

ABSTRACT

BAMBANG SISWANTO. Economic Model of Groundwater Damage Control in Semarang City: A Game Theory Approach and Economic Experiments. Supervised by F.X. SUGIYANTO and AKHMAD SYAKIR KURNIA

Groundwater abstraction in Semarang City is thought to have triggered land subsidence and sea water intrusion. This research models the behavior of groundwater users through economic experiments using Prisoner's Dilemma Game. The experimental design is a 2^3 factorial design. The independent variables or factors are payoff, framing, and communication, while the response variable is the level of cooperation. The G statistic shows a significant logit equation model. Wald statistic shows a significant framing factor, whereas communication factor, framing and communication interaction factor, all factors interaction are significant but with the opposite sign. The McNemar change test and the Fisher exact test for 2×2 tables confirm the results of multinomial logistic regression analysis.

The study implies a policy based on the treatment proxy in experiments. First, narrating the depletion and the role of groundwater users is narrated. Second, building trust before implementing information disclosure on groundwater use. Third, determining groundwater extraction fines after internalizing scarcity rent in groundwater prices calculation.

Keywords: Semarang City, groundwater damage, prisoner's dilemma game, economic experiments, payoff matrix, framing, communication