Determinants of Household Sensitivity to Coastal Hazards in the Volta Delta, Ghana

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Introduction

- Climate change, local subsidence and sea-level rise interact with population dynamics to increase exposure to coastal flooding and other hazards (Hallegatte et al. 2013).
- Deltas have fragile ecosystems and are especially vulnerable to coastal hazards (Nicholls & Cazenave, 2010).
- However, exposed populations may differentially sense the impact of coastal hazards due to their geophysical, socioeconomic and demographic characteristics (Codjoe & Afuduo, 2015; Appeaning-Addo, 2013). Sensitivity refers to the extent to which a system is affected by perturbation.
- To assess vulnerability in deltas it is important to determine which characteristics are associated with sensitivity to perturbations by hazards.

Objective

- This paper presents a local-scale inquiry into the geophysical, demographic and socioeconomic household characteristics associated with sensitivity to the impacts of coastal hazards.

Methods

Data 2016 DECCMA Sending Area Survey

- Sample size – 932 households in 5coastal districts

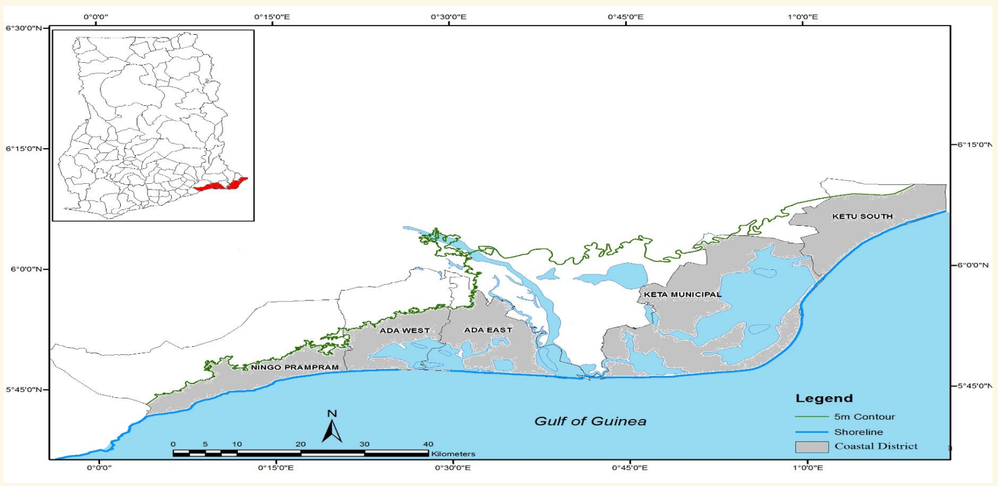
Analysis

- Factor Analysis, GIS & Spatial analysis, Logistic regression models

Measurement

- **Sensitivity**: Impact of hazard on housing, economic security, food security, drinking water, health, crop / livestock loss
- **Hazards:** flooding, salinity and erosion.

Map of coastal districts in Volta Delta



Results

Figure 1. Extent of Sensitivity to Coastal Hazards

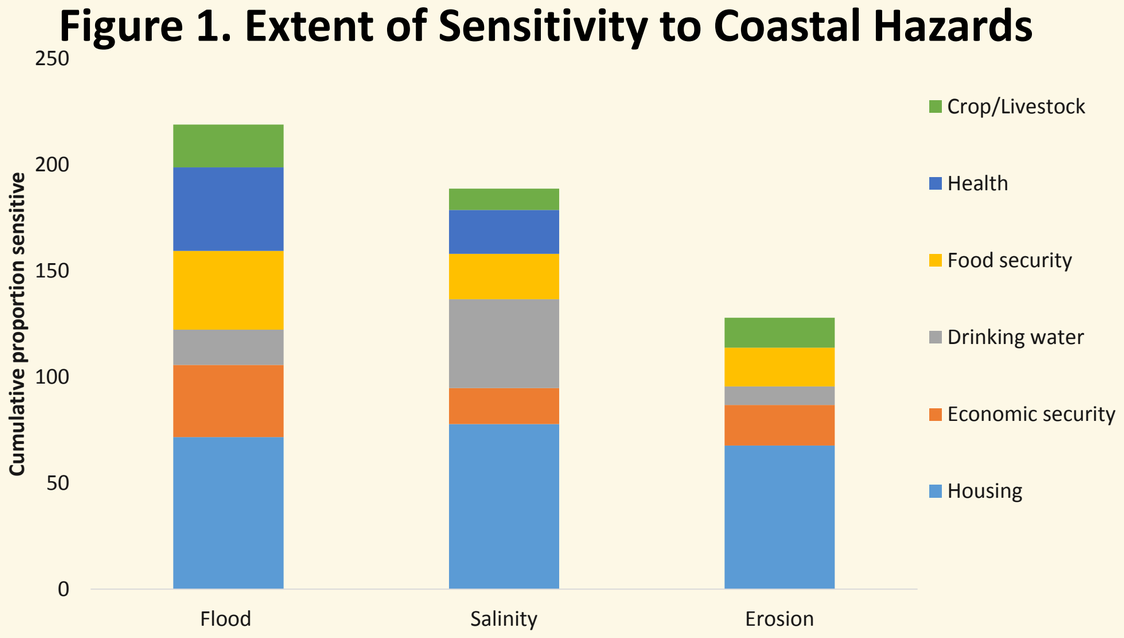


Table 1. Likelihood Odds of Household Sensitivity to Flooding, Salinity and Erosion (n=932)

Household Characteristics	Flooding OR (s.e) Nagelkerke R^2 =.224	Salinity OR (s.e) Nagelkerke R^2 =.295	Erosion OR (s.e) Nagelkerke R^2 =.144
Geophysical			
Distance to shoreline (r= <1km)			
1- 5km	.872 (.342)	.450 (.335)*	
>5 km	.576 (.185)**	.198 (.203)***	
District (r = Ada East)			
Ada West	.194 (.278)***	.370 (.277)***	.885 (.258)
Ningo-Prampram	.187 (.321)***	.284 (.320)***	.646 (.314)
Keta	.857 (.239)	1.873 (.256)*	.575 (.282)*
Ketu South	.345 (.290)***	1.550 (,292)	.183 (.416)***
Sociodemographic			
Drinking water source (r = surface water)			
Pipe/Borehole	1.320 (.233)	2.740 (.251)***	
Sachet / Bottle / Other	.575 (.281)*	1.000	
Toilet facility (r = Flush)			
Pit latrine	1.310 (.353)	.629 (.320)	
No facility/ beach/ field	2.219 (.338)*	1.388 (.301)	
KVIP	1.678	.393 (.317)**	
Subjective wealth (r=Very poor)			
Poor	.906 (.166)	.950 (.168)	
Not poor	.468 (.301)*	.508 (.287)*	
Gender composition (r= Female adults only)			
Female head + male adult	2.859 (.300)***	1.456 (.282)	
Male headed	2.171 (.287)***	1.823 (.268)*	
Social capital (r = Low)			
Medium	.608 (.190)**		
High	.687 (.196)*		

*** p<.001; **p<.01; *p<.05; (r) = Reference category s.e = Standard error
Only significant variables are displayed in the table. Models include other variables.

Discussion & Conclusion

- Both socioeconomic and geophysical characteristics are essential predictors of population sensitivity to coastal hazards.
- The effects of sociodemographic characteristics on household sensitivity are hazard-specific.
- Geophysical features determine household sensitivity to all coastal hazards .
- Further analysis of total vulnerability must include adaptive capacity of delta populations sensitive to hazards.

References

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