

In Partial Fulfillment of the Requirements for the Degree of

Master of Science
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Will defend his thesis

**Floods, Vulnerability, and the US-Mexico Border: A Case Study of
Ambos Nogales**



Abstract

Environmental change and natural hazards represent a challenge for sustainable development. By disrupting livelihoods and causing billions of dollars in damages, disasters can undo many decades of development. Development, on the other hand, can actually increase vulnerability to disasters, by depleting environmental resources and further marginalizing the poorest. Big disasters and big cities get the most attention from the media and academia. The vulnerabilities and capabilities of small cities have not been adequately explored, and, while cities in developed countries have begun to initiate mitigation and adaptation responses to global environmental change, most cities in developing countries have not.

In this thesis I explore the vulnerability to flooding of the US-Mexico border by using the cities of Nogales, Arizona, USA and Nogales, Sonora, Mexico as a case study. I ask the following questions: What is the spatial distribution of vulnerability, and what is the role of the border in increasing or decreasing vulnerability? What kind of coordination should occur among local institutions to address flooding in the cities?

I used a Geographic Information System to analyze the spatial distribution of flood events in, and the socio-economic characteristics of, both cities. The result is

an index that estimates flood vulnerability using a set of indicators that are comparable between the two cities. I interviewed planners and local government officials to validate the vulnerability model and to assess collaboration efforts between the cities. The research contributes to our understanding of vulnerability and sustainability in two ways: (1) it establishes a framework that makes it possible to assess and compare vulnerability in cities located in different countries, (thus surmounting problems of data incompatibility), and (2) it highlights the institutional arrangements of border cities and their role in decreasing or increasing vulnerability. The results of this research can strengthen efforts to address flooding issues in other cities.

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Faculty, students, and the general public are invited.

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