Adaptation lessons from rural communities in Puerto Rico and the US Virgin Islands after hurricanes Irma and Maria: Summarizing challenges and strategies in agriculture and forestry working landscapes

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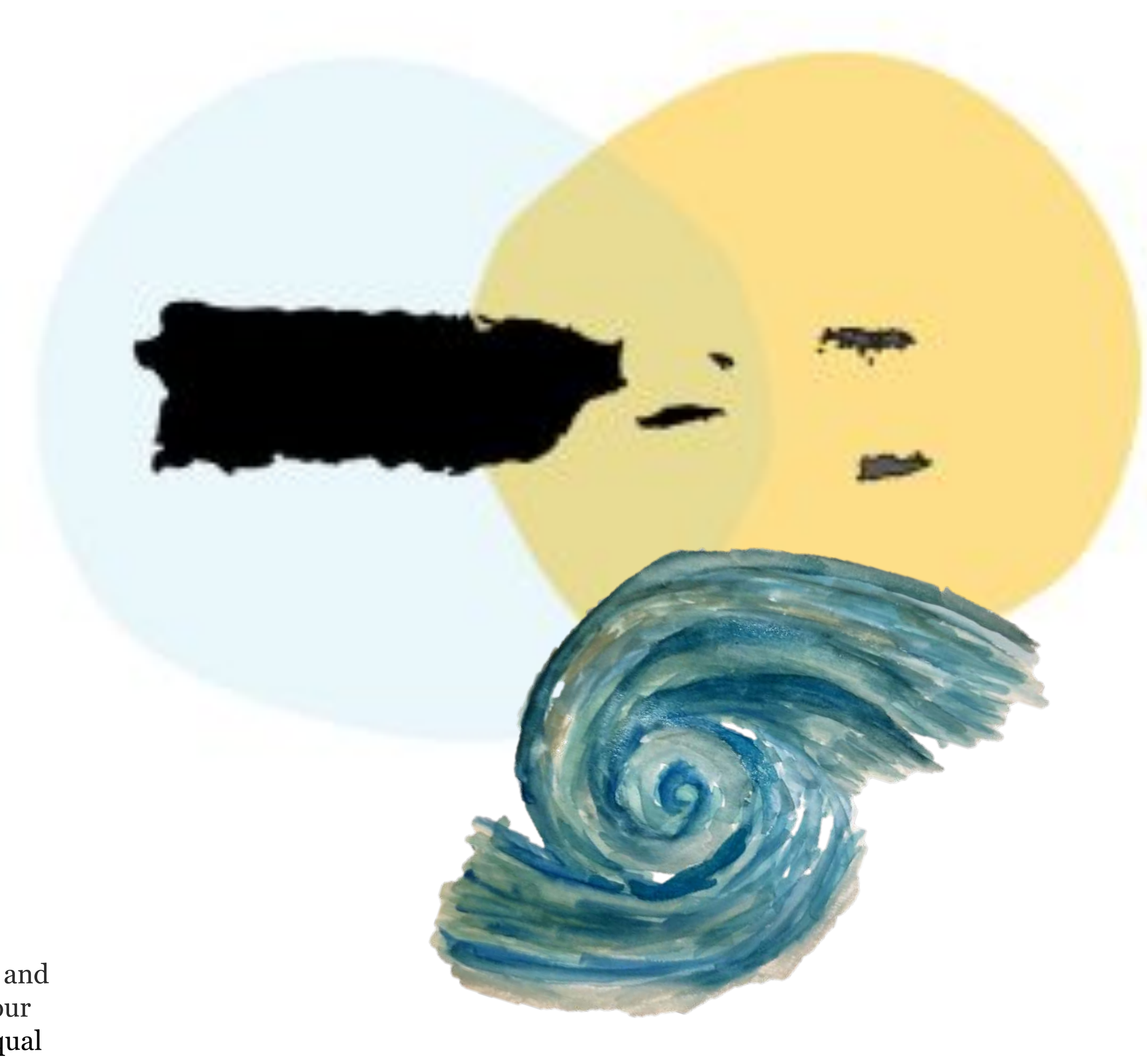
BACKGROUND

- Puerto Rico and the US Virgin Islands, both US territories in the Caribbean, have been subject to compounded shocks after the brunt impacts of the 2017 hurricanes Irma and Maria. Those impacts have been amplified by local vulnerabilities and island characteristics.
- Understanding how different communities and societal sectors navigate disruptions in the built and natural environments is crucial for fortifying adaptation and mitigation efforts.



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Since the 2017 hurricanes, the USDA CARIBBEAN CLIMATE HUB has led and collaborated in several activities with the goals of:

- Co-producing new knowledge about adaptation strategies in relation to social-ecological disruptions in disaster contexts.
- Developing sector-specific information for hurricane adaptation.
- Facilitating spaces for cross-sectoral collaborations and knowledge exchange.







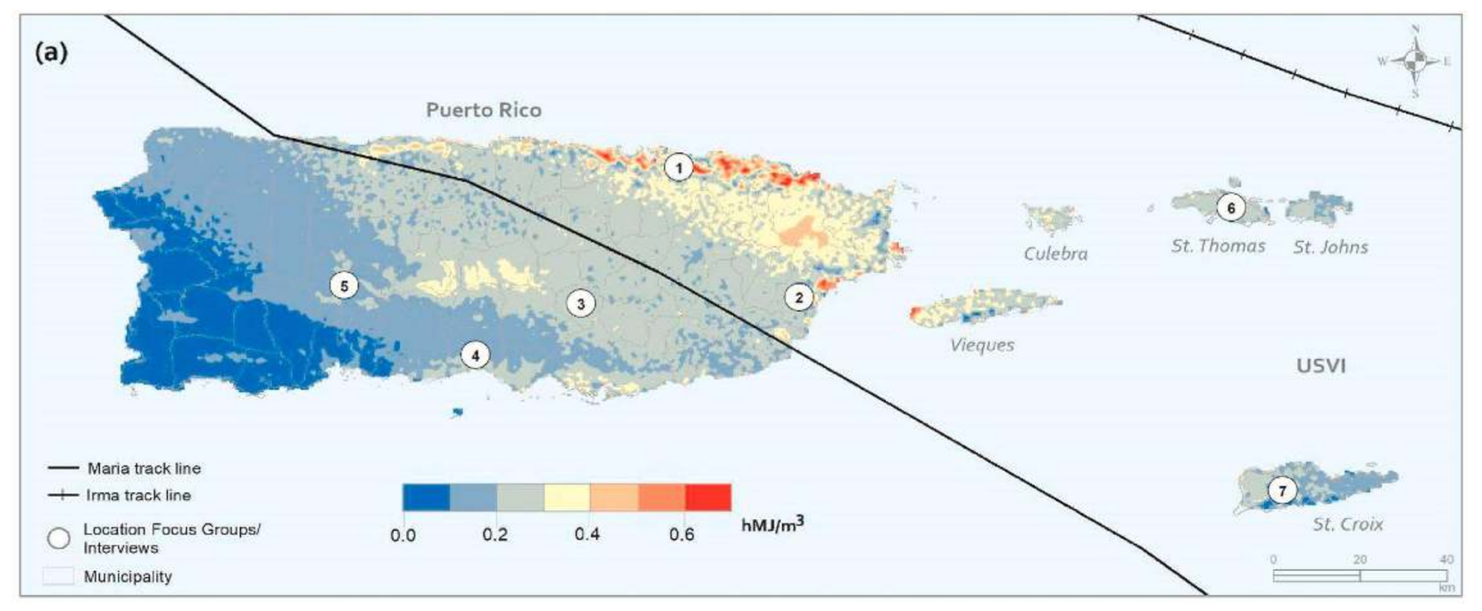
Focus groups with 152 participants across agricultural sectors and entities in Puerto Rico and the US Virgin Islands highlighted opportunities and challenges for mitigation, adaptation & preparedness for future storms.

Key points from focus groups

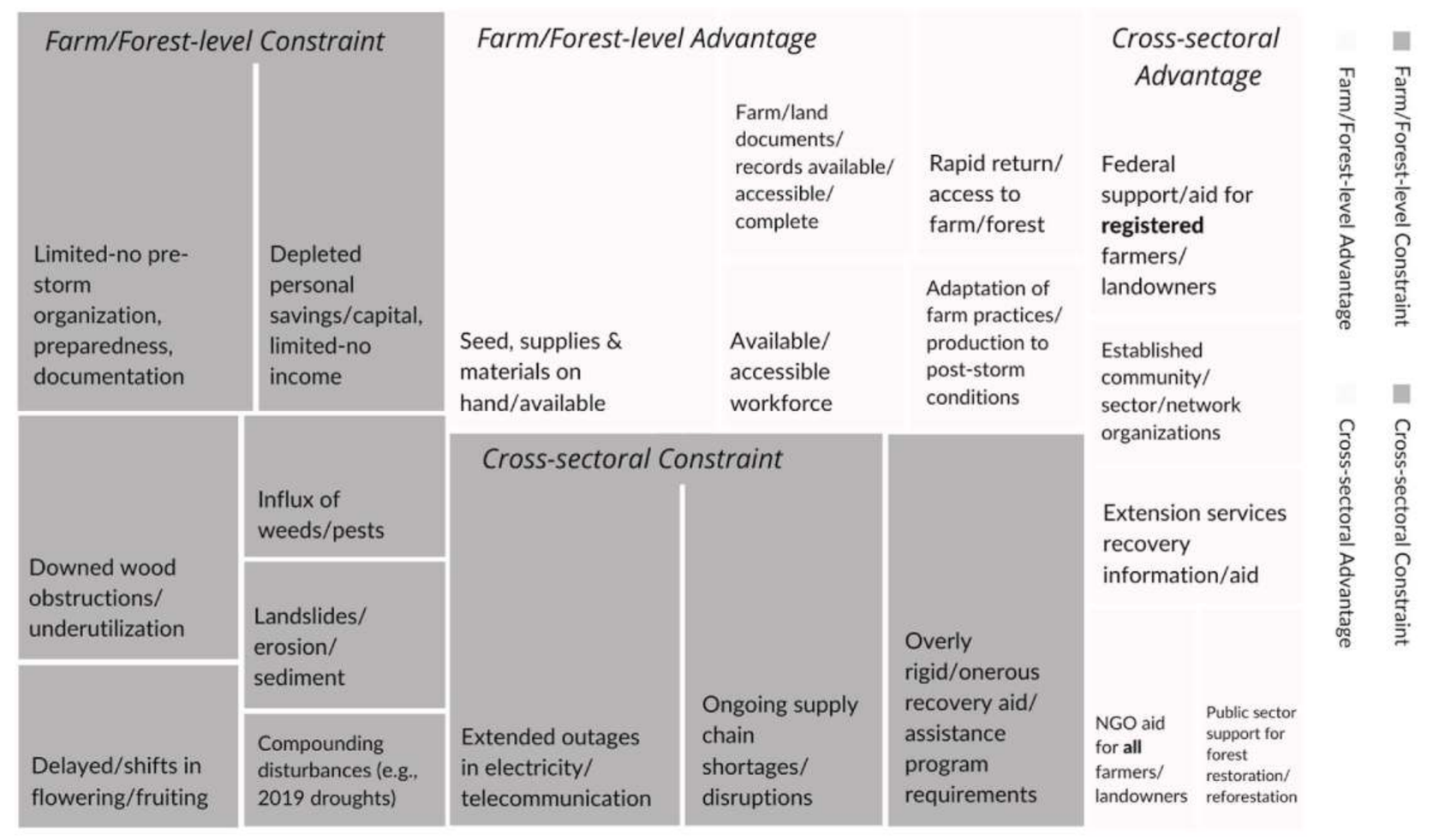
- Most farmers and forest owners reported coping with the effects of the hurricanes largely on their own. Some also reported the emergence of informal or extemporized relief and recovery support, mostly from family members, neighbors, and others in their local community.
- Few participants or sectors reported having adequate hurricane preparations, mitigation, or adaptation practices in place prior to the storms.
- Low levels of risk reduction and adaptation were mostly associated with the limited human, financial, and technological resources to implement strategies at individual and community levels.
- Many participants expressed a desire to incorporate more specific hurricane plans and preparations into their production systems.

Selection of mitigation and adaptation practices and strategies reported to be effective in addressing hurricane effects on farms and forests in the U.S. Caribbean

- Crop and species diversification
- Contour farming in sloped areas
- Erosion controls
- Windbreaks/windrows with multipurpose species
- Forest protection/restoration on steep slopes and in riparian areas with native species
- Pruning/maintenance of roadside trees and those at points of access/egress
- Shade coffee (versus coffee planted in full sun)
- Single story poultry houses (versus two story poultry houses)
- Installation/maintenance of back-up water supply (e.g., retention ponds, cistern)
- Off-grid/back-up power source and supplies (e.g., generator, solar)



Puerto Rico and US Virgin Islands, highlighting: a) hurricanes Irma and María tracks, their Gale Wind Kinetic Energy (hMJ/m3), and the location of focus groups and interviews.



Constraints and advantages associated with the recovery from hurricanes Irma and María in agriculture, forest, and rural communities in PR and USVI.

McGinley, et al. 2022 https://doi.org/10.1016/j.ijdrr.2022.103346

We are developing a set of climate adaptation guides for tropical agriculture and forestry that will provide sector-specific strategies and help streamline information about USDA programs.

- Informative conversations with farmers, forest stewards, and partners across sectors
- Qualitative assessments of farming and forestry operations
- Applied research and evaluations
- New partnerships, outreach activities, and workshops
- Sector-specific draft guides and vulnerability briefs
- Draft adaptation workbook and collaborative repository
- Workshops to farmers, landowners and advisors
- Synthesis report (e.g., peer-review articles)

We developed an online farm planning tool to provide accessible biophysical and meteorological information to farmers and landowners.

The Farm Planning Tool can help anyone better understand the characteristics of any land in Puerto Rico, whether a farm or a forested area.

The Tool generates a report about the land cover and soil type, flood and elevation characteristics, geology, hydrography, average precipitation and temperature per month, and other geographic and climatic characteristics for any chosen terrain.

Give it a try!

We have an ongoing NIFA-funded project that aims to support a *Climate-smart Caribbean*.
We are also developing reports about the recent impacts of Hurricane Fiona in Puerto Rico in collaboration with various Conservation Districts (pictures below).


Intercropping of bananas and coffee trees fell. Most of the harvest was lost. Farm at Las Marías Municipality.

Landslides and damages to plantain crop in a farm located in the Villalba Municipality.

Livestock, sugar cane, and hay farm in the Cabo Rojo Municipality.

Plantain crop loss at Hormiguero Municipality.

Plantain farm in Añasco Municipality. Visible flooding and losses.

Milk being discarded by lack of energy and transportation at a dairy farm, Hormiguero Municipality.


Tropical Fruits Farm in Guayanilla Municipality. Visible flooding, soil erosion and damages to their mango crops.

Infrastructure damage at a banana farm, Lajas.

Flooded soil, fallen branches, and various crop losses at the a farm in Sabana Grande Municipality.

Flooded pastures and lost forage at a farm located in Cabo Rojo.

Damages to Fruit trees, Eggplant and Pitahaya crops at Finca Atabey, located in Santa Isabel.