

Regeneration of the fires affected forest by using R.S and GIS in Aroosh region Northern of Iraq

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ABSTRACT

We have in this study highlights, analysis and modeling of natural regeneration after forest fires in the hand of the Aroosh the in northern Iraq and is located between Longitudes $43^{\circ} 17' 23.207''$ - $43^{\circ} 27' 43.578''$ and latitudes $36^{\circ} 49' 12.363''$ - $36^{\circ} 53' 14.208''$ and altitude above sea level between 637-1404 m and an area of 96.58 km^2 and an area. For the purpose of classification of the study area for the various plant blankets and areas of forest fires, we have based on the field survey to determine the points set the ground GPS users to determine the points for classification purposes, as well as we used the satellite image of a space satellite Pleiades captured on 06/02/2013 ability resolution 2m for classification purposes, where we conducted the classification process is directed unsupervised classification of the satellite image, showed the result of classification we get 10 varieties, a burned forests, leaves a broad forest, needle forests, mixed forests, soil, grass and jungles, pastures, agricultural land, roads, buildings and Construction and rocks, and identified and compare it with the setting Ground points 135 points and, calculated classification accuracy of the statement space and evaluation dependent on the Error Matrix percentage for each class and the map as a whole, and the accuracy of the overall classification 85.18%, has also used statistical measure of Kappa to calculate the precise terms of this scale that measures the degree of difference between the ground control points that have been taken and the goals that have been classified in Category stomach map of the site itself and compared and was 84.56% .

In order to see and compare the biodiversity of forests burnt and unburned in the study area, we have selected 45 samples at random dimensions of $30 \text{ m} \times 30 \text{ m}$, and in this study were compared species diversity, structure, and composition between the first two burned forests and the second unburned, It was calculated density, dominance, frequency and guide importance value index (IVI) as well as family importance value index (FIV) to assess the plant configuration, and we measured the diameters and heights of all members of the signatories and classified into 5 categories, was the country category (0.2-5cm) is the dominant (most abundant) in either of the categories of the Highs were reissued for the class (0.2-5m) in both locations. The study reported significant differences between the two sites

where evidence of biodiversity used in the study Shannon-Wiener diversity index (H') ($\chi^2 = 5.42$), Shannon evenness index (E) ($\chi^2 = 4.08$) and ($\chi^2 = 4.77$) Simpson's index ($1-D$) adds to the Species richness (S) ($\chi^2 = 10.43$). In both locations more makes the rule, which recorded the highest turnover Directory IVI was burnt forest is *Pinus brutia* Ten. Offset by forest type in unburned *Quercus aegilops* L., either FIV highest value recorded guide for families Pinaceae and Fagaceae at two sites.

The study also found through to study soil samples an analysis that the fire may have caused the reduction of organic matter in the soil (4.35%) compared with unburned forests (4.48%), because the destruction of vegetation by fires lead to increased runoff and sediment loss, especially in the first year after the fire, and this affects the organic matter, either fire's role in pH, it increased the value of pH (7.73) in the burnt forest compared with unburned forests (7.59), either with respect to EC there is a decline in the value of EC forest burning compared with unburned forest, either texture physical components have changed a bit after the fire, but did not affect the texture in general.

The study concluded that the fire was less at high altitudes because of the low temperatures and high humidity that limit the fires, the study found that the highest percentage of trees, sapling and seedling was in the northern facade by 37.29%, 38.13% and 37.64%, respectively, and this shows the power of regeneration and the density of vegetation on this interface compared interfaces other as a result of the appropriate climatic conditions of temperature and humidity, and the highest percentage of trees, sapling and seedling was in decline 20%, which is 32.76, 49.21 and 50.48, respectively, and then there is a clear decline in the values and this shows that regeneration more efficient on the slopes of moderate or flat areas on steep slopes.

The NDVI values ranged from 0.214 to 0.542, and when comparing the burned and unburned forest and found significant differences ($P = 0.0001$) as a result of the devaluation of NDVI after the fire directly because it is linked to the biomass above the earth, so the fire helps to reduce this biomass-based on the degree of coverage of vegetation which based NDVI account.

In addition to the traditional statistical analysis, we used statistical analysis, geographical adoption of spatial analysis models bitmap, which is one of the most important pillars of geographical statistical analysis because of its flexibility and high accuracy in the interpretation of many of the phenomena that are unable to interpret and clearly the traditional statistical analysis, and the study of spatial analysis in Aroosh forests used analysis Variogram

and analysis Kriging to show spatial correlation basal area BA and use of this Purpose GS+V.5 program, the results of differences analysis in the form of distribution of basal area between the trees showed at various ranks of these spaces, as it gave a form-year-old at random in distribution and all study samples, but showed a variation in the distribution the ranks of the large basal spaces clearly two sets of distribution forms, the first group was distributed among the ranks of the large basal spaces randomly and representative samples (2,5, 6, 7,10, 11, 12,15, 17, 18, 19,21 , 22 ,24, 28, 29, 30 , 31, 34, 36,38, 41and 43), if we compare the burnt forest with the forest is burning in terms of distribution form and we took the distribution towards the east and the south, where the climatic conditions are more favorable for the occurrence of fires, we find in the burning of forests in the samples (1, 3,4,13) was gathering southeastern direction and the sample (8) towards the east while in the forest is burning, we find the sample (20) just to the south and samples (25,45) to the east, and this means that 33.33% of the burnt her forests form of distribution to the east and the south Lama forest is burning, we find the ratio of 10% and this explains the fires occurred in the samples of burnt the larger proportion because of strong sunlight and the lack of moisture and high temperatures, while the second set of samples has emerged large basal species different spatial distributions of the first group, as these areas gathered at what point of the sample and the samples consisted not mentioned in the first set.

Was conducted Variogram type Isotropic basal space analysis and all study samples users to model type Spherical study found that the rate of long-forest burnt 137 490 m while the forest is burning 62 320 m and this explains the high rate of regeneration in the burning of forests compared with forests unburned other words, the open spaces in the burnt forest helped to innovate because the fire is working to increase light connecting density to the land of the forest, the emergence of differences in the values of term (A) to analyze Variogram basal area and the various resulting from the spatial distribution of different individual study samples, the short ranges that appeared in each of the samples (2, 5,8, 11,18, 22,29,32, 33.36, 39, 40, 41, and 42) which indicate the points of pairs of these samples are in sites close to each other and at the same time is not identical in the basal area of these individuals, while the remaining samples showed over the top of the analysis Variogram This is a result of the existence of symmetry in the basal area of its members by not less than half the number of trees that leads to the increase in the value of long-Variogram. The coefficient of determination values ranged between (zero -0.917), in the burning forests ranged between (zero - 0846) and an average of 0388, while in unburned forests ranged between (zero- 0917) and an average of 0.244 meaning that the values of the coefficient of determination showed as

little to do with the relationship between the basal area of spatial and space occupied by trees, that specifically low coefficient, which took an average of forest burning and forest unbound values attributed to perform this analysis on all sample personnel (trees, sapling, seedling) and the rivalry that occurs between the trees in the light (as of the determinants of growth) is among the trees only while the sapling and seedling do not have the ability to compete in the recipient's direct light from the top of the forest canopy coronary .

To determine the phenomena and trends, gathering areas have used Kriging analysis for the preparation of bilateral maps and three-dimensional, and results of the analysis of bilateral dimensional maps found that there is variation in the distribution of the large basal spaces as samples appeared (12, 17, 21,22, 23,28.31, 35 and 40,41, 42,44 , and 45) were randomly assigned to the ranks of the large basal area while the rest of the samples are synthesis emerged.

Maps triple has been used dimensions to clarify the direction of phenomena have appeared from the analysis and different study samples, and the application of this analysis for the different study samples, we find that (11) of these samples was the direction of the phenomenon in which the direction of the east, which samples (3, 4,7, 10, 12, 17,19,21, 23,36 and 45), in what appeared to the direction of the phenomenon of samples (9,14,25, 27, 42,and 44) towards the northeast, while the samples (5, 13, 31.33, 38, 41) was the direction of the phenomenon towards the north-west, the north and the trend represented in the samples (6, 11, 15, 16, 22.26, 28, 29, 32, 35, 39, 40), and has taken (6) samples the southwestern direction, namely, (1, 2.8, 20 and 34.37), while alone in the two samples (18 and 24), the southern direction and the sample (43) was the only in the southwestern direction, either the sample (30) was alone in the western direction.

The Pattern analysis test results, or what is known as analysis of the pattern we found that study samples showed distinct patterns in the distribution of the phenomenon pattern, and receded in two forms two main regular and indiscriminate while phenomenon synthesis only appeared in four of the samples, namely, (20,27, 29,and 34).