

Flood Prioritization in Sub- Watersheds Based on Morphometric Parameters Using GIS Techniques

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Abstract

Among natural disasters, flood is one of the most widespread and largest hazards which result in high costs and heavy destruction. Hence, prioritization of potential flooding areas has gained importance in natural resources management, especially in the context of watershed management. The aim of this study is prioritization of flooding in sub-watersheds based on morphometric parameters using GIS techniques. For this, Pol-Doab Shazand watershed was divided into 24 sub-watersheds on the basis of relief ratio, change in drainage density, area of the whole watershed and crests. Then, 10 Morphometric parameters namely drainage density, bifurcation ratio, stream frequency, length of overland flow, form factor, shape factor, elongation ratio, circulatory ratio, compactness coefficient and derange texture were obtained for each sub-watershed. Various morphometric parameters including linear and shape characteristics were determined for each sub-watershed and assigned ranks SW1 through SW24 on the basis of value and relationships. Therefore, sub-watersheds were classified into three categories of high, medium and low in terms of priority for soil and water conservation measures. The results show that 14 sub-watersheds (SW5, 7, 8, 10, 11, 12, 14, 15, 16, 17, 19, 20, 22 and 23) out of the 24 qualified for high priority class, 6 sub-watersheds (SW6, 9, 13, 18, 21 and 24) categorized as medium priority and 4 sub-watersheds (SW1, 2, 3 and 4) were categorized as low priority based on the integration of morphometric parameters.

Keywords: Prioritization, Flooding, Morphometric parameters, GIS

Evaluation of Environmental Impact Assessment Process in Iran: Challenges and Solutions

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Abstract

More than 15 years has passed since the Council of the Environmental Protection in 1994 required reporting on environmental assessment of plans and projects by the developers. During this period, in addition to stabilizing the country's legal status for environmental assessment process the number of plans and projects subject to environmental assessment increased from 7 to 51. The number of reports increased dramatically over recent years. Hence, during these 15 years, about 1382 projects have been reported and decision made about their fate. Consequently, economic conditions, social, cultural and political challenges and problems facing the country have also been analyzed and ways that can cause the system to enhance the environmental assessment of the country reviewed. Results show the environmental impact assessment process in the country and the rules and regulations for this are fairly well. However, the executives in various sectors such as agencies, project promoters, consultants and experts declare that there are weaknesses and challenges needed to be resolved in a comprehensive manner and the environmental assessment requires empowerment in all sectors.

Key words: Assess the impacts, Challenges, Strategies, Rules and regulations

Distribution of Cadmium in Isfahan Urban Area

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Abstract

Inorganic pollutants, heavy metals and trace elements such as nickel, cadmium, mercury, lead and copper was studied. Generally, heavy metal is a chemical element with a density higher than 5.5(g/mol). Cadmium is produced through the consumption of refined cadmium, copper and nickel smelting and fuel combustion. This project aimed to examine the distribution of cadmium in the urban areas of Isfahan Province and evaluate soil contamination and the effect of various factors in this regard. Traffic was studied in the City and 14 samples were taken from surface soil with a minimum distance of 750 m in an area of 10177 hectares and transferred to the laboratory. Then, using the standard methods of soil analysis parameters CEC, EC, pH and Cd were measured.

The highest amount of cadmium was 10.5 (mg/kg) in Khorram Street and the lowest 1(mg/kg) in the three-way Hakim Nezamy and the average concentrations of cadmium was 3.7 (mg/kg). The sparsely populated areas and the residential areas between the two sides of the river namely Bozorgmehr Bridge and Nazhvan Bridge and Parvaz Square showed a very low contamination.

Key words: Heavy metals, Cadmium, Urban area Isfahan

Contamination Factor and Comprehensive Pollution Index (A Case Study in Nahavand City)

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Abstracts

Any change in the environmental characteristics such that the normal functions and biological balances are disrupted and life of organisms is threatened directly or indirectly is called environmental pollution. The purpose of this study was to determine the contamination with heavy metals Chromium, Copper, Nickel and Zinc in soils of Nahavand city, Hamadan Province using different indicators. A total of 39 soil samples were taken systematically and concentrations of Chromium, Copper, Nickel and Zinc were measured using a spectrophotometer. Geo-accumulation index, contamination actor and Nemeru comprehensive pollution index were used to determine the extent of contamination in the study area. Results showed that the Cobalt concentration in the region is at the maximum allowable concentrations based onr other countries. The Geo-accumulation index results showed that the rate of accumulation of the index is between 0 and 1 for all metals. Concentration of heavy metals in soil was related to their natural origin. Contamination factor results showed that most samples were moderately to highly polluted. Contamination factor for Chromium was the highest and 10.26% of the data showed they were moderately to highly polluted. Analysis of interpolation maps of comprehensive pollution index showed that the metals Chromium, Copper, Nickel and Zinc have geological and agricultural origins. These metals are present naturally in soil, but human activity has caused the accumulation of these metals in the soil.

Key words: Geo-accumulation index, Contamination factor, Nemeru comprehensive pollution index, Heavy metals, Nahavand

Uncertainty Management in the IUCN Red List Assessments

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Abstract

Nature and information derived from it are full of uncertainties. Uncertainty is not considered a problem; rather it is a characteristic of data sources and needs proper consideration and management. Mismanagement or neglect of uncertainty may lead to ambiguity and errors in results. As most information sources used for species threat classification are incomplete or uncertain, we need to address these issues when applying red list criteria. This approach can also be used in Environmental Impact Assessment process. Recent developments in uncertainties management have resulted in improved red list assessment. Fuzzy logic has been used in the improved versions of these assessments and this topic forms the main core of the present paper. Here we deal with uncertainties, its sources, types and the way to handle them in red list assessment and its advantages and disadvantages.

Key Words: Uncertainty, Red list assessment, Fuzzy logic, Fuzzy management of uncertainty.

Integrating Economic Valuation and Environmental Impact Assessment in Iran: Challenges and Solutions

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Abstract

Today, environment is considered as one of the main components of macroeconomic policy which overshadows other components. That is why the most important factor of and a prerequisite for any type of macro-level activity is its environmental compatibility. During recent years, many have attempted to estimate the costs caused by various environmental pollutions and destructions to organize managing actions and make right and efficient decisions on the design and performance of developing process. The lack of adequate efficiency in qualitative methods of assessment has caused a tendency to quantitative assessment of development impacts on environment during recent years throughout the world. This research has attempted to investigate the objectives of impact assessment reports in Iran, and provide a way to improve their efficiency. Among the existing reports on development impact assessment in Environmental Protection Agency, 50 were chosen from the different samples such as dams and water structures (5 samples), Petrochemicals (5 samples), powerhouse (4 samples), steel industries (8 samples), industrial estate (5 samples), refinery (4 samples), tourism (5 samples) and several others (8 samples) and then these options were investigated: currency and quantitative evaluation of the whole project, the highest pollution and impacts resulted from the plan, the most environmental factors affected by the plan, the quantitative impact assessment in two phases of plan utilization and construction, and the evaluation of damages. In the next stage, among the 50 analyzed reports ⁹ including the option of qualitative impact assessment were chosen to evaluate each project properly. Considering the fact that each project has a lot of consequences and impacts, we tried to investigate the most important ones (applying the impact screening instruction of Asian Development Bank). So the most important negative impacts caused by the project performance were extracted and ecosystem services affected were investigated consequently. According to the published guideline by the World Bank, there are at least two economic valuation methods for quantitative evaluation of each damaged ecosystem service. Finally, the challenges in integration of economic valuation and environmental impact assessment studies in Iran and solutions to this were proposed.

Key Words: Valuation, Cost benefit analysis, Environmental impact assessment, Environmental economic impact assessment

The Waste Newspaper, a Sustainable Source of Raw Material for Paper Products

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Abstract

Limitation of cellulosic raw materials and environmental laws to decrease the exploitation of forests and level of pollutants, especially the industrial pollutants is occasion for use of recycled papers. However, the strength properties of papers are very important. The aim of this study is increase the strength properties of recycled paper. In this research, the newspaper samples were selected randomly and after pulping and deinking, refined and divided into two groups. In the first group, only cationic starch (2%) was added and standard papers were made (control sample). The other group was treated with different percentages of hydrogen peroxide (2%, 3%, 4%) under the alkaline conditions and then the oxidized fibers were treated with cationic starch (2%) and finally made into standard paper. Then, the strength properties were measured according to a TAPPI standard. The results showed that hydrogen peroxide treatment increased the strength properties of recycled newspaper. The highest increase was related to the treatment with hydrogen peroxide 3%, while the least strength properties were related to the control group.

Key Words: Waste newspaper, Hydrogen peroxide, Strength properties, Cationic starch

The Study of Habitat Variables Affecting Cavity-Nesting Birds' Density in Golestan National Park, Iran

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Abstract

This study was designed to examine the effects of environmental variables affecting cavity-nesting birds' density in Golestan National Park. Bird density and association of birds with environmental variables were studied using a distance sampling method and ordination procedure. Birds and environmental variables were detected within a 25 m radius of each of 122 sampling points. To determine the bird species density and association between environmental variables and bird community, distance sampling method and canonical correspondence analysis were performed respectively. In the period of the study, a total of 612 observations from 12 cavity-nesting bird species were recorded. The highest densities of the birds belonged to Red-breasted Flycatcher, Nutatch, and Coal Tit. On the contrary, Robin, Great-spotted Woodpecker, and Lesser-spotted Woodpecker represented the lowest density. The first axis of CCA separated two groups of the birds. The first group (namely secondary cavity-nesting birds), including Wren, Great Tit, Coal Tit, Robin, and Red-breasted Flycatcher had positive correlation with the number of trees less than 10 m in height, the number of trees with dbh of less than 20cm and 20-50cm. The second group (namely primary cavity-nesting bird), including Great-spotted Woodpecker, Lesser-spotted Woodpecker, Black Woodpecker, Nutatch, and Treecreeper showed positive correlation with tree height, snag height, snag dbh, snag decay stage, log height, log dbh, log decay stage, and the number of trees with dbh more than 100cm. The results of this study highlighted the importance of habitat variables, especially snags and logs, for conserving and enhancing of avifauna and especially cavity-nesting birds that may ultimately lead to biodiversity conservation in the forest ecosystems.

Keywords: Cavity nesting birds, Density, Golestan national park, Habitat variables

Approaches to Environmental Impact Assessment in Agriculture

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Abstract

Environmental issues such as climate change, global warming and pollution and depletion of natural resources require that the sources of these effects i.e. agriculture, services and industry be considered. Methods and techniques have been developed for assessing these direct and indirect impacts. The present paper introduces and describes the relevant methods and techniques. Then the paper classifies the methods into three classes: input related (e.g. Environmental risk mapping, Multiple linear programming (LP) approach and eco-point), emission related (e.g. Life cycle assessment and Sustainability of energy crops) and system state related (Multi- agent system, the farmer sustainability index, agro-environmental indicators and Environmental impact assessment). Finally, with regards to stakeholders and the type of agro-ecosystem, some actions are recommended for combination of approaches in environmental impact assessment of agriculture.

Keywords: Agriculture, Environment, Impact assessment