

15th IconSWM-CE & IPLA GF 2025



Zero Waste and Circular Economy 2025

Editor-in-Chief

Prof. Sadhan Kumar Ghosh

Editors:

**Prof. Narpinder Singh,
Dr. Gopalji, Dr Manavendra Singh,
Dr. Rachn Karmakar, Dr Sutripta Sarkar,
Dr Ipsita Saha, Dr Debasis Mitra, Prof Rahul Baidya
Assistant to Editor-in-Chief: Mr. Dineshkumar M**

Abstract Book

**Proceedings of the 15th IconSWM-CE & IPLA Global Forum 2025
15th International Conference on Sustainable Waste Management &
Circular Economy and IPLA Global Forum 2025**

**Graphic Era (Deemed to be University), Dehradun, India
International Society of Waste Management, Air and Water (ISWMAW)
International Partnership for Expanding Waste Management Services of Local Authorities
IPLA (A SDG Partnership)**

October 29 - November 01, 2025, India

Zero Waste and Circular Economy 2025

Editor-in-Chief:

Prof. Sadhan Kumar Ghosh,

Editors:

Prof. Narpinder Singh,

Dr Gopalji, Dr Manavendra Singh,

Dr. Rachn Karmakar, Dr Sutripta Sarkar,

Dr Ipsita Saha, Dr Debasis Mitra, Prof Rahul Baidya

Assistant to Editor-in-Chief: Dineshkumar M

Proceedings of the abstracts 15th IconSWM-CE & IPLA Global Forum 2025

Graphic Era (Deemed to be University), Dehradun
International Society of Waste Management, Air and Water
(ISWMAW)
IPLA (A SDG Partnership)

Year of Publication: 2025

ISBN: 978-93-48697-31-8 (e-copy)
ISBN: 978-93-48697-87-5 (Paper Back)

Zero Waste and Circular Economy 2025

Chief Editor: Prof. Sadhan Kumar Ghosh

Editors: Prof. Narpinder Singh, Dr Gopalji, Dr Manavendra Singh, Dr. Rachn Karmakar, Dr Sutriptta Sarkar, Dr Ipsita Saha, Dr Debasis Mitra, Prof Rahul Baidya
Assistant to Editor-in-Chief: Dineshkumar M



International Society of Waste Management, Air and Water (ISWMAW), India
Kolkata 700041, iswmaw@gmail.com, www.iswmaw.com



Graphic Era (deemed to be) University,
Dehradun, Uttarakhand, India



International Partnership for Expanding Waste Management Services of Local Authorities (IPLA), Japan, Global Secretariate at ISWMAW, India



SINTEF, Oslo, Norway



Catch Them young; Zero Waste & Circular Economy in Campus

CRIC

CRIC [Consortium of Researchers in International Collaboration]

The book's publisher: International Society of Waste Management, Air and Water (ISWMAW), 2025

The book's printer: Dutta Copier, Jadavpur, Kolkata 700032

The book's typesetter: Ribboning Solutions, R C Thakurani, 284 M G Road Kolkata 700104,

The book's publication date : 29.10.2025

Copyright 2024 : # The Editor(s) (if applicable) and The Author(s), under exclusive license to International Society of Waste Management, Air and Water (ISWMAW), 2024

1st Edition,

ISBN: 978-93-48697-31-8 (eBook)

ISBN: 978-93-48697-87-5 (Paper Back)

This work is subject to copyright. All rights are solely and exclusively with the Publisher, whether the whole or part of the material is concerned, specifically the rights of translation, reprinting, reuse of illustrations, recitation, broadcasting, reproduction on microfilms or in any other physical way, and transmission or information storage and retrieval, electronic adaptation, computer software, or by similar or dissimilar methodology now known or hereafter developed. The use of general descriptive names, registered names, trademarks, service marks, etc. in this publication does not imply, even in the absence of a specific statement, that such names are exempt from the relevant protective laws and regulations and therefore free for general use. The publisher, the authors, and the editors are safe to assume that the advice and information in this book are believed to be true and accurate at the date of publication. Neither the publisher nor the authors or the editors give a warranty, expressed or implied, with respect to the material contained herein or for any errors or omissions that may have been made. The publisher remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.

This International Society of Waste Management, Air and Water (ISWMAW) .

The registered office address is: 29/6, Jadunath Ukil Road, Kolkata 700041, India

For communication send mail to: iswmaw@gmail.com; iconswm.ce@iswmaw.com, iconswm2025@geu.ac.in;

Price: INR 500/- (Soft Copy / Paper Back);

ISBN: 978-93-48697-31-8 (eBook)

ISBN: 978-93-48697-87-5 (Paper Back)

Editorial Board



Editor-in-Chief, Prof. Sadhan Kumar Ghosh



Prof. Narpinder Singh,
VC, Graphic Era (Deemed to be University), India



Dr. Kare H Karstensen,
Ch. Scientist, SINTEF, Norway



Mr. M. Veerachary,
President, JUWWMG, India



Dr. Cristian Engelsen,
Ch. Scientist, SINTEF, Norway



Prof. Ronald L. Mersky,
Widener University, USA



Dr. V. Maryev,
Russian Federation



Mr. Ulhas V Parlikar,
Global Consultant, India



Mr. M. Divi Rao,
Ex-Director, Divis Laboratory, India



Mr. U. Tripathy, Former Secretary, MNRE, Gol, India



Dr. Premakumara Jagath,
Dickella Gamaralalage, IGES, Japan



Mr. Palash Saha,
SINTEF, Norway



Dr. Gopal Ji,
Graphic Era (Deemed to be University), India



Dr. M. K. Singh,
Graphic Era (Deemed to be University), India



Dr. N. Dzebisashvili,
Georgian Technical University, Georgia



Dr. Catherine DR. Pueyo,
TAU, Philippines



Dr. Ipsita Saha,
Guru Nanak Institute of Technology, India



Dr. BUI Thi Thanh Huong, VNU, Hanoi



Prof. Rahul Baidya,
Head, Sustainability; IEM, India



Dr. Sutripta Sarkar,
Barrackpore Rastraguru Surendranath College, India



Dr. Debasis Mitra,
Graphic Era (Deemed to be University), India



Mr. Rachan Karmakar,
Graphic Era (Deemed to be University), India



Mr. Dineshkumar M,
Assistant to the Editor-in-Chief, India

IconSWM-CE Excellence Award 2025 for Co-processing

Award Listing	Diamond Award	Platinum Award	Gold Award
Category 1: TSR % in 2024	Adani- Ambujanagar Cement Plant (Kiln 1), Gujarat	JSW- Nandyal Cement Plant, Andhra Pradesh	JSW- Shiva Cement Plant, Odisha
Category 2: TSR % in 2020-2024 (5 years)	Nuvoco Vistas- Chittor Cement Plant, Rajasthan	MP Birla- Chanderia Cement Plant, Rajasthan	--
Category 3: NRPW utilized in 2024 (tonnes)	Adani- ACC Chanda Cement Plant, Maharashtra	JSW- Nandyal Cement Plant, Andhra Pradesh	Nu Vista (Nuvoco)- Risdha Cement Plant, Chhattisgarh
Category 4: NRPW utilized in 2020-2024 (5 years) (tonnes)	MP Birla- Chanderia Cement Plant, Rajasthan	--	--
Category 5: AR utilized in 2024 (tonnes)	Adani- Marwar Mundwa Cement Plant, Rajasthan	Nu Vista (Nuvoco)- Risdha Cement Plant, Chhattisgarh	JSW- Shiva Cement Plant, Odisha

Individual Awards:

IconSWM-CE Excellence Leadership Award 2025 for Co-processing	
Mr. Uma Shankar Chaudhary	Ambujanagar Cement Works, Somnath, Gujarat
Mr. Niraj Acharya	Nuvoco Vista – Chittor Cement Plant, Chittorgarh, Rajasthan
Mr. Ravish Galav	Nu-vista Ltd. – Risdha Cement Plant, Baloda Bazar, Chhattisgarh
Mr. Sajeesh Kurup	JSW Cement Ltd., Nandyal Plant, Nandyal, Andhra Pradesh
Mr. Chetan Rawal	Marwar Cement Works, Ambuja Cement, Marwar Mundwa, Rajasthan
Mr. Satyanarayan Digambrathi	Chanda Cement Works, ACC Limited, Chandrapur, Maharashtra
Mr. Deepak Jasuja	Chanderia Cement Plant, Rajasthan
Mr. Anik Kumar Mishra	Shiva Cement Plant, Sundargarh, Odisha

Individual Category Award	Awardees
Award of Appreciation for the Significant Support to ISWMAW Initiatives	Dr. Christian John Engelsen
Award of Appreciation for his outstanding activities as the Vice President, ISWMAW	Prof. Amit Kumar Ghosh
Award of Appreciation for the Significant Support to ISWMAW Initiatives	Dr. Mitali Ghosh Bakshi
Award of Appreciation for his continued support in the IconSWM-CE Excellence Award Scheme for Coprocessing	Mr. Palash Kumar Saha

Contents

Editorial Board	iii
Award List	iv
Contents	v – xxvii
Special Issue 4-1 and 4- 2: 15th IconSWM-CE & IPLA Global Forum 2025;	xxix
Core Group Members	xxix
Chief Patron	xxix
Patron	xxix
Chairmen	xxix
Immediate Past Chairmen 2024	xxix
Convenor	xxix
Joint Convenors	xxix
Organizing Secretaries	xxix
Co-Chairmen 15th IconSWM-CE & IPLA Global Forum 2025	xxix
Vice-Chairmen 15th IconSWM-CE & IPLA Global Forum 2025	xxix
Chairman's International Research Secretariat at ISWMAW	xxix
Local Organizing Committee & Working Group at GEU, Dehradun	xxx
National Organizing Committee	xxx
15th IconSWM-CE & IPLA Global Forum 2025 International Scientific Committee (ISC)	xxx
15th IconSWM-CE & IPLA Global Forum 2025 - Country Specific Working Group (CSWG) Members	xxx-xxxiv
Editorial	xxxv-xxxix
Announcement of the Journal Publication by ISWMAW	xl
Journal SWTM : Annual Subscription Rates from January 2025	xlii
Circular Economy by School Children - the Next Generation	xlii-xlviii
The mission “Catch Them Young: Zero Waste & Circular Economy in Campus” in Nepal, June 2025.	xlix

Sl. No.	Title and Author	Page No.
I.	CIRCULAR ECONOMY ADOPTION IN SCHOOL CAMPUS: EDUCATION, BEHAVIORAL DIMENSIONS AND IMPLEMENTATION	1 – 12
01	Comparative Analysis of integrating EPR Communication into K-12 Education in Vietnam and India BUI Thi Thanh Huong¹, NGUYEN Ngoc Tram Anh², R S S Nehru³, NGUYEN Thi Thu Ha⁴, Sadhan Kumar Ghosh⁵ ¹ School of Interdisciplinary Sciences & Arts, Vietnam National University, Hanoi ² Monash University, Australia ³ Department of Education, Sikkim University, Gangtok, India	2
02	Innovative Solutions to Campus Waste Management Practices: A Project-Based Approach in High School Rizalie K. Capangpangan¹, Sadhan Kumar Ghosh², Setiawan¹ ¹ Iligan City National High School, Purok 9, Kiwalan, Philippines; ² Sustainable Development & Circular Economy Research Centre, International Society of Waste Management, Air and Water, & Ex-Jadavpur University, Kolkata, India	2
03	Current Status of Human Resource Training Management at Vocational Colleges in Vietnam Toward the Development of Smart Agriculture Pham Cuong¹, Hoang Thi Minh Hue² ¹ VNU- University of Education, Hanoi College for Electro-Mechanics ² Phuong Dong University	3
04	An Integrated Cipo–Logic Model Framework for Managing Vocational Training in Smart Agriculture-Oriented Education Hoang Thi Minh Hue¹, Pham Cuong², Tran Thi Lua¹, Nguyen Trong Dang¹, Dinh Quang Truong¹ ¹ Phuong Dong University; ² VNU- University of Education; Hanoi College for Electro-Mechanics	3
05	Environmental Education in Sustainable Development Through Technology-Enhanced Teaching Methods Nguyen Thi Nhu Hue¹, Nguyen Thanh Trieu² ¹ University of Languages and International Studies, Ha Noi, 100000, Vietnam ² FPT University, Can Tho City, 90000, Vietnam	4

Sl. No.	Title and Author	Page No.
06	People’s Perception on Material Transition is key for Sustainable Waste Management Debendra Chandra Baruah School of Multidisciplinary Studies, Tezpur University, India	4
07	Nurturing and Embedding Zero-Waste and Circular Economy Concepts and Practices in Kenya’s Basic Education Sadhan K. Ghosh^{1,5}, Charles N. Kariuki², Edwin A. Juma³, Peter K. Musymi³, Chrispus Wandera⁴; Caren E. Amoiti², Michael K. Koech^{1,4} ¹ International Society of Waste Management, Air and Water (ISWMAW), India ² Department of Humanities, Catholic University of Eastern Africa, Nairobi, Kenya ³ Department of Humanities, Karatina University, Nyeri, Kenya ⁴ Kenyatta University, Nairobi, Kenya ⁵ Jadavpur University, Kolkata, India	5
08	Evaluation Of Environmental Education Policy in Vietnam from 2005 to Present Nguyen Anh Tuan¹, Ngo Quang Son², Hoang Thi Minh Hue³, Tran Van Tuan¹, Do Thi Nhu Quynh¹ ¹ University of Education, Vietnam National University, Hanoi, Vietnam ² Trung Vuong University, Hanoi, Vietnam ³ Phuong Dong University, Hanoi, Vietnam	5
09	A Study on Agricultural Waste Management and its Role in Strengthening Marketing Competitiveness of Marginal Farmers in Uttarakhand Gagan Deep Singh Kumaun University, Nainital (Uttarakhand), India	6
10	New certification on Circular Economy Bhavya Mangla Designation and affiliation (Organisation): Automotive Head, India (DNV Business Assurance India Pvt Ltd)	6
11	Waste Management for Schools through Adiwiyata Implementation and Flagship International Initiative CTY: ZW & CEC Warmade Wanhi, IDAA¹, Ni Made Utami Dwipayanti², Bimastyaji Surya Ramadan³, Nurani Ikhlas³, Rulli Pratiwi Setiawan¹, Sadhan Kumar Ghosh^{4,5} ¹ Institut Teknologi Sepuluh Nopember Surabaya, Indonesia ² Udayana University, Indonesia ³ Diponegoro University, Indonesia ⁴ International Society of Waste Management, Air and Water, India ⁵ Jadavpur University, Kolkata, India	7
12	Solid Waste Management Knowledge and Practices in Culturally Diverse Communities in Nigeria Adaeze U.P. Ejike-Alieji¹, Chidi T. Nzeadibe² ¹ Department of Geography, Alex Ekwueme Federal University Ndufu-Alike, Ebonyi State ² Department of Geography and Environmental Sustainability, University of Nigeria, Nsukka, Enugu State	7
13	Assessing the Impacts of the Scientific Research Support Policy n Students’ Research Activities in Thuongmai University Nguyen Anh Tuan¹, Ngo Quang Son², Tran Van Tuan¹, Nguyen Thi Nhung¹, Do Thi Nhu Quynh¹, Dao Thuy Linh¹, Hoang Thi Minh Hue³ ¹ University of Education, Vietnam National University, Hanoi, Vietnam ² Trung Vuong University, 3 Phuong Dong University, Vietnam ³	8
14	Comparative Analysis of Progress of Swachh Bharat Mission – Way Forward for Attaining the Sustainable Development Goals in India Chowdhury S R¹, Modak Nipu², Ghosh S K³ ¹ BAE&S, Dept Planning and Statistics, Govt. of West Bengal and Researcher, Jadavpur University, India ² Mechanical Engineering Department, Jadavpur University, Kolkata, India ³ FET & Retd Professor and Formerly Head of Mechanical Engineering Dept, Jadavpur University, Kolkata, India	8
15	The Pyropolitics of Plastic: An Assessment of Converging Threats to Environmental Security Sibusiso Ngxingo¹, Roman Tandlich^{1,2} ¹ Disaster Management and Ethics Research Group (DMERG), Faculty of Pharmacy, Rhodes University, Artillery Road, P.O. Box 94, Makhanda 6140, South Africa; ² Disaster Management Programme, Stenden South Africa, 1 Grand Street, Port Alfred 6170, South Africa	9

Sl. No.	Title and Author	Page No.
16	Level of Contamination of the Terrestrial Food Chain by Per and Polyfluoroalkyl Substances (PFAS) And Related Human Health Risks Francesco DiMaria Italy	9
17	The Role of Indigenous Knowledge in Combating Plastic Pollution Paramita Bhattacharjee	10
18	Integrative Environmental Communication Based on the "Si Cantik Cerdas" Waste Bank Bani Eka Dartiningsih ¹ , Dinara Maya Julijanti ¹ , Misbah Zulfa Elisabet ² ¹ Universitas Trunojoyo Madura, Bangkalan, indonesia ² Universitas Islam Negeri WaliSongo, Semarang, Indonesia	10
19	Religion and Environmental Restoration: An Interfaith Perspective to Address the Ecological Crisis Endang Supriadi Faculty of Social and Political Sciences, State Islamic University Walisongo Semarang	11
20	Community Participation in Developing a Circular Economy through Household Waste Management in Aceh Arfriani Maifizar, Misbah Zulfa Elizabeth Faculty of Social and Political Science, State Islamic University Walisongo, Indonesia	11
21	Enduring Amid Crisis: The Ethno-Economic Resilience of Women Pottery Artisans in the Laboora Indigenous Community Asliah Zainal, Anita Rezki Institut Agama Islam Negeri Kendari, Indonesia	12
II.	CIRCULAR ECONOMY, WASTE MANAGEMENT & POLICY	13-37
01	Integrating Fuzzy Analytic Hierarchy Process (Fuzzy-AHP) and The Electre Method to Evaluate Factors Influencing Plastic Waste Reduction in Tourism for Sustainable Development in Vietnam Huong Quynh Thi Nguyen Faculty of Hospitality and Tourism, Thuongmai University, Mai Dich Ward, Cau Giay District, Hanoi City, Vietnam	14
02	Analysis of waste recovery practices in Togo: identification of sectors with economic benefits Nitale M Balikine Krou ¹ , Ogouvidé Akpaki ¹ , Gnon Baba ² ¹ University of Kara, Togo ² University of Lomé, Togo	14
03	Waste Governance, Circular Economy and Waste Management Policies in the Nairobi City County Government, Kenya Michael K. Koech, Kaburu J. Munene, Mary K. Kinoti, Magdalene Kagendo Circular Economy and Research Specialist	15
04	Circular Economy in the Latin American Mining sector Gabriela Munoz-Melendez El Colegio de la Frontera Norte	15
05	Plastic Waste Governance and the Circular Economy: A Study of Climate Change Policies in the Global South Oluwamurewa A. Newo, Anthony M. Oladoyin, Ugochukwu D. Abasilim Covenant University, Ota, Ogun State, Nigeria	16
06	Green Growth and Plastic Waste Management in Lagos, Nigeria Newo, Oluwamurewa ¹ , Oladoyin, Anthony ² , Eneanya, Augustine ² ¹ Department of Political Science and International Relations, Covenant University, Ota, Ogun State, Nigeria ² Covenant University, Ota, Ogun State, Nigeria	16
07	Reimagining Carbon: Building a Circular Carbon Economy for a Sustainable Future B. Anupam	17

Sl. No.	Title and Author	Page No.
08	A Multi-Criteria Evaluation for Strategic Site Selection for Decentralized Waste Treatment Units in the Joshimath–Badrinath Corridor (Western Himalayan Region) Deepika Dimri¹, Mayank Singh Bhakuni¹ ¹ Himalaayn Women Awareness and Livelihood (HIMWAL) Society ² Dayanand Sagar University, Bangalore, India	17
09	Zero Waste and Circular Economy Integration in Biogas Production: A Pathway to Sustainable Resource Management in India Hemant Kumar. K. J¹, Jyothilakshmi. R², B. Sadashive Gowda³, Sadhan Kumar Ghosh⁴ ¹ Dept. of Mechanical Engineering, Vidyavardhaka College of Engineering, Mysore; India ² Dept. of Mechanical Engineering, M. S. Ramaiah Institute of Technology, Bangalore; India ³ Principal, Vidyavardhaka College of Engineering, Mysore; India ⁴ Dept. of Mechanical Engineering, Jadavpur University, India	18
10	From Closure to Circularity: Understanding and Mitigating Long-Term Environmental Threats from Landfills Amala Jaison, Indulekha K. P Research Scholar, Department of Civil Engineering, College of Engineering Trivandrum, APJ Abdul Kalam Technological University, Thiruvananthapuram, Kerala, India	18
11	A Review: Sustainable Waste Management as a Foundational Component of Environmentally Responsible Economic Systems Lakshdeep Jhans¹, Harpreet Kaur², Anmol³ ¹ Department of Plant Breeding and Genetics, Punjab Agricultural University, Ludhiana, Punjab, India ² Assistant Professor in Department of Fashion Designing, Kanya Maha Vidyalaya, Jalandhar, Punjab, India ³ Department of Forestry and Natural Resources, Punjab Agricultural University, Ludhiana, Punjab, India	19
12	Prioritizing Plastic Waste Management Strategies in Tourism: A Fuzzy MCDM Approach for National-Level Sustainable Development in Vietnam Huong Quynh Thi Nguyen Faculty of Hospitality and Tourism, Thuongmai University, Mai Dich Ward, Cau Giay District, Hanoi City, Vietnam	19
13	A Comparative Study of Existing Municipal Solid Waste Management practices in the metropolitan cities of Kolkata and Mumbai for the period 2015 to 2025 Mufti Mohammad Saif¹, I. Mukherjee¹, A. Ray¹, Md. W. Akram¹, T. Pattanayek¹, D. Sau² ¹ Department of Civil Engineering, Aliah University, Kolkata, India ² Dept of Civil Engineering, Jadavpur University, Kolkata, India	20
14	Financial Sustainability and Commercial Prospects of Solid Waste Management Nishtha Srivastava¹, Avnish Chauhan², Naman Agarwal³, Shaheen Efrahi Ali³, Debasis Mitra⁴, Rachan Karmakar⁵, Muneesh Sethi⁶ ¹ Department of Applied Sciences and Humanities, Invertis University, Bareilly, UP, India ² Department of Environmental Science, Graphic Era Hill University, Uttarakhand, India ³ Department of Management, Invertis University, Bareilly, UP, India ⁴ Department of Microbiology, Graphic Era Deemed to be University, Dehradun, Uttarakhand, India ⁵ Department of Environmental Science, Graphic Era Deemed to be University, Dehradun, Uttarakhand, India	20
15	Planetary Boundaries in the Circular Economy: E-waste Management Within Earth's Safe Operating Space Oladele A. Ogunseitan Distinguished Professor, University of California, Irvine	21
16	Assessment of Thermodynamic Parameters and Reaction Mechanism for Power Plant Cyanobacterium Pyrolysis: Isoconversion Kinetic Analysis Kaustav Nath, Ranjana Chowdhury Jadavpur University, Jadavpur, Kolkata, India	21
17	Circular Economy and Waste Management in Georgia: Policy Gaps and Future Prospects Khatuna Chikviladze¹, Nugzar Buachidze², Guranda Tchelidze³ ¹ Ministry of Environmental Protection and Agriculture, Georgia ² Institute of Hydrometeorology at Georgian Technical University, Georgia ³ Caucasus University, Georgia	22
18	Policy and Systemic Approaches to Food Waste Reduction in Georgia Darejan Dughashvili^{1,2}, Natela Dzebisashvili² ¹ Georgian Academy of Agricultural Sciences, GAAS, Tbilisi, Georgia ² Institute of Hydrometeorology at Georgian Technical University, Tbilisi, Georgia	22

Sl. No.	Title and Author	Page No.
19	Implementation of Business Intelligence (BI) in Waste Management Systems in Russia: Challenges and Strategic Opportunities Maria A. Liubarskaia, Daria A. Ipatova Russian New University	23
20	Legal Mechanisms for Attracting Investment in Circular Economy Projects: Russian Experience and International Practice Pakerman Galina Moscow State Institute of International Relations (MGIMO)	23
21	Processing of technogenic wastes – Russia’s global cooperation T.S. Budina, U.V. Zvorykina International Institute of Energy Policy and Diplomacy of MGIMO University (MIEP MGIMO)	24
22	Waste Management and Circular Economy in Georgian Secondary Schools Natela Dzebisashvili^{1,2}, Darejan Dughashvili^{1,2} ¹ Institute of Hydrometeorology at Georgian Technical University, Tbilisi, Georgia ² R. Agladze Institute of Inorganic Chemistry and Electrochemistry of Ivane Javakishvili Tbilisi State University, Tbilisi, Georgia	24
23	Integrating SMRs into Africa’s Water–Energy–Health Nexus for a Circular Economy Transition Bernice Karikari International Institute of Energy Policy and Diplomacy (MIEP), Moscow State Institute of International Relations (MGIMO University), Russia	25
24	Waste to Wealth Vikram Singh Kumawat Head of Department of Polymer Science & Rubber Technology, Vidya Bhawan Polytechnic College, Udaipur, Rajasthan, India	25
25	Participatory Maximisation of Zero-Waste and Circular Economy Uganda's Basic Education Wandera, Shaban Yusuf, Opolot Isaac Chrispinus of Kenyatta University	26
26	Integrating Waste Legislation and Circular Economy Strategies in Climate Policy: International Lessons and Georgia’s Experience N. Chikhradze¹, M. Elizbarashvili¹, N. Dzebisashvili², M. Khachidze¹, M. Tsintsadze¹, G. Dvalashvili¹, Z. Rikadze¹ ¹ Faculty of Exact and Natural Sciences, Ivane Javakishvili Tbilisi State University, Tbilisi, Georgia ² Institute of Hydrometeorology at Georgian Technical University, Tbilisi, Georgia	26
27	Waste Management for Schools through Adiwiyata Program Implementation in Indonesia Warmadewanthi, IDAA¹, Ni Made Utami Dwipayanti², Bimastyaji Surya Ramadan³, Nurani Ikhlas³, Rulli Pratiwi Setiawan¹ ¹ Institut Teknologi Sepul Nopember Surabaya Indonesia ² Udayana University, Indonesia ³ Diponegoro University, Indonesia	27
28	Solid Waste Management and Circular Economy in Campus Nupur Tandon Pro waste Concepts Pvt. Ltd.	27
29	Circularity Through Sludge Management and Utilisation Anurag Garg Solid and Liquid Waste Research Laboratory (SWRL), Environmental Science and Engineering Department, Indian Institute of Technology (IIT) Bombay, Mumbai, India	28
30	Circular Economy through Retreading Business in JK Tyre/JK Treads Kodavati V Krishna Rao J K Tyre & Industries Ltd (Rajasthan), India	28
31	Circular Economy and Solid Waste Management-Practices in OCCL Limited Yajnasoma Pattanayak OCCL limited, Dharuhera, Haryana, India	29
32	Circular Economy and Solid Waste Management-Practices in Dolfin Tyre Jitendra Pancholi Vice President – Dolfin Rubbers Ltd. (Punjab), India	29

Sl. No.	Title and Author	Page No.
33	Circular Economy and Japanese Management System (Learning for Indian Citizens) Narendra Kumar Sharma Chairman, Quality Circle Forum of India- Rajsamand Chapter, India	30
34	Circular Economy and Solid Waste Management-Practices in Pulp & Paper Industries Gouri Shankar Patnaik JK Paper Ltd. as Head Quality assurance and Technical Services. Director (PAPRI), Head of ESG – J K Paper Ltd.	30
35	Waste to Wealth Vikram Singh Kumawat Department of Polymer Science & Rubber Technology, Vidya Bhawan Polytechnic College Udaipur Rajasthan, India	31
36	Circular economy measures at provincial levels: Karnataka a case study Upendra Tripathy IAS	31
37	Developing and Implementing Sub-National Level Circular Economy Action Plan Shilpi Kapur Bakshi Environmental Management Centre Pvt Ltd.	32
38	Domestic Solid Waste Management in Areka Town of Wolaita Zone, Ethiopia: Challenges and Suggestions Selemon Thomas Fakana ^{1,2} , Yogalakshmi K.N. ¹ ¹ Department of Environmental Science and Technology, School of Environment and Earth Science, Central University of Punjab, 151401, Bathinda, India ² Department of Environmental Science, College of Agriculture and Natural Resources, Gambella University, P.O. Box 126, Gambella, Ethiopia	32
39	The Circular Economy in South Asia: An Overview of Progress and Regional Trends Ezra Osorio ¹ , Premakumara Jagath Dickella ¹ , Pham Ngoc Bao ¹ , Lakshitha Paranagamage ¹ , Miwa Tatsuno ³ , Thejani Yashodhara ² ¹ Sustainable Consumption and Production Area, Institute for Global Environmental Strategies (IGES), Japan ² Centre Collaborating with UNEP on Environmental Technologies (CCET), Japan	33
40	Ending Open Burning: A Circular Economy Case Study from the Southern Maldives Gordon Linley Jackson Soneva Namoonaa Champion, Soneva Namoonaa, Male 20077, Maldives	33
41	Sustainable Solid Waste Management Practices at an open dumping site in Erode District, Tamil Nadu Kanmani S ¹ , Geethamani R ² , Swaswati Roy ¹ ¹ Department of Civil Engineering, KPR Institute of Engineering and Technology, Coimbatore, India ² Department of Civil Engineering, Bannari Amman Institute of Technology, Sathyamangalam, Erode, India	34
42	Informal Waste Sector and Plastic Pollution: Pathways to a Just Circular Economy in South Asia Bharati Chaturvedi Chintan Environmental Research and Action Group, New Delhi, India	34
43	Exploring the Cultivation and Market Potential of Salicornia brachiata for Sustainable Integration into India's Food System Dineshkumar M ¹ , Sadhan Kumar Ghosh ² , Prasanta Kumar Dey ³ , Amit Dutta ⁴ ¹ Department of Mechanical Engineering, Jadavpur University, India ² International Society of Waste Management, Air and Water (ISWMAW), Kolkata, India ³ Operations Management, Aston Business School, Aston University, UK ⁴ Department of Civil Engineering, Jadavpur University, India	35
44	Informal Waste Sector and Plastic Pollution: Pathways to a Just Circular Economy in South Asia Lakshitha Paranagamage ¹ , Chettiyappan Visvanathan ² , Premakumara Jagath Dickella Gamaralalage ¹ ¹ IGES Centre Collaborating with UNEP on Environmental Technologies, Institute for Global Environmental Strategies (IGES), 2108-11 Kamiyamaguchi, Hayama, Kanagawa ² Department of Civil and Environmental Engineering, Faculty of Engineering, Mahidol University, 25/25 phutthamonthon 4 Road, Salaya, Nakhon Pathom	35

Sl. No.	Title and Author	Page No.
45	From Waste to Resource: A Case Study on the Functioning of Goa's Saligao Solid Waste Treatment Plant Arjun Morajkar, Sakshi Gawas Sant Sohrobanath Ambiyee Government College and Research Centre, Virnoda, Pernem, Goa, India	36
46	From Waste to Resource: Economic Reforms and Circular Economy Practices at JECRC University Ayushi Tambi ¹ , Nidhi Sharma ² Jaipur School of Economics, JECRC University, Jaipur, Rajasthan, India	36
47	Culture, Traditional Markets, And Waste Management: Mapping Material Flows and Circular Interventions in Jayapura City Akhmad Kadir Department of Anthropology, Cendrawasih University	37
48	Genealogy of Household-Based Waste Management in Surakarta Nurhadi Universitas Sebelas Maret	37
		38
III.	ENERGY: WASTE-TO-ENERGY, BIO-FUELS & RENEWABLE ENERGY	38-53
01	Sustainable Technologies for Biohydrogen Production: A Review Asha P Tom ¹ , Jayalekshmi S J ² , Jetey Elizabeth Philip ³ , Priya Venugopal ⁴ ¹ Department of Civil Engineering, Carmel College of Engineering and Technology, Alappuzha, APJ Abdul Kalam Technological University, Kerala, India ² Wood India Engineering & Projects Private Limited, India ³ Maintenance Engineer, Kautex Textron, Canada ⁴ Structural Engineer, P&P Association, Kerala, India	39
02	Methodological Basis for Waste - to - Energy Projects in Georgia Maka Jishkariani Georgian Technical University, Department of Electro Energy and Electro Mechanics, Tbilisi, Georgia	39
03	Valorisation of anaerobic digestate: opportunities and constraints Harshit Tiwari, Anurag Garg Solid and Liquid Waste Research Laboratory (SWRL), Environmental Science and Engineering Department, Indian Institute of Technology (IIT) Bombay, India	40
04	Critical Review of the Performance of Refractory Materials in Biomass Gasifier R. Thiyagarajan ¹ , P K Srividhya ² Department of Mechanical Engineering, Periyar Maniammai Institute of Science & Technology, Thanjavur, Tamil Nadu, India	40
05	Keratinase Activity and Microbial Growth Determination in Isolates Obtained from Partially Degraded Poultry Feathers in Soil of Dehradun Region of Uttarakhand, India, for Sustainable Disposal of Poultry Feather Waste Arpana Pal ¹ ; Keerti Singh ² ; Kunal Kishor ³ ¹ Department of Microbiology, School of Basic and Applied Sciences, Sri Guru Ram Rai University ² Department of Microbiology, School of Paramedical and Allied Health Sciences, Sri Guru Ram Rai University ³ Dept of Microbiology, School of Allied Health Sciences, Sharda University	41
06	Comparative Study on Performance of Bacterio-algal Fuel Cell with and without Biofilm Gagan Deep Singh Chemical Engineering Department, Jadavpur University, West Bengal, India	41
07	Assessment of thermodynamic parameters and reaction mechanism for power plant cyanobacterium pyrolysis: Isoconversion kinetic analysis Kaustav Nath, Ranjana Chowdhury Jadavpur University, Jadavpur, Kolkata, India	42
08	Integrated Solid Waste Management and Waste-to-Energy Conversion at the Sohar Integrated Waste Treatment Facility, Oman Manoj Beria, Prashant Singh Kutaula	42

Sl. No.	Title and Author	Page No.
09	Electricity Generation from Pure Lactic Acid and Cottage Cheese Whey in a Microbial fuel cell using Shewanella Putrefaciens MTCC 8104: Mathematical Modelling and Experimental Studies S. Mandal, D. Laha, R. Chowdhury Chemical Engineering Department, Jadavpur University, India	43
10	Biochar Addition for Enhanced Biomethane Production from Food Waste: Process Performance and Techno-Economic Assessment Rupak Jana ¹ , Subhadeep Das ² , Ranjana Chowdhury ¹ ¹ Chemical Engineering Department, Jadavpur University, India ² Amity Institute of Biotechnology, Amity University, India	43
11	Process Water as a Secondary Resource Stream in Co-Hydrothermal Carbonisation of Sewage Sludge and Kitchen Waste K. Rathika ^{1,2} , Bholu Ram Yadav ^{1,2} ¹ CSIR-National Environmental Engineering Research Institute, Nagpur, India ² Academy of Scientific and Innovative Research (AcSIR), Ghaziabad, India	44
12	Assessment of Physicochemical Changes in Municipal Solid Organic Waste Composting with Different Bulking Agents Hema Kandpal, R. K. Srivastava Department of Environmental Science, G.B. Pant University of Agriculture and Technology, Pantnagar, India	44
13	Waste to Resource: High Technologies and Nature-Based Solutions Mariya Hasnat, Ambrina Sardar Khan, Mohd Kashif Khan Department of Environmental Science, Integral University, Lucknow, India	45
14	Utilization of Waste/Used Cooking Oil (UCO) into Renewable Energy Sources Neeraj Atray, Aman Kumar Bhonsle, Tushar Agarwal Biofuel Division, CSIR-Indian Institute of Petroleum, Dehradun, India	45
15	Innovative Waste Heat Utilization Strategies for Sustainable Refrigeration and Energy Recovery Rajarshi Chakraborty, Seeniappan Kaliappan, Roseline Velankanni T, Biswajit Banik, Aman Ahamed Mokami, Goutam Roy ¹ Dept. of Mechanical Engineering, Greater Kolkata College of Engineering and Management, Kolkata, India ² Department of Mechanical Engineering, KCG College of Technology, Karapakkam, Chennai, India ³ Department of Mathematics, KCG College of Technology, Karapakkam, Chennai, India ⁴ Department of Mechanical Engineering, Swami Vivekananda University, Barrackpore, West Bengal, ⁵ Dept of Mechanical Engineering, Greater Kolkata College of Engineering and Management, Kolkata, India	46
16	Innovative Sustainability Assessment of Pyrolysis Using Fuzzy Logic and Life Cycle Analysis Jozsef Kovacs ¹ , Endre Domokos ² ¹ Innovation Management Doctoral school, University of Óbuda, 1034 Budapest, Bécsi út 96/B, Hungary ² University of Pannonia, 8200 Veszprém, Egyetem utca 10, Hungary	46
17	Methodological Basis for Waste - to - Energy Projects in Georgia Maka Jishkariani Georgian Technical University, Department of Electro Energy and Electro Mechanics, Tbilisi, Georgia	47
18	Valorization Pathways for Corn Cob (Zea mays) Waste in the Philippines: A Systematic Review of Sustainable Applications and Circular Bioeconomy Prospects Catherine DR. Pueyo ¹ , Bennidict P. Pueyo ¹ , Sadhan Kumar Ghosh ² ¹ Department of Agricultural and Biosystems Engineering, College of Engineering and Technology, Tarlac Agricultural University, Philippines ² ISWMAW, Kolkata, India	47
19	Advantages and Disadvantages in recent Biological Filtration systems for efficient Biogas Upgrading Joselyn B C Toomey, Rachan Karmakar, Suman Naithani Department of Environmental Science, Graphic Era (Deemed to be University), Dehradun, India	48
20	Life Cycle Assessment of Municipal Solid Waste Gasification for Sustainable Energy Recovery: A Case Study Approach Rahul S Raj Department of Mechanical Engineering, UPES, Dehradun, India	48

Sl. No.	Title and Author	Page No.
21	From Residuals to Resources: A Review of Business Models and Technological Innovations for Waste-to-Energy and Value-Added Byproducts Saurav Sati, Pradeep Kumar Sharma, Pratibha Naithani, Rachan Karmakar, Nikhil Ranjan Behera Department of Environmental Science, Graphic Era (Deemed to be University), Dehradun, Uttarakhand, India	49
22	Waste to Energy and Other Value-Added Products Vanishree R College: Presidency University, School of Law, Bangalore, India	49
23	Policy Approaches to C&D Waste Management: Lessons from Canada and Beyond Sujeewa Wimalasena Calgary, Canada	50
24	Repurposed eco bricks as a potential source of fuel to heat households in South Africa Sibusiso Ngxingo ¹ , Roman Tandlich ^{1,2} , Georgia Gace ² , Michal Holubcik ³ , Barnabas Poulson ² ¹ Disaster Management and Ethics Research Group (DMERG), Faculty of Pharmacy, Rhodes University, Artillery Road, P.O. Box 94, Makhanda 6140, South Africa ² Disaster Management Programme, Stellenbosch University, 1 Grand Street, South Africa ³ Katedra energetické techniky, Univerzita 8215/1, BC308, 010 26 Žilina, Slovakia	50
25	Energy Potential of Briquettes Produced with Different Biomass and Cow Dung Mixture Rahul Baidya ¹ , Sadhan Kumar Ghosh ² ¹ Office of Sustainability, Department of Mechanical Engineering, Institute of Engineering & Management, School of University of Engineering and Management Kolkata, India ² International Society of Waste Management, Air and Water, Kolkata, India	51
26	Co-processing of Hazardous Industrial Waste in Cement Kiln- Findings from Multiple Experimental Studies Rahul Baidya ¹ , Sadhan Kumar Ghosh ² ¹ Office of Sustainability, Department of Mechanical Engineering, Institute of Engineering & Management, School of University of Engineering and Management Kolkata, India ² International Society of Waste Management, Air and Water, Kolkata, India	51
27	Industrial Waste to Biohydrogen Production: An Innovative Membrane-Based Approach Monalisha Samanta, Subhrajyoti Ghosh, Ganesh Chandra Sahoo, Sourja Ghosh Membrane and Separation Technology Division, CSIR-Central Glass and Ceramic Research Institute, Jadavpur, Kolkata, India	52
28	Evaluating Waste-to-Energy Pathways for Municipal Solid Waste and Sewage Sludge: An LCA Approach to a Sustainable Environment Nitesh Premchand Machhirake, Kumar Raja Vanapalli Department of Civil Engineering, National Institute of Technology, Mizoram, India	52
29	Gasification of Seaweed for Sustainable Waste Management Deepan Jesu. A, Kasmir Karan Britto V, Vijayaragavan S, Lalith Pankaj Raj Nadimuthu, Kirubakaran Victor Centre for Rural Energy, The Gandhigram Rural Institute- Deemed to be University, Tamil Nadu, India	53
30	Optimizing Rooftop Resources: A Comparative Case Study on Energy and Crop Yields from Agro-PV and Conventional PV Systems at Gandhigram Rural Institute Vijayakumar G ¹ , Anish Malan ² , Sandeep kumar singh ² , Lalith Pankaj Raj Nadimuthu ¹ , Kirubakaran Victor ¹ ¹ Centre for Rural Energy, The Gandhigram Rural Institute-Deemed to be University, Tamil Nadu, India ² National Institute of Solar Energy, Ministry of New and Renewable Energy, Government of India, India	53
IV.	ENVIRONMENTAL MONITORING, RISK & POLLUTION CONTROL	54-79
01	Spatial and Environmental Impact Assessment Using GIS: A Case Study of South Delhi Land-Use and Groundwater Quality Bini Samal ¹ , Shyamala Mani ² ¹ Forest Ecology and Environment, Forest Research Institute, Dehradun, India ² WASH and Waste Management, Centre for Chronic Disease Control (CCDC)	55
02	Phytoremediation Process for Contaminated Ponds: A Step for Smart City through Traditional Ecological Approach Jagruti Shah, Khayali vaidya, Manish Solanki, Seema Sharma Department of Environment and Life Science, Kraqtiguru Shyamji Krushna Verma, Kachchh University, India	55

Sl. No.	Title and Author	Page No.
03	Microplastics in the Environment: A Systematic Review of Sources, Impacts, and Research Priorities Chirag Acharya, Kuldeep Kumar Singh, Arun Kumar Department of Food Technology, Chhatrapati Shahu Ji Maharaj University, Kanpur, Uttar Pradesh, India	56
04	Invisible E-Waste: Management of Waste E-cigarettes in Australia Gimhan Jayasiri, Sunil Herat, Prasad Kaparaju School of Engineering and Built Environment, Griffith University, Australia	56
05	Solid Waste Dynamics and Management Challenges in the Kaudiyala-Tapovan Eco-Tourism zone along the National Highway-7: Implications for Sustainable Himalayan Tourism Vidhu Gupta, Anantabha Joshi, Akshay Saini, Ajay Jaguri, Rahul Rawat, Dhruv Gairola, Kaustubh Chamoli Department of Environmental Sciences, H.N.B. Garhwal University, Srinagar Garhwal, Uttarakhand, India	57
06	Investigation on the inhibition mechanisms of green corrosion inhibitors for mild steel in acid solutions: a review based on experimental and computational analysis Vipra Kamboj ¹ , Brij Bhushan ¹ , Manvandra Kumar Singh ² , Arunima Nayak ¹ , Chandresh Rastogi ³ , Bindu Mangla ⁴ , Gopal Ji ² ¹ Department of Chemistry, Graphic Era (deemed to be University), Uttarakhand, India ² Department of Mechanical Engineering, Graphic Era (deemed to be University), Uttarakhand, India ³ Nanotechnology Programme, Centre for Advanced Studies, Uttar Pradesh, India ⁴ Department of Chemistry, J.C. Bose University of Science and Technology, Faridabad, Haryana, India	57
07	Assessing the influence of the soil parameters on permeability as an aid for contaminant transport in ground water for the Haldia industrial belt, West Bengal, India T. Pattanayek, I. Mukherjee, K. Ghosh, M. W. Akram, M. M. Saif, A. K. Gangopadhyay, D. Sau Civil Engineering, Aliah University, Newtown, Kolkata, India	58
08	A Study on The Effects of Storage Conditions on The Performance of Rubber Semi-Manufactured Babylon Tires Emad Kadum Njim ¹ , Naeem Abdulmohsin Alhilo ² , Adnan Alshukri ³ , Ihsan Obayes Khudhair ⁴ , Neha Tiwari ^{5,6} , Royal Madan ⁷ ^{1,2,3,4} Ministry of Industry and Minerals, State Company for Rubber and Tires Industries, Iraq ⁵ Department of Mechanical Engineering, Govt Co Ed Polytechnic Raipur, India ⁶ Department of Mechanical Engineering, Kalinga University, Naya Raipur, Raipur, India ⁷ Department of Mechanical Engineering, Graphic Era (Deemed to be University), Uttarakhand, India	58
09	Integrated Assessment of Polyethylene Biodegradation by Galleria mellonella Larvae: Survival, Physicochemical, and Microbial Insights Haritha Rajan, Suja P Devipriya School of Environmental Studies, Cochin University of Science and Technology, Kochi, India	59
10	A Review on Green Corrosion Inhibitors for Low Carbon Steel in Acidic Media: Mechanistic Insights, Applications, Challenges, And Future Strategies Ritik Koushik ¹ , Arunima Nayak ¹ , Manvandra Kumar Singh ² , Brij Bhushan ¹ , Chandresh Rastogi ³ , Priyanka Tyagi ⁴ , Gopal Ji ² ¹ Department of Chemistry, Graphic Era (deemed to be University), Uttarakhand, India ² Department of Mechanical Engineering, Graphic Era (deemed to be University), Uttarakhand, India ³ Nanotechnology Programme, Centre for Advanced Studies, Uttar Pradesh, India ⁴ Department of Chemistry, Dhanauri PG College, Affiliated to Sri Dev Suman Uttarakhand University	59
11	Nutrient Potential of Sewage Sludge Asha Elizabeth Vadassery Sebastian, Anand Madhavan School of Environmental Studies, Cochin University of Science and Technology, Kalamassery, Kerala, India	60
12	MNPs: Emerging Threats to Ecosystem A Aich ¹ , Sadhan Kr Ghosh ² Scientist at Dr Shyama Prasad Mookerjee National Institute of Water & Sanitation, Ministry of Jal Shakti, Govt of India. Vice President ISWMAW, India Former Dean of Engineering and Head of the Mechanical Engineering Department, Jadavpur University, President ISWMAW, India	60
13	Gamma and Neutron Shielding Performances of Red Mud Based Shields Abhishek Shrivastava ¹ , Rahul Arya ^{1,4} , Varsha Agrawal ^{1,4} , Abhijit Bijanu ^{1,4} , Gaurav Rajak ^{1,4} , Kasuhik Banerjee ² , Sujoy Chatterjee ^{2,3} , Satya Smiran Nayak ² , Deepti Mishra ¹ , Mohammed Akram Khan ¹ , Shabi Thankaraj Salammal ¹ ¹ CSIR-Advanced Materials and Processes Research Institute, Bhopal (CSIR-AMPRI), India	61

Sl. No.	Title and Author	Page No.
	² Variable Energy Cyclotron Centre (VECC), Kolkata, India ³ Bhabha Atomic Research Centre (BARC), Kolkata, India ⁴ Academy of Scientific and Innovative Research (ACSIR), Gaziabad, India	
14	Risks of harming the environment Levaeva Lyubov Post-graduate student MGIMO	61
15	Iron-Rich Industrial Waste as a Base for Advanced Radiation Shielding Materials Keerti Meena ¹ , Mohammed Akram Khan ¹ , Deepti Mishra ¹ , Parul Shrivastava ¹ , Abhishek Shrivastava ¹ , Varsha Agrawal ^{1,2} , Shabi Thankaraj Salammal ¹ ¹ CSIR-Advanced Materials and Processes Research Institute (CSIR-AMPRI), Bhopal, India ² Academy of Scientific and Innovative Research (AcSIR), Ghaziabad, India	62
16	Landfill Site Suitability Analysis Using GIS: A Case Study of Barabanki City Nida Fatma ¹ , Amina Jafri ² , Arpit Chouksey ³ ^{1,2} Department of Environmental Science, Integral University, Lucknow, India ³ Water Resources Department, Indian Institute of Remote Sensing, Dehradun, India	62
17	Survey of PM - Particle Pollution in Georgian Cities and Their Surrounding Areas Liana Intskirveli, Aleksandre Surmava, Natia Gigauri Institute of Hydrometeorology at the Georgian Technical University, Tbilisi, 0112, Georgia	63
18	Estimation of Volatile Organic Compounds at Different Locations of Dumping Sites of Punjab, India Mahima Sharma, Jatinder Kaur Katnoria Department of Botanical and Environmental Sciences, Guru Nanak Dev University, Amritsar (Punjab), India	63
19	Technological Challenges, Research Advancements and Future Prospects Towards Valorization of Pine Wastes Richa Bhatt, Arunima Nayak, Brij Bhushan Graphic Era (Deemed to be University), Dehradun, India	64
20	Assessment of Microplastic Contamination in Shrimp Aquaculture Farms from Ernakulam, Kerala, India, and Estimating Human Exposure through Consumption Abhinab Borah, Suja Purushothaman Devipriya School of Environmental Studies, Cochin University of Science and Technology, Kochi, India	64
21	Non-Ionizing Radiation from Electronic Devices: An Emerging Environmental Hazard Evaluated through Allium cepa Bioassay Ankita Sharma ¹ , Shalini Bahel ² , Jatinder Kaur Katnoria ¹ ¹ Department of Botanical and Environmental Sciences, India ² Department of Electronics Technology Guru Nanak Dev University, India	65
22	Exotoxicological Effects of Polypropylene on Terrestrial Ecosystem Earthworm (Lampito mauritii) Babita Thakur ¹ , Jaswinder Singh ² , Joginder Singh ¹ , Adarsh Pal Vig ³ ¹ Department of Microbiology, School of Bioengineering and Biosciences, Lovely Professional University, Phagwara, Punjab, India ² Department of Zoology, Khalsa College Amritsar, Punjab, India ³ Department of Botanical and Environmental Sciences, Guru Nanak Dev University, Amritsar, Punjab, India	65
23	Phytotoxic Assessment of Chlorpyrifos on Mustard (Brassica juncea) Asha S Raj, Preethy Chandran School of Environmental Studies, Cochin University of Science and Technology, Cochin, India	66
24	Microplastics Removal from Urban Wastewater Using Microfiltration: Technical Assessment Rubén Rodríguez-Alegre, Sergi Durán-Videra, David Carmona-Fernández, Laura Pérez Megías, Carlos Andecochea Saiz, Xialei You Leitat Technological Center, Circular Economy & Decarbonization department, Carrer de La Innovació 2, 08225, Terrassa, Barcelona, Spain	66
25	Metals Removal from Vehicle Emissions in Runoff Water David Carmona-Fernández, Sergi Durán-Videra, Rubén Rodríguez-Alegre, Laura Pérez Megías, Carlos Andecochea Saiz, Xialei You 1Leitat Technological Center, Circular Economy & Decarbonization Department, Carrer de La Innovació 2, 08225 Terrassa, Spain	67

Sl. No.	Title and Author	Page No.
26	A Geospatial Approach to Identifying Suitable Municipal Solid Waste Disposal Sites in Tiruchirappalli City, Tamil Nadu, India Subash S, Shobana Lakshmi M, Suresh S Gunasekaran S, Muthukumar M	67
27	A Remote Sensing and Geographical Information System Approach for the Zoning of Wastewater Drainage Systems in Dindigul District, Tamil Nadu, India Agalya N, Madhumitha G, Iswarya R, Muthukumar M, Gunasekaran S Centre for Geoinformatics, Gandhigram Rural Institute (DTBU), Gandhigram, Dindigul, Tamil Nadu, India	68
28	Decarbonising Steel: A Data-Driven Strategy for Scope 3 Emission Reduction Raktim Dasgupta ¹ , Arup Ranjan Mukhopadhyay ² , Sadhan Kumar Ghosh ³ , Biswanath Doloi ⁴ ¹ Jadavpur University, India ² ISI, Kolkata, India ³ ISWMAW, Ex Dean Faculty of Engineering & Technology Jabalpur University, India	68
29	Addressing the Challenges of Medical Waste Management in Healthcare Systems Mitali Baksi USA	69
30	Spatio-Temporal Land Use and Land Cover Changes in Dehradun (2013–2023) Ankit Negi ¹ , Shivam Nautiyal ² , Kamal Kant Joshi ³ , Ankit Nainwal ⁴ , Anoop Bahuguna ⁵ ^{1,2,4,5} Department of Civil Engineering, Graphic Era Hill University, Dehradun, India ³ Department of Environmental Science, Graphic Era Hill University, Dehradun, India	69
31	Optimizing Landfill Siting with GIS and Multi-Criteria Evaluation: A Case Study of Bangalore Urban District (BUD) M I Jisly Shareefa, M Muthukumar Center for Geoinformatics, GRI Dindigul dist. Tamil Nadu, India	70
32	About Stonesoup Trust Ankit Negi ¹ , Shivam Nautiyal ² , Kamal Kant Joshi ³ , Ankit Nainwal ⁴ , Anoop Bahuguna ⁵ ^{1,2,4,5} Department of Civil Engineering, Graphic Era Hill University, Dehradun, India ³ Department of Environmental Science, Graphic Era Hill University, Dehradun, India	70
33	Waste Management Systems in JK Tyre & Industries Limited, Chennai Annadurai. K JK Tyre & Industries Ltd (Tamil Nadu), India	71
34	Microplastic Isolation from the River-Water, Soil and Leachate in the Kathmandu Valley for Study Structure, Morphology and Quantity Jyoti Giri ^{1,2} , Anjali Shrivastav ¹ , Mandip Rai ¹ , Pratima BK ¹ ¹ Tri-Chandra Multiple Campus, Tribhuvan University, Ghantaghar, Kathmandu, Nepal ² Nepal Development Research Institute, Sanepa, Lalitpur, Nepal	71
35	Circular Economy Paradigm Shift of Electronic Waste Abhishek Kumar Awasthi Veerangna Awanti Bai College Chhatarpur, Madhya Pradesh, India	72
36	Resource and environmental effects of WEEE recycling in China Jie Guo School of Environment and Architecture, University of Shanghai for Science and Technology, 516 Jungong Road, Shanghai 200093, People's Republic of China	72
37	Revealing Building Stock Materials with Industry and Private data sources to inform Material Stock Analysis in Philadelphia USA Kimberlee Zamora Department Chair and Associate Professor Construction Management, School of Engineering Widener University, USA	73
38	Plastic waste and a hazard in fire disaster management in South Africa Chidinma Iheanetu ¹ , Roman Tandlich ^{1,2} , Ella Norton ² and Daniel Bergset ² ¹ Disaster Management and Ethics Research Group (DMERG), Faculty of Pharmacy, Rhodes University, Artillery Road, P.O. Box 94, Makhanda 6140, South Africa ² Disaster Management Programme, Stenden South Africa, 1 Grand Street, Port Alfred 6170, South Africa	73
39	Animal Waste and Domestic Pet Management During Emergencies and Disasters Maame M. Ansa ¹ , Roman Tandlich ^{1,2} , Luthando Sikade ² , Ruan Cannon ² ¹ Disaster Management and Ethics Research Group (DMERG), Faculty of Pharmacy, Rhodes University,	74

Sl. No.	Title and Author	Page No.
40	Artillery Road, P.O. Box 94, Makhanda 6140, South Africa ² Disaster Management Programme, Stenden South Africa, 1 Grand Street, Port Alfred 6170, South Africa Waste, Greywater and Water Management During Fire Emergencies in South Africa Siphumze Bani ¹ , Roman Tandlich ^{1,2} , Eric Stoch ² , Juliet Chipumuro ² ¹ Disaster Management and Ethics Research Group (DMERG), Faculty of Pharmacy, Rhodes University, Artillery Road, P.O. Box 94, Makhanda 6140, South Africa ² Disaster Management Programme, Stenden South Africa, 1 Grand Street, Port Alfred 6170, South Africa	74
41	Assessment of Heavy Metal Contamination in Treated Effluent from Electroplating Industries Papiya Mandal, Renu Daulta CSIR-NEERI, Zonal Centre, New Delhi, India	75
42	Environmental Impacts of Plastic Waste and Pathways to Sustainable Management Sunayana, Kartik Veer CSIR-NEERI, Delhi Zonal Centre, Naraina Industrial Area Phase 1, New Delhi, India	75
43	Comparative Evaluation of Electrocoagulation and Biochar Adsorption for Hazardous Landfill Leachate Treatment Abhay Kumar, Kunwar D. Yadav Department of Civil Engineering, Sardar Vallabhbhai National Institute of Technology, Surat, Gujarat, India	76
44	Performance Evaluation of UV-LED Disinfection: Understanding Inactivation Distribution in Water Systems Nupur Salve, Sampatrao D Manjare, Saroj Sundar Baral Department of Chemical Engineering, BITS Pilani K K Birla Goa Campus Zuari Nagar, Goa, India	76
45	Himalayan Harmony: Sustainable waste management system at high altitude terrains Jasojeet Naik Affiliated under Healing Himalayas Foundation, India	77
46	Risks of Harming the Environment Levaeva Lyubov Post-Graduate Student MGIMO, Russia	77
47	Coastal Conservation Dilemma: Mangrove and Deep Sea Sedimentation from a Socio-Ecological System Perspective in Kampung Laut, Ujung Alang, Cilacap Regency Indra Jaya Kusuma Wardhana ¹ , Misbah Zulfa Elizabeth ² , Syamsu Budiyan ¹ , Dinara Maya Julijanti ¹ ¹ Faculty of Social and Cultural Sciences, Trunojoyo University ² Faculty of Social and Political Science State Islamic University Walisongo, Indonesia	78
48	Determining the water quality classification of the river Kvirila Lali Shavliashvili ¹ , Gulchina Kuchava ¹ , Ekaterine Shubladze ¹ , Giorgi Kordzakhia ¹ , Givi Gavardashvili ² , Zurab Rikadze ³ ¹ Institute of Hydrometeorology, Georgian Technical University ² Tsoetne Mirtskhulava Institute of Water Management, Georgian Technical University ³ National Environmental Agency of the Ministry of Environment Protection and Agriculture of Georgia	78
49	Environmental effects and Microbial Diversity of Landfills Sutripta Sarkar ¹ , Saptadipa Sen ¹ , Sadhan K. Ghosh ² ¹ Post Graduate Department of Food and Nutrition, Barrackpore Rastraguru Surendranath College, West Bengal, India. ² Prof. (retired), ex-Head, Dept. of Mechanical Engineering, Jadavpur University, Kolkata, India	79
V.	INNOVATION: SUSTAINABLE MATERIALS & PRODUCT INNOVATION	80-102
01	Valorization of Invasive Weed Biomass for Eco-Friendly Control of Alternaria alternata Nitika Thakur ¹ , Gaurav Sharma ² , Vandna Kumari ³ ^{1,2} Department of Biotechnology, Shoolini University of Biotechnology and Management Sciences, Bajhol, Solan, India ³ Department of Biotechnology, Himachal Pradesh University, Summer Hill Shimla, India	81
02	Repurposing Textile Waste into Sustainable Jesmonite Products M. Jayalakshmi, P. Anusha, N. Bhanu Prakash, K. Vagdevi, P. Tanusri Department of CSE, Kalasalingam Academy of Research and Education, Anand Nagar, Krishnankoil, Tamilnadu, India	81

Sl. No.	Title and Author	Page No.
03	Designing Circularity with Paper Khushbu Dublish World University of Design, Haryana, India	82
04	Vegetable oil-based extraction of microplastics from complex landfill matrices: A comparative evaluation of castor and olive oil Ayan Lodh¹, Sudha Goel^{1,2} ¹ School of Environmental Science and Engineering, Indian Institute of Technology Kharagpur, Kharagpur, India ² Environmental Engineering and Management, Department of Civil Engineering, Indian Institute of Technology Kharagpur, Kharagpur, West Bengal, India	82
05	A short Review on Sustainable Pavement Construction Using Geopolymer Concrete and Recycled Aggregates Saikrishna Chelluri Department of Civil Engineering, Maulana Azad National Urdu University, Polytechnic, Bangalore, India	83
06	Characterization of Treated and Untreated Areca Catechu Fiber and Walnut Shell Powder as Sustainable Composite Reinforcements Harish Panjagala¹, Diwakar Reddy Vanimireddy¹, Siva Bhaskara Rao Devireddy² ¹ Department of Mechanical Engineering, S.V. University College of Engineering, Tirupati, A.P, India ² Department of Mechanical Engineering, St. Ann's College of Engineering and Technology, Chirala, A.P, India	83
07	Valorization of Biomass and Invasive Species for Sustainable Briquette Production: A Circular Economy Approach Alaknanda J Adur, Samruddhi Nikose Department of Environmental Science, St. Joseph's University, Bengaluru, India	84
08	Extract preparation of waste spinach leaves in ethanol, deposition of the extract on copper by drop casting, and corrosion testing of coated copper in 3.5% NaCl Vipra Kamboj¹, Brij Bhushan¹, Manvandra Kumar Singh², Arunima Nayak¹, Vinita³, Gopal Ji² ¹ Dept. of Chemistry, Graphic Era (Deemed to be University), Dehradun, India ² Dept. of Mechanical Engineering, Graphic Era (Deemed to be University), Dehradun, Uttarakhand, India ³ Dept. of Chemistry, Deen Dayal Upadhyay Gorakhpur University, Gorakhpur, India	84
09	Friction and Wear Responses of Copper Metal Matrix Hybrid Composites Reinforced with Waste Metallic Stainless-Steel Chips Manvandra Kumar Singh¹, Gopal Ji¹, Vineet Kumar¹, Ashwani Sharma², Uma Shankar³, Sujeet Kumar Chaubey⁴, Rajeev Nayan Gupta⁵, Rohit Singh Gautam⁶, Manish Kumar⁷, Sadhan Kumar Ghosh⁸ ¹ Department of Mechanical Engineering, Graphic Era (Deemed to be University), Dehradun, India ² Department of Mechanical Engineering, IIT (BHU), Varanasi, UP, India ³ Micro Advanced Research Centre, Micro Labs Limited, Bangalore, India ⁴ Department of Mechanical Engineering, Marwadi University, Rajkot, Gujarat, India ⁵ Department of Mechanical Engineering, NIT Silchar, Assam, India ⁶ Department of Mechanical Engineering, TMU, Moradabad, UP, India ⁷ Department of Physics, ARSD College, University of Delhi, Dhaua Kuan, New Delhi, India ⁸ Sustainable Development and Research Centre, ISWMAW, India	85
10	Eco-friendly green synthesis of sulfur-doped BiOCl/BiOBr type-II heterojunction via Azadirachta indica for visible-light-driven photocatalytic degradation of imidacloprid Debasmita Datta¹, Vishal Kumar Parida², Sudha Goel¹ ¹ Environmental Engineering and Management, Department of Civil Engineering, Indian Institute of Technology Kharagpur, India ² Amity School of Engineering and Technology, Amity University Jharkhand, India	85
11	Development of Baked Cookies Incorporating Scleroderma sp.: A Sustainable Approach Linking Nutritional Enhancement and Solid Waste Management Ayushi Gupta, Sudhir Kumar, Hradesh Rajput, Kuldeep Kumar Singh Department of Food Technology, Chhatrapati Shahu Ji Maharaj University, Uttar Pradesh, India	86
12	A Sustainable Solution for Livestock Nutrition: Pelletized Feed from Food Processing Waste Manish Solanki, Seema Sharma Department of Environment and Lifesciences, KSKV Kachchh University, Bhuj, Gujarat, India	86
13	Circular Economy Inspired Utilization of Tea Waste in Dye Pollution Mitigation Neeru¹, Shalini Singh^{1,2} ¹ School of Bioengineering and Biosciences, Lovely Professional University, Punjab, India ² Shri Ramwaroop Memorial University, Lucknow-Deva Road, Uttar Pradesh, India	87

Sl. No.	Title and Author	Page No.
14	Calcium-Oxide-Assisted Thermochemical Conversion of Plastic Waste Natela Dzebisashvili ^{1,2} , Grigor Tatishvili ¹ , Darejan Dughashvili ^{1,2} ¹ R. Agladze Institute of Inorganic Chemistry and Electrochemistry of Ivane Javakhishvili Tbilisi State University, Tbilisi, Georgia ² Institute of Hydrometeorology at Georgian Technical University, Tbilisi, Georgia	87
15	Improving the Agronomic Suitability of Coir Pith Through Targeted Chemical Treatments for Electrical Conductivity Reduction Umalakshmi Kalayamkudath Subran ¹ , Abesh Reghuvaran ² ¹ School of Environmental Studies, Cochin University of Science and Technology, India ² Centre for Science in Society, Cochin University of Science and Technology, India	88
16	Development of Gum Acacia-Based Thin Films Through Acrylamide Grafting Rachna Sharma, Rachan Karmakar Department of Applied Science and Engineering, Tula's Institute, Dehradun, Uttarakhand, India	88
17	Sustainable Fashion Tegina Ekaterina Russian Branch of the United Nations Environment Programme	89
18	Sustainable Development of Starch-Based Bioplastic from Agro Waste: A Pathway Toward Sustainability and Circular Economy Department of Environmental Sciences, C.B.S.H, G.B.P.U.A & T. Pantnagar, Udham Singh Nagar, Uttarakhand, India Department of Applied Science and Engineering, Tula's Institute, Dehradun, Uttarakhand, India	89
19	Green synthesis and Characterization of an Eco-friendly TiO₂ Nanocomposite for Efficient Removal of Dyes from Wastewater Neeraja Paramala, E. Sandhya Rani, and Narasimha Golla Department of Virology, Sri Venkateswara University, Tirupati, Andhra Pradesh, India	90
20	Sustainable Development of Activated Carbon: Synthesis Strategies, Functional Modifications, Environmental Applications, and Future Perspectives Anjas Asrani ¹ , Narendra Gariya ¹ , Brijesh Prasad ^{1,2} , Adhirath Mandal ³ ¹ Department of Mechanical Engineering, Graphic Era (Deemed to be) University, Dehradun, Uttarakhand, India ² Pinegreen Welfare Foundation, Uttarkashi, Uttarakhand, India ³ Jaypee Institute of Information Technology, Noida, India	90
21	Green Synthesis of Silver Doped Zinc Oxide / Magnesium Oxide Nanoparticles and its Adsorptive Studies on Dye Degradation Kolluru Sree Manaswini, G. Jyothee Pallavi, N. Chitti Babu Department of Chemical Engineering, Andhra University, Visakhapatnam, India	91
22	Investigations on Concrete Incorporating Mill Scale via Response Surface Approach Nishant Singh, Yogesh Iyer Murthy Department of Civil Engineering, Faculty of Civil Engineering, Jaypee University of Engineering and Technology, Guna, India	91
23	Unlocking the Value of Spent Mushroom Compost (SMC): A Circular Economy Approach to Sustainable Agriculture and Bioremediation Ahmad Asgharzadeh ¹ , Mohaddeseh Shirinzadeh ² , Ahmad Ali Pourbabae ² , Hamid Reza Zare Guildehi ² , Bahman Khoshru ¹ ¹ Soil and Water Research Institute, Agricultural Research, Education and Extension Organization (AREEO), Karaj, Iran ² Department of Soil Science and Engineering, Faculty of Agriculture, University of Tehran, Karaj, Iran	92
24	Manufacturing Rubber Products for Industrial Applications Using EPDM Rubber Reinforced with Different Nanomaterials Emad Kadum Njim ¹ , Naeem Abdulmohsin Alhilo ² , Adnan Alshukri ³ , Ihsan Obayes Khudhair ⁴ , Neha Tiwari ^{5,6} , Royal Madan ⁷ ^{1,2,3,4} Ministry of Industry and Minerals, State Company for Rubber and Tires Industries, Iraq ⁵ Department of Mechanical Engineering, Govt Co Ed Polytechnic Raipur, India ⁶ Department of Mechanical Engineering, Kalinga University, Naya Raipur, Raipur, India ⁷ Department of Mechanical Engineering, Graphic Era (Deemed to be University), Dehradun, India	92

Sl. No.	Title and Author	Page No.
25	Structural and Optoelectronic Response of Na₂LiSbBr₆ via Density Functional Theory Karishma Sharma¹, Hansraj Karwasara¹, Kishor Kumar¹, Amit Soni², Jagrati Sahariya³ ¹ Department of Physics, Manipal University Jaipur, Jaipur, India ² Department of Electrical Engineering, Manipal University Jaipur, Jaipur, India ³ Department of Physics, NIT Uttarakhand, Uttarakhand, India	93
26	A review: The Effectiveness and Characteristics of Glass Fiber in Concrete Ankit Nainwal, Ankit Negi, Anoop Bahuguna, Ritiksha Danu Department of Civil Engineering, Faculty of Engineering, Graphic Era Hill University, Dehradun, India	93
27	Sustainable Energy Optimization in A Production Shop Through Heat Loss Reduction, Electrical Scheme Improvement, Improved Illumination and Improved Machine Orientation Alivia Mondal¹, Asoke Kumar Paul², Subir Ray³ ¹ Department of Architecture, Jadavpur University, Kolkata, India ² Department of Electrical Engineering, Techno India University, Kolkata, India ³ M/s D Kapur Pvt. Ltd. 3, Pangla Danga road, Plot-66, Udayan Industrial Estate, Kolkata, India	94
28	Design, Fabrication and Performance Testing of a Damper for a Modified Tray-Type Dryer Jaynerale A. Enriquez¹, Donna Fay N. Labrador², Ermalyn DG. Galo³, Mary Grace N. Semilla⁴ ¹ Agricultural and Mechanization Division, Philippine Center for Postharvest Development and Mechanization, Muñoz, Nueva Ecija, 3119, Philippines ^{2,3,4} Department of Agricultural and Biosystems Engineering, College of Engineering and Technology, Tarlac Agricultural University, Malacampa, Camiling Tarlac 2306, Philippines	94
29	Advances in Biodegradable Cushion Materials Using Bio-Binders: A Review Sivabalan Veerasekaran¹, Pramooth Kumar Sekar², Lokeshwaran Karthikeyan³, Balaganesh Pandiyan⁴, Muthuselvam Athithanagam⁵, Vasudevan Mangottiri⁶ ^{1,2} Dept. of Chemical Engineering, Paavai Engineering College (Autonomous), Namakkal, Tamil Nadu, India ³ Dept. of Chemical Engineering, National Institute of Technology, Calicut, Kerala, India ⁴ Dept. of Chemical Engineering, Paavai Engineering College (Autonomous), Namakkal, Tamil Nadu, India ⁵ Dept. of Biotechnology, Paavai Engineering College (Autonomous), Namakkal, Tamil Nadu, India ⁶ Dept. of Agricultural Engineering, Bannari Amman Institute of Technology, Sathyamangalam, Erode, India	95
30	Assessment of Solid Waste Management in the Block Sadholi Kadeem, District Saharanpur in View of Swachh Bharat Mission Sufiyan Mirza^{1,2}, Rekha Bagri³, Ashok Pundir¹, Namra Fatima⁴, Wajiha Khan², Bheem, Pratap⁵ ^{1,2} Department of Civil Engineering, GEU, Dehradun, Uttarakhand, India ³ Department of Civil Engineering, School of Technology, Glocal University, Uttar Pradesh, India ⁴ Research Scholar, Department of Environmental Science, GEU, Uttarakhand, India ⁵ Department of Civil Engineering, Shivalik College of Engineering, Shiniwala, Dehradun, India	95
31	Waste Printed Circuit Boards Reutilization by Slurry Electrolysis Mengjun Chen The Society of Solid Waste of Chinese Society for Environmental Sciences, Key Laboratory of Solid Waste Treatment and Resource Recycle (SWUST). Ministry of Education; Department of Environmental Engineering, Southwest University of Science and Technology, 59 Qinglong Road, Mianyang, Sichuan Province, 621010, China	96
32	Waste Management Through the “7R” Strategy for Driving the Circular Economy in the Rubber/Tyre Industry Barun Kumar Samui Principal Scientist, Hari Shankar Singhania Elastomer and Tyre Research Institute (HASETRI), Mysore, Karnataka, India	96
33	Prospects of Cellulose Extraction from Cotton and Conversion into Biofilm and Hydrogel Vasudevan M¹, Jaikrishna K², Boomika N², Yazhinishree R², Rashmi NS² ¹ Department of Agricultural Engineering ² Bannari Amman Institute of Technology, Sathyamangalam, Erode, Tamil Nadu, India	97
34	Maximizing Wheat Straw Utilization: An Integrated, Near-Zero-Waste Sequential Biorefining Approach Harmeet Kaur, Dinesh Goyal Department of Biotechnology, Thapar Institute of Engineering & Technology, Patiala, Punjab, India	97
35	Nature-Based Greywater Recycling Using Constructed Wetlands: Potential for Water Circularity in Lucknow Residential Colonies Km Pallavi Singh Institute of Engineering and Technology, Lucknow, India	98

Sl. No.	Title and Author	Page No.
36	Life Cycle Assessment of Bioplastic Reinforced with Sugarcane Trash Extracted Cellulose Milind JOSHI, Sampatrao D MANJARE Advanced Sustainable Materials Lab, Department of Chemical Engineering, BITS Pilani, K. K. Birla Goa Campus, Zuarinagar, Goa, India	98
37	Examining the Impact of Election-related Political Unrest on Solid Waste Management in Africa Michael Koech, Charles Kariuki, Chrispinus Wandera, Juliana Mwanja	99
38	Circular Green Waste Management using Solar-Powered Electric Vehicle Fleet to Achieve Sustainable Development Goals: A Case Study of Gandhigram Rural Institute Shiva Kishnu S, Cholan T, Lalith Pankaj Raj Nadimuthu*, Kirubakaran Victor Centre for Rural Energy, The Gandhigram Rural Institute- Deemed to be University, India	99
39	Fast Fashion Waste and Improving the Welfare of Urban Communities (A Study of the Gerakan Seribu Rupiah Community in Semarang, Indonesia) Ririh Megah Safitri State Islamic University of Walisongo Semarang	100
40	Design, Fabrication and Performance Evaluation of Remote-Control Operated Corn Seeder Bangcoro, Michelle P., Agbulig, Jonard A., Pagatpatan, Chelsie C Institut Agama Islam Negeri Kendari, Indonesia	100
41	Extraction and Evaluation of Pectin from Persian Lime (Citrus x latifolia) Peels as a Potential Edible Coating Cresta A. Riparip ¹ , Fatima P. Gumamac ² , Ed Daryl F. Onza ³ ¹ Dept. of Agricultural and Biosystems Engineering, Tarlac Agricultural Engineering ² Dept. of Agricultural and Biosystems Engineering, Tarlac Agricultural University ³ Dept. of Agricultural and Biosystems Engineering, Tarlac Agricultural Engineering	101
42	Development and Assessment of a Filtration System Utilizing Bamboo Charcoal for Treating Domestic Greywater MA. Jennefer, S. Caliboso, Elgine, C. Najorda Department of Agricultural and Biosystems Engineering, College of Engineering and Technology, Tarlac Agricultural University, Camiling	101
43	Performance Evaluation of Vertical Dutch Bucket on The Growth and Yield of Cherry Tomato (Solanum Lycopersicon) Roanne M. Galo, Mary Grace N. Semilla, Msae Republic of the Philippines, TARLAC AGRICULTURAL UNIVERSITY, Camiling, Tarlac	102
44	Composting: Circularity of Organic Wastes in school – A case study in Kolkata, West Bengal, India Sadhan Kumar Ghosh ^{1,2} , Chaitali Mukherjee ³ , Purbali Ray ⁴ ¹ Jadavpur University, Kolkata, India ² International Society of Waste Management, Air and Water, & Ex- Jadavpur University, Kolkata, India ³ Assistant Teacher of Biology, Santoshpur Rishi Aurobindo Balika Vidyapith, Kolkata, India ⁴ Assistant teacher of Chemistry, Santoshpur Rishi Aurobindo Balika Vidyapith, Kolkata, India	102
VI.	IoT: AI, MACHINE LEARNING & SMART SYSTEMS FOR WASTE AND ENVIRONMENT	103-115
01	Waste Governance, Circular Economy and Waste Management Policies in the Nairobi City County Government, Kenya Michael K. Koech, Kaburu J. Munene, Mary K. Kinoti, Magdalene Kagendo Department of Environmental Sciences and Education, School of Agriculture and Environmental Sciences, Kenyatta University, Kenya	104
02	A Review on The Use of Robotics in Integrated Waste Management Through Artificial Intelligence & Machine Learning Mohammad Usama Department of Environmental Science, Integral University, Lucknow, India	104

Sl. No.	Title and Author	Page No.
03	AI-Driven Serenely Bird Species Recognition and Environment Monitoring Framework with Enhanced CNN and Blockchain Architecture H. M. Nimbark, H. P. Jadeja, R. M. Bhatt Computer Science, Gyanmanjari Innovative University, Gujarat, India	105
104	Eco-Sense AI Recycle: AI – Powered Smart Waste Segregation Adriyan Roy, Aryaman Chugh, Sridevi Ponmalar Department of Computational Intelligence, SRM Institute of Science and Technology, Chennai, India	105
05	AI/ML-Driven SMS Alert System for Sustainable Employment in Rural India Vasudha, Ruchi Gaur Computer Science & Design, School of Design, World University of Design, Sonipat	106
06	Rethinking Waste Management: A Theoretical Framework and Actionable Propositions for IoT Integration Rushi Anandan Karichalil KJ Somaiya Institute of Management, India	106
07	Solid Waste Management and Circular Economy in Campus Param Mehta, Seema Sharma KSKV Kachchh University	107
08	AI-Based Statistical Cost Forecasting Models for Recycling Startups in Emerging Economies Avishkar B. Walke, Shriram N. Kargaonkar MAEER's MIT Arts, Commerce & Science College, Alandi, Pune, India	107
09	Students' Attitudes Toward the Integration of AI in Environmental Education Nguyen Thanh Trieu ¹ , Nguyen Thi Nhu Hue ² , Thai Phuoc Nghia ³ ¹ FPT University, Can Tho City, 90000, Vietnam ² University of Languages and International Studies, Ha Noi, 100000, Vietnam ³ National Chiayi University, Chiayi, 600, Taiwan	108
10	Bins to Insights: A Machine Learning Conceptual Framework for Agricultural Waste Management under the Consideration of Circular Economy and Sustainability Garima Jaitly, Shwetank Avika Department of Management Studies, Graphic Era Deemed to be University, Dehradun, India	108
11	Designing AI-Integrated Curriculum for Smart Agriculture Development Hoang Thi Minh Hue ¹ , Pham Cuong ² , Tran Thi Lua ¹ , Nguyen Trong Dang ¹ , Dinh Quang Truong ¹ ¹ Phuong Dong University, 171 Trung Kinh Street, Yen Hoa Ward, Hanoi, Vietnam ² VNU- University of Education, Vietnam; Hanoi College for Electro-Mechanics, Vietnam	109
12	Sustainable Solid Waste Management at Himalayan Pilgrimage Destinations: Integrating AI Solutions. Vinta Kumari, Nitika Thakur Shoolini University of Biotechnology and Management Sciences, Solan, H.P	109
13	AI-Driven Forecasting of Energy Generation from Municipal Solid Waste: A Case Study of Mumbai Pratik Sawant, Shriram N. Kargaonkar MAEER's MIT Arts, Comm. & Science College, Alandi, Pune, Pune, India	110
14	Statistical Modelling and AI-Driven Framework for Quality Control and Sustainable Waste Management Swati Ithape, Shriram N. Kargaonkar MAEER's MIT Arts, Commerce & Science College, Alandi, Pune, India	110
15	Optimizing Personalized Medicine through Integrated Statistical Modelling, AI/ML, and Healthcare Management for Sustainable Precision Health Manasi S Jadhav, Shriram N. Kargaonkar MAEER's MIT Arts, Commerce & Science College, Alandi, Pune, India	111
16	Statistical Modelling of Wastewater Quality Prediction Using AI and IOT Sensors Chetan S. Chamkure, Shriram N. Kargaonkar MAEER's MIT Arts, Commerce & Science College, Alandi, Pune, India, India	111

Sl. No.	Title and Author	Page No.
17	Deep Learning–Driven Automated Classification and Segregation of Food Waste for Circular Economy Application Ipsita Saha ¹ , Amit Kundu ² , Sadhan Kumar Ghosh ³ , Shreeja Sinha ¹ , Nilagrib Ray ¹ , Raktim Dasgupta ⁴ ¹ Department of Computer Science & Engineering, Guru Nanak Institute of Technology, Kolkata, India ² Department of Management Studies, North Eastern Hill University, Shillong, India ³ Chairman, ISWMAW, Kolkata, India ⁴ Department of Mechanical Engineering, Jadavpur University, India	112
18	A Review on the Use of Artificial Intelligence for the Development of a Smart City through Integrated Waste Management system and Circular Economy Mohammad Usama Department of Environmental Science, Integral University, Lucknow, India	112
19	Predictive Analytics for Municipal Solid Waste and E-Waste Generation: A Machine Learning Approach for Urban Areas Latpate Sandhya ¹ , Sunil Mahajan ² , Shriram N. Kargaonkar ¹ ¹ Dept. of Mathematics, MAEER's MIT Arts Comm. and Science College, Alandi, Pune, India ² Dept. of Electronic Science, MAEER's MIT Arts, comm. and Sci. college, Alandi, Pune, India	113
20	Intelligent System for Mango Leaf Disease Detection Using Image-Based Deep Learning Sohrab Ali, Sameer Dev Sharma, Parminder Singh School of Computing Sciences, Uttaranchal University, Dehradun, India	113
21	Rethinking Waste Management: A Theoretical Framework and Actionable Propositions for IoT Integration Rushi Anandan Karichalil KJ Somaiya Institute of Management, India	114
22	Revealing Building Stock Materials with Industry and Private data sources to inform Material Stock Analysis in Philadelphia, USA Kimberlee Zamora Department of Construction Management, School of Engineering, Widener University, USA	114
23	Leveraging AI for Material Identification in Unauthorized Dumps for Circular Economy Applications Adi Mager Tel Aviv University Department of Environmental Studies, Israel	115
VII.	MICROBIAL WASTE SOLUTIONS & BIOTECHNOLOGY	116-121
01	Wild Cucurbit to Functional Food: Exploring the Nutritional and Therapeutic Promise of Cucumis callosus Kuldeep Kumar Singh, Hradesh Rajput, Sudhir Kumar Department of Food Technology, Chhatrapati Shahu Ji Maharaj University, Kanpur, Uttar Pradesh, India	117
02	Trends, Challenges, and Opportunities in Bioremediation of Oil-Contaminated Soils: A Review of Microbial Technologies' Role in Achieving a Circular Economy Ahmad Asgharzadeh, Bahman Khoshru, Kobra Saghafi Soil and Water Research Institute (SWRI), Agricultural Research, Education and Extension Organization (AREEO), Karaj, Iran	117
03	Closing the Loop with Nature-Based Solutions: Household Kitchen Waste to Soil-Boosting Bioformulations Khayali Vaidya, Seema B. Sharma Department of Environment and Life Science, KSKV Kachchh University, Bhuj, Gujarat, India	118
04	Phytochemical Profiling and Bioactive Properties of Rhizophora apiculata from Marine Mangroves E. Sandhya Rani, Narasimha Golla Department of Virology, Sri Venkateswara University, Tirupati, A.P., India	118

Sl. No.	Title and Author	Page No.
05	Quorum Sensing Modulation of Pseudomonas aeruginosa by Emblica officinalis Seed Extract Ankita Sureshbhai Chavda College of Computer Science and Information Technology (BKNMU), Junagadh, Gujarat, India	119
06	Sustainable Production of Eicosapentaenoic Acid (EPA) from Marine Microalgae: A Circular Bioeconomy and Waste Valorization Approach Gowthamraj G, R., Balakrishnaraja National Food Laboratory, Kolkata, India Department of Biotechnology, Bannari Amman Institute of Technology, Sathyamangalam, India	119
07	A Review on the Role of Marigold (Tagetes erecta L.) in Cleaning Polluted Soil and Enhancing Soil Health through Phytoremediation Chanchal Saini Department of Biosciences, School of Liberal Arts and Sciences, Mody University of Science and Technology Lakshmanagarh, Sikar, Rajasthan, India	120
08	Myco-Membranes: A Green Approach to Wastewater Filtration Ashwini Modi, Ananda Babu K Mahakal Institute of Technology, Ujjain, India Dptt Civil Engg, PIMR Indore, Prestige Institute of Management and Research, India	120
09	Green Synthesis of Iron Nanoparticles from Prosopis Juliflora M. Muthu mani, E. Gomathi, P. Balaganesh, T. Saranya, R. Prem, M. Sakthivel, J. Vasanth Kumar, C. Nirmala Department of Biotechnology, Paavai Engineering College, Namakkal, Tamilnadu, India	121
10	Comparative Assessment of Algal Species for Wastewater Remediation: A Review of Biological Efficiency and Supporting Quantitative Approaches Nikhil Ranjan Behera ¹ , Rachan Karmakar ¹ , Saurav Sati ¹ , Pradeep Kumar Sharma ¹ , Abhishek Chauhan ² , Deepika Saini ² ¹ Dept. of Environmental Science, Graphic Era (Deemed to be University), Dehradun, India ² Dept. of Mathematics, Graphic Era (Deemed to be University), Dehradun, India	121
VIII.	SUSTAINABILITY: CROSS-CUTTING TECHNOLOGY, ECONOMY & POLICY	122-132
01	Reimagining Carbon: Building a Circular Carbon Economy for a Sustainable Future B. Anupam Kumaun University, Nainital (Uttarakhand), India	123
02	From Access to Trust: Key Drivers of Digital Payment System Usage Ashish Salvi Government College of Arts, Science and Commerce, Quepem-Goa, India	123
03	Improving the Methodology for Assessing the Effectiveness of Implementing Circular Economy Technologies Based on Digital Cognitive Modeling Tools Zvorykina U.V, Pisareva O.M Federal State Budgetary Educational Institution of Higher Education "State Academic University of Humanities	124
04	From Scarcity to Sustainability: Critical Metals and the Imperative of Recycling Konstantin V. Ivanovskikh, Yulia V. Sokolova, Olga V. Yurasova, Sergey A. Vasilenko, Liliya Yu. Mezhevaya, Dmitry I. Smirnov, Maxim A. Shchelkonogov, Andrey I. Goliney GIREDMET State Research & Design Institute of Rare Metal Industry, JSC ROSATOM State Atomic Energy Corporation, Moscow - 111524, Russia	124
05	Advancing Circular Economy and Industry 4.0 Practices in Indian Manufacturing: A Systematic Supply Chain Case Study Ipsita Saha ¹ , Amit Kundu ² , Sadhan Kumar Ghosh ³ ¹ Department of Computer Science & Engineering, Guru Nanak Institute of Technology, Kolkata, India ² Department of Management Studies, North Eastern Hill University, Shillong, India ³ Chairman, ISWMAW, Kolkata, India	125

Sl. No.	Title and Author	Page No.
06	Sustainable Energy Optimization in a production shop through Heat Loss Reduction, Improved illumination and Improved machine orientation Alivia Mondal, Asoke Kumar Paul Department of Architecture, Jadavpur University, Kolkata, India Electrical Engineering, Techno India University, Kolkata, India	125
07	Citizen Science for Climate Resilience and Adaptation Among Small Scale Farmers in Busia County, Kenya Chrispinus Wandera Kenyatta University	126
08	Driving Positive Change: Entrepreneurship and the Path to Sustainable Development Padmavathy Dhillon Indian Institute of Management Sambalpur, Odisha, India	126
09	HR Strategies for Driving Circular Economy Success Ravi Pant HR Consultant, PantHR Pulse, Udaipur (Ex-HR Head, Mayur Uniquoters Ltd, J K Tyre & Industries Ltd, Reckitt Benckiser, Uflex Ltd).	127
10	Challenges in Talent Management in the New Era Rakesh Prasad Srivastav HR & IR of JK Tyre & Industries Ltd.	127
11	Challenges in Talent Management in the New Era Rakesh Prasad Srivastav Designation & Affiliation: Former GM - HR & IR of JK Tyre & Industries Ltd, India	128
12	Bridging Gaps in Solid Waste Management through Source Segregation and Monitoring: A Case Study of Rajam Municipality, Andhra Pradesh Gunde Padma, Musini Venkateshwarlu, Paruchuri Saikesh Department of Environmental Engineering & Science, Bharatiya Engineering, Science & Technology Innovation University (BESTIU), Anantapur, India, CMR College of Engineering & Technology, Hyderabad, India and Director, Ecopie Services LLP, Telangana State, Hyderabad, India	128
13	Environmental Commitment Indicator Framework for Electric Vehicle Purchasing Based on a Survey: Methodological Framework and Implementation Jozsef Kovacs, Habil Monika Garai-Fodor Innovation Management Doctoral School, University of Óbuda, 1034 Budapest, Bécsi út 96/B, Hungary University of Óbuda, 1034 Budapest, Bécsi út 96/B, Hungary	129
14	Derelict Buildings, Renewal Strategies, and Demolition Waste: An Evaluation in the Context of Legislation and Practice Burcu SALGIN¹, Dilek YILDIZ², Gonca ARIN³, Çiğdem POLATOĞLU SERTER⁴ ¹ Department of Architecture, Faculty of Architecture, Erciyes University, Kayseri, Türkiye ² Department of Architecture, Faculty of Architecture, İstanbul Technical University, İstanbul, Türkiye ³ Directorate of Disaster Affairs, Kayseri Metropolitan Municipality, Kayseri, Türkiye ⁴ Department of Architecture, Faculty of Architecture, Yıldız Technical University, İstanbul, Türkiye	129
15	Policy analysis of the local planning documents and the evolution of the local planning in South Africa Chidinma Iheanetu¹, Roman Tandlich^{1,2}, Mahas Shah², Brooklyn Williams² ¹ Disaster Management and Ethics Research Group (DMERG), Faculty of Pharmacy, Rhodes University, Artillery Road, P.O. Box 94, Makhanda 6140, South Africa ² Disaster Management Programme, Stenden South Africa, 1 Grand Street, South Africa	130
16	Sustainable Production of Cement Concrete by the Partial Replacement of Coarse Aggregates with Ceramic Wastes Mwigine J. Kamenga, Thomas I. Chuwa, Jalalya Mabojoano Department of Civil and Highway Engineering, Arusha Technical College, Arusha, Tanzania	130
17	Waste Management in Poultry Farms: Circular Economy Approach to achieve SDG Abirami. G, Santhiya. M, Shalini. K, Revathy S. R, Kirubakaran. V The Gandhigram Rural Institute - (Deemed to be University), Centre for Rural Energy, Dindigul, India	131
18	Recycling Plastic Waste into Sustainable Pathway Bricks H. Thasleem Kowthar, M. Vijayalakshmi, R. Issath Fathima R, S.R. Revathy S.R, V. Kirubakaran Centre for Rural Energy, The Gandhigram Rural Institute- Deemed to be University, India	131

Sl. No.	Title and Author	Page No.
19	The Politics of Empowerment: Household Waste Governance and Community Participation in Banyumas Regency, Central Java, Indonesia Masrohatun Faculty of Political and Social Science, UIN Walisongo Semarang	132
20	Gendering the Energy Transition: The Role of the Indonesian Women’s Coalition (KPI) in Empowering Women through Renewable Energy Initiatives in Salatiga City Tika Ifrida Takayasa Universitas Islam Negeri Walisongo Semarang, Indonesia	132
IX.	TOURISM, HOSPITALITY & CSR IN WASTE MANAGEMENT	133-137
01	A Multi-Criteria Evaluation for Strategic Site Selection for Decentralized Waste Treatment Units in the Joshimath–Badrinath Corridor (Western Himalayan Region) Deepika Dimri ¹ , Mayank Singh Bhakuni ^{1,2} ¹ Himalaayn Women Awareness and Livelihood (HIMWAL) Society ² Dayanand Sagar University, Bangalore, India	134
02	A Traditional water Resource “Naula”, status in Almora District, Uttarakhand, India Dhenesh Raj ¹ , Udayan Saha ² , Kamal Joshi ¹ ¹ Department of Environmental Sciences, Graphic Era Hill University, Dehradun, India ² Department of Electronics, Gati Shakti Vishwavidyalaya, Vadodara, India	134
03	A Circular Framework for Sustainable Spiritual Festivals: Lessons from the Kumbha Mela, Christmas, and Hindu Pujas Rikke Marie Moalem ¹ , Sujayalakshmi Devarayasamudram ² , Sadhan Kumar Ghosh ³ , Ipsita Saha ⁴ , Priti Mangesh Bharambe ⁵ ¹ Department of Sustainability and Planning, Aalborg University, Copenhagen, Denmark ² Nursing Department, North Carolina Central University, Durham, North Carolina, USA ³ Sustainable Dev. and Circular Economy Research Centre, ISWMAW, India ⁴ Guru Nanak Institute of Technology, Kolkata, India ⁵ MIT Arts commerce & Science college, Aalandi, Pune, India	135
04	Tourism and Sustainable Waste Management on the Danish Island of Bornholm Rikke Marie Moalem ¹ , David Christensen ^{1,2} , Anine West Selander ² , Sadhan Kumar Ghosh ^{3,4} ¹ Aalborg University, Copenhagen, Denmark ² BOFA, Rønne, Denmark ³ Jadavpur University, Kolkata, India ⁴ International Society of Waste Management, Air and Water, India	135
05	Eco-Health and Global Patients: Sustainable Waste Management and Consumer Perceptions in India’s Medical Tourism Swarnika Aggarwal ¹ , Dr Anugrah Rohini Lall ¹ , Rishabh Singhal ² ¹ Department of Humanities and Social Sciences, Graphic Era University, Dehradun, India. ² Department of Physics and Computer Science, Dayalbagh Educational Institute, India	136
06	Circular Economy in Tourism: A Case Study on Waste Reduction and Water Management in Ecotel Hotels in Emerging Economy Nirmiti Thakur, Aditi Lathkar, J.S. Sudarsan School of Energy & Environment, NICMAR University, Pune, India	136
07	Assessment of Food Waste Management Practices and Sustainability Initiatives in Luxury Hotels: A Case Study of The Nainital Region, Uttarakhand Dharmender Rawat, Rakesh Dani, Amanjeet Singh Sethi, Ravish Kukreti Hospitality Management, Graphic Era Deemed to be University, Dehradun, India	137
08	Nano-astaxanthin for sustainable crop production and food security in Macrotyloma uniflorum Nidhi Chauhan School of Health Sciences and Technology, UPES, Dehradun, India	137
09	Systems Thinking and Circular Engineering: Reimagining Resource Flows for a Sustainable Future Brajesh K Dubey Environmental Engineering & Management, Dean - Campus & Community Development, Chairperson - School of Water Resources, Department of Civil Engineering, IIT-Kharagpur, West Bengal, India	138

Sl. No.	Title and Author	Page No.
10	Examining the impact of Election-related political unrest on solid waste management in Africa Michael Koech, Charles Kariuki, Chrispinus, Wandera, Juliana Mwanja Kenyatta University. Uganda	138
11	The Current Status of Information Technology Application and Digital Transformation in the Care and Education of Children Aged 0–6 in Preschools in Vietnam Le Thi Luan ¹ , Nguyen Thi Trang ¹ , Chu Thi Hong Nhung ² , Vu Thi Huong Giang ³ ¹ Vietnam National Institute of Education Sciences (VNIES) ² VNU University of Education ³ Haiphong University	139
12	Examining the impact of Election-related political unrest on solid waste management in Africa Michael Koech, Charles Kariuki, Chrispinus, Wandera, Juliana Mwanja Kenyatta University. Uganda	139
13	Innovative Microbial Nano-Electrigen Approaches for Sustainable Bioelectricity Production from Wastewater Utkarsh Jain School of Health Sciences & Technology (SoHST), University of Petroleum and Energy	140
14	Sustainable Production of Cement Concrete by the Partial Replacement of Coarse Aggregates with Ceramic Wastes Mwigine J. Kamlenga, Thomas I. Chuwa, Jalalya Maboiano Department of Civil and Highway Engineering, Arusha Technical College, Arusha, Tanzania	140
15	Promoting Repair and Reuse Culture for a Circular Economy: A Community-Based Sustainable Waste Management Initiative Nisha K. G Assistant Professor – Finance & Industry Relations Coordinator GRG School of Management Studies, PSGR Krishnammal College for Women	141
16	Physical & Chemical Characterization of Legacy Waste at Dhapa Dump Site Subhabrata Mahapatra, Dibakor Mandal, Samran Banerjee, Sourav Chakraborty, Abhisek Roy, Amit Dutta Department of Civil Engineering, Jadavpur University, Kolkata, India	141
17	Nano-astaxanthin for sustainable crop production and food security in <i>Macrotyloma uniflorum</i> Nidhi Chauhan School of Health Sciences and Technology, UPES, Dehradun, India	142
18	Circular Textiles and Regulatory Divergence: Comparing the EU’s EPR-Driven Framework with India’s Emerging Policy Landscape S. Durgalakshmi, M.R. Keerthana Law College, The Tamilnadu Dr. Ambedkar Law University	142

Waste Governance, Circular Economy and Waste Management Policies in the Nairobi City County Government, Kenya

Michael K. Koech*, Kaburu J. Munene, Mary K. Kinoti, Magdalene Kagendo

Department of Environmental Sciences and Education, School of Agriculture and Environmental Sciences, Kenyatta University, Kenya

*Corresponding Author: mi.koech@yahoo.com / mi.koech@gmail.com

ABSTRACT: Kenya's urban spaces are at a crossroads of environmental and developmental transformation, particularly as they confront mounting challenges of waste management, resource efficiency, and sustainable urbanisation. Anchored in the constitutional right to a clean and healthy environment (Article 42), this paper critically examines the interface between circular economy (CE) principles and waste management governance in Nairobi City County. Drawing on frame analysis, review of policy documents, and comparative insights from global CE transitions, the study interrogates institutional structures, stakeholder engagement, informal sector dynamics, infrastructure capacity, and political economy considerations shaping implementation outcomes. Nairobi's case is emblematic of broader systemic tensions in low- and middle-income countries: a progressive policy architecture that remains stymied by fragmented governance, under-resourced municipalities, and exclusionary models of service delivery. While CE ideals such as reduce, reuse, and recycle have entered Kenya's policy discourse, their translation into practice is constrained by limited public participation, technological gaps, and financial bottlenecks. The paper argues for multi-scalar governance coherence, data-driven planning, inclusive integration of informal actors, and incentive-based models to catalyse a just and sustainable circular transition. Through this, Nairobi can move towards an urban metabolism that is ecologically restorative, economically viable, and socially equitable.

Keywords: Artificial Intelligence, Machine Learning, LSTM, Municipal Solid Waste, Decision Support System, Vehicle Routing Problem, Smart Cities, Circular Economy.

A Review on The Use of Robotics in Integrated Waste Management Through Artificial Intelligence & Machine Learning

Mohammad Usama*

Department of Environmental Science, Integral University, Lucknow, India

*Corresponding Author: mdusama@iul.ac.in

ABSTRACT: The development of artificial intelligence and machine learning is playing an important role in different aspects of urban lifestyle. It is now playing a significant role in ensuring sanitation and health in cities through the use of AI-powered robots in integrated waste management. AI-powered robots use artificial intelligence and machine learning in waste management, like they use it in automated waste sorting, collection of wastes, trash compaction, remote surveillance, under water clean up and waste to energy facilities. The benefits of bringing automation and robotics in waste management are many like robots can precisely sort and handle wastes. Robots are supported with high resolution cameras, sensors and they use artificial intelligence in identifying and sorting diverse types of wastes like plastics, paper, metal etc. from mixed streams. It is very effective in reducing occupational health concerns like injuries to workers from hazardous wastes. Waste collection and transportation have been transformed entirely through the use of robotics, as it involves using autonomous vehicles having robotic arms for waste collection and optimizing the routes. The volume of trash in bins is reduced as robotic systems can compact waste. Floating debris can be also removed from water bodies by robots. Waste disposal sites can be managed effectively through surveillance robots and drones having cameras and sensors. Waste Disposal in landfills gets reduced by automation as recycling rate of wastes increase and natural resources are also conserved through effective recovery of materials. Automation brings cost reduction in waste management, as it lowers the cost of labor and also helps in achieving environmental sustainability through efficient resource management. AI supported sorting of wastes provides flexibility and adaptability as they can identify new materials and can also adapt to varying waste streams. This is not possible in manual sorting of wastes. Some of the successful case studies regarding use of robotics in waste management are Zen Robotics (Finland), AMP Robotics (USA), Prairie Robotics, Waste Robotics and Recycleye

Keywords: Artificial intelligence, Machine learning, Robotics, integrated waste management, IoT sensors, automation.