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Effects of climate change on the climate ecological niche of *Bromus tomentellus Boiss* using Maxent in Isfahan province

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Abstract

Maximum entropy (MAXENT) method was used to model the potential habitat of *Bromus tomentellus* Boiss and evaluate the effects of climate change on the species distribution in Isfahan province. The species occurrence were determined using a stratified random sampling method and geographic information system. Sixty occurrence sites were used as training points and 20 sites as independent test points in modeling approach in the western region of Isfahan. We produced 22 environmental layers including three physiographic and 19 bioclimatic maps. The relation of species occurrence with environmental variables was explored using the MAXENT approach. Then, the effects of climate change on species distribution was evaluated under two climate change scenarios including RCP2.6 (optimistic) and RCP8.5 (pessimistic). The response curve of the species revealed that this species is more likely occurs in the range of 2500 to 3500 altitudes, slope 10 to 30 degrees, annual precipitation of 240 to 260 mm and the average temperature between 8 to 10 ° C. According to the model projections, the habitat of this species will increase (about 46.1 km2) under the optimistic scenario. The species distribution will decrease under the pessimistic scenario considerably (about 35.74 km2).

Keywords, Species distribution modeling, Occurrence points, Species response curves, Climate change scenarios.

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Spatial prediction of shallow landslides using statistical and machine learning models (Case Study: Sarkhoon watershed)

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Abstract

Landslide susceptibility mapping is considered as the first important step in landslide risk assessment. The main purpose of this study is to compare the performance of a machine learning algorithm (a logistic model tree), and a statistical model (a logistic regression), for landslide susceptibility modeling in the Sarkhoon watershed, Chaharmahal, and Bakhtiari province. For this purpose, at first, a landslide inventory map including a total of 98 landslide locations was constructed using historical landslides, and extensive field surveys. In addition, a total of 100 non-landslide locations were also identified to construct a database. The landslide and non-landslide locations were randomly selected and divided into two groups with a 70/30 ratio for modeling and validation processes. Twenty conditioning factors were selected based on literature review and geo-environmental properties in the study area. Subsequently, the logistic model tree (LMT) and the logistic regression (LR) models were applied to identify the influence of conditioning factors on landslide occurrence. Finally, the performance of the models in landslide susceptibility mapping was investigated using the area under the receiver operating characteristics curve (AUC). The results concluded that the LR model (AUC = 0.797) outperformed and outclassed the LMT (AUC = 0.740) model in the study area. Although both models were reliable tools for spatial prediction of landslide susceptibility; however, the LR model was more accurate that it can be proposed as an alternative tool for better management of areas prone to landslide in the study area.

Keywords: Statistical assessment; Sarkhoon watershed; Susceptibility; Landslide; GIS; Machine learning;

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Monitoring and Zoning Metrological Drought Characteristics Using Markov Chain and Geo-statistical Methods (Case Study: Qazvin Province)

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Abstract

Soil is known as a dynamic media so it easily degrades with inapplicable usage so with increase in the degradation of this limited source, the world's food safety would be in danger. Thus, applicable and sustainable usage of agricultural lands is become an essential and inevitable agenda. Therefore, the aim of this study is to Digital soil mapping using decision tree for agricultural land suitability, In order to constitute management programs for sustainable use of agricultural lands. For this aim, samples were collected based on cLHS and after some laboratory experiments, modeling and digital soil mapping were created by Random Forest Model. Also, agricultural land suitability for dominant crops was investigated by the parametric method. The results showed that the land evaluation for irrigated wheat with surface irrigation 75.27% of the total area S2 class and 24.73% of the land in the class S3, respectively. In assessing the suitability of land for Maize irrigation, 14.78% of the land in classes S1, S2 84.82 of class and 0.39% of the land in the class S3, respectively. Results for alfalfa irrigation land evaluation showed that 11.10 percent of the land in classes S1, 88.49% in the S2 class and 0.4% of the class S3, respectively.

Keywords: Parametric square root method, conditioned Latin hypercube sampling, Wheat, Maize, Alfalfa, Qazvin.

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The Effect of Vegetation Cover on Microclimate in Dryland Ecosystem (Case Study: Sistan Plain)

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Abstract

Any Changes in a dry land surface ecosystem will be affected by the climate near the ground or microclimate in the vertical plane. In recent decades' wetland drying cause to reduced vegetation significantly. Assessing Zabol synoptic station statistics shown an increased temperature of this place. It seems that there has a direct relationship between the changes in land surface vegetation and increases the ambient temperature. The situation ground roll on microclimate has been investigated to illustrate this relationship. In this study we compare and assessment temperatures at depth of 5cm and surface and height about 150 cm and heat fluxes and energy in three microsites with different vegetation cover. The distance between the experiment microsites is about 20 km, and the elevation difference is less than 10 meters. Microsite A with the total vegetation average about 65%, B microsites 20% and microsites C with 100% bare soil. It evaluated the equation $\rho c_p z_a \frac{dT_{air}}{dt}$ to investigate the role and effects of vegetation on the ground surface. Data analyzes showed temperatures in the period of study at the C microsites were higher than other microsites. It seems the lack of vegetation in microsites C has a major role in the higher air temperature. In micro site C At 00:30 Am (local time) the air temperature was 3.2ºC higher than microsite A and B. The results showed there is a direct relationship between the vegetation cover percentage and air temperature because of different soil heat fluxes and surface temperature.

Keywords: Microclimate, Surface Effect, Dryland, Vegetation Percentage, Sistan Delta

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Modeling of Geometrical characteristics of gully erosion (Case study: Ilam province)

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Abstract

One of the types of water erosion and land degradation which causes an imbalance in the area of natural resources and agricultural land and gives heavy losses is the gully erosion phenomenon. Land degradation, a broken ecological balance of the land and landscape and risk of falling at biological resources in these areas, among other things, the study of the gully, is inevitable and necessary, especially in the Darrehshahr Township. In this regard, Gully 36 number was selected in Darrehshahr area in the Ilam province. To this end, were identified environmental factors, Physical - Chemical Soil properties, cover and hydrological properties of gullies tested using aerial photography, the digital maps, and field operations. To determine the extent effect these factors on each of the gully geometry characteristics using fuzzy logic and information theory, the membership function and the weights of the membership function of each of the factors was calculated. The the relationship between the independent and dependent variables was obtained by using multivariate regression. Results of statistical analysis using multiple regression (stepwise method) revealed that length of gully with upstream area of the gully, top, and bottom width and cross-section of the Gully with basin elongation, deep gully with basin elongation and slope curvature, high of head Gully with local slope of the gully and steep walls of gully with percentage cover has a significant relationship. So could be concluded that characteristics of geometry gully in the study area would be a function of the upstream, basin elongation, curvature slope, Local slope of the gully head and the percentage of canopy cover catchment area of the gully.

Keyword: geometric characteristics, multiple regression, gully erosion, fuzzy logic, information theory

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Effects of Biologically improvement treatments on vegetation performance (Case study: Zalo Ab Abdanan rangelands)

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Abstract

The current study nvestigates the effects of range improvement treatments on vegetation performance in Zaloo-Ab rangeland that is 10 Kilometers far from the west south of Abdanan County in Ilam Province. In this Study three corrective treatments included Exclosure, Seeding and Sowing were chosen and next to them some sites were selected as control sites which were in neighbors two by two. Vegetation sampling was done Random – systematic in every control and corrective operation sites in length of three transects of 100 meters in 30 plots of one square meter. Vegetation specifications including production, density, percentage of the cover crown, bare soil, stone and pebbles, and litters. Obtained data were analyzed by version 16 of SPSS software using t-independent test and variance analysis to compare each corrective and control sites and three corrective sites together. The obtained results showed that provided corrective operations have caused increase in cover crown, production, density of class I and II plants and decrease in class III plants, bare soil and pebbles respected to control site (in one percent level). Results of one-way variance analysis and comparison of averages of measured vegetation specifications in three treatment sites also showed a significant difference in one percent level.

Keywords: Range improvement, Exclosure, Seeding, Sowing

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Studying the stabilization effect coefficient of some of the non-oil mulches on sand dunes fixation

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Abstract

For over fifty years, using oil mulch has been one of the ways to stabilize sand dunes in Iran. Although oil mulch using has been successful in stabilizing sand dunes, but due to the problems in the implementation of mulching with oil products, the use of the more efficient of combination and cheaper methods will become necessary. In this regard, the present study aimed to evaluate the performance of some of the non-oil mulch to stabilize sand dunes in the Kashan's Rig-Boland desert. Mulch used in this study consisted of resin mulch, polymers, and biopolymers, inorganic and biological were used. In natural areas by installing various graded indicators on the hill, the mulch with an appropriate amount with three replications (three hills), were sprayed on the sand dune. To evaluate the effect of mulch on stabilizing the sand dunes, the effect stabilization index was used. The comparison test showed that the highest coefficient effect of stabilization with significant effect done on the biological mulch. After that, however, three other mulches including resins, inorganic and polymer are, respectively had the most significant effect. Although there was no significant difference between these three types of mulches. Biopolymer Mulch with the lowest coefficient of stabilization effect showed significantly different from other mulches. Mulching in the hills with biological mulch, due to tightly crust formation against erosion, removal of sand and dunes almost stopped and hill completely has been stabilized. Among the studied mulches, just biological mulch had more resistant.

Keywords: Desertification, Wind Erosion, Sand Dunes, Soil amendment.

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Evaluation of populations of *Elymus hispidus var. hispidus* ecotypes in different ecological zones of Kurdistan province

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Abstract

The evaluation of *Elymus hispidus var. hispidus* ecotypes in different ecological zones of Kurdistan province was carried out at Baharestan Agricultural Research Station in order to the nomination of the best ecotypes in terms of adaptability and establishment. The experiment started in 2010 and continued to 2015. For each Ecotype, the adequate seed of different stocks in the whole of the province was reaped. In the reproduction phase (2010 autumn) and after soil preparation, all ecotypes were planted on plots with 5*6 m2. In 2011 and 2012autumn, the Ecotype of each Species based on complete randomized block design with 3 replications and 2-meter intervals on 2*4 m2 plots and 4 lines with 4-meter length and 50 cm intervals (In order to the elimination of marginal effects) planted. The measured traits for plant selection were 1) growing 2) flowering 3) seeding 4) Yield 5) canopy cover 6) height and 7) regrowing, all data were statistically compound analyzed by SPSS and averages were compared using Duncan method. Results showed that there were significant differences among the measured traits and ecotypes ($P \leq 0.05$) in all studied years (2012-2015). In terms of measured parameters for all ecotypes of *Elymus hispidus var. hispidus*, Dolab Ecotype, showed superiority in the Baharestan research station conditions. It seems that altitude, soil properties, and aspect factors have had most efficacy on different ecotypes operation of this species in this study.

Keywords: Ecotypes, Baharestan Station, Establishment, Adaptability

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Multi scale Analysis of Geomorphologic Instantaneous Unit Hydrograph (GIUH)

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Abstract

Given the increasing trend of application of Geographic Information System (GIS) for natural resources study in one hand and complication of biological, geomorphological, hydrological and ecosystem mechanisms, on the other hand, the scale is an overlooked but very impressive and flourishing concept. As for any natural resources study consistent with its phase, various maps are used and produced so in order to make the achieved results usable for planning as well as management of resources, determination of the scale of the study and application domain for the results is very significant.

Since using GIUH model in the basins without hydrological data have been widely recommended by hydrologist and this model developed in accordance to the relationship between geomorphological properties of basins and their effects on hydrological responses, so before using that it is essential to determine the optimal scale (in viewpoints of accuracy, time and cost) which in this paper will be selected from 1:50000 and 1:25000 scales, inclusively used in topographic maps in Iran, using multi-scale analysis. Of course, it should be mentioned that giving a comparison between the results of GIUH and the recorded data as well as the model's effectiveness in our research basin has not been the purpose.

Keywords: Scale, Hydrographic network, Geomorphologic Instantaneous Unit Hydrograph (GIUH), Jajroud watershed

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Quantitative analysis of vegetation feedback on the occurrence of dust in arid ecosystems (Case study: Isfahan province)

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Abstract

Dust event is one of the secondary complications of the ecosystem in arid and semi-arid areas. This phenomenon results from system feedback against multiple factors of pressure and destruction. One of the most important foundations of ecosystems is vegetation. Because the vegetation factor reflects many factors in the ecosystem, therefore, the interaction of factors can be understood by studying the relationship between its changes and other factors such as dust phenomena. The aim of this study was to investigate the effect of vegetation and relationship with dust events in Esfahan province during 2000-2016 using Geographic information system and Normalized difference vegetation index. The data of dusty days in the region synoptic stations were provided from Meteorological Organization and the frequency of dusty days in different years was determined. Using the method of Normal Kriging in GIS; dusty days were zoned. Vegetation map was prepared based on NDVI in July for each year using MODIS image. The regression analysis of annual dust and vegetation index were also performed to quantitatively analyze the effect of vegetation cover on the occurrence of dust. The results of zoning showed that the number of dust in recent years increased compared to the past and in 2011 and 2007 were recorded as the most and the least numb of dust event with496 and 67 days respectively. The most number of dust has occurred in Naeen and Esfahan stations with 914 and 805 days and the least number of dust in Golpaygan and Daran stations with 91 and 11 days respectively. The results showed that the highest number of dust storms occurred in the east and center of the province, and the lowest in other parts of the province. Vegetation cover has been the lowest during the study period in the east and center of the province. The NDVI was also the lowest in 2011-2012 and 2015, with a change from 0.69 to -0.19. The results showed a significant correlation between the amount of dust event and vegetation distribution. In addition, decreasing vegetation's caused the increase in the number of dust event. Generally, the vegetation shows 78% significant correlation with dust events. Therefore, ecosystems management especially vegetation has the main role in dust events.

Keywords: Degradation, management, Geographic information system, Normalized difference vegetation index, Esfahan Province

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Investigation of influence biological the operation on the function of rangeland (Case study: Niatak range, Sistan)

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Abstract

The studies of functional features of patches of rangelands will help effectively in the detection the healthiness of arid and semi-arid rangelands, the improvement of soil conditions as well as the recognition of the effects of managerial and natural changes of rangelands. In order to investigate the function of landscape, sampling from Niatak region of Sistan was conducted in the same condition that had some native plant species such as *Alhagi camelorum* and *Salsola rigida* and two planted species namely *Tamarix ramosissima* and *Haloxylon persicum*. Effect of these plant pots was investigated on characteristics of ecosystem function. 4 transect with 150 meters long was established and 11 soil surface indices were determined by using three characteristics of stability, infiltration, and cycling of nutrient from LFA method. The results indicated that two planted plant species had higher function rather than native plant species and differences were significant. *Tamarix ramosissima* had the highest function among the native and established plant species. In general, high function in planted patches ecological could be suggested to select suitable species in restorations of similar rangeland.

Keywords: function, stability, range, biological, Sistan

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Evaluation of the effect of forest cover on quantitative and qualitative runoff parameters in Chitgar Forest Park Watershed, Tehran

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Abstract

Many environmental challenges such as stormwater runoff and flood risk, chemical and particulate pollution of urban air, soil and water, the urban heat island, and summer heat waves are exacerbated in urban environments. Runoff from heavy rainfalls in many parts of the world leads to erosion, sedimentation, and transportation of elements that forest covers are the most important factors in controlling it. In this research, the qualitative and quantitative characteristics of runoff in Chitgar forest park have been investigated to determine runoff patterns and forest cover effect on it. Hence, runoff discharge and physicochemical parameters were measured and analyzed during three storm events (December 25, February 13, and May 5 of 2017). The results of the present study indicated that the average values of the measured parameters were 1988.3 l / h for discharge, 40.64 mg/l total dissolved solids (TDS), 2064.8mg/l total suspended solids (TSS), 7.75 for pH, 2.95mg/l Calcium, 2.23mg/l magnesium, 584.4mg/l Sodium, 5.71mg/l Potassium, 1.36mg/l Nitrate, and 0.71 mg/l Phosphate. Also, the correlation between parameters showed that there was a strong relationship between measured parameters, with the highest correlations between calcium with discharge (0.66) and total dissolved solids (0.69), sodium with pH (0.7) and total dissolved solids (0.65). Comparison of three studied sub-basins A, B, and C (29, 31, and 24% forest cover, respectively) showed that the increase in forest cover will result in the reduction of runoff. On the other hand, as a result of higher forest cover in sub-basins A and B, the amount of TSS, TDS, Na, K, and Ca were lower than that of C. However, as a result of higher biological activities in sub-basins A and B, the amount of nitrate and phosphate was higher than C.

Keywords: Flow rate, Urban runoff; Water quality; TDS; TSS; Chitgar forest park

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Institutional Analysis of Drought Management in the Ghareh Chay Watershed in Saveh County: An Application of Social Network Analysis

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Abstract

The phenomenon of drought in Iran during the past decades are increasingly on the rise. While drought management as a functional approach can help reduce the effects of this phenomenon. In this respect, the role of institutions and institutional entrepreneurship in areas that suffer from drought are can be used as the perfect solution for the management of drought. The aim of this study was to analyze the institutional management of drought with the approach of social network analysis. The statistical research community is smallholder farmers of Saveh town. The dominant statistical method in this study is to measure and extract the total network indexes through the network analysis technique. Based on information obtained from the institutional rankings were determined that the most current information on educational information network two-sided with the ministry of agriculture and veterinary. In the context of the flow of information, banks and credit institutions support the centrality of the ranking. In terms of information flow as well as the largest specialized veterinary related role information to current technical and specialized in order to catch up with climate change. The research results show that the different dimensions of social networks effect on the mobilization of resources and on the other hand, the lack of institutional entrepreneurship can damage caused by climate change will intensify. In the end, suggestions are made to improve the management of droughts.

Keywords: Institutional Theory, Institutional Entrepreneurship, Social Network Analysis, Institutional Adaptation, and Drought.

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Utilizing LANDSAT imagery to monitor land-use change and land grabbing to evaluate Human drivers factors in Babol kenar sub-basin, northern Iran

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Abstract

Iranian northern forests have been damaged due to easily access, population increase and c etc. with human-made in recent decades. Evaluating land-use changes is one of the main methods to monitor and manage natural resources. The present study was conducted in Babolakrood sub-basin, Mazandaran province, northern Iran that has estimated to be 14896 hectares, with population to amount to 1521 families containing small villages. We studied land-use change and land grabbing in four periods 1966, 1994, 2003. 2013 by cover images and LANDSAT imagery. After preparing the sub-basin boundary, the process of digital and aerial images was conducted by Microstation, Erdas, ArcGIS, and Autocad. Then, area alteration of arable lands, residential places and roads were compared during the four periods. The resultshave shown that the most area alterations raised in the first period from 1966 to 1994 as the conservaion of ranges and forests to arable lands. During 1966 to 2013 period, the area of 413 hectares equal to 3 percents (8.8 hectares per year) of ranges and forests reduced to other uses.

Keywords: land-use change, land grabbing, ranges and forests, LANDSAT imagery, Babol kenar sub-basin.

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Source fingerprinting of aeolian sediments using Monte-Carlo simulation method

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Abstract

Quantifying source contribution of aeolian sediments is essential to prioritize sources and mitigate wind erosion. The objective of this research is quantifying the uncertainty associated with results of sediment fingerprinting method using Monte-Carlo simulation technique in the Sirjan plain. Six sediment samples were collected from the sand sheets and forty source samples consisting Qt (n=13); Qc (n=17); Qsg (n=5); and Dc (n=5) were collected from geological spatial sources in the surrounding area. The concentration of eight geochemical elements was measured in both the sample group. A two-stage statistical method including Kruskal Wallis H test and a stepwise discriminant function analysis applied for discriminating of aeolian sediment sources. Based on the two-stage statistical method, four geochemical properties consisting of Fe, K, Mg, and Cu were selected as optimum fingerprints. The Qc and Dc were recognized as dominant sources for aeolian sediments in the study area and also, full uncertainty or full range (0-100%) calculated for some source contributions. Therefore, management activities for mitigation of wind erosion should establish at the Qc and Dc source regions. This technique has great potential for quantifying source contribution of aeolian sediments at another area with active wind erosion.

Keywords: Fingerprinting, Tracer, Aeolian Sediment, Monte-Carlo simulation, Sirjan.

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Study the effect of environmental factors on aboveground net primary production (Hir-Neur rangelands, Ardabil province)

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Abstract

The purpose of this study is to investigate the relationships between aboveground net primary production (ANPP) and environmental factors (such as elevation above sea level, slope, aspect, compound topographic index, seasonal and annual precipitation, seasonal and annual temperature) which was carried out in the rangelands of Hir-Neur in Ardebil province. Initially, considering the vegetation types and different classes of environmental factors, at the maximum vegetative growth stage, using one square meter plot (330 plots) with random–systematic and clipping-weighing (harvesting) method ANPP was estimated. Using 1:25000 scale maps, digital elevation model (DEM) map, the maps of the slope, aspect, elevation classes, and topographic index were extracted. In addition, using gradient equations (calculated from the study areas stations such as Ardabil, Sarein, Khalkhal, and Kowsar) the seasonal and annual precipitation and temperature maps were extracted. One-way analysis of variance (ANOVA) was used to evaluate the significance of ANPP in different classes of environmental factors. Then, to determine the most important environmental factors affecting, the principal component analysis (PCA) was used. Also, the ANPP map prepared using extracted quadratic regression equation in GIS. The results showed that the ANPP have a direct relationship with elevation and precipitation, and have an inverse relationship with temperature. Also, the maximum of ANPP recorded in west aspect. The results of PCA indicated that the components of one (include annual precipitation, annual temperature, elevation) and components of two (include slope) with 76.10% had the most effect on ANPP. Also, the ANPP map prepared and the accuracy of the map was 0.54, which indicates the validity of the model. The results of this study can be used to manage rangelands to balance of ANPP supply-demand and carbon of the ecosystem.

Keywords: rangelands, aboveground net primary production, topographic factors, climatic factors, Hir-Neur

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Investigation of factors affecting landslide and their susceptibility zoning in Latyan catchment

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Abstract

Landslide causes many social and economic losses in many parts of the world every year. These losses can be greatly reduced by using appropriate management measures such as mapping landslide susceptibility mapping in the basin. The aim of this study is landslide susceptibility mapping using Mahalanobis distance in the Latyan catchment. First, a total of 208 cases of landslides identified and geo-referenced using geographic information systems based on an interpretation of aerial photographs and extensive field surveys and provided a landslide inventory map. Then the map of 12 factors, including rainfall, land use, distance to fault, distance from river, distance from road, lithology, altitude, slope, aspect, plan curvature, Peak Ground Acceleration and topographic wetness index as the most important factors in landslides was prepared and the correlating each factor and the landslide was examined. Finally, landslide susceptibility zoning map was provided based on the Mahalanobis distance in Latyan catchment. To evaluate the results, the ROC and chi-square tests were used. The results show more than 80 % of the catchment located in the range of high and very high susceptibility classes and need suitable management operations. AUC index (area under the curve ROC) for this model is achieved to 0.896 or 89.6% which represent capability and high accuracy. Chi-square test results also reflect the proper separation of landslide susceptibility classes by model.

Key Words: Zoning, Landslide, Mahalanobis distance, ROC index, Latyan

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Investigation the management of shepherds in the distribution of livestock in the rangeland and its compliance with the grazing suitability map

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Abstract

The role of shepherds in maintaining, managing and distributing livestock in rangelands is very important. Flock guidance plays a major role in the distribution of grazing and livestock performance in rangelands. Therefore, it is necessary to evaluate the existing spatial system and it is clear to what extent livestock are given inappropriate places according to ecological criteria and indices. The present study was conducted to evaluate the role of shepherds in herding and distribution of livestock (sheep) and its adaptation to rangeland suitability map. Record of movement of livestock in different months of the grazing season by GPS and its adaptation to rangeland suitability map which is led by shepherds in areas where the limitations of forage production and sometimes, the sensitivity of soil to erosion, have little value for why. Therefore, the hypothesis of the study that shepherd does not play an effective role in the distribution of livestock on the basis of rangeland merit is confirmed and given that shepherds have given the animals in places where they have little merit for why it is concluded that the spatial system in the rangelands of the region is not efficient. Therefore, the use of new technologies such as GPS and electrical fences along with native knowledge in order to properly control the herd and reduce the burden of livestock grazing in the areas that are not based on ecological criteria and indicators, do not have the necessary merit, is suggested.

Keywords: Rangeland suitability, livestock distribution, mountainous rangelands of Urmia.

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Forage quality change of camel's feeding plant in the Maranjab desert

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Abstract

In order to provide animal's nutritional requirements and production of animal protein, it's necessary to adjust the balanced diet and the correct nutrition plan, which is based on the proper understanding of food and this is possible through the analysis of nutrients. This research aimed to study and compare of forage quality in seven species that are grazing by camel including: *Nitraria schoberi*, *Smirnovia iranica*, *Seidlitzia rosmarinous*, *Stipagrostis plumosa*, *Astragalus squarrosus*, *Alhaji persarum* and *Zygophyllum eichwaldii* conducted in two stages of vegetative growth at Maranjab desert rangelands. For this purpose, the indices of dry matter (DM), Crude Protein (CP), Dry Matter Digestibility (DMD), Acid Detergent Fiber (ADF), Metabolic Energy (ME), Nitrogen (N), Phosphorus (P), Potassium (K) and Sodium (Na) were subjected to chemical analysis. The results showed that the forage quality indices between the species and phonological stages were significantly different ($P<0.01$). In all species, as the growth stages and plant maturity progressed, the amount of crude protein, metabolic energy and phosphorus were decreased and the amount of dry matter and ADF were increased. While *N. shoberi* had the highest amount of crude protein (26.51) in the vegetative growth stage, *S. rosmarinous* showed the lowest protein (3.91) at seeding stage. In addition to, with regard to both phonological stages, while the highest dry matter digestibility, metabolic energy, potassium, and sodium were found in *S. rosmarinous* species, the highest amount of crude protein, nitrogen, and phosphorus was observed in *S. iranica* species.

Keywords: Diet adjustment, Forage quality indices, Maranjab desert, Forage quality, Phenological stages

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Effect of Geographical aspect's on Functional Potential and soil surface indicators in Summer Rangelands (Case Study: Chhar-Bagh Summer Rangeland, Golestan province)

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Abstract

Given the importance of having data on vegetation and soil in different geographical aspect, the aim of this study is the assessment the geographical aspect's impact on Functional Potential and soil surface indicators in Chaar-Bagh Summer Rangeland, Golestan province. For the study used the method Landscape Function Analysis (LFA) and main Geographical aspect. For this purpose, in the four main geographical aspects, three transects 100,m were established and along with the transects type, length and width patches and interpatches were measured. To calculate the Functional Potential (Soil Stability, Infiltration and Nutrient Cycling and Vegetation Organization Index). To investigate the functional significance potential of SAS Software and ANOVA, for mean potential functional classification of Duncan Test used. To investigate the soil surface along each transect, 5 plots, and 11 indicators way quality and using the scoring tables and to check the normality of the data, the Kolmogorov-Smirnov test was used. To investigate the significance Kruskal-Wallis nonparametric test and classification of soil surface indicators grouped Duncan test was used. The results showed a significant difference between the functional potential in different geographical aspects ($P< 0.05$) So that the highest percentage of functional potential to the north and lowest in the East was estimated. Vegetation organization index for geographical aspects North, South, East, and West were respectively 0.53, 0.43, 0.38 and 0.51. The results showed that except cryptogam cover and Micro-topography indexes, all indicators were significant in different geographical aspects ($P< 0.05$). Results of this study indicated the effect on vegetation and soil characteristics for proper and optimal management. Also, Geographical aspects can have a significant effect on the potential of the rangeland ecosystem.

Keywords: Stability, Infiltration, Soil properties, Landscape Function Analysis (LFA).

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