

# Modelling the Coupled Effects of Climate Change and Management Approaches in the Plantations of Southern China

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**Key words:** Land management; Climate change; forest management; trade-off

## SUMMARY

Global climate change has caused real and also derived potential risks to forest ecosystems, especially affecting their composition, spatial distribution and ecological services. Learning how to adopt appropriate adapting and mitigating approaches on plantations is vital to sustainable forest management. This study aims at examining the coupled effects of climate change and management approaches in the forest plantations of Southern China, so as to propose sustainable forest management approaches that can fulfil the requirements of ecological service improvements and timber production of the forest plantations. Taihe County in Jiangxi Province, where forest plantations occupy more than half of the total forest area, was selected as the study area. The LANDIS-II (Landscape Disturbance and Succession) model was used to simulate the influences of climate change and forest management on biomass and timber production of plantations. Finally the trade-off between biomass and timber production was investigated based on a statistical approach of standard deviation. Results showed that, (1) among the newly coordinated parallel processes for developing new scenarios of Representative Concentration Pathways, say RCP 2.6, 4.5 and 8.5, biomass of plantations in the study region under RCP 4.5 will be greater than that of the other two scenarios; (2) though increased temperatures over the next hundred years will increase the biomass of plantations, timber production capability will be greatly determined by harvesting techniques; (3) in the Red Soil Hilly Regions (RSHR), as one of the most important plantation distribution areas in China, the most appropriate forest management approach appears to be middle harvest intensity under the RCP 4.5 scenario, which can fulfil the coupled requirements of ecological services and timber production on plantations.

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