

## Investigation of the Effects of Global Warming on Carbon Storage Capacity of Pure and Mixed Forests of Zonguldak-Dirgine Region by Using Climate Change Scenarios

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**Abstract:** The negative effects of global warming, which is the most important environmental problem particularly during last two decades, continue to negatively affect all social life and the future of the world's natural resources. Increasing the carbon storage level is very important in mitigating the effects of this global problem. In this regard, it is necessary to protect the existence of natural resources with high carbon storage capabilities as well as creating awareness of social environmental cleaning. Forests are at the forefront of these important natural resources. Forests, which naturally have the ability to renew themselves, have different carbon storage abilities at every age and growth stage. However, the problem of global warming, the effectiveness of which is increasing rapidly, negatively affects this important feature of forest resources in terms of carbon storage. In this research, the possible changes in the carbon storage capacities of the forests in Dirgine province, which is located in the Western Black Sea Region, which is one of the regions with productive high forest resources which has very valuable pure and mixed forest resources, due to the effects of global warming, were investigated by using climate change models. For this purpose, Shared Socio-economic Pathways (SSPs) presented in the 2021 IPCC sixth evaluation report (AR6) for the years 2040, 2060, 2080, and 2100 in the WorldClim database, using 19 different bioclimatic variables, including altitude, and aspect, according to 245 and 585 global climate change scenarios. Modeling was done with Maximum Entropy software using topographic variable. As a result of the model applications, the annual mean temperature, the maximum temperature in the warmest months, the mean temperature in the driest period, the mean temperature in the warmest period and seasonal precipitation were determined as the bioclimatic variables that have the most important effects on the change in the carbon storage capacity of pure and mixed stands in the research area. According to these model applications, the carbon storage capacity of pure forest will decrease by 13.6% in 2040, 23.8% in 2060, 34.7% in 2080 and 41.3% in 2100. Depending on the effects of global warming, it has been determined that it will weaken by 11.5% in 2040, 20.7% in 2060, 30.8% in 2080 and 37.9% in 2100 in the mixed forest resources in the Dirgine province.

**Keywords:** Global warming, Climate change scenarios, Bioclimatic variables, Dirgine, Pure forest, Mixed forest.