

Resilience-Vulnerability Interaction in the Context of Disasters and Complexity: Study Case in the Coastal Plain of Gulf of Mexico

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Abstract : In the last twenty years, academic and scientific literature has been focused on understanding the processes and factors of coastal social-ecological systems vulnerability and resilience. Some scholars argue that resilience and vulnerability are isolated concepts due to their epistemological origin, while others note the existence of a strong resilience-vulnerability relationship. Here we present an ordinal logistic regression model based on the analytical framework about dynamic resilience-vulnerability interaction along adaptive cycle of complex systems and disasters process phases (during, recovery and learning). In this way, we demonstrate that 1) during the disturbance, absorptive capacity (resilience as a core of attributes) and external response capacity explain the probability of households capitals to diminish the damage, and exposure sets the thresholds about the amount of disturbance that households can absorb, 2) at recovery, absorptive capacity and external response capacity explain the probability of households capitals to recovery faster (resilience as an outcome) from damage, and 3) at learning, adaptive capacity (resilience as a core of attributes) explains the probability of households adaptation measures based on the enhancement of physical capital. As a result, during the disturbance phase, exposure has the greatest weight in the probability of capital's damage, and households with absorptive and external response capacity elements absorbed the impact of floods in comparison with households without these elements. At the recovery phase, households with absorptive and external response capacity showed a faster recovery on their capital; however, the damage sets the thresholds of recovery time. More importantly, diversity in financial capital increases the probability of recovering other capital, but it becomes a liability so that the probability of recovering the household finances in a longer time increases. At learning-reorganizing phase, adaptation (modifications to the house) increases the probability of having less damage on physical capital; however, it is not very relevant. As conclusion, resilience is an outcome but also core of attributes that interacts with vulnerability along the adaptive cycle and disaster process phases. Absorptive capacity can diminish the damage experienced by floods; however, when exposure overcomes thresholds, both absorptive and external response capacity are not enough. In the same way, absorptive and external response capacity diminish the recovery time of capital, but the damage sets the thresholds in where households are not capable of recovering their capital.

Keywords : absorptive capacity, adaptive capacity, capital, floods, recovery-learning, social-ecological systems

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