

Title: Performance Indicators for Assessing Environmental Management Plan Implementation in Water Projects

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Abstract: This research aims to examine the performance indicators that are crucial for assessing the implementation of environmental management plans (EMPs) in water projects. To achieve this aim, a questionnaire survey, integrating a systematic literature review (SLR), was used to identify the initial performance indicators. Subsequently, ten interviews with environmental professionals were carried out to uncover additional indicators not identified by the SLR. Following the survey design and pilot study of the survey, the data collection resulted in 112 valid responses from environmental professionals engaged in water projects in Saudi Arabia. The data analysis encompassed reliability tests, mean ranking, normalized mean analysis, exploratory factor analysis (EFA), and partial least squares structural equation modeling (PLS-SEM). The normalized mean analysis highlighted 13 critical parameters among 39 for further investigation. The EFA disclosed three underlying constructs: environmental impact indicators, operational and safety indicators, waste management, and public safety indicators. PLS-SEM was used to validate the relationship between these indicators and the successful implementation of EMPs. The results indicate that all three underlying constructs positively influence the effective execution of such plans. This is the first study to model the relationships of the performance indicators in water projects. The study's findings underscore the importance of developing precise performance indicators tailored to diverse construction projects that are mainly focused on water facility construction. The identified performance indicators offer significant insights for policymakers, practitioners, and researchers and provide a solid foundation for the advancement of knowledge in the field of environmental management.

Keywords: Sustainable development; Water projects; Environmental management plan; Performance indicators

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