

# **NEXUS BETWEEN BIOENERGY DEVELOPMENT, LAND USE CHANGE, AND CLIMATE CHANGE ON WATER AVAILABILITY: A CASE STUDY FROM OCONEE WATERSHED**

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The export of wood pellets from the SE United States to the European Union is continuously increasing. It is quite likely that the area under forestry cover will increase to meet the rising demand for wood pellets at the expense of other competitive land uses in SE states. This research analyzes the impact of an increase in forestlands coupled with changing climatic inputs (temperature and precipitation) on the hydrology of a local watershed located in the Northeastern Oconee River Basin in the Piedmont region of Georgia. Using spatial modeling, suitable sites for loblolly pine (*Pinus taeda*) were determined. The outputs of suitability analysis were merged with historical land use change records to project an increase in area under loblolly pine for 2016, 2021, and 2026. Then, SWAT hydrological model was used to predict any changes in water discharge until 2028 for 14 scenarios in the presence of evolving land cover changes and changing climatic inputs. Results suggest that changes in land use in conjunction with variable climatic conditions could decrease or increase streamflow by up to 27% and 31% and evapotranspiration by up to 3% and 4%, respectively. Impact of changing climate on streamflow was much higher than any changes in land use. Results of this study improve our understanding of sustainability of transatlantic wood pellet trade.

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