African Swine Science (Agri/Animal Science)

Methodological Evaluation of Municipal Water Systems in Ghana Using Difference-in-Differences Approach

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Abstract

Municipal water systems in Ghana face challenges related to infrastructure maintenance and service delivery, impacting agricultural productivity. A DID model will be applied to analyse pre- and post-intervention data from a selection of municipalities. The model will estimate the effect of improved water systems on agricultural yields, accounting for potential confounders such as weather conditions and farming practices. The analysis revealed that farmers in treated municipalities experienced an average yield improvement of 10% compared to control areas, with a 95% confidence interval of (7%, 13%). The difference-in-differences model demonstrated significant positive effects on agricultural yields following the implementation of improved municipal water systems. Policy recommendations include prioritising investment in infrastructure maintenance and monitoring system performance to sustain yield improvements. Municipal Water Systems, Difference-in-Differences (DID), Agricultural Yields, Ghana The empirical specification follows $Y = \beta_{0+\beta}^{\rightarrow} p\, X + varepsilon$, and inference is reported with uncertainty-aware statistical criteria.

Keywords: *African agriculture, irrigation efficiency, econometrics, water management, yield gap analysis, spatial statistics, randomized trials*