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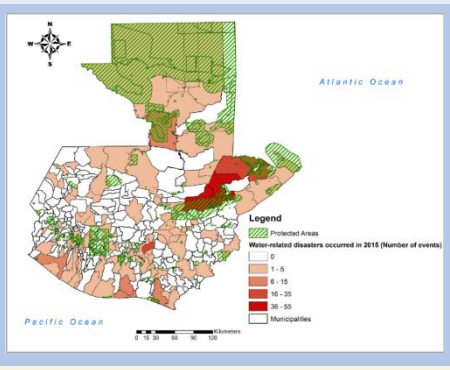
Policy Brief
Environment for Development

Protected areas can serve as infrastructure against extreme events

Protected areas are policy instruments for conservation. Many of these areas are forests, which provide ecosystem services such as regulating water flows from precipitation. However, for this policy tool to be effective in reducing the adverse impacts of extreme precipitation events, a series of conditions and complementary actions are required.

The Problem

Climate change will lead to an increase in extreme events and, consequently, an increase in the number of hydrological disasters. According to the DESINVENTAR[1] database, a total of 139 precipitation-related disasters were recorded in Guatemala in the year 2000, and by 2015, the number had increased to 380. This represents a 173% increase. According to the IPCC, this trend is global and is driven not only by population growth but also by climate change, which affects the occurrence of extreme precipitation events.



Context

Forests, mangroves, and wetlands regulate the hydrological cycle, soil erosion control, and storm protection, helping to reduce the occurrence and damage caused by floods and landslides. These ecosystems can serve as green protective infrastructure. The scientific evidence supporting this has been extensive and comes from different countries and regions worldwide. Therefore, preventing land-use changes in forests, mangroves, and wetlands can generate direct benefits for local communities.

Policy Recommendation

One tool for maintaining this green infrastructure is implementing public policies, such as protected areas, to conserve forests, mangroves, and wetlands. However, this alone is not sufficient. For there to be positive effects on populations, several aspects must be considered.

First, the protection of those areas must be effective. The policies must not only safeguard the right type of land but also include monitoring and enforcement to ensure that, once created, land-use change is no longer possible. This is not always the case.

[1] https://www.desinventar.org/

Second, protected areas may have no effect. That is, in the absence of protected areas, land use might not have changed anyway. A protected area would not have been deforested even in the absence of protection. Therefore, implementing the policy would not translate into greater benefits for the population. Evidence of the limitations this generates on the effects of an increase in ecosystem services is well documented in countries similar to Guatemala, such as Mexico and Costa Rica.

Third, even when the first two conditions are met, the location of the protected area, and therefore the flow of services it generates, may not reach areas where people live. Some areas, if protected, could provide services benefiting larger populations compared to others. Therefore, these areas must be identified to generate a broader increase in profits.

In line with these considerations, there are no robust statistically significant effects of protected areas on floods and landslides in Guatemala. However, in Costa Rica, PAs significantly reduced floods. These results were robust in magnitude and sign, and most were statistically significant. The estimated magnitude is large, representing approximately 34% of the average number of floods. The effect of flooding on flood-related deaths was approximately 32%. Findings for Costa Rica also show the effects of landslides in districts with a high population density.

Potential Impact

The implementation of protected areas delays the negative impacts that extreme precipitation can have on communities. These delays provide an opportunity to take remedial measures, such as assessments and flood-preparedness actions, to prevent catastrophic outcomes. For protected areas to be effective at postponing adverse effects, they must be located in regions with high deforestation risk and in those parts of watersheds where precipitation and water flows are concentrated.

Key Points

- Climate change will increase the number of extreme events, which will lead to more disasters.
- Forests regulate water flow and have the potential to reduce disaster impacts.
- To protect, protected areas must be strategically implemented so they not only reduce deforestation but also impact water flows in key areas.

About this brief

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