

Environmental Engineering
Educational Program of the
Faculty of Engineering, Universidad
de Ciencias y Artes de Chiapas
20th anniversary

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This issue of the Journal *Espacio I+D Innovación más Desarrollo* of the Universidad Autónoma de Chiapas commemorates the twenty years of creation of the degree in Environmental Engineering, an educational program of the Faculty of Engineering at the Universidad de Ciencias y Artes de Chiapas - UNICACH. We want to share some of the results and contributions of its graduates, researchers, and collaborators. Over the years, they have managed to create a community that remains current in the face of the challenges of climate change, monitoring compliance with environmental legislation and regulations for the equitable administration of the valuable natural resources provided by our entity and the region for the world. Various social organizations and governments recognize the crucial importance of environmental engineering professionals in the protection and restoration of the environment, which highlights their important role as the current metaphor "healers of the planet".

Since its inception, the program has trained high-quality, competent, and ethical human resources at the undergraduate and graduate levels. Along the way, ties of friendship and collaboration have been strengthened with academics and researchers from various higher education institutions, such as UNACH, who today contribute to the publication of this issue for academic and scientific dissemination purposes. We greatly appreciate the collaboration of its graduates who continue their specialization or work in institutions such as the Tecnológico Nacional de México through the Instituto Tecnológico de Tapachula and the Instituto Tecnológico de Tuxtla Gutiérrez, the Universidad Autónoma de Chiapas, the Municipal Civil Protection Secretariat of Tuxtla Gutiérrez, the Fundación Cántaro Azul A.C., and, of course, the Universidad de Ciencias y Artes de Chiapas.

This issue includes 7 articles, most of which converge on environmental problems and natural phenomena of high concern to society and that continue to be a challenge in the search for joint solutions, about the management of urban solid waste, the generation of wastewater in different economic sectors, the governance of water resources in communities and alternatives for their disinfection, the treatment of complex wastewater, and seismic risk in the metropolitan area. The contribution of each article is reflected in aspects that affect society in general and show the need to

continue addressing these challenges, taking into account the social, academic, business, scientific, and government sectors in a comprehensive way.

The approach on the inadequate disposal of solid waste that is generated in each house, workplace, or public space by each inhabitant in our state, as well as its management, are clearly presented in "Waste Destination: A view of its impacts", which provides a global vision on the final garbage disposal in Mexico, as well as its main environmental and social impacts. "Study of Generation of Municipal Solid Waste in the Municipality of Chiapilla, Chiapas" presents in detail the per capita generation and composition of waste, as well as management strategies that include the modification of local regulations and the importance of environmental education campaigns, to improve the current conditions for the study site.

The issue of water resources is of urgent and relevant importance both locally and internationally, requiring the permanent efforts of each sector of society. In this order, some of the authors of this publication address issues that deal from community organization in the rural and indigenous context that ensure access to water in their context, which has allowed progress in the fulfillment of the human rights to water and sanitation, such as "The case of the Association of Water Management Committees in the Municipality of Sitalá". As well as the explanation of the impacts of pollutants such as fats and oils in wastewater from the hotel sector in the Mexican Caribbean, in addition to its challenges, alternatives, and recommendations for reducing its impact. Another scenario that discloses corrective strategies in wastewater treatment is the article "Application of an electrochemical process to treat liquid waste from GRAM staining tests" where the authors present the treatability tests for a very complex wastewater to treat given its high organic load and low biodegradability, this process can be a real treatment option for complex mixtures of dye residues. Another related alternative in the reduction of impacts on water is the obtaining of organic dyes that can be obtained at low cost and that contribute with a disinfectant action in water, this issue is shown in the article "Spectral Characterization and True Color Analysis of Different Natural Dyes such as *Bixa Orellana* and *Brassica oleracea* var. *Capitata* compared to *Indigofera suffruticosa* and *methylene blue*".

Finally, this issue presents "Seismic hazard in the metropolitan area of Tuxtla Gutiérrez: two case studies", where the authors seek to contribute to the understanding of seismic hazard in the Metropolitan Area of Tuxtla Gutierrez, through the analysis of historical damage and soil characteristics as a fundamental element in the site effect in the region, using a methodology based on Geographic Information Systems. Maps are presented that can be used as key tools for risk management and urban planning in the region.

The works presented in this publication show only a small part of the wide diversity of problems related to the environment, its preservation, conservation, management, and administration of natural resources that do not compromise their availability for future generations and where the role of environmental engineering occupies a relevant and necessary place to contribute to the public and private order.



Figure 1



Figure 2

In commemoration of the 20th anniversary of the Environmental Engineering educational program of the UNICACH's Faculty of Engineering, we would like to express our deepest gratitude to the 29 generations of graduates for taking the spirit of our degree beyond the classroom and transforming it into concrete actions that transform the world through their success and commitment as a reflection of the quality and dedication of the effort in their academic training. To the directors who have believed in the educational program and have been key to positioning our degree as a driver of change. To the teachers for being the backbone of this achievement, who have inspired generations of environmental engineers to work for a sustainable future with their teaching and commitment. To the administrative staff, whose constant support and daily effort allow us to keep everything going enthusiastically and fundamentally for our community.

Thank you for being part of this history and building a legacy that will continue to positively and favorably impact our society and the environment.