

Emerging Environmental Technologies and Health Protection

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Preface

A new volume of journal research book series entitled Emerging Environmental Technologies and Health Protection (JEETHP) has been realized, which is a challenge for research dissemination; research and development for stakeholders; graduates; investors; social planners; vocational education, training and all the while keeping in mind not to do any injustice to the zeal of a contributor who has worked so hard to pen the text. However, “Emerging Environmental Technologies and Health Protection” last decades old philosophy has been attracting not only due to the circumstances of post COVID-19 pandemic era but also for integrated environmental public health protection the attention of scientists worldwide. Academicians as well as industrialists are equally interested in this new stream of environmental - chemical science; innovative biotechnologies for health protection; sustainable designs; information communication technologies (ICTs); smart engineering projects; efficient e-learning - training tools; social health policy – social cohesion – media; efficient operation of veterinary units; sustainable tourism; health soil – environmental resources; effective community health units; infant units; forest – ecological infrastructures protection; sustainable designs; efficient construction designs for all; fluid mechanics for the semantics and building capacities between different scientific disciplines in engineering, biotechnology, materials and social sciences for health protection and sustainable development.

Researchers, all over the world, are conducting active research in different fields of engineering, social science and technology by adopting innovative principles and methodologies to devise new processes with a view towards helping, protecting, and ultimately saving the environment of our planet from further anthropogenic interruptions and damage. Achieving sustainability of resources is the basic spirit of innovative sustainable projects; it inspires us to try alternative “green” sustainable approaches in place of traditional “gray” practices in everyday industrial and scientific activities. Waste management, food protection, innovative materials, efficient information technologies and sustainable design avoiding associated hazards and risks is a matter of great concern. It’s quality important for both domestic purposes and industrial needs. Emerging environmental technologies are coming a necessity within clean technologies; waste management; sustainable designs; green chemistry; food productivity; food protection; public health; safety design; innovative materials; landfill emissions' exploitation; social sciences; architectural landscape upgrade; ICTs; IoTs; e-learning; green web utilities; reading materials and educational utilities for vocational training; smart technologies; green cities; sustainable health tourism; sustainable tourism; sports for emotional and physical activities; safe construction designs; environmental health monitoring. They are therefore an important task. But, selecting technology dyes at a cost to the environment that should be avoided when considering which technique to use.

Hence, the far important challenge is to make an applied technique sufficiently sustainable and green within a circular economy. Environmental resources pollution is often discussed with respect to various pollutants and their treatments, but the issue of emerging technologies that support health protection and sustainability has not been discussed sufficiently in the literature. Hence, the emerging environmental

technologies and environmental health protection has tremendous scope worldwide. That is why emerging environmental technologies and health protection is an important issue which needs to be addressed seriously.

The chapters in the current book volume, periodical research series are the outcome of the scholarly writing of researchers of international repute with stellar credentials, who have tried to present an overview of current solutions to particular environmental problems that promote sustainability from different scientific fields. The main aim is to protect human health and environmental resources building capacities that support a sustainable development taken place proper designs and applied environmental technologies, all of which are “green.”

The current periodical book volume contains ten chapters, all of which focus on the theme of green technologies, efficient designs that are sustainable and discuss techniques, tools and materials which are nonhazardous, eco-friendly, protecting public health and social progress from different scientific disciplines.

Nowadays, an important topic is Brucellosis: A Highly Infectious Zoonosis of Public Health and Economic Importance. Chapter 1 presents the semantics about Brucellosis, a highly infectious, neglected, foodborne zoonotic disease, is caused by consumption of unpasteurized milk or undercooked meat of infected animals origin, or direct contact with the discharges. It is the most common re-emerging significant disease globally, and causes a significant human morbidity in endemic regions of the world. Globally, around 500, 000 cases of human brucellosis occur each year. The disease is responsible to cause an estimated economic loss of US dollars 344 billion to the livestock industry. Brucellosis in human beings is especially caused by *B. abortus*, *B. melitensis*, *B. canis*, and *B. suis*. Since brucellosis affects animals all over the world, people who always work with animals or come into contact with infected animal’s blood or other discharges are at higher risk of contracting the disease. Human-to-human transmission of the infection is uncommon; some such instances have happened through breastfeeding, trans-placental transmission, and blood transfusion. The clinical signs of the disease comprises fever, sweating, malaise, anorexia, headache, arthralgias, and back pain. There are three most important laboratory methods for the diagnosis of brucellosis consisting of microbiological, serological, and molecular techniques. The standard treatment for acute brucellosis in adult humans requires a combination therapy of different antibiotics. It is crucial to impart health education to the public to consume only the pasteurized milk, and take care in handling and disposal of foetus, placental membranes, and uterine discharge. Additionally, one health approach including veterinary, medical, environmental, and other related professionals should collaborate to control brucellosis, a life threatening bacterial disease of global importance.

In recent years, numerous epidemiological studies have shown that Lactic acid bacteria are ubiquitous members of many plant microbiomes and several members of the lactic acid bacteria are known to produce antibacterial substances. On the other side, plants and crops care is a big challenge and a hard mission, which must be constantly improved. The status of food security is critical, and protection against losses caused by crop pests and plant diseases is necessary to improve food security. Actually, researchers are looking for new natural and non-toxic antibacterial agents as alternative to control plant diseases and the use of lactic acid bacteria could be a good alternative. Many agricultural groups adopted lactic acid bacteria, as component of

sustainable agriculture, to control plant pests and stimulate plant growth. Thus Chapter 2 focuses on the Lactic Acid Bacteria as Alternative in the Control of Phytopathogenic Microorganisms. Chapter 3, presents useful solutions for the Safety and Precautions of Hotels, Motels, Restaurants and Food Markets in Rwanda for COVID-19.

Chapter 3 presents the case study of Rwanda that is one of the countries in Africa which fight against the COVID-19, setting the several rules for outbreak during opening some activities hand washing where in tax pack, markets, supermarket, churches, carrying nose mask and respect social distancing and respecting all policies of WHO. This article shows how to protect people when the bar and restaurant will be open including methods, discussions and result reduces the rate of spread of pandemic for citizens, tourists and visitors in Rwanda. Nowadays, Coronavirus 2019 disease is a globally declared pandemic viral disease affecting upper and lower respiratory tract, and it is caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). The virus under the genus Betacoronavirus and it is enveloped and has single stranded positive sense RNA genomes with high mutation rate. Bats are suggested to be the natural reservoir of a wide range of coronaviruses. It can be transmitted through airborne droplets to the nasal mucosa in closed environments and direct/indirect contact. Clinical symptoms of the disease include high fever, chills, cough, and difficulty in breathing, diarrhea, myalgia, fatigue, expectoration, and hemoptysis. In addition, acute respiratory distress syndrome, heart failure, respiratory failure, and liver failure are most likely to occur. The general diagnosis of the disease includes consideration of clinical history/signs, travel history, and contact history of the suspected patient. Laboratory tests used to confirm the diagnosis include molecular tests, virus isolation, serological tests, and electron microscopy techniques. It has major public health and economic impact globally. Although viral diseases have no specific treatment, the treatment of the disease is almost supportive. Prevention and control measures of the disease include provision of protective equipment, disinfection, hygiene regulations, isolation and designing isolation rooms. Chapter 4 focuses on the COVID-19: A Life Threatening Disease of Global Importance.

Chapter 5 focuses on a useful Evaluation of the Potential of Building Integrated Photovoltaic Panels in Reducing Electricity Consumption of Public Schools in Kuwait. Electricity consumption in Kuwait is on the rise, and the residents of Kuwait have recently experienced programmed electricity cuts during the hot summer months. The government of Kuwait sells electricity at a highly subsidized rate to its residents. However, newer sources of energy are being investigated to fuel the energy needs of the country. Since the percentage of sunshine during the year in Kuwait is rather high, solar energy becomes a viable option. The purpose of this study is to evaluate the potential of monocrystalline photovoltaic solar panels in meeting the energy needs of the government schools in Kuwait. In 2006 there were 664 government schools in Kuwait, and new schools are being built every year. Schools in Kuwait are large, and their design is simple. This creates a large roof area, which is suitable for PV panel installation. Ten schools were randomly selected in three different areas in Kuwait. The schools were relatively new (built after 1990), and of different educational levels. School plans, electric bills, and occupancy information were gathered from various ministries. The area of each school plan in the horizontal (roof), north, east, south, and west directions was calculated. Using the PVSYST5 software, the solar panels output in each direction was calculated, using a

tilt angle of 30 degrees for the roof and 90 degrees for the elevation. 90% of the roof area was utilized and 50% of the total elevation areas. The results showed that the roof area is the most viable direction for energy generation, producing 211 kWh/m². Several schools needed a fraction of their roof areas to fully cover their energy demand. CO₂ emission savings were also calculated to be an average of 676 metric tons/year per school. It can therefore be concluded that installing PV panels on school roofs is a viable option for solar energy generation.

Enterohemorrhagic *Escherichia coli* (EHEC) constitute a subgroup of serotypes (*E. coli* O157 and some other serogroups) of Shiga toxin producing *E. coli* (STEC) that is associated with severe human diseases like bloody diarrhoea and haemolyticuraemic syndrome. EHEC is an important global zoonotic foodborne pathogen, which is reported from developing as well as developed nations of the world. EHEC rarely causes disease in animals but ruminants are recognized as their main natural reservoir. Cattle are considered to be the most important source of human infections with EHEC O157. Faecal-oral- route is the chief mode of transmission. Humans may acquire infection by the ingestion of raw ground beef, other animal products and contaminated fruits and vegetables, direct contact with animal carriers, their faeces, and contaminated soil or water. The affected persons exhibit the signs of water diarrhea, hemorrhagic colits, abdominal tenderness, severe abdominal cramps, low grade fever, nausea, vomiting, dehydration, hemolytic anemia, and kidney failure. The mainstay of treatment is the assessment of dehydration and replacement of fluid and electrolytes. Proper hand washing after using the lavatory or changing a diaper, especially among children or those with diarrhea is imperative to reduce the risk of transmission. Chapter 6 focuses on Emerging Role of Enterohemorrhagic *Escherichia Coli* As a Global Foodborne Pathogen.

Thinking is considered the foundation of everything we can do it. Every action, every solution, and every decision that is the result of thinking. We think when we decide what to eat for lunch, how to meet a project schedule, and what to say during a conversation. We think when we drive a car (although, unfortunately, we're not always thinking about driving). We are thinking all the time, and although not always filled with valuable thinking, our brains are in gear. Even when we are sleeping, we are thinking. As teachers teaching of thinking skills requires to intervene at the level of the mental process and teach individuals what processes to use when, how to use them, and how to combine them into workable strategies for task solution. The current paper aims at showing the main characteristics of Thinking, thinking in a context, and components of thinking. Chapter 7 focuses on Teaching of Thinking.

Chapter 8 presents the importance of Environmental Health Landfill Emissions – Environmental Resources Utilities for Soil Health and Sustainable Development. This chapter analyses the role of environmental utilities in terms of public health protection and sustainability from landfill emissions. Useful analysis is taken into account based on hydraulics so as to mitigate rheological toxic hazardous concentrations at landfill's biodegradation - bottom leachates migration and efficient economic designs. Integrated management techniques are presented for landfill emissions. Useful results are presented for the safety of veterinary units, safe sports physical activities for all and sustainable tourism infrastructures.

Moreover, chapter 9 presents Efficient E-Learning Framework – Digital Reading and Green Utilities for Public Health and Sustainability. The aim of this study is to better understand the role of e-learning related to

digital reading materials for all, and associated training courses related to environmental health, land - scape architecture, emotional, physical sports activities, educational hydraulics. The integrated waste management solutions, efficient landfill designs for public health protection and recreational sports, other sustainable educational health tourism activities, upgrade of landscapes next to landfill boundaries are presented. In this study is investigated the right operational project management of efficient monitoring design re - lated to efficient constructions at community health facilities utilizing properly geoinformation utilities. An educational e-learning framework is presented for sustainability using proper digital reading material for vocational educational training, digital content from linguistics, demonstration of green utilities associated with efficient constructions around recycling, renewable resources, sports, sustainable tourism facilities, architectural landscape upgrade and recreational facilities in green circular social economy.

Furthermore, chapter 10 presents Mitigation of Environmental Health Risks Within Safe Openings at Buildings Close To Sanitary Bioreactors. In this paper a review is made for efficient operational building designs and associative construction facility management for people living at post COVID-19 era in a communal health tourism building care unit or other kind of buildings close to landfill sites. Literature review is presented on studies around sustainable sanitary designs concerning social and operational problems of people with particular disorders living at safe buildings with qualitative environmental health next to proper ecological health tourism infrastructures. Efficient safe building designs are necessary supporting particular facilities management at ecological health tourism infrastructures, sports constructions in physical activities for all ages giving assistance to people with particular disorders not to be excluded from society. A risk assessment framework is presented with useful conclusions for efficient communal building designs, other buildings and efficient sanitary engineering designs for people with particular disorders in safe care communal sports facilities within green circular economy.

Furthermore, this book volume of periodical research series can be used as an important platform to inspire researchers and stakeholders in any related fields in order to develop sustainable processes for important techniques for use in associated fields of green projects; sustainability; food productivity; food protection; waste management; biotechnology; materials; safety design; monitoring; public health protection; ecological health; community health; geohealth; sustainable circular economies and associated information communication technologies. We gratefully acknowledge all the contributors of this book, without whom these valuable chapters could not have been completed. We express our highest gratitude and thankfulness to all of them.

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Acknowledgments

After the successful publication of last volume again completing a task like the publication of the current third volume of relative journal book chapters, at JEETHP's sections in this task it takes time to rewind again your journey and relive it through memories, you remember people with encouraging faces that have motivated you to complete the task with untiring efforts to your full ability. Such smiling faces remove any pain of stress encouraging us to "Go ahead."

In the post COVID-19 pandemic era we have all to be careful following the right guidelines that are recommended by the Authorities and relative Public Health Organizations for the public health protection. However, we want to express our special thanks to all esteemed contributors of this book, who deserve special mention for contributing their writings, without which this book would not have been possible. We deeply acknowledge our families for their never-ending encouragement, moral support and blessings. We appreciate their patience over the course of this book. We are also thankful to many others whose names we have not been able to mention but whose association and support has not been less in any way.

Brief Biographies of the Editors

Prof. Dr. Tilemachos K. Koliopoulos is a very well-known author of many books, educational notes, research journals and hundreds of articles over the last twenty years. He has been scientific and laboratory collaborator giving lectures in the fields of environmental management, sanitary, civil, environmental and geo-information engineering during the last years at Technological Educational Institute of Athens, Department of Public Health and Community Health and at University of West Attica in Athens, Greece. He has been Professor of Technical Academy of Greek Air Forces. He has been Visiting Professor giving lectures, RD's presentations and seminars for Universities and others in Europe and overseas. Currently he is Managing Director of the Telegeco Research & Development Center. He did his PhD at University of Strathclyde in Department of Civil Engineering, Center of Environmental Management Research, in Glasgow in the U.K. His research has been in Numerical Modelling and Associated Risk Assessment in sanitary, environmental, civil engineering subjects. His research interests are focused on the development of right techniques for Public Health's protection; CFD; waste recovery; circular economy for smart cities; construction materials; atmospheric chemistry; sustainability – energy; clean technologies; optimum landfill design; environmental chemistry; hydraulics – hydrology; numerical modeling; simulation learning tools; ICT's; IoT's; VLR's; food protection; biotechnologies; biomass treatment; waste management; monitoring environmental resources and emissions; sanitary drawings; landfill gas; leachates' treatment; landfill emissions; risk assessment; web g.i.s tools; project management; sanitary engineering designs; community health building facilities; efficient construction designs; sustainable tourism; quality assurance; econometrics; decision making and sustainable development designs. Also he has made postgraduate studies Master of Environmental Studies at University of Strathclyde, Master of Business Administration at Open University of Greece in project management and I.C.T's for the protection of environmental resources and public health. He is a chartered civil engineer finished civil, environmental engineering studies at National Technical University of Athens in Greece. He has been specialized in information and communication technologies for Public Health's protection and Sustainable Designs solving proper CFD, environmental engineering computational problems, project management and operational management problems applying particular geo-information communication utilities. He has worked for National Agricultural Research Foundation in Greece as well as at several projects in environmental, civil and sanitary engineering for public health protection in public and private sector. He has been Member of the Editorial Board, reviewer of several Scientific Journals. He has been member of various international professional societies including the Greek Association - Society of Civil Engineers; American Society of Civil

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Prof. Dr. Mahendra Pal, Emeritus Professor, Ex-Professor of Veterinary Public Health (UNDP), Addis Ababa University, Ethiopia, is an internationally renowned scientist, and a well known distinguished academician with 601 publications and 8 books. Prof. Pal also worked as Professor and Head, Department of Veterinary Public Health, Anand Agricultural University, India. He is associated as Editor and Member of many online journals. Prof. Pal guided over many students at DVM, MVSc, MSc, and Ph.D. level in India and Ethiopia. He is credited to develop Pal's medium, APRM medium, PHOL stain and Narayan stain for the study of fungi, which are implicated in the clinical disorders of humans and animals. Prof. Pal elucidated for the first time the role of *Cryptococcus neoformans* in the mastitis of goat and buffalo, *Fusarium solani* in corneal ulcer of buffalo, *Aspergillus fumigatus* in rhinitis of camel and mule, *Trichophyton verrucosum* in

dermatitis of deer, and *Candida tropicalis* in human lung empyema.

He has established for the first time the prevalence of *Cryptococcus neoformans* in the environment of New Zealand, Nepal, and Djibouti. Prof. Pal has reported the first isolation of *Candida albicans* from mastitic milk, and *Trichophyton verrucosum* in dermatitis of camel in Ethiopia. Prof. Pal launched the Ph.D. programme for first time in Veterinary Public Health at Addis Ababa University, Ethiopia and also at College of Veterinary Science, Anand, Gujarat, India. His biography is published in World's Who and Who. Prof. Pal is recipient of many award including "Distinguished Teacher Award", "Jawaharlal Nehru Award", "International Achievement Award", and "Life Time Achievement Award". Prof. Pal delivered guest lectures in medical and veterinary colleges in India, New Zealand, Japan, and Ethiopia. He is the "First Indian Veterinarian" who worked as "JSPS Visiting Scientist" at University of Tokyo, Japan. Considering his immense contribution, Prof. Pal is known as "Father of Veterinary Mycology" in India. Very recently, he launched "Narayan Consultancy" on Veterinary Public Health and Microbiology to give free technical advice to scientists of poor resource countries of the world.

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