

Statistical Dependence Modeling of Hurricane Impacts on Regional Workforce Sectors

Topic: Environmental Input-Output Modeling

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Hurricanes have the potential to damage critical infrastructure systems, disrupt workforce and commodity flows, and can cause adverse socioeconomic impacts on the affected regions. Of particular interest in this paper is the assessment the cascading effects of workforce disruptions on the production outputs of interdependent economic sectors. Hence, this paper presents an impact analysis model to assess the uncertainties associated with workforce recovery. The uncertainty in workforce disruptions is linked to hurricane intensity levels inducing a statistical dependence relationship between hurricane intensity and the recovery period estimates for each workforce sector. This paper, to the best of our knowledge, demonstrates the first attempt to integrate such a statistical dependence relationship with an economic input–output (I-O) modeling approach. Additionally, the most critical workforce sectors are identified and prioritized on the basis of economic loss and sector inoperability metrics, which we use in the simulation of hurricane scenarios in the Commonwealth of Virginia. Such a prioritization may be useful to guide resource allocation to expedite hurricane recovery. The resulting model is capable of providing disaster preparedness insights to support the prioritization of sectors that are deemed critical in the recovery process.