

# Strategies for Communicating Landslide Risk in Puerto Rico

Raquel Lugo Bendezú<sup>1</sup>, Yahaira Álvarez Gandía<sup>1</sup>, Jocelyn West<sup>2</sup>

<sup>1</sup>University of Puerto Rico Mayagüez, <sup>2</sup>Natural Hazards Center



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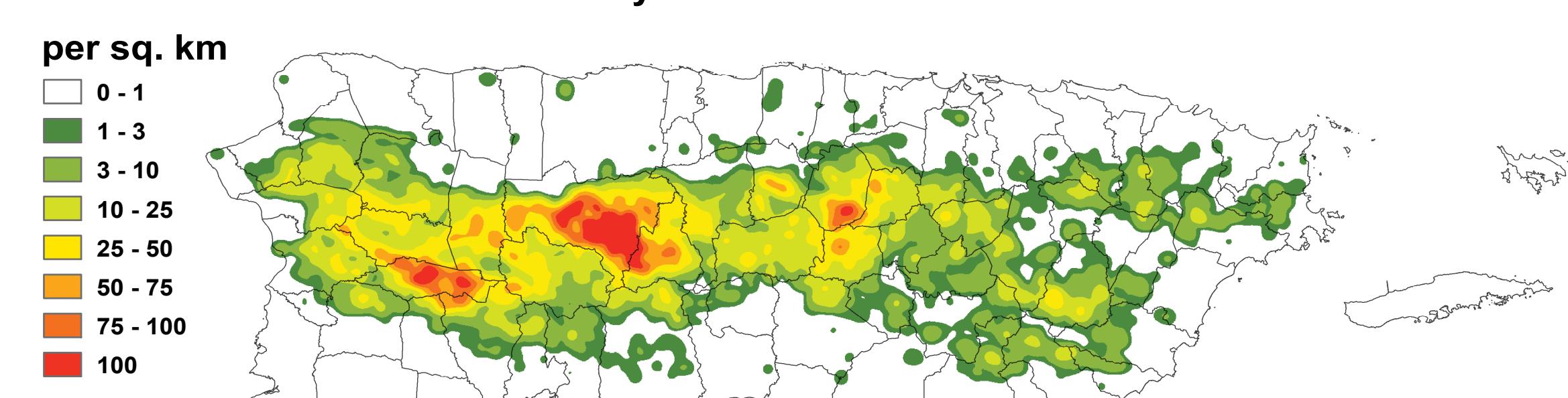
## Abstract

Heavy rainfall associated with Hurricane Maria triggered **more than 70,000 landslides** on the island of Puerto Rico. Following the disaster, Puerto Rican officials expressed interest in developing educational materials on landslide hazards. To address this need, the U.S. Geological Survey and the Natural Hazards Center at the University of Colorado Boulder have partnered with geologists and students from the University of Puerto Rico Mayagüez to develop outreach materials on landslides. The goal is to increase awareness of landslide threats and inform risk reduction strategies by creating a range of products tailored to the Puerto Rican context that emergency managers and mitigation practitioners can use to communicate landslide risk to residents of Puerto Rico.

This poster features a mock-up of a **Spanish-language, graphic-based educational booklet on landslides** that reflects the local geologic and cultural setting of Puerto Rico. Printed pamphlets are commonly used as educational materials for landslide hazards, and we examined a range of existing pamphlets on landslides to inform the development of the educational materials for Puerto Rico. Informal interviews and existing risk communication literature targeted to communities on the island suggest that such pamphlets are useful but not sufficient to adequately communicate hazard risk in Puerto Rican communities. Thus, the booklet we are developing will be the first step in a broader effort to facilitate discussions with disaster risk communication stakeholders and will be expanded into multiple modes (e.g., animated videos, flyers, and social media posts) to be distributed to communities. The project will use ongoing monitoring and evaluation to update the educational materials based on user input and to inform future communication efforts.

## Landslide Education in Puerto Rico

### Hurricane María Landslide Density



### Student Team Members Experiences

This project has involved two undergraduate students at the University of Puerto Rico-Mayaguez and a graduate student at the University of Colorado Boulder. This section of the poster offers insights into our experiences.



Photo showing damaged electrical cables in Dorado. Given the situation on the island, our university was shut down for approximately two months. Our semester was shortened drastically.



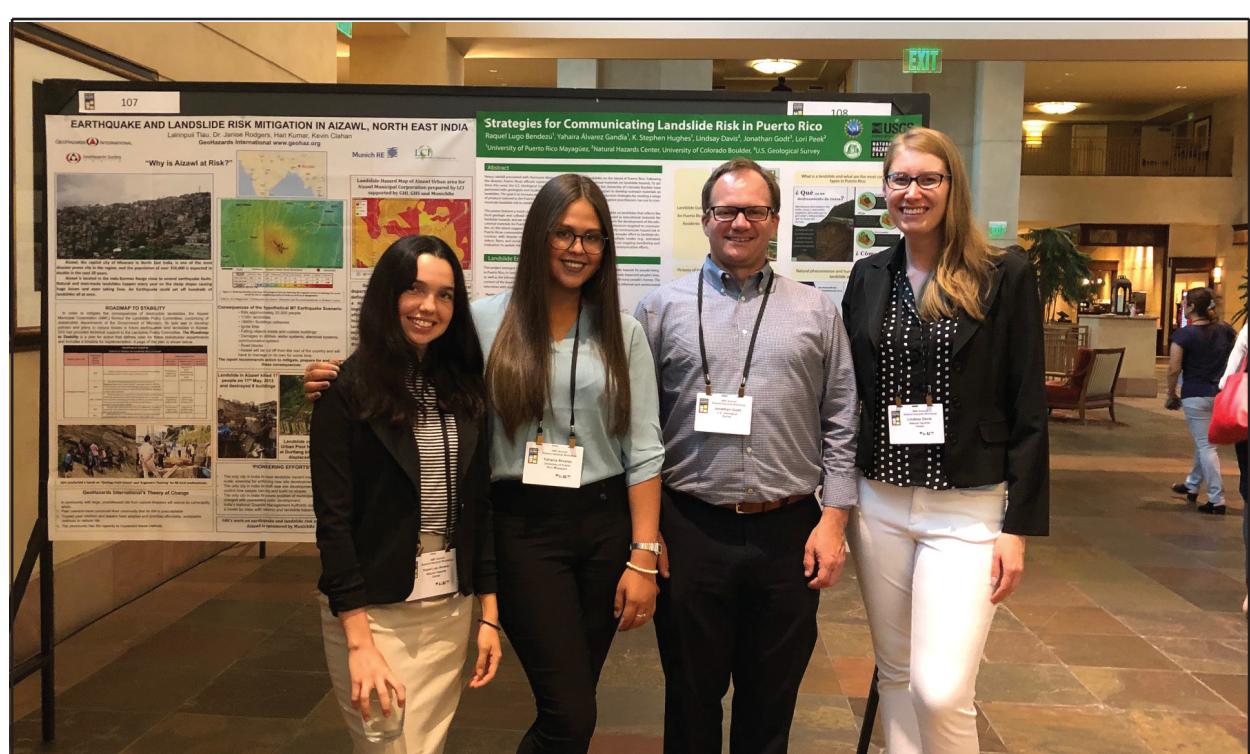
The landslides damaged homes all around where we live, work, and go to school. It was disruptive to residents and compelled us to want to do this research. Many people were affected by landslides induced by the hurricane. Photo showing a damaged house in Utuado.



In response to the needs of the communities of Utuado that were affected by landslides, students from the University of Puerto Rico of Mayagüez supplied groceries to various families.



Working with the Natural Hazards Center on creating educational materials has given us the opportunity to help our community become more resilient to natural hazards.



Our work has been presented at various conferences, in which we have received positive feedback and ideas on how to improve the guide and reach a bigger audience.



This experience has strengthened our interest in continuing to pursue similar work. We feel honored to be part of a team dedicated to educating and helping communities in need after disasters.

## Future Work

This is an ongoing project that will be expanded into various formats such as:

- Animated videos
- Flyers
- Newspaper
- Social media posts
- Radio

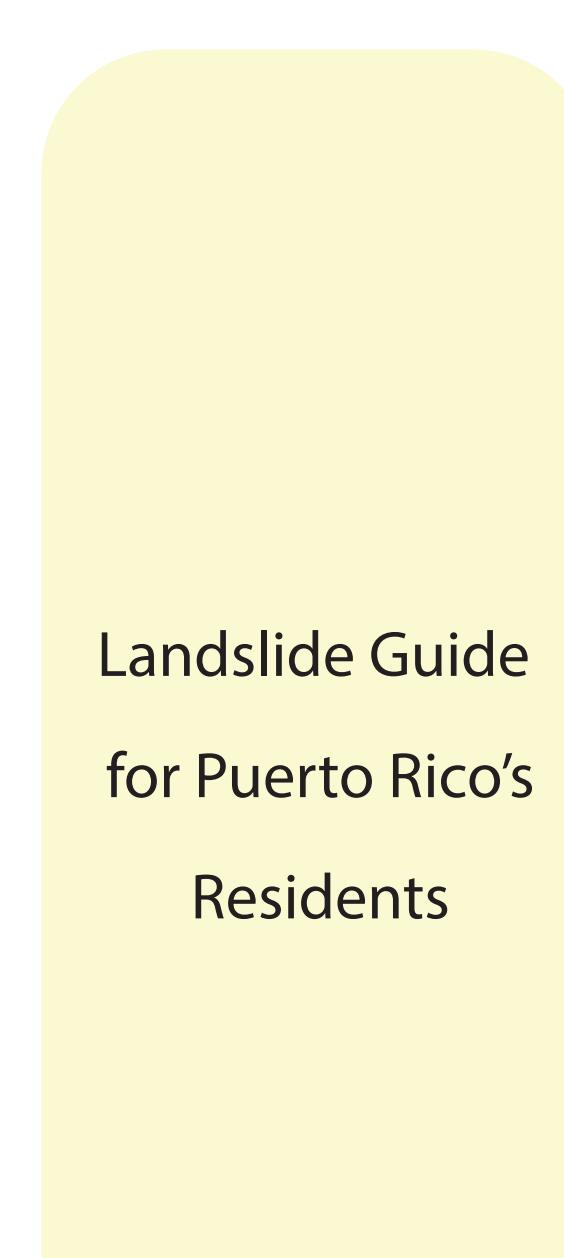
The main goal is to reach as many people as possible through multiple channels of Spanish and English language communication as part of a broader educational campaign.

## Acknowledgements

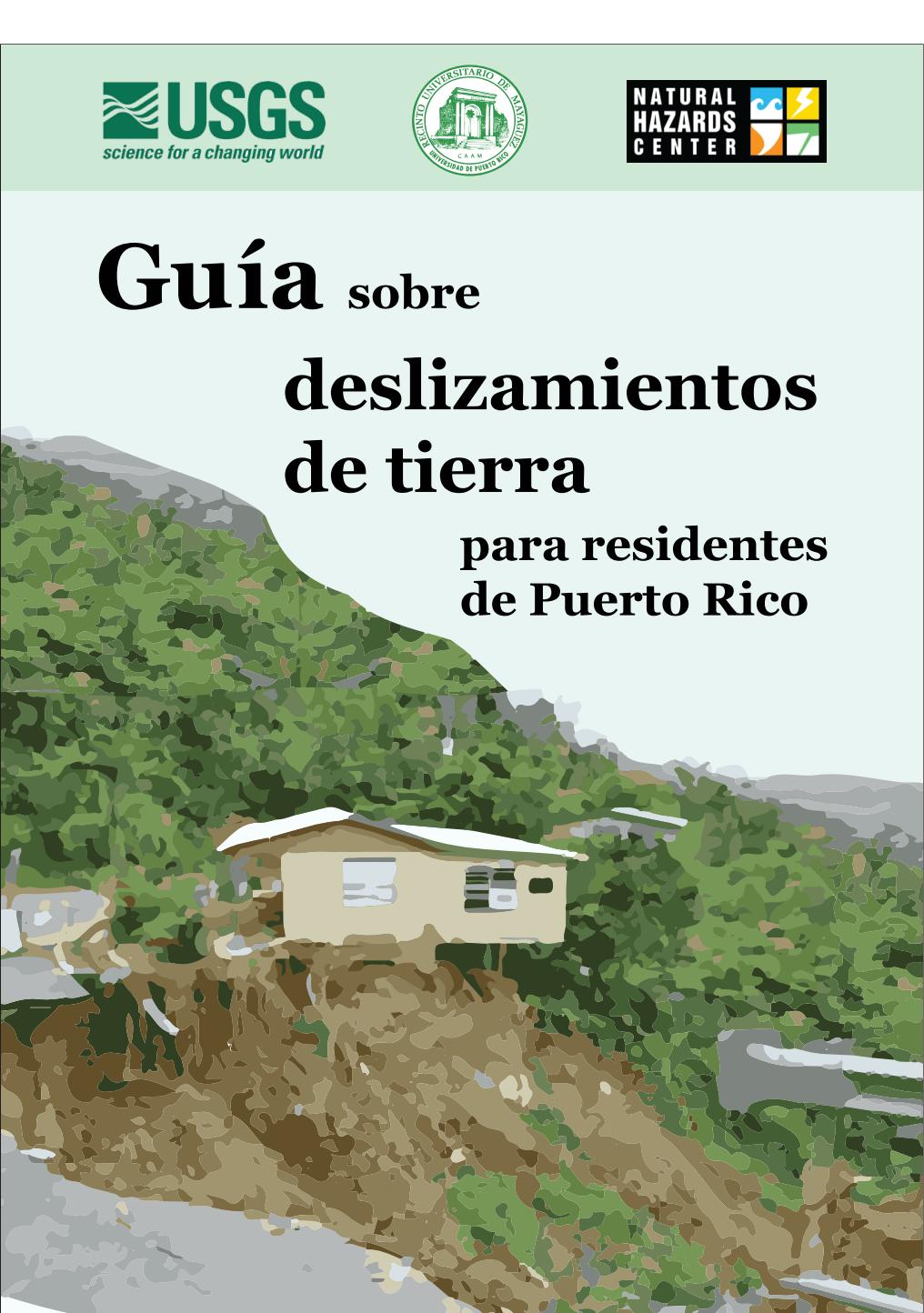
We would like to thank the various reviewers and collaborators for making this work possible, including: Bill Schulz, Darysabel Pérez Martínez, WFO San Juan, Puerto Rico Seismic Network, Lorna Jaramillo Nieves, Jennifer Santos Hernández, Christa G. von Hillebrandt-Andrade and the National Weather Service. This poster is based upon work supported by the National Science Foundation (NSF Award # 1635593) with supplemental support from the U.S. Geological Survey and the Puerto Rico Science, Technology, & Research Trust. Any opinions, findings, conclusions, or recommendations expressed in this material are those of the authors and do not necessarily reflect the views of the NSF, USGS, or PRSTR.

## References

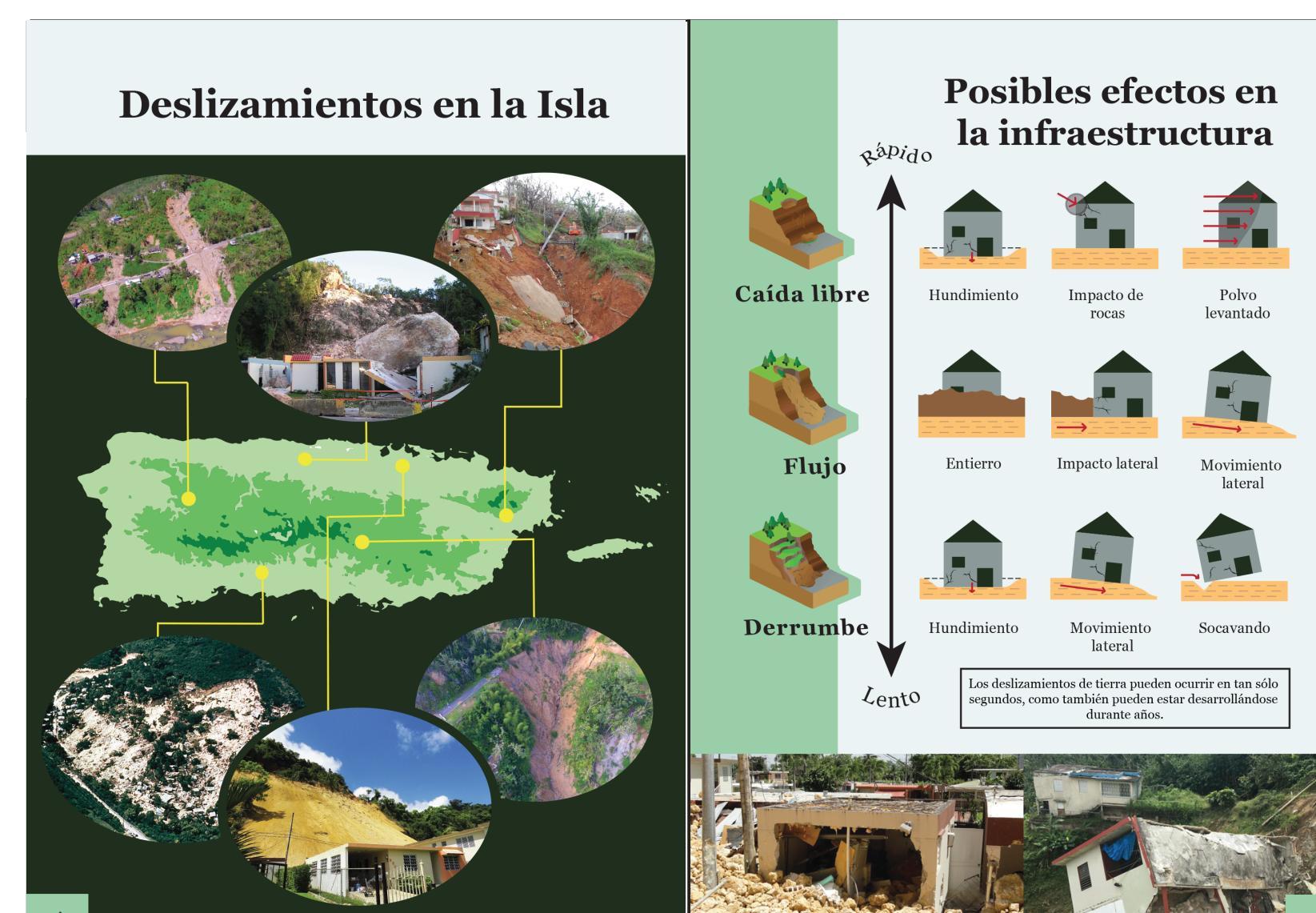
Bessette-Kirton, et al., 2019; Hughes, et al., 2019; Larsen, 2008; López-Marrero, 2010; Milet and Peek, 2002; Hodgson et al., 1993; Wood et al., 2012.



Landslide Guide  
for Puerto Rico's  
Residents



Pictures of landslides on the island and some structural damage to houses



Signs of landslide activity in infrastructure and nature



How to prepare and mitigate during and after an event

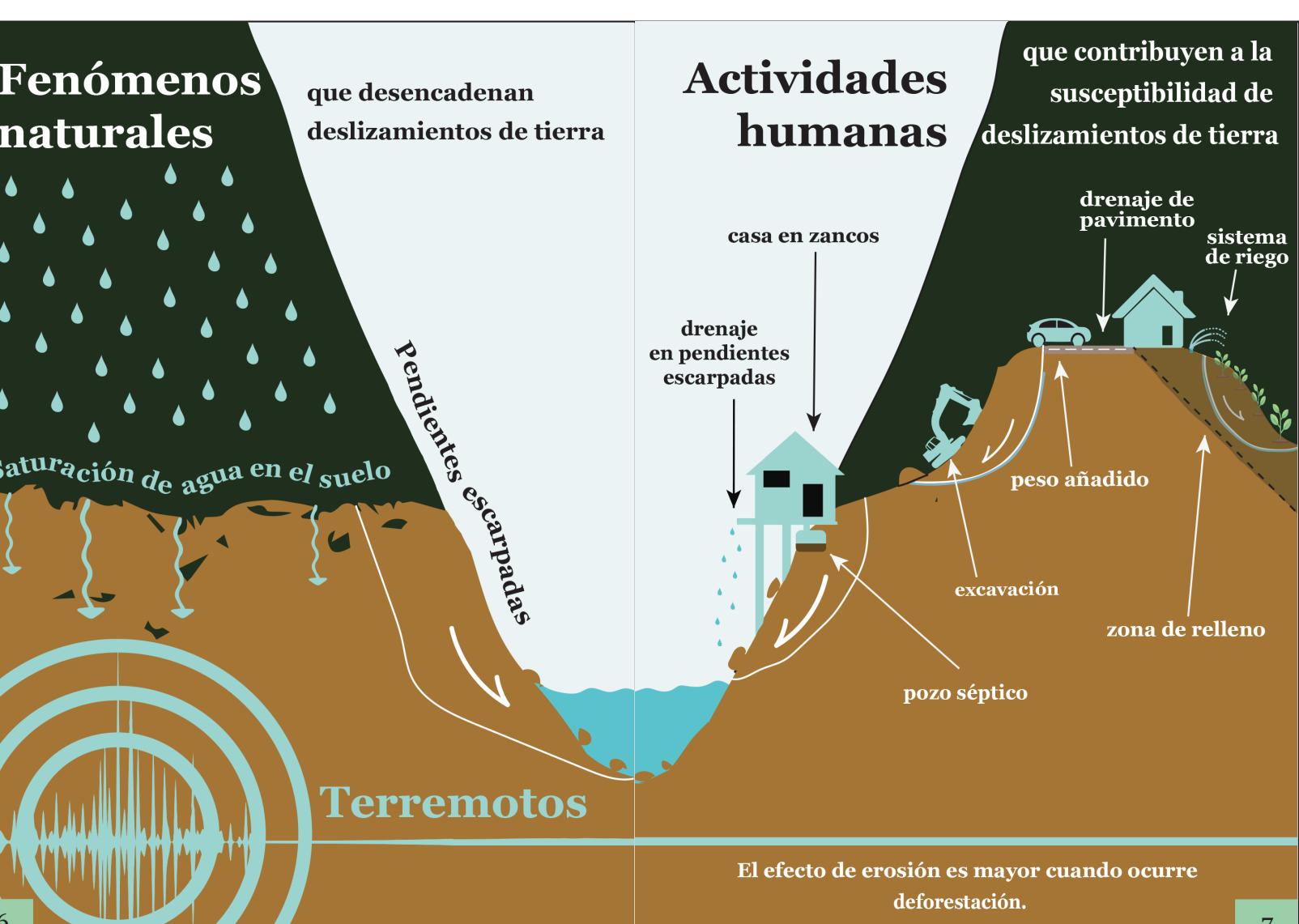


What is a landslide and what are the most common types in Puerto Rico?



¿ Cómo pueden verse ?

Natural phenomena and human activities that trigger landslide activity



How to prepare before the event



Construction safety rules to follow and landslide hazards insurance policy

