



Technological interventions for promoting sustainability: selected extended papers from an international conference ‘CHEM-CONFLUX²²’

Dipesh S. Patle¹ · Zainal Ahmad² · Sushil Kumar¹

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Background of this Special Issue

Constant growth of population and its never-ending needs have prompted rapid industrialization, which in turn resulted in gradual deterioration of the environment. Energy is central to the human kind and its pervasive consumption has made the tremendous impact on environment as a result of continuously growing and ever-increasing energy needs of society. Hence, technological interventions for promoting sustainability are inevitable to secure clean environment. United Nations (UN) has defined sustainable development goals as presented in Fig. 1. Technological advancements can play a key role in achieving these sustainable development goals. In this respect, CHEM-CONFLUX²², a multidisciplinary international conference, was jointly organized by MNNIT Allahabad (Prayagraj, India) and USM Malaysia (Malaysia) during April 14–16, 2022, with the objective of inviting ideas emphasizing on the thrust areas pertaining to sustainable development. With this special issue, it is aimed to understand the current trends of research that is being conducted pertaining to the broad themes of energy & environment, and to examine the exciting & key research areas that can be taken up further highlighting the inter-disciplinary nature of the field. It is expected that this issue will help the scientific community, in general,

and young scientists in particular to come up with excellent research projects for sustainable development.

Contents of this Special Issue

A total of 233 articles were presented during the conference, out of which 32 articles were recommended for the potential publication in the special issue of *Environmental Science and Pollution Research (ESPR)* journal, based on their scope, quality, and technical superiority. Out of the 32 invited articles, 21 articles were reviewed. Finally, five articles were accepted through the rigorous review process with just about 24% acceptance rate. These five articles cover areas involving smart techniques for prediction of sewer manhole’s life, sustainability analysis of smart materials, biodegradation using novel bacterial strain, metal oxide–clay composite based dye removal, and novel MISO PEM fuel cell, and are as follows:

Prediction of remaining life of RCC sewer manhole using smart material based EMI technique for sustainable environment

Sustainability analysis of sandstone using smart material by EMI approach

*Imidacloprid biodegradation using novel bacteria *Tepidibacillus decaturensis* strain ST1 in batch and in situ microcosm study*

One-pot synthesis of metal oxide-clay composite for the evaluation of dye removal studies: Taguchi optimization of parameters and environmental toxicity studies

Design of model based control strategies for a novel MISO PEM fuel cell control structure

Responsible Editor: Philippe Garrigues

✉ Dipesh S. Patle
dipesh-patle@mnnit.ac.in

Zainal Ahmad
chzahmad@usm.my

Sushil Kumar
sushilk@mnnit.ac.in

¹ Department of Chemical Engineering, Motilal Nehru National Institute of Technology, Allahabad 211004, Uttar Pradesh, India

² School of Chemical Engineering, Universiti Sains Malaysia, Engineering Campus, 14300 Nibong Tebal, Penang, Malaysia

Concluding remarks

With immense pleasure and great expectations, we prepare this special issue of *ESPR* journal. The articles submitted by the contributors were rigorously reviewed to evaluate their

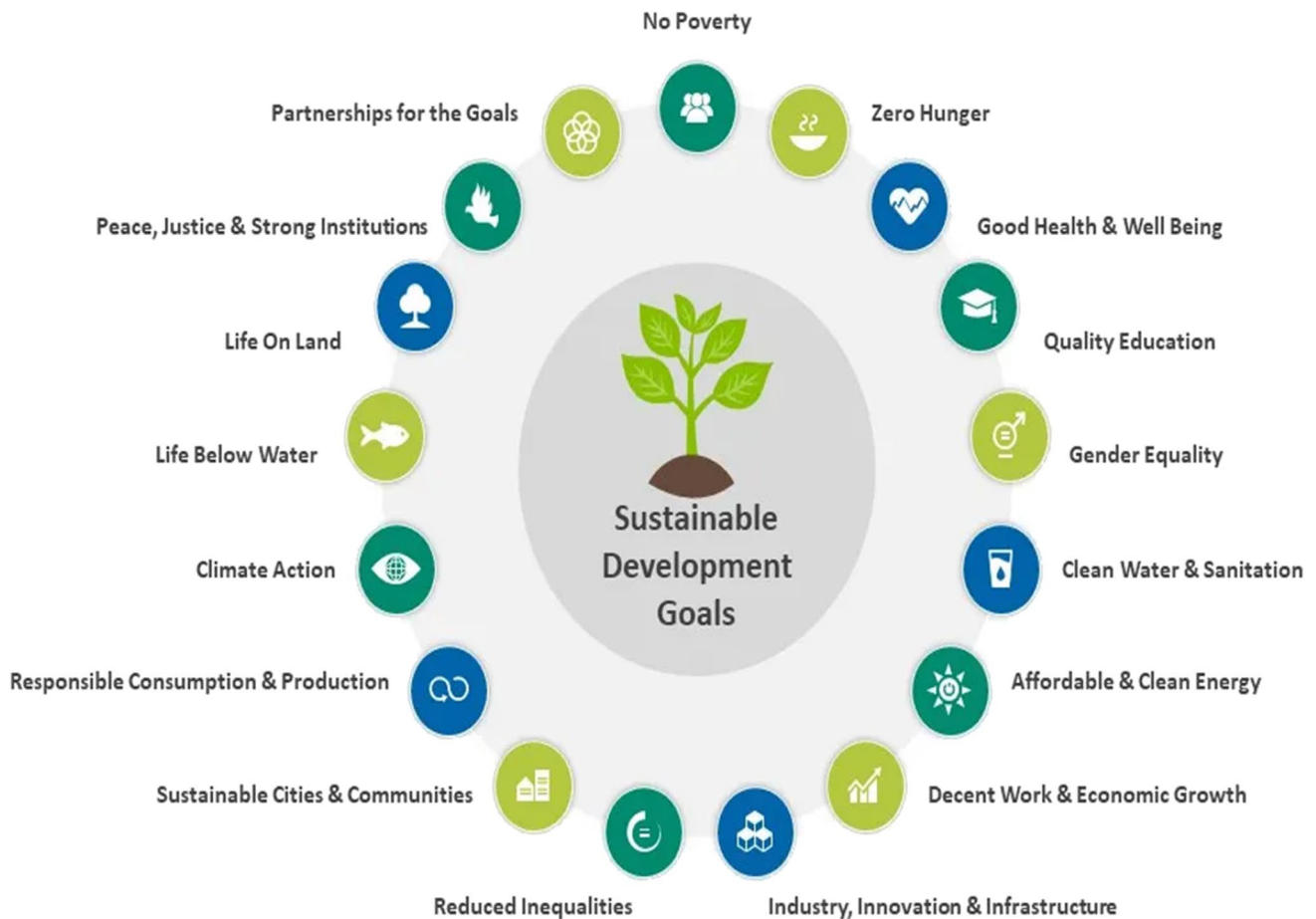


Fig. 1 Sustainable development goals (courtesy: United Nations, <https://sdgs.un.org/goals>, accessed: March, 2023)

technical merits and usefulness in the given context. The revered reviewers and editors have done commendable work at accomplishing the tasks within a given timeline with due dedication.

The objectives of this special issue ‘CHEM-CONFLUX²²’ are to provide a premier multidisciplinary platform for scientists, practitioners, and educators to present progresses and challenges-cum-solutions espoused in the areas of interest and to educate the interested readers about the novel developments of technologies for promoting sustainability. This

special issue sought contributions that can guide researchers, practitioners, and educators in achieving environmental sustainability targets by emphasizing on several issues central to clean environment. In this context, this special issue sought to publish both empirical and theoretical contributions, leading to promotion of sustainability. It is expected that the articles published in this special issue will provide guidance on sustainable technologies for the betterment of environment through clean technologies.

Acknowledgements We sincerely acknowledge the scholastic contributions of the contributors. We hope that this issue of *ESPR* will further sensitize the budding researchers to drive their inventions for achieving an all-round sustainable growth. Finally, we show our deep sense of appreciation to the Editor-In-Chief and staff of *ESPR* for their noteworthy efforts in supporting the CHEM-CONFLUX²².

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Dr. Dipesh S. Patle, Dipesh S. Patle has received Bachelor's, Master's, and Doctoral degree from Amravati University (India), Birla Institute of Technology and Science (BITS) Pilani (India), and Universiti Sains Malaysia (USM) (Malaysia), respectively. He completed his post-doctorate at Politecnico di Milano (POLIMI), Italy. He has worked at BITS Pilani (India), Indian Institute of Technology (IIT) Kharagpur (India), and Vellore Institute of Technology (VIT) (India) in various capacities. Currently, he is associated with Motilal

Nehru National Institute of Technology Allahabad (India). His research interests include biodiesel synthesis, process intensification, simulation, plantwide control, and operator training simulator development. He has many international publications to his credit and has visited several countries for various purposes, including conference presentations. He has completed externally funded projects, funded by various agencies—Science and Engineering Research Board (SERB), New Delhi (Government of India); Research University Grant, USM, Malaysia; Technical Education Quality Improvement Programme (TEQIP), India. Dr. Dipesh has received several awards from various organizations—Sanggar Sanjung Award 2014 (Journal Publication 2014) from USM Malaysia, Graduation on Time (GOT) award from USM Malaysia, Erasmus Mundus Post Doctoral Fellowship from Erasmus Mundus (It's Time for Collaboration TowARDS Close Cooperation (INTACT) in 2016, etc. His work "Operator training simulator" was selected as one of the finalists for the Training and Development Award in IChemE Singapore Awards in 2016. He has guest edited (ing) many special issues for various journals, namely, *Chemical Product and Process Modeling (CPPM)*, *Energy Nexus*, *Journal of Indian Chemical Society (JICS)*, *Environmental Science and Pollution Research (ESPR)*, and *Biomass Conversion and Biorefinery*. He is also a professional member of American Institute of Chemical Engineering (AIChE) and Indian Institute of Chemical Engineering (IICHe).



Prof. Zainal Ahmad, Zainal Ahmad received B.Eng (Hons) in Chemical Engineering from University of Surrey, UK, in 1998. In 2001, he received M.Sc in Applied Process Control (with distinction) from the University of Newcastle Upon Tyne, UK. He also obtained his PhD from this university in 2005. He worked as a process engineer in a petrochemical plant before joining USM in 2000. Besides being responsible for the undergraduates, Dr. Zainal also worked together with his post-graduate students in designing and conducting innovative research projects, to continually enhance his expertise and professional knowledge. In addition to that, Dr. Zainal also conducted training, workshops, seminars, short courses, and consultation for the chemical and process industries.



Dr. Sushil Kumar, Sushil Kumar is performing the research in the domain of reactive extraction of carboxylic acids from aqueous solutions (fermentation broth/waste stream), which are socially and industrially important. Additionally, he is working in the research areas of process intensification, waste water treatment, modeling and simulations, and chemical thermodynamics. He has carried out extensive experimental and theoretical research work in area of separations using reactive extraction. He has

supervised six PhD students, three out of six have completed their PhD thesis in the area of reactive extraction. He has completed one research project under the scheme of Young Scientist "Reactive Extraction of Nicotinic- and Isonicotinic Acids from Aqueous Solution" funded by SERB DST New Delhi. His research has also been funded from UPCST, Lucknow (2018–2021), and TEQIP-II (2014–2015). He has also handled the two major consultancy projects of 100 lakhs each under Namami Gange Scheme of Govt. of India funded by CPCB, New Delhi, in the years of 2017 and 2018. Strong foundation was developed for experimental and theoretical research through these studies. More than 16 master's thesis are also supervised by him in different topics. Currently, he is supervising 40 research students in the areas of extraction, bioremediation, and bio-energy and wastewater treatment. He has published 145 research articles in various refereed journals and conferences of repute (60 journal, 80 conference proceedings, and 50 book chapters). He received a prestigious Outstanding Scientist in Chemical Engineering Award from Venus International Foundation in 2019 toward the recognition of his scientific contribution. He has also been nominated for Bharat Vikas Award 2019 by Institute of Self Reliance, Bhuvanagar.