



“Gheorghe Asachi” Technical University of Iasi, Romania



EDITORIAL

A SPECIAL ISSUE ON

PROGRESS IN ENERGY AND ENVIRONMENTAL SUSTAINABILITY FOR GREEN DEVELOPMENT OF URBAN AND RURAL AREAS

The special topic “***PROGRESS IN ENERGY AND ENVIRONMENTAL SUSTAINABILITY FOR GREEN DEVELOPMENT OF URBAN AND RURAL AREAS***” focus on the important issues of energy resources and anthropogenic pollution of the environment in modern agriculture and industrial manufacture, and proposes some ideas and methods for green progress in sustainability of energy and environment.

Industrial pollution is one of the leading causes of pollution worldwide; for example the United States Environmental Protection Agency estimates that up to 50% of the nation's pollution is caused by industry. Because of its size and scope, industrial pollution is a serious problem for the entire planet, especially for nations which are rapidly industrializing. This form of pollution dates back to antiquity, but widespread industrial pollution accelerated rapidly in the 1800s, with the start of the Industrial Revolution, allowing for a much greater volume of production, but generating a corresponding increase in pollution.

During time, pollution problems manifested due to the use fuels like coal, which is notoriously unclean; water pollution, caused by dumping of industrial waste into waterways; improper containment of waste, which causes leakage into groundwater and waterways. Industrial pollution impacted also air and soil quality, causing extensive environmental problems.

In this context, the main goal of the topic was to address the progress of the advanced energy and green environment in modern agriculture and industrial manufacture. All the papers selected for this issue are devoted to generate a framework for

understanding and formulation of actions meant to develop feasible solutions, taking into account a variety of institutional, social and international perspectives.

Jijun Gao et al. elaborated a survey on typical organic pollutants and health risks of main water sources in Yellow River Basin and provided the data on the levels of the 17 compounds in the fifty source water sites. At the same time, the health risk (including cancer risk and noncarcinogenic risk) of the target compounds in the fifty source water sites for the potential exposed population was evaluated with the health risk assessment model.

Yuqiao Long et al. proposed a coupled karst-porous groundwater model based on the adapted general head boundary. The coupled model can be used for macroscopic groundwater management of a karst-porous groundwater system in Taiyuan. The setting of tank model depends on the observation data of artificial discharge and nature recharge/discharge which always are observed annually or monthly, so the tank model is usually used to simulate the karst groundwater level and deficit, at an annual or monthly time scale.

Junfeng Dou et al. studied the naphthalene degradation characteristic in soil inoculated with the mixed denitrifying bacteria. They found that the enriched mixed bacteria obtained in their study were more efficient to degrade naphthalene under nitrate reducing conditions, and could potentially remediate soil contaminated with naphthalene using nitrate as terminal electron acceptors.

Jiang Yu et al. analyzed water quality and biodiversity of surface microlayer in fresh waters.

Their results suggest that the research of the surface microlayer in sea and fresh waters should pay more attention in the future, for water environment monitoring, assessment and pollution control.

Lu Shi-bao et al. elaborated a risk analysis of hydraulic engineering constructions. They applied the basic principle of analytic hierarchy process to establish three-layer structure system of hydraulic engineering construction risk. Strengthening engineering measures of leakage prevention and deformation for the agricultural hydraulic engineering constructions can ensure for social benefit and ecological benefit.

Zhang Chen et al. have a research of the evaluation of urbanized ecological environment quality, based on the case study on Beijing Chaoyang District. The analysis of the land use change provided insight into the nature changes that had taken places in Chaoyang District. Population density, green coverage rate, ecological land per capita and construction land per capita were the most important factors affecting ecological environment quality.

Huafeng Deng et al. developed experimental research on changes in the mechanical property law of reservoir bank sandstone under "immersion-air dry" circulation. They considered the time-dependence of water-rock interaction and the impact of water pressure changes on the rock samples, which made the experiment conditions more close to reality. The relevant experiment methods, experiment results and conclusions can also provide a useful reference for advanced studies on other rock mass degradation laws.

Zhidang Yang et al. analyzed the characteristic of adsorption of dibutyl-phthalate (DBP) on humic acid. The results suggest that the adsorption efficiency increases with increasing equilibrium-concentrations of DBP, and the relationship between them can be well described by Langmuir equation. Also, temperature is an important factor affecting the adsorption and desorption of DBP on humic acids.

Liu Bo et al. have performed a research on the dynamic compression mechanical characteristics of rock material with different weathering degrees. The study found that the compressive strength, Young's modulus of granite specimens with different weathering degrees are all increased with the increase of loading rate, while Poisson's ratio is decreased with the increase of loading rate. As the increase of weathered degree of the granite specimens, the rising rate of compressive strength is increased, while the rising rate of Young's modulus remains unchanged. Their results provide basic parameters for the theoretical research of the response of rock mass structures under earthquake loads.

Yang Yongkang et al. studied the *in-situ* ecological construction technology in desert open-pit mining area. They have shown that a better environment can be created with the application of *in-*

situ ecological construction in desert open-pit mine. *In-situ* ecological construction emphasizes pre-planning and ecology protection in the process of mining.

Bin-song Wang et al. studied the ecological inhibition of sulfate-reducing bacterial activity and associated population succession in oilfield flooding water. They found significant changes in microbial diversity before and after the eco-suppression, and dominant functional bacterial populations shifted from sulfate-reducing bacteria to those capable of denitrification. These results indicate that the utilization of eco-inhibitors have successfully inhibited the sulfate-reducing bacterial activities.

Gang Wei et al. analyzed the additive load of pipe jacking construction on adjacent pile. The results show that the variation of the additional load is a three-dimensional problem closely related to the relative position of the boring machine and the pile.

Qi Yuanjing et al. developed a coordination analysis on urbanization level and land use efficiency of Xinjiang areas based on Exploratory Spatial Data Analysis. They suggested that counties in Xinjiang can be divided into five types: synchronization coordination type, lagging urbanization type, lagging land benefit type, gradually fitting type, and low level coordination type. The synchronization coordination type cities are few. They are center and secondary center cities with relatively high development level and the number of cities that fall in other types is relatively even.

Hongxia Zhang et al. analyzed dynamics of land use/ cover change in Iraqi marshlands using remote sensing techniques. They found that cumulative impacts of dam construction upstream and intensive drainage schemes in and around the marshlands have been destructive for the Iraqi marshlands.

Song Yantun et al. evaluated the impacts of urban landscape functional types on urban greenspace. According to different urban landscape functional type, the authors try to establish the comprehensive disturbance measurement index system of artificial control city environment.

Liang Wang et al. developed an experimental study on effects of different carbon sources on phosphorus removal during denitrifying process in the parallel A²O-MBR system. The proposed system was inoculated with the sludge collected from the secondary settling tank in a municipal sewage treatment plant. The activity of denitrifying phosphorus accumulating bacteria was promoted for the phosphorus uptake in anoxic conditions. The simultaneous denitrification was also improved indirectly, while the total nitrogen removal was increased by more than 15% due to the change of the carbon source from sodium propionate to sodium acetate.

Yun Ma et al. have a research of the assessment of heavy metals contaminations from solidified waste drilling mud landfilling pond in ordos plateau (semi-arid region) in China. They considered that a focus on the solidification/stabilization of heavy metals in waste drilling mud and improving long-term performance of impermeable layer in the present condition is essential.

Junfei Chen et al. carried out the risk assessment and classification for detention basins based on particle swarm optimization - support vector regression (PSO-SVR) in Huaihe River Basin, China. The study shows that the PSO-SVR model is effective for flood risk assessment of detention basins and can provide decision-making support for detention basins management.

Liqiang Ma et al. developed a simulation study on water-preserved mining in multi-excavation disturbed zone in close-distance seams. They studied the moving characteristics of overlying strata and the development rules of water-flowing fractured zone in multi-excavation disturbed zone in close-distance seams, and analyzed the feasibility of water-preserved mining in multi-excavation disturbed zone. The research results provide reference for water-preserved mining in close-distance seams.

Xue Qiang et al. performed an investigation of the recovery efficiency of methane using vertical wells operating in landfills. The monitoring data and analytical results showed that Numerical Simulation of Gas Volume Method can carry a more comprehensive evaluation of methane recovery in landfill relative to EPA method, and cover system produced by Ecological Sludge Evapotranspiration Technology was more efficient in restraining cracking and increasing the methane recovery efficiency.

Zhentao Wang et al. developed an experimental investigation on wet flue gas desulfurization with electrostatically-assisted twin-fluid atomization. The removal test indicated SO₂ removal efficiency increased and increasing tendency became slower with increasing voltage and Ca/S ratios.

Wenting Wu et al. explored landscape design of community parks from ecology and recreation perspectives. They have taken the central park in Dengta community of Lishui landscape as case study for design analysis. They found that Ecological recreation Community Park can meet people's multi-level needs in a limited space.

Jialing Zhang et al. investigated the effects of chlorine ions on the photoelectro-catalytic degradation of organics using highly ordered TiO₂ nanotube arrays. It was found that the effects of Cl⁻ on TiO₂ nanotube arrays electrode and TiO₂ nanoparticles film electrode were different.

Dengfeng Wang et al. approached the problem of optimization of casing wall design for electrostatic precipitators. By setting wall columns

and wall beams, the total steel consumption of casing wall structure is comparatively small when the whole wallboard is divided into blocks whose aspect ratio is about 1.3-2.0.

Minghui Xie et al. elaborated some research on cleaner production potential in Liao River Basin based on system dynamics. They suggested that cleaner production remained mainly targeted towards particular manufacturing processes and business strategy within individual companies. In order to further enhance its effectiveness and efficiency, it should be applied at a level of one system, such as one basin.

Song Yantun et al. analyzed polycyclic aromatic hydrocarbons in different soils and vegetables from the Pearl River Delta, South China. One of their results showed that concentrations of PAH in paddy soil were slightly higher than those in vegetable soils.

Feng Xu et al. make a dynamic simulation of China's carbon intensity and energy intensity, focusing on industry and energy structure adjustments by 2020. The dynamic simulation analysis based on LINGO programming, suggested that the carbon intensity and energy intensity in China can be reduced with 43% and 46%, respectively.

Zhao Ying et al. analyzed some effects of acidic and alkaline pollutants on thermal behavior, microstructure and mechanical properties of clays. The analysis suggested that strong acids and alkali accelerated the chemical reaction between chemical solution and clay particles, and caused the release of minerals in clay particles, which further lead to the pore development, and finally the increase of permeability coefficient and the decrease of unconfined compressive strength. The corrosion of the clay by acid solution was stronger than that generated by alkaline solutions.

Liang Chunling studied the wetland ecosystem services based on emergy analysis of Lake Nansi in Shandong, China. Adopting the theories and methods of emergy analysis, the annual average emergy input-output of the Lake Nansi wetland ecosystem is calculated. Further, the emergy analysis chart is drawn to evaluate the energy flow and the economic value of the lake. The input and output emergy, the emergy-currency value, the emergy investment ratio, the net emergy output ratio and the environmental load ratio are calculated and analyzed for investigating the energy flow and distribution of the Lake Nansi wetland ecosystem.

Xuyao Qi et al. studied environmental hazards of coal fire and its prevention in China. The turning off methods of peeling and removing, water or grout injection, foam injection, gel injection, three-phase foam and sand-suspended slurry are discussed. The authors concluded that some progresses have been made in coal fire prevention. However, because of the complexity of coal fire, it is still difficult to detect and extinguish coal fire efficiently.

Zi Tang et al. made an estimation of carbon dioxide emissions and spatial variation from tourism accommodation in China. Based on their results, the authors considered that the next step for the research emphasis should improve the estimation accuracy, and forecast the tendency of carbon dioxide emissions.

Mingwei Guo et al. have a study on environmental geological problems caused by slope management. In case study, the anchors were supported on the slope surface based on the calculating results of slope stability, and the grass seeds were suggested to be planted among the

anchors on the surface of the slope, which protect the surrounding environment near the bridge.

In this topic, we concern for the progress of the advanced energy and green environment in modern agriculture and industrial manufacture, and proposed some approaches and schemes possible to be studied and applied for ensuring energy and environmental sustainability for green development of urban and rural areas.

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Guest editor:

Professor Guoqing Li

*Northeast Electric Power University of Shenyang,
China*



Guoqing Li (1963) is a *Professor* at the Department of Electric Power Engineering, within the Faculty of Electrical Engineering of the *Northeast Electric Power University* of Shenyang, China, *Project Director* of the over 20 grants and research themes. His research interest includes: operation analysis and control of large-scale wind power network, running condition monitoring of high voltage electrical equipment, power system analysis of optimization the operation, industrial safety and energy conservation, electric power environmental monitoring. He is author or coauthor of 12 books, and published more than 100 papers. He is the director of the scientific industry research institution of Northeast Electric Power University, and the expert receiving special government allowance from China State Council.