

ASSESSING CASCADING IMPACT OF INTERFACE BETWEEN CRITICAL INFRASTRUCTURE AND EXTREME WEATHER EVENTS (EWEs)

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Abstract—The main purpose of this research is to establish the cascading impact of Extreme Weather Event(s) on Critical Infrastructures (CIs). Extreme weather is those weather phenomena that are at the extremes of the historical distribution, and are rare for a particular place and/or time, especially severe or unseasonal weather. Such extremes include but are not limited to severe thunderstorms; severe snowstorms, ice storms, blizzards, flooding, hurricanes, and high winds, and heat waves. The definitions of Critical Infrastructure (CI) differs amongst countries, however, their importance for the functioning of societies is widely recognized. The UK Government defines Critical National Infrastructure (CNI) as those infrastructure assets (physical or electronic) that are vital to the continued delivery and integrity of the essential services, the loss or compromise of which would lead to severe economic or social consequences or to loss of life. The aim of this paper is to evaluate the Critical Infrastructures essential for societal functions, health, safety, security, economic or social well-being, their interdependencies, and the cascading impact of climate change linked extreme weather events on these Critical Infrastructures. Literature identifies 13 CIs from Indian context. Their interdependencies are categorized based on their driving power and dependence on other sectors through application of cross-impact matrix multiplication applied to classification (MICMAC). Then based on the dependency number weighted ranking is established. The findings show that Energy ranks highest as CI as all other CIs rely on it for continual operations, while healthcare, defence and tangible culture (monuments) rank lowest. However, in limitation, this study has done single level cross-matrix, and in future EWEs also need to be incorporated for revised ranking.