

A Conceptual Framework for Vulnerability Assessment of Climate Change Impact on Oil and Gas Critical Infrastructures in the Niger Delta

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Abstract : The impact of climate change is severe in the Niger Delta and critical oil and gas infrastructures are vulnerable. This is partly due to lack of specific impact assessment framework to assess impact indices on both existing and new infrastructures. The purpose of this paper is to develop a framework for the assessment of climate change impact on critical oil and gas infrastructure in the region. Comparative and documentary methods as well as analysis of frameworks were used to develop a flexible, integrated and conceptual four dimensional framework underpinning; 1. Scoping - the theoretical identification of inherent climate burdens, review of exposure, adaptive capacities and delineation of critical infrastructure; 2. Vulnerability assessment - presents a systematic procedure for the assessment of infrastructure vulnerability. It provides real time re-scoping, practical need for data collection, analysis and review. Physical examination of systems is encouraged to complement the scoped data and ascertain the level of exposure to relevant climate risks in the area; 3. New infrastructure - consider infrastructures that are still at developmental level. It seeks to suggest the inclusion of flexible adaptive capacities in original design of infrastructures in line with climate threats and projections; 4. The Mainstreaming Climate Impact Assessment into government's environmental decision making approach. Though this framework is designed specifically for the estimation of exposure, adaptive capacities and criticality of vulnerable oil and gas infrastructures in the Niger Delta to climate burdens; it is recommended for researchers and experts as a first-hand generic and practicable tool which can be used for the assessment of other infrastructures perceived as critical and vulnerable. The paper does not provide further tools that synch into the methodological approach but presents pointers upon which a pragmatic methodology can be developed.

Keywords : adaptation, assessment, conceptual, climate, change, framework, vulnerability

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