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| Content..... | Page |
|--|-------------|
| Corn Yield Estimation Using Agroclimatic Indices in West and Southwest Regions of Iran..... | 4 |
| Saeed Bazgeer | |
| Large-scale atmospheric circulation patterns associated with the occurrence of severe storms Zab basin..... | 5 |
| Nader Parvin | |
| Prioritizing hydrological erosion-prone response units in Latyan catchment..... | 6 |
| Ali Ahmadabadi * Amir Karam * Mohsen PourbashirHir | |
| Evaluate the natural capacity of winter sports tourism development in rural areas Zab basin using GIS and MCDM..... | 7 |
| Emam Ali. Asheri | |
| Spatial analysis of the province's tourism climate comfort using TCI by GIS..... | 8 |
| Ali Asghar Abdollahi | |
| Spatio-temporal analysis of snow cover in Iran based on topographic characteristics..... | 9 |
| Elham Ghasemifar * Mohammad Rezaei * Forozan Isvand Zibaei | |
| The Analysis of Monthly moisture advection changes in Iran's atmosphere over the recent half-century..... | 10 |
| Mehdi Doostkamian | |
| Analysis of urban spatial transformations by using Cellular Automation (CA); for direction spatial development of Chalous city..... | 11 |
| Reza kheyroddin * Fardis salarian | |

Corn Yield Estimation Using Agro climatic Indices in West and Southwest Regions of Iran

(Manuscript received: Monday, June 16, 2014, in final form: Wednesday, March 16, 2016)

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Abstract

Crop yield estimation can be helpful for planning and implementation of policies pertaining to food procurement, distribution, pricing and import-export. Since crop yield is the culmination of many temporal plant processes and is affected by various climatic factors, parameterization of these factors and investigation of their relationship with yield are essential for crop yield modeling. In this study, the feasibility of corn yield estimation has been carried out using statistical regression models together with the analysis of correlation between corn yield during different growth stages and climatological variables for some regions in the west and south west of country. The results revealed that the difference between estimated and actual corn yield were -250 to -3577 and 16 to 1812, -160 to -3000 and 24 to 2566, -270 to -1370 and 286 to 3550, -188 to -1322 and 26 to 2130 kg/ha for Kermanshah, Kohdasht in Lorestan, Dehloran in Ilam and Dezfool in Khozestan, respectively. In Overall, the results show that maximum and minimum temperatures, wind speed at 2 meter height, sunshine hours and relative humidity have maximum correlation with corn yield in emergence of earing to silking and silking to physiological maturity (ripening) stages which had close estimated values to observed ones for different regions (correlation coefficient of 0.573 to 0.858 and standard error of 1002 to 2148 kilogram per hectare).

Key Words: Corn, Yield estimation, Agricultural climatology, Statistical Models, Iran

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Large-scale atmospheric circulation patterns associated with the occurrence of severe storms Zab basin

(Manuscript received Wednesday, July 1, 2015, in final form: Tuesday, December 1, 2015)

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Abstract

The aim of this study is to analyze the synoptic situation of severe storms of Zab basin. Daily data of wind speed, over the period 1364/01/01 to 1390/12/29 (9861 days) from three synoptic stations, was taken from the department of meteorology. Given the scale of temporal and spatial distribution, through threshold size of wind speed and comprehensiveness as well as calculation of the 90th percentile of the wind speed, 40 days of pervasive and severe storms were selected. Sea level pressure data on the network with a size $2.5^{\circ} \times 2.5^{\circ}$ that was located on 00-80 degrees east longitude and 00-80 degrees northern latitude from the database NCEP/NCAR were extracted. A Matrix was formed in the dimensions of 864 columns in 40 rows on rows of days with stormy days on the rows and elevation data middle levels of the atmosphere, on the columns. A principal component analysis was performed on data matrix elevation and six factors were identified that about 97/4% of the Pressure elevation changes of 500hp level was explained. To identify synoptic patterns, cluster analysis integration "wards" was performed on these components. The results showed that the storms happen frequently during spring and autumn. April was the most prevalent (33%) and July and August had the lowest number of storms. Five synoptic patterns of atmospheric middle level, in the form of three major causes of severe storms in the Zab River Basin: Cut off low pattern, Shallow trough pattern of long wave and deep trough pattern of short wave. In these between, cut off low synoptic pattern of the upper atmosphere with an abundance of 47.5 percent in May and December had the highest frequency. Irregularities in the movement and position of the polar vortex caused the jet stream and storm paths meridional winds to have greater control and troughs to be driven deeper towards the low latitudes. Because of the special arrangement of relatively strong and contrasting surface synoptic, the pressure gradient and energy exchange at its maximum reached compression Isobaric lines and as a result, strong winds in the catchment area level have been created. The winds blow, almost in all identified patterns, from the west and southwest.

Keyword: Atmospheric Circulation, Severe Storms, Principal Component, Clustering, Zab basin

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Prioritizing hydrological erosion-prone response units in Latyan catchment

(Manuscript received: Monday, July 13, 2015, in final form: Tuesday, February 16, 2016)

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Abstract

Soil erosion in watersheds, causing problems such as the loss of agricultural land productivity and reduce soil surface layer, endangering the life of reservoirs and water utilities, loss of soil fertility, increasing flood, threatening human food security, etc. The negative effects of soil erosion, watershed management operations to improve care. According to the extent of the watershed and the lack of resources, prioritizing catchment areas due to the urgent need to implement watershed management plan is one of the solutions. Therefore, in this study the hydrological response units (HRU) were extracted in the Latyan dam basin. Hydrologic response units as a new approach can form smallest catchment study area. The need to prioritize the hydrological response of the watershed, using "Simple Additive Weighting and weighing "Analytical Network Process were performed. The results show that Most amount of erosion and Following the First Priority of Watershed's preserve is in the eastern part of the lake dam And the upstream basin with poor ranch land use, sedimentary-alluvial lithology and 26 degree of slop.

Keywords: HRU, Prioritize of Erosion, ANP, SAW, Latyan.

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Evaluate the natural capacity of winter sports tourism development in rural areas Zab basin using GIS and MCDM

(Manuscript received: Thursday, December 10, 2015, in final form Friday, March 18, 2016)

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Abstract

Sports tourism is one of the ways sustainable rural developments. The aim of this study was to evaluate the environment in rural areas to develop tourism Zab catchment Winter sports using GIS and multi-criteria decision-making models (MCDM) is. First, data and environmental parameters such as topographical maps of 1: 25,000, elevation data, slope, slope, land use, watershed divisions, road communication, geology, urban and rural centers were obtained from national mapping agency. Compare the test and evaluation of each layer by sports experts, natural resources and the environment was conducted. Using the software, Idrisi, normal matrix to determine the final weight of each layer and extraction was applied in the respective layers. Then, information, digital maps were prepared in the ArcGIS system and environmental parameters were classified. Overlay function operation was performed using a combination of informative layers and map geographic area with the characteristics of each unit was created. Finally, the peripheral rural areas Zab basin was assessed. The results showed that, taking into account all environmental parameters about 4% of the total land area of less than 5 Km² for development of winter sports tourism in rural areas are suitable Zab basin. Another consequence is that the areas with the greatest potential in the North West (villages of West Piranshar) and Southeast (villages of East Baneh) were identified. In addition, the proportion of secondary catchment area is 2450 Km² and the average proportion is 2450 Km².

Keywords: Normal Capacity, Sustainable Rural Development, MCDM, ArcGIS, Zab Basin

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Spatial analysis of the province's tourism climate comfort using TCI by GIS

(Manuscript received: Tuesday, July 28, 2015, in final form: Saturday, February 20, 2016)

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Abstract

This study has aimed to carry out spatial analyze of comfort climate index in Kerman Province using GIS, firstly the statistics of seven required climatic factors were extracted in 10 synoptic and Climatologic stations in the province in the time period of 60 years (1951 to 2010 AD), and based on TCI model, essential changes were exerted on data. After processing and analyzing the data and providing the information bank, the ranks of CID and CIA were got and numeral amount, f ICT by TCI calculation software was calculated with differentiation of month of the year. Monthly TCI distribution map for each city was drawn in ARCGIS software using interpolation method (IDW). The results showed that the best months in terms of comfort for tourists are April (835), October (829), November (818), may (782), march (757), and September (756). the worst months are January (622), July(643), June(665), august(667), February (693) December (707).

Keywords: climate comfort, tourism, Kerman province, TCI method, GIS

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Spatio-temporal analysis of snow cover in Iran based on topographic characteristics

(Manuscript received: Sunday, October 11, 2015, in final form: Thursday, March 3, 2016)

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Abstract

Snow cover is an important parameter in the hydrological cycle and energy budget of the surface. The knowledge of the spatial and temporal distribution of snow cover is essential to understand the complex behavior of this parameter. This study aims to evaluate the spatio-temporal of snow cover in Iran using the 500 m 8 day MODIS snow cover product data (MOD10A2) during 2001–2015. Since the maximum of the snow cover area was observed in January 2008, we separated this area as region of snowy in Iran. Separated area categorized into five districts based on elevation. Spatial distribution of snow cover carried out in relation to slopes of 0 to 44.9 ° and 44.9 to 89.8 °. We used from Mean, standard deviation (SD) and coefficient of variation (CV) to showing temporal distribution of snow cover. Results show that, the snow cover is directly related to elevation. The highest regions have the Maximum snow cover (in regions of 4 and 5 snow cover reached to 100%). Average of 8-day snow cover in slopes of 44.9 to 89.8 ° was higher than slopes of 0 to 44.9 °. The maximum and minimum of snow cover were related to northern and flat slopes, respectively. The maximum values in mean, SD and CV has occurred in 8 days of 33, 9 and 41, respectively. SD Rises in the middle 8-day (from 9 to 41) and reduced in ending the 8-day. The CV is an interesting statistic to show the variability of snow cover. The maximum values of CV were observed in the Caspian lowlands region. the CV values reduced by increasing in elevation In all cases.

Key words: snow cover, spatio-temporal of snow cover, MODIS, Iran.

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The Analysis of Monthly moisture advection changes in Iran's atmosphere over the recent half-century

(Manuscript received: Wednesday, January 29, 2014, in final form: Tuesday, March 1, 2016)

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Abstract

The purpose of this study is to investigate the changes of temporal and spatial moisture advection in Iran's atmosphere. To achieve this purpose, data -orientation and meridional components of the database during the 1390-1340 NCEP / NCAR related to the Oceanography Organization United States was extracted, examined and analyzed .For the calculation of features and software programming environment Mat lab, software Grads and Surfer software was used to perform graphics operations'. The largest decline occurred in summer. However, in all months, western and southern parts of Zagros had the most intensive decreasing slope during the period. In all months, especially summer, south east have increasing consistency.

Keywords: direction, special humidity orientation components and meridional wind, trend analysis, Iran

Analysis of urban spatial transformations by using Cellular Automation (CA); for direction spatial development of Chalous city

(Manuscript received: Tuesday, April 21, 2015, in final form: Saturday, February 13, 2016)

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Abstract

In recent years, areas of cities have been change because of extreme climatic conditions and natural attractive conditions. Speeds of these changes and development are too fast that cause some speculation, because the value of land in some regions is too important to make a good decision with an update model. It is therefore appropriate to such developments Chalous physical spatial pattern of cellular automata that realistic results obtained from the evolution of regional spatial development, analysis and modeling approaches in order to be suitable for expression of the changes provide city condition. The output of the analysis and modeling of spatial development of the inner city shows that most developments in the Caspian Sea and coastal lands are within the metropolitan area. External developments in the southern part of the city and is located at the junction of the ring with the law that could threaten agricultural land and the environment. Order part of the process that has a lot of speed and intensity, strategic and management approaches and policies are strict and regulated.

Keywords: urban spatial development, cellular automation, spatial development, sprawl, City Branch

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