Chapter 2
Utilizing Technology for Sustainable Resource Management Solutions:
Economics and Finance

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ABSTRACT

This review examines technological, economic, and financial aspects of sustainable resource management. It explores historical development, contemporary technology, economic effects, cost-benefit analyses, market dynamics, and sustainable behaviour incentives. The research also examines economic models of government economic sustainability initiatives. Investment choices, risk assessment, and finance sources for sustainable resource management are reviewed. Field applications of IoT, AI, and machine learning are also covered. It discusses ethics, socioeconomics, and adoption issues. The study found that IoT, AI, blockchain, and robots enable resource management monitoring and optimisation. However, financial, ethical, and social issues persist. Integrating economic and financial views promotes collaborative, inclusive, and internationally coordinated initiatives, according to the research.

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INTRODUCTION

As pollution and natural resource depletion affect people worldwide, sustainable resource management is vital (Jahanger et al., 2022). This fast-growing, technology-driven region has emerged due to the complex interaction between economic and financial strategies (Alshurideh et al., 2022). Sustainable resource management is about meeting present requirements without jeopardising future ones. Use and conservation of natural resources are required (Zakari et al., 2022). Ecological, social, and economic factors must be considered to solve this complex issue. Increasing resource depletion and climate change make this issue urgent and vital, requiring new solutions from economics, technology, and finance (Bag et al., 2021).

Poor resource management harms ecosystems, economies, and societies (Razzaq et al., 2021). Environmental degradation and inefficient resource use cause species extinction, global warming, and increased natural disasters (Khan et al., 2021). These issues worsen socioeconomic inequality and endanger marginalised populations (Ahmed et al., 2021). Sustainable resource management is a unique method that balances human demands with environmental protection for resilience and long-term success. Sustainable resource management is changing fast with technology. Real-time data from IoT devices and sensors provides ecosystem and supply chain insights. Machine learning algorithms improve resource allocation and waste avoidance, boosting prediction abilities (Opatha, 2018). Information technology, artificial intelligence, and data analytics provide resource monitoring, modelling, and optimisation (Karmaker et al., 2021). By tracing all resource transactions, blockchain technology promotes ethical sourcing and accountability. SRM addresses micro and macroeconomic difficulties (Kouhizadeh et al., 2021). Depletion affects microeconomic production costs and supply networks for natural resource-dependent companies. The global economy's dependence on environmental well-being is shown by climate change-related economic impacts (Nandi et al., 2021). The economic lens helps decision-makers weigh the costs and advantages of sustainable practices to balance environmental and economic goals.

Financial factors drive sustainable resource management (Ahmed et al., 2021). Scalability of sustainable initiatives depends on financial structures, such as public-private partnerships or impact investments. Due to their financial resources and experience, financial institutions are vital to sustainable projects (Opatha, 2018). Green technology and eco-friendly initiatives are developing as investors realise the financial potential of sustainability (Kouhizadeh et al., 2021). When technology, economics, and finance meet, new techniques develop. As technology reduces costs, sustainable practices are becoming more profitable (Nandi et al., 2021). Technology-generated data is used in economic models to evaluate resource management decisions (Zhang et al., 2021). Financial tools and market incentives promote sustainable behaviours and link economic interests with environmental goals (Nandi et al., 2021). The three components work together to provide a complete approach to sustainable resource management. Examining the technological aspects of sustainable resource management from an economic and financial perspective is the goal of this chapter.