

Water and Nutrients Dynamics in and around Eucalyptus Forests

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Brazil is the biggest eucalyptus forestation country in the world, and 0.6% of a country or 3,500,000 ha is eucalypt forest already. Though there have been several studies reporting environmental impacts of eucalyptus plantation such as over-uptake of water and nutrition, biodiversity loss, volatilized or emitted harmful substances, in Brazil salient issues have not occurred. At first, this project evaluates scientific backgrounds and finds threshold conditions to environmental mal-impacts. Based on verifying environmental functions of eucalyptus such as uptake of over excessed or contaminated nitrate from groundwater and soil erosion control, sustainable crop producing systems with coupling with eucalyptus plantation in land-use sequences could be proposed. Two study sites, Rio Claro and Mandacaru, were set around the area of Piracicaba, Sao Paulo State of Brazil, where sugar cane field and eucalyptus forest are set out sequentially. Piracicaba area is covered by silty sand layers on the undulating peneplain. The annual mean temperature is 21.4 degree C, and average annual precipitation is 1279mm. The stands of the eucalyptus are about 4 years old and their heights are around 15m. Sets of monitoring wells of 3 to 8 m-depth were installed, and groundwater chemistry is analyzed and water levels are surveyed regularly. As preliminary results, groundwater in the sugar cane fields are affected a little by fertilization, that is relatively high nitrate concentration, and surface soil or organic matters are degraded, while those in the eucalyptus forest are fairly good. More research in the next two years could propose possible sustainable farm systems including eucalyptus plantation.

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