

Importance of forest ecosystems in global climate change

Ahmet Alper Babalık^{1,*}, Nilüfer Yazıcı¹

¹Suleyman Demirel University, Faculty of Forestry, 32260, Isparta, Turkey

* Corresponding author: alperbabalik@sdu.edu.tr

Abstract: Global warming is the increase of Earth's average surface temperature due to effect of greenhouse gases, such as carbon dioxide emissions from burning fossil fuels or from deforestation, which trap heat that would otherwise escape from Earth. Climate change is the change of the normal weather patterns around the world over an extended period of time, typically decades or longer. Human induced climate change is expected to continue in the coming decades, with considerable effects on the environment. Consequences of climate change include an increased risk of floods and droughts, losses of biodiversity and damage to economic sectors such as agriculture and forestry. Forest ecosystems play a very important role in maintaining natural processes. Forests are one of the biggest reservoirs of carbon, so they help to keep the carbon cycle and other natural processes working and help reduce climate change. Forest ecosystems are major contributors to the Earth's ability to maintain its climate, by the global impact of their photosynthesis. They are a natural defense against climate change, removing the greenhouse gas carbon dioxide and generating oxygen. This assists in purifying the atmosphere and controlling rising temperatures. However, forest ecosystems are important in the global carbon cycle because they store large quantities of carbon in vegetation and soil, exchange carbon with the atmosphere through photosynthesis and respiration. Also forest ecosystems keep carbon by increasing of living biomass and participation of fallen leaves to soil carbon reservoir. Large portion of carbon goes to developing biomass when trees are planted. By this way, during the first 30–40 years of development of the tree are large amounts of carbon. The vast majority of carbon sequestration takes place within the first 60-100 years. A well developed, 100-year-old beech tree can absorb 40 million m³ air and also it can bind 6 tones carbon from 1200 m³ carbon dioxide. On the other hand, forest ecosystems bind about three billion tons of carbon which emitted as a result anthropogenic effects every year. This also constitutes 30% of CO₂ from fossil fuels. The aim of this study is to present the current state of knowledge about the role of forest ecosystems in the global climate change and carbon cycle, with respect to the potential role of forests to mitigate carbon dioxide emissions and thus affect climate change.

Keywords: Global warming, Climate change, Forest ecosystems, Carbon cycle