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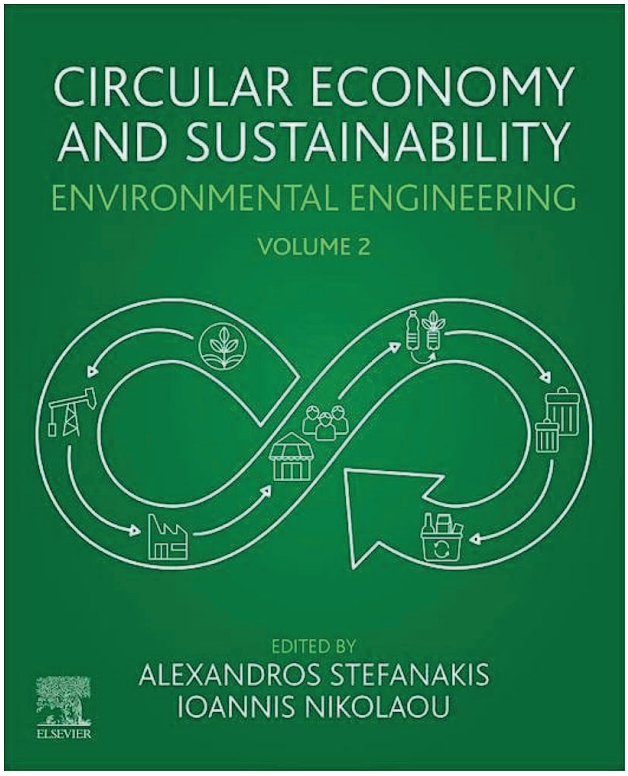
BOOKS REVIEW 2



CIRCULAR ECONOMY AND SUSTAINABILITY: MANAGEMENT AND POLICY (VOLUME 2)

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This is a second volume of the two books, which are dedicated for the analysis of the concept and application of the principles of circular economy as an integral part of the sustainable development. This second volume is devoted to the engineering and technology aspects of these processes. The book presents a variety of perspectives, explores diverse solutions and concepts related to the implementation of circular economy and sustainability. The book contains information that can be useful for a broad range of professionals, scholars and decision makers by helping them to better understand the meaning of the circular economy concept.

The book comprises twenty-nine chapters, ten of which are focusing on wastewater treatment and sludge related issues, eight chapters are dedicated for nature-based solutions and constructed wetlands, two chapters are describing circular economy in the building sector, and the remaining nine chapters cover various sectors of industry, materials and waste management. Naturally, several of the chapters can be assigned to several of these areas as the studied subjects are closely related and interlinked.

Circular economy approach in the wastewater sector is highly relevant from recycling of water and nutrients perspective, as well as for ensuring food and water safety. Several circular and sustainable wastewater treatment systems and use of sludge are discussed providing examples based on cases in Greece (Chapter 4), India (Chapters 2 and 6), Brazil (Chapter 9), several Latin American countries (Chapter 2) and Iraq (Chapter 11). Although it is generally agreed that nutrient recycling is particularly important when managing wastewater treatment sludge, the risks of introducing unwanted and harmful substances to soil and food chain are also highlighted (e.g. Chapters 3, 7, 8, 10), suggesting the need for further research and technology development in this area.

A study on nature-based wastewater treatment and reuse in a compact space on one of college campuses in India (Chapter 6) shows that substantial savings of tap water can be made with relatively simple solutions, at the same time eliminating most of pollution from household. Placement of the installations close to housing did not even decrease the social acceptance of such compact, close-to-home wastewater treatment solutions.

A concept of the Wastewater Garden (WWG) is introduced in Chapter 11 as a type of nature-based wastewater treatment system resembling a constructed wetland, which not only has a function of cleaning the wastewater, but also ads an aesthetic value to the area by resembling ornamental gardens and contributing to history and culture.

Chapter 14 on the contribution of green roofs to the nature-based solutions for socially and environmentally responsible new cities provides a comprehensive review of such solutions with an example of a case study. Despite being highlighted as best management practices thanks to multiple social, environmental, and economic benefits, such solutions are still lacking support from financial incentives, regulations and public awareness.

The importance of constructed wetlands in wastewater and leachate treatment has been acknowledged for decades. Chapters 12, 13, 15, 16 and 17 highlight this technology from various angles, including circular economy, challenges that still need to be overcome in African countries, issues related with the presence of pharmaceuticals in wastewater, and recovery of electrical energy from the constructed wetlands by microbial fuel cells. Furthermore, the importance of preserving natural wetlands is discussed in the context of Philippines in Chapter 18, which also highlights the necessity of environmental education when

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striving towards the implementation of the sustainable development goals.

Chapter 19 highlights how companies operating in the building industry design a circular business model (CBM), and how collaborative relationships across the building supply chain enforce their CBM. The study presents a step-by-step research framework, which highlights the phases and procedures that companies operating in the building sector can follow and implement for a successful CBM and analyses four Italian companies considered as circular economy (CE) champions from theoretical, management and policy-making points of view.

A study that explores how actors in Dutch construction supply chains deal with the deep uncertainty and dynamic complexity of decision-making in transitioning toward more mature closed-loop supply chains (CLSC) management is presented in Chapter 20.

Strategies for the global manufacturing of circular materials are suggested in Chapter 21. This chapter is both, a critical review and an opinion on the challenges related with circular materials. It presents the barriers and enablers of circular design, describes various current classes of material resources and highlight flaws in their designs preventing recycling, as well as discusses strategic routes to favor a circular design approach. Encouragement of recycling and repurposing, including development of advanced separation techniques, as well as redesigning materials by manufacturers are suggested as the main pathways that can enable the development of circular materials.

Chapter 22 guides the reader towards the area of Waste to energy and presents some examples of how energy issues and, in particular, the reduction of energy demand, have become the center of urban interventions in neighborhoods of Madrid periphery, as well as how it can be seen as the long-term strategy for energy refurbishment in the Spanish building sector.

Chapter 23 leads the reader to the area of circular economy models in the mining sector. This chapter describes how a circular analysis model can be applied to optimize mining operations and concludes that circular economy principles can provide an ideal framework for decoupling economic growth from environmental degradation caused by surface mining.

Chapter 24 describes the use of microorganisms in bioleaching as a tool that can be adapted to waste management sector for the recovery of various elements from MSWI ashes, by this contributing to the circular economy.

A review of circular economy initiatives implemented across Asia with emphasis on the eastern and southeastern parts is described in Chapter 25, which focuses on the circular economy applications in the forestry sector across the world, and the science-based initiatives undertaken for the benefit of the industry.

Extraction of nutrients from wastewater originating from corn-ethanol industry are described in Chapter 26. In this study, the utilization of a thermodynamic model to enhance struvite precipitation along with its operational function for P and N removal from wastewater was investigated, achieving the removal efficiency of phosphate and ammonium as high as 97% and 87%, respectively. Authors expect that this process can enhance an economic interest for nutrient recovery as struvite to be used as a high purity fertilizer.

Chapter 27 is dedicated to food processing waste as a potential source of adsorbent to be used for toxicant removal from water. Technical solutions and policy drivers have been identified as two key factors that could promote the application of food processing waste as adsorbents in wastewater treatment. Such solution is suggested as a promising green technology bringing benefits for society, businesses and the environment.

Chapter 28 complements the book with a study on sustainable circular economy design in 2050 for water and food security using renewable energy. It describes five technologies that are based on distinct circular economy processes to reach the goal of sustainability. Technological achievements in 2022 and beyond are suggested to set the path for innovations in technologies in 2050.

And finally, Chapter 29 concludes this book with a study on issues, challenges, and solutions moving towards circular economy in e-waste management sector in India. The chapter includes two case studies that highlight the benchmark practices both in the informal and formal sector. Security threats evolving from e-waste have been raised as a major issue in this field.

Overall, the book presents a versatile view of circular economy and how it is applied in various fields and disciplines to reach the goals of the sustainable development.

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