

System dynamics modelling of deforestation rate and forest rehabilitation in the upstream of Ciliwung watershed, Bogor Regency

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Abstrak

One of strategic watersheds in Indonesia is the Ciliwung watershed. The rapid growth of development in this watershed has resulted in reduced forested lands and water catchment areas. The critical point is when the upstream area as a buffer zone also experiences uncontrolled land conversion for various purposes. Indonesia Law Number 41 of 1999 concerning Forestry, Article 18 contains a mandate for the Government to determine and to maintain the adequacy of forest cover in each watershed. This research seeks to understand the condition of rehabilitation and deforestation of forested land in Bogor Regency as the upstream of the Ciliwung watershed which affects its downstream water system in DKI Jakarta Province. By applying system dynamics modelling, it is expected that an ideal scenario of rehabilitation which the government must undertake will be identified to cope with deforestation rates in forested upstream watersheds. The methodological approach applied in this paper is a mixed method with system dynamics - based analysis methods. The results of model simulations carried out in Business as Usual conditions and Simulation of Scenarios Model going forward to 2060. From the alternative scenarios available, it reveals that the rehabilitation capability scenario of 3.6% / year is the most optimal in order to overtake deforestation rates in the upstream Ciliwung watershed. If the simulation setting is extended to 2100, the maximum area of forested land in 2090 will be 8,134.05 ha (still below the carrying capacity of the available forest area).