

Title : Assessing Environmental Management Plan Implementation in Water Supply Construction Projects: Key Performance Indicators

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Abstract: Assessing the implementation of environmental management plans (EMPs) in construction projects is crucial for meeting environmental sustainability goals and reducing potential adverse impacts. By using performance indicators (PIs), stakeholders can objectively measure the performance of EMP implementation, identifying areas of success and areas that may require improvement. Therefore, this study aims to examine the PIs for assessing EMP implementation in water supply construction projects, using Saudi Arabia as a case study. Data from semi-structured interviews and a systematic literature review were used to develop a potential list of PIs. Then, the PIs were used to create a survey and distributed to industry professionals. Data from 112 respondents were analyzed using mean ranking analysis, the normalization method, exploratory factor analysis (EFA), and fuzzy Citation: Radzi, A.R.; Farouk, A.M.; Romali, N.S.; Farouk, M.; Elgamal, M.; Rahman, R.A. Assessing Environmental Management Plan Implementation in Water Supply Construction Projects: Key Performance Indicators. Sustainability 2024, 16, 600. <https://doi.org/10.3390/su16020600> Academic Editor: Manuel Duarte Pinheiro Received: 28 October 2023 Revised: 30 December 2023 Accepted: 4 January 2024 Published: 10 January 2024 Copyright: © 2024 by the authors. Licensee MDPI, Basel, Switzerland. This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY) license (<https://creativecommons.org/licenses/by/4.0/>). synthetic evaluation (FSE). Eighteen critical PIs for assessing EMP implementation in water supply construction projects were identified, including public safety, road safety hazards, construction waste, clogged drainage, irregular flooding, the spilling of chemical substances, slope failures, soil erosion, landslide occurrence, increased schedule waste, changes in the color of bodies of water, oil/fuel spills, restricted site accessibility, the smell of run-off water, traffic accidents on construction sites, the spread of disease, changes in the color of run-off water, and overflowing silt traps. The EFA revealed that PIs can be grouped into three underlying constructs: fluid-related indicators, health and safety-related indicators, and site environment-related indicators. The FSE results confirmed that all PIs are between moderately critical to critical. This study's significance lies in its examination of PIs that aim to improve the environmental performance of water supply construction projects. Understanding which indicators are most effective allows for targeted improvements, helping to minimize negative environmental impacts and ensuring sustainable practices. Finally, this study is a pioneer in examining the critical PIs for assessing EMP implementation in water supply construction projects

Keywords: environmental management plan; EMP; water supply construction projects; Saudi Arabia; exploratory factor analysis; EFA; fuzzy synthetic evaluation; FSE

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