

# INSTITUTIONAL CAPACITIES OF RESPONSE TO EXTREME RAINFALL EVENTS IN SMALL COASTAL TOURISM AND ARTISANAL FISHING ECONOMIES IN LATIN AMERICA

## Summary

Coastal communities from Latin America and the Caribbean Sea islands are not completely aware on possible impacts derived from global changes, such as those related to sea level rise, elevation of mean sea temperature, and increasing extreme weather events. Particularly local fishing-tourism based economies are threatened because as extreme meteorological events occur with more regularity, their livelihoods are increasingly exposed. To deal with these problems, financial, human, and political resources of government and non-government actors need to strengthen their local institutional arrangements and capacities to be conscious about their own risks, to promote adaptation and reduce the impacts of these meteorological occurrences. Based on three case studies in the region, the characterization of local environmental and socioeconomic conditions, and the evaluation of the local institutional capacities (key actors role and relationships, legal framework and mechanisms for citizen participation) seem to be essential to be in a better position for prevention, response and adaptation to the risks and impacts derived from extreme rainfall events.

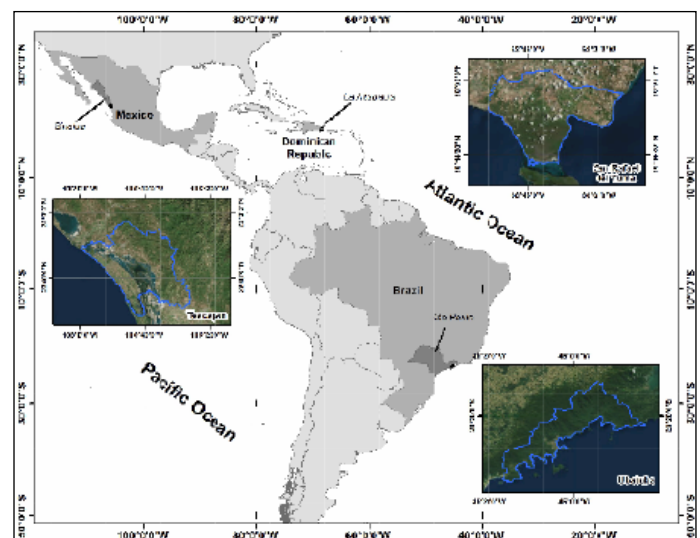
## Why is this issue important?

Coastal populations are growing, increasing dependence on economic activities such as fishing and tourism; thus it is imperative for tourism and artisanal fishing – based economies to understand that the extreme events might be more frequent and intense because of climate change, causing more flooding and landslides, and that they need to adapt to this verifiable and scientifically-established information. To build awareness, it is indispensable to examine and learn about risks they are facing and how they are currently withstanding and adapting to the potential negative effects from extreme rainfall events, seen from the local institutional response capacities view. Once risks and capacities are known, it is possible to strength these capacities.

## Evaluation: The Methodological approach

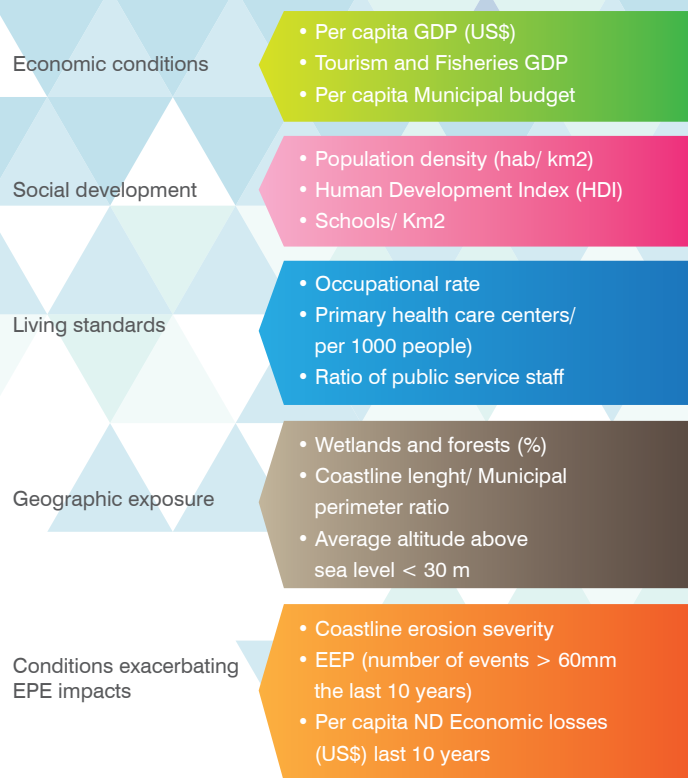
### Study sites

Three Latin-America coastal communities, Teacapan (Mexico), Bayahibe (Dominican Republic) and Brava de Almada (Brazil), with diverse social and environmental conditions, which favor or reduce vulnerability to extreme rainfall events, were selected as study sites to evaluate their exposure to risks and the local capacities to manage them.



### Coastal vulnerability assessment

To get a comprehensive estimate of the vulnerability in the study sites, a series of environmental, social, and economic indicators were analyzed with the method proposed by the United Nations Environment Programme (UNEP, 2005), adapted by Wang et al. (2014) and modified here. Groups of three weighed indicators are arranged in five criteria that jointly estimate exposure (Economic conditions, Social development, Living standards) and severity (Geographic exposure and Conditions exacerbating extreme precipitation effects). Values were standardized, allowing comparisons among study sites.



To obtain the information, semi-structured interviews allowed the identification of key actor's inter and intra-relationships, the administrative structure and the mechanisms of citizen's participation.

All the available regulations on land use, prevention and mitigation of natural disasters and response actions were acquired and organized at Nation, State and local level to obtain information on legal framework.

## Research findings

### **Risk perception**

Although risk indicators must be revised and adapted by country, to fit the available data which are not the same in the region, the inclusion of vulnerability and severity criteria allowed to comprehensively evaluate risk, not only from a physical, economic or social point of view. It is also possible to compare among sites, becoming a useful tool to prioritize actions. Thus, even when the Brazilian study site reflects the highest position regarding economic conditions and living standards, situated in middle position concerning the possible effects of extreme rainfall events, the comprehensive assessment qualify it as the most threatened site. This is consequence of the method, which integrates not only the magnitude of the indicators, but also their positive or negative effect on resilience, weighed by importance.

### **General remarks about institutional capacities of response**

Considering the threats from extreme rainfall events, despite the local differences by study site, the key actors' networks and the legal framework are potentially enough to cope with hazards, but citizen participation mechanisms are not, as derived from the analysis of the information from the interviews and questions on regulations.

The key actors are the same, community (mainly fisheries and tourism staff), government and NGOs, but they are unevenly represented by country, with differences in roles and importance.

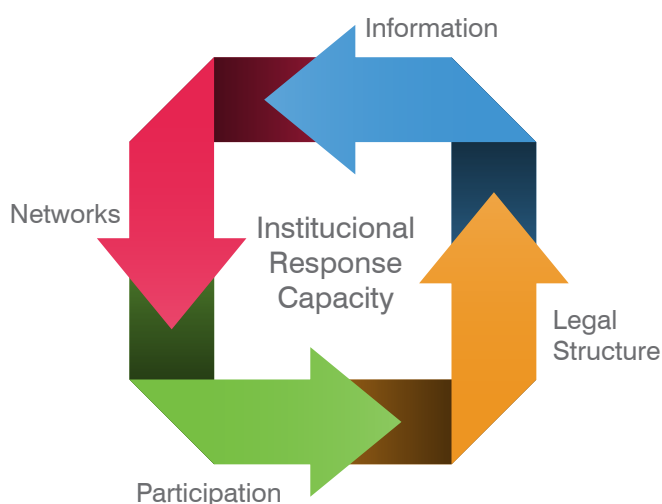
In general, the earlier regulations related to prevention and response to EPE are from the 1980's, mainly reacting to emergency situations, but during the last decade is when most federal laws and regulations were issued to help tackle climate change issues, with proposals for mitigation and adaptation. Every country has developed legal mechanisms to prevent and respond to extreme events at the federal, state and municipal levels.

Therefore, responsibilities and roles are well defined and understood in every study site, but resilient capacities are also defined by the strength of the actors' inter e intra-relationships and the existence of spaces for citizen participation, clearly the weakest output in this research; with differences by country, then affecting the study sites situation.

### **Understanding local capacities**

The local institutional arrangements to manage threats from extreme rainfall events are examined from the perspective of the Key actors' relationships, the Legal framework and the Citizen's participation mechanisms, adapting the proposal for urban health risks from Romero-Lankao et al. (2013).

The method assumes that risks mitigation requires cooperation and coordination among actors from different sectors, reinforcing institutional response. The legal framework defines responsibilities and planning mechanisms to enhance institutional response capacities. Finally, civic participation encourages citizens to be enlightened and informed, enhancing adaptation and self-organizing communities, allowing to address large and complex issues.





*Brava de Almada (Ubatuba), Brazil:* Displays good structural capabilities to react in extreme rainfall situations, however inter-institutional communication strategies are deficient and popular participation in the construction and implementation of the contingency plans were neither detected. Only relations among community actors are strong, while emerging among government members, mainly on prevention. With few exceptions, little or no relationship can be established among the three actors groups, and must be strengthened to improve local response capacity to EPEs.



Brava de Almada

*Teacapán (Escuinapa), Mexico:* Incomplete schemes to integrally manage disasters were detected. Although the civil protection system is robust and the actors' network is well defined at regional (state) level, locally the response actions are fragile and delayed. Most of the citizen response actions are based on past experiences, with unplanned arrangements operating under unregulated procedures and null or minimum participation in the land planning, prevention or response instruments.



Teacapán

*Bayahibe (San Rafael de Yuma), Dominican Republic:* The country is now going through a new phase of their disaster risk response system that plans to integrate all members. Interviews showed that some geographic areas, especially small ones like Bayahibe, are being ignored by a central government-led initiative.



Bayahibe





## Challenges

There are several issues that must be improved to increase the capacities of response to face extreme rainfall events and reduce their impacts in the communities that can be synthesized in four main themes:

- Promotion of citizen participation in risk management issues, improving communication strategies that build two-way bridges between local and central information generators fitting extreme rainfall responses to local necessities and priorities
- Increase social perception on extreme rainfall hazards and risks, consolidating spaces for citizen participation for those actors involved in prevention and response to help construct plans and become familiar with them.
- Capitalization of prevention and response actions from previous experiences
- Develop or update risk management and monitoring tools such as risk and vulnerability maps, contingency plans, and hydro-meteorological measurement indicators, particularly during the rainy season.



## Further reading

Romero Lankao, P., S. Hughes, A. Rosas-Huerta, R. Borquez, and D.M. Gnatz. 2013. Institutional capacity for climate change responses: an examination of construction and pathways in Mexico City and Santiago. *Environment and Planning C: Government and Policy*, 31: 785-805.

UNEP. 2005. *Assessing coastal vulnerability: Developing a global index for measuring risk*. 54 p. [http://www.unep.org/dewa/Portals/67/pdf/CVI\\_PM65\\_Final\\_05.pdf](http://www.unep.org/dewa/Portals/67/pdf/CVI_PM65_Final_05.pdf)

Wang, G., Y. Liu, H. Wang and X. Wang. 2014 A comprehensive risk analysis of coastal zones in China. *Estuarine, Coastal and Shelf Science*, 140 (2014) 22-31.

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