

Chapter 8

Environmental Conservation and Sustainable Development

Wasswa Shafik

 <http://orcid.org/0000-0002-9320-3186>

*School of Digital Science, Universiti Brunei Darussalam, Brunei & Digital
Circularity and Resilience Laboratory (DCRLab), Kampala, Uganda*

ABSTRACT

Despite technological advances, natural and human-induced radiation impacts biodiversity, ecology, and sustainable development. This study investigates radiation's varied effects on ecosystems, emphasizing how direct and indirect factors disrupt trophic linkages and population dynamics in underwater species. It reveals diverse environmental consequences, including genetic alterations and ecosystem disruptions. The study assesses the efficacy and feasibility of mitigation and remediation strategies, highlighting the need for stronger, more comprehensive policies to protect ecosystems and promote radiation-free growth. It underscores the importance of evaluating and improving policies to enhance environmental stewardship. Real-world ecological and biodiversity disasters related to radiation are depicted, providing responses and insights. Finally, the study suggests ways that more research can be done in the future to fill in the gaps in our knowledge and help us understand and deal with this important problem in a way that is more in line with digital inclusion and globalization.

DOI: 10.4018/979-8-3693-4111-7.ch008

INTRODUCTION

Environmental management and sustainable development (EMDS), which play a vital role in the health and functioning of the earth's seas, face ongoing risks from various stressors. One such stressor (a chemical or biological agent, environmental condition, external stimulus, or an event seen as causing stress to an organism) is radiation contamination, a multifaceted and formidable problem (Banerjee et al., 2023). The extensive and varied ecosystems, encompassing coral reefs, kelp forests, and open ocean settings, offer substantial support to a wide range of environmental organisms. These ecosystems are crucial in providing sustenance, livelihoods, and environmental benefits to billions of individuals globally (Manakane et al., 2023). The health and sustainability of these ecosystems have environmental value and worldwide economic and cultural importance.

The transboundary character of radiation pollution in ecology and biodiversity underscores the importance of international collaboration and governance. The natural environment exhibits a lack of adherence to political boundaries, enabling radiation contamination to exert extensive consequences that transcend the confines of individual nations (Olabi et al., 2023). The imperative for collaborative endeavors among nations, regulatory entities, and international institutions, for example, the International Atomic Energy Agency¹ (IAEA) and the United Nations², is of utmost significance. To ensure efficient monitoring and mitigation of radiation-related accidents and their environmental and societal effects, it is imperative to establish standardized processes, facilitate data sharing, and establish robust agreements (Bayarsaikhan et al., 2023).

IAEA provides critical data and analysis to member states, helping to identify and address radiation contamination and its potential impacts on health and the environment. It also develops and promotes international safety standards and guidelines for the safe use of nuclear technology and the management of radioactive waste (Giammarile et al., 2024). IAEA offers technical support, expertise, and resources to affected countries, facilitating rapid and effective mitigation of radiation hazards, training and capacity-building programs for member states to enhance their abilities to manage radiation risks, and largely fosters collaboration among scientific communities to advance understanding and innovation in radiation safety (Fontanet Soler et al., 2024). Moreover, the UN develops and advocates for international policies and frameworks that address radiation contamination and its effects. Through its various agencies, the UN promotes the implementation of these policies at the national and international levels.

The UN also facilitates coordination and collaboration among member states, international organizations, and other stakeholders to address radiation contamination, fostering public health initiatives. The UN Environment Programme³

34 more pages are available in the full version of this document, which may be purchased using the "Add to Cart" button on the publisher's webpage: www.igi-global.com/chapter/environmental-conservation-and-sustainable-development/352803

Related Content

Information Technology Adoption Dynamics for SMEs in the Manufacturing Sector of Namibia

Neeta Baporikarand Sigried Shikokola (2020). *International Journal of ICT Research in Africa and the Middle East* (pp. 60-77).

www.irma-international.org/article/information-technology-adoption-dynamics-for-smes-in-the-manufacturing-sector-of-namibia/259888

Digital Talent Development Cooperation Between China and Africa

Wei Ye (2024). *Examining the Rapid Advance of Digital Technology in Africa* (pp. 26-44).

www.irma-international.org/chapter/digital-talent-development-cooperation-between-china-and-africa/339980

Preservation of Cultural Identity and Preventing Piracy of Indigenous Intellectual Properties

John S.C. Afele (2003). *Digital Bridges: Developing Countries in the Knowledge Economy* (pp. 190-197).

www.irma-international.org/chapter/preservation-cultural-identity-preventing-piracy/8345

Ex-Post Stakeholder Analysis of National ICT Policy Subsystem: Case of Malawi

Frank Makozaand Wallace Chigona (2016). *International Journal of ICT Research in Africa and the Middle East* (pp. 15-34).

www.irma-international.org/article/ex-post-stakeholder-analysis-of-national-ict-policy-subsystem/163393

Sustainable Developments in Nano-Fluid Synthesis for Various Industrial Applications

G. Nixon Samuel Vijayakumar, Vinay Kumar Domakonda, Shaik Farooq, B. Senthil Kumar, N. Pradeepand Sampath Boopathi (2024). *Adoption and Use of Technology Tools and Services by Economically Disadvantaged Communities: Implications for Growth and Sustainability* (pp. 48-81).

www.irma-international.org/chapter/sustainable-developments-in-nano-fluid-synthesis-for-various-industrial-applications/333733