

Risk Management, Mitigation, and Recovery Towards an Engineering Framework for Flood Control in Cavite

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Abstract

Flooding poses serious threats to communities and infrastructure in Cavite, necessitating systematic approaches to risk management, mitigation, and recovery. This study aims to examine eight key objectives: (1) identify and assess flood risks, (2) evaluate planning and design strategies, (3) analyze mitigation measures, (4) assess resource mobilization, (5) examine recovery and rehabilitation processes, (6) evaluate monitoring and evaluation practices, (7) investigate community participation and resilience, and (8) develop an engineering-based framework for integrated flood control. Using a quantitative research design, structured surveys were administered to stakeholders from engineering, public, private, and community sectors. Statistical analyses, including one-tailed tests, paired tests, ANOVA, and regression analysis, were conducted to determine relationships among the risk management dimensions. Results indicate that early stages, particularly Risk Identification and Assessment and Risk Planning and Design, are generally effective, whereas Risk Mitigation Strategies and Resource Mobilization require improvement. Regression analysis further revealed that Monitoring and Evaluation is the only dimension strongly associated with Community-Based Risk Resilience, highlighting the critical role of systematic assessment in enhancing preparedness and sustainability. The study concludes that consistent monitoring and evaluation, combined with coordinated stakeholder engagement, strengthens overall resilience and informs actionable strategies for flood control. Based on these findings, an engineering-based framework integrating technical interventions, resource planning, and community participation was developed to guide effective and sustainable flood management in Cavite.

Keywords: Civil Engineering, Flood Risk Management, Mitigation, Recovery, Quantitative Research, Statistical Analysis, Philippines