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## Measuring Household Vulnerability: A Fuzzy Approach

Gautam Sethi

*Bard Center for Environmental Policy, SETHI@BARD.EDU*

Molly Gilligan

*International Union for Conservation of Nature, molly.gilligan@iucn.org*

Amy Richmond

*United States Military Academy, amy.richmond@usma.edu*

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# Measuring Household Vulnerability: A Fuzzy Approach

**Gautam Sethi, Molly Gilligan, and Amy Richmond**  
Bard Center for Environmental Policy ([sethi@bard.edu](mailto:sethi@bard.edu))  
International Union for Conservation of Nature ([molly.gilligan@iucn.org](mailto:molly.gilligan@iucn.org))  
United States Military Academy ([amy.richmond@usma.edu](mailto:amy.richmond@usma.edu))

**Abstract:** This research develops an index of vulnerability for Ugandan households using a variety of economic, social and environmental variables with two objectives. First, there is only a small body of research that measures household vulnerability. Given the stresses faced by households susceptible to water, environment, food, livelihood, energy, and health security concerns, it is critical that they be identified in order to make effective policy. We draw on the socio-ecological systems (SES) framework described by Ostrom (2009) and adapt the model developed by from Giupponi, Giove, and Giannini (2013) to develop a composite measure. Second, most indices in the literature are linear in nature, relying on simple weighted averages. In this research, we contrast the results obtained by a simple weighted average with those obtained by using the Choquet integral. The Choquet integral is a fuzzy measure, and is based on the generalization of the Lebesgue integral. Due to its non-additive nature, the Choquet integral offers a more general approach. Our results reveal that all households included in this study are highly vulnerable, and that vulnerability scores obtained by the fuzzy approach are significantly different from those obtained by using the simple weighted average ( $p = 9.46e-160$ ).

## REFERENCES

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