Introduction to Circular Economy

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The concept of a Circular Economy has emerged as a transformative framework for addressing the environmental, economic, and social challenges of the 21st century. As the global population continues to grow and natural resources become increasingly scarce, the limitations of the traditional linear economy — characterized by a "take, make, dispose" model — have become evident. The linear approach has not only strained ecological systems but also led to significant economic inefficiencies and social inequalities. In response to these challenges, the circular economy presents a regenerative and restorative model designed to minimize waste, optimize resource use, and create sustainable economic opportunities. The Bharatiya Gyana Parampara i.e., Indian Knowledge System as it commonly known to all of us now is also briefly described in this book as the concept of a circular economy was inherently practiced in ancient India, deeply rooted in the principles of sustainability, resource efficiency, and minimal waste generation. Traditional Indian society emphasized harmony with nature through practices such as reuse, recycling, and repurposing of materials. Agricultural systems followed natural cycles, using organic compost and crop rotation to maintain soil fertility. Handicrafts and textiles were produced using renewable resources like cotton, wool, and natural dyes, with worn-out materials often repurposed into quilts, ropes, or cleaning cloths. Metal and wooden tools were repaired or melted down for reuse, reflecting a resource-conserving mindset. Water harvesting systems, such as stepwells and reservoirs, ensured sustainable water management. The philosophical and spiritual underpinnings of Indian culture, including concepts from Vedic and Buddhist traditions, advocated for minimalism and mindful consumption, discouraging excess and waste. This self-sufficient and regenerative approach to production and consumption closely aligns with modern circular economy principles, highlighting the relevance of ancient Indian wisdom in addressing contemporary sustainability challenges. This book, Introduction to Circular Economy, aims to provide a comprehensive foundation for understanding the principles, strategies, and practical applications of the circular economy. It explores how circular thinking can reshape industries, redefine business models, and drive innovation in the face of growing environmental and economic pressures. The circular economy encourages a shift from the consumption of finite

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Author

Dr. Mukul Chandra Bora has an extensive academic background in civil engineering, reflecting his commitment to scholarly excellence. He earned a Ph.D. in Civil Engineering from the Indian Institute of Technology (TIT) Guwahati in 2011, following an M. Tech in Geotechnical Engineering from IIT Kharagpur in 2000. His journey in the field began with aB.E.in Civil Engineering from Dibrugarh University in 1988. With decades of professional experience, Dr. Bora has held key academic and administrative roles. Since August 2012, he has been the Director of the Institute of Engineering & Technology, Dibrugarh University. Previously, he served as State Project Administrator for the Northeast State Project Implementation Unit (2017-2021) of TEQIP - III project of Ministry of Education, Government of India. His teaching career includes a tenure at Technical Education Department of Government of Assam together with professional experience as a Quantity Surveyor at PBS Limited, Guwahati (199l-1995) and a Site Engineer at M.L. Dalmiya & Co. Ltd., Kolkata (l989-1991). Dr. Bora's research and consultancy work focus on ground improvement techniques, geosynthetics, rainfall impact on groundwater, non-biodegradable waste in construction, and slope stabilization. He has contributed significantly to materials characterization and geotechnical investigations for major infrastructure projects, including power plants and industrial facilities. He is at fellow of the Institution of Engineers (India), a Senior Member of the Asia Pacific Chemical, Biological and Environmental Engineering Society (Hong Kong), and a Member of the International Association for Life Cycle Civil Engineering (Italy). Additionally, he serves as a reviewer for reputed journals, including Springer's Journal of the Institution of Engineers (India), Series A. Beyond civil engineering, Dr. Bora has made remarkable contributions to the Bhartiya Knowledge System (BKS), which encompasses philosophy, science, mathematics, astronomy, Ayurveda, linguistics, and traditional Indian technologies. Rooted in ancient texts like the Vedas and Upanishads, BKS has profoundly influenced Indian civilization. Dr. Bora is dedicated to reviving and integrating traditional Indian knowledge with modern research and education, bridging the gap between ancient wisdom and contemporary advancements. His book, ''Foundations of Bhartiya Knowledge System" (2023), published by Khanna Publishing House, delves into the fundamental principles of India's knowledge systems, promoting their relevance in the modem era. Through his work, Dr. Bora continues to advance both civil engineering and India's intellectual heritage, fostering a deeper appreciation of Bhartiya wisdom among scholars and students.

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