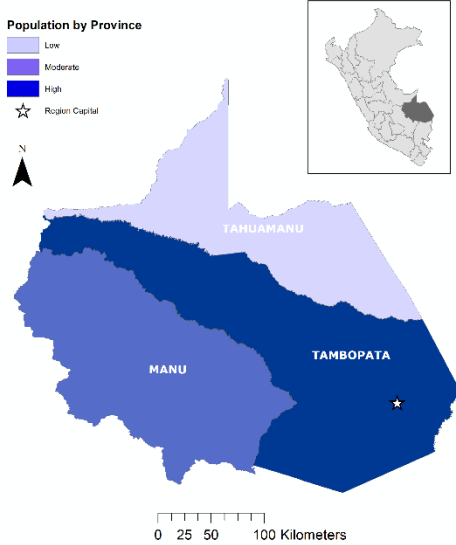




Peru: Regional Profiles

National Disaster Preparedness Baseline Assessment

Region: Madre de Dios



Region Capital: Puerto Maldonado
 Region Area: 88,964 km²

Madre de Dios is one of twenty-five regions in Peru. Located in the interior of southeast Peru, Madre de Dios is bordered by Brazil and Bolivia, and has the lowest population density of any department in Peru. Mineral extraction is the primary economic activity, followed by service industries and commerce. Puerto Maldonado is the region’s capital. As of 2015, the region’s population was estimated at 137,316; with the highest percentage residing in the province of Tambopata. Relative to the rest of Peru, the population of Madre de Dios has lower than average life expectancy (72.2 years), though it has higher than average access to improved water (82.6%), lower illiteracy (4.2%) and lower poverty (3.8%).



Multi-Hazard Risk (MHR) ¹

Score = 0.369, Rank = 25 of 25

Of the twenty-five regions of Peru, Madre de Dios ranks 25th in multi-hazard risk (MHR = 0.369). Table 1 outlines the individual components that contribute to risk. As shown in the bar chart of Figure 1, Madre de Dios’ very low multi-hazard risk is a function of its very low multi-hazard exposure (MHE = 0.268), low vulnerability (V = 0.386), and high coping capacity (CC = 0.546). The ternary graph at right shows that Madre de Dios’ exposure is significantly lower than the national average, with vulnerability and lack of coping capacity just slightly lower than the national average for these components.

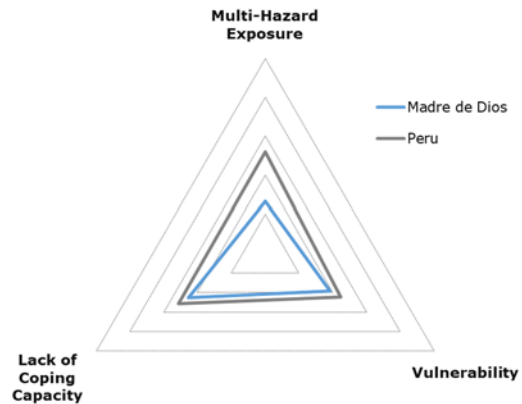
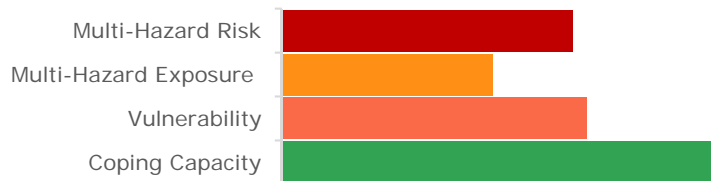


Figure 1. Components of the Multi-Hazard Risk Score compared to the national average.

¹ **Multi-Hazard Risk (MHR)**: An index that measures the likelihood of losses or disruptions to a region’s normal function due to interaction between multi-hazard exposure, socioeconomic vulnerability and coping capacity. $MHR = (MHE + V + (1-CC))/3$. Values range from 0-1.

Components of Multi-Hazard Risk (MHR) ²

Table 1. Scores and ranks for each component of the Multi-Hazard Risk Score.

Multi-Hazard Exposure (MHE)		Vulnerability (V)		Coping Capacity (CC)	
Very Low		Low		High	
Score	Rank (of 25)	Score	Rank (of 25)	Score	Rank (of 25)
0.268	21	0.386	18	0.546	7

Multi-Hazard Exposure (MHE) ³

Score = 0.268, Rank = 21 of 25

Madre de Dios has very low multi-hazard exposure relative to other regions of Peru (MHE = 0.268). This score is a function of both Raw and Relative MHE, as shown in Figure 2. The Raw MHE Score is an index reflecting the absolute value of population exposed to multiple hazards. This score can aid in understanding the overall scale of hazard exposure. The Relative MHE Score is an index reflecting the proportion of the region’s base population exposed. This score can assist in the determination of how important hazards are, and can help prioritize disaster management activities across regions. Estimates of exposure by hazard type are summarized in Table 2.

Table 2. Estimated ambient population⁴ exposed to each hazard type.

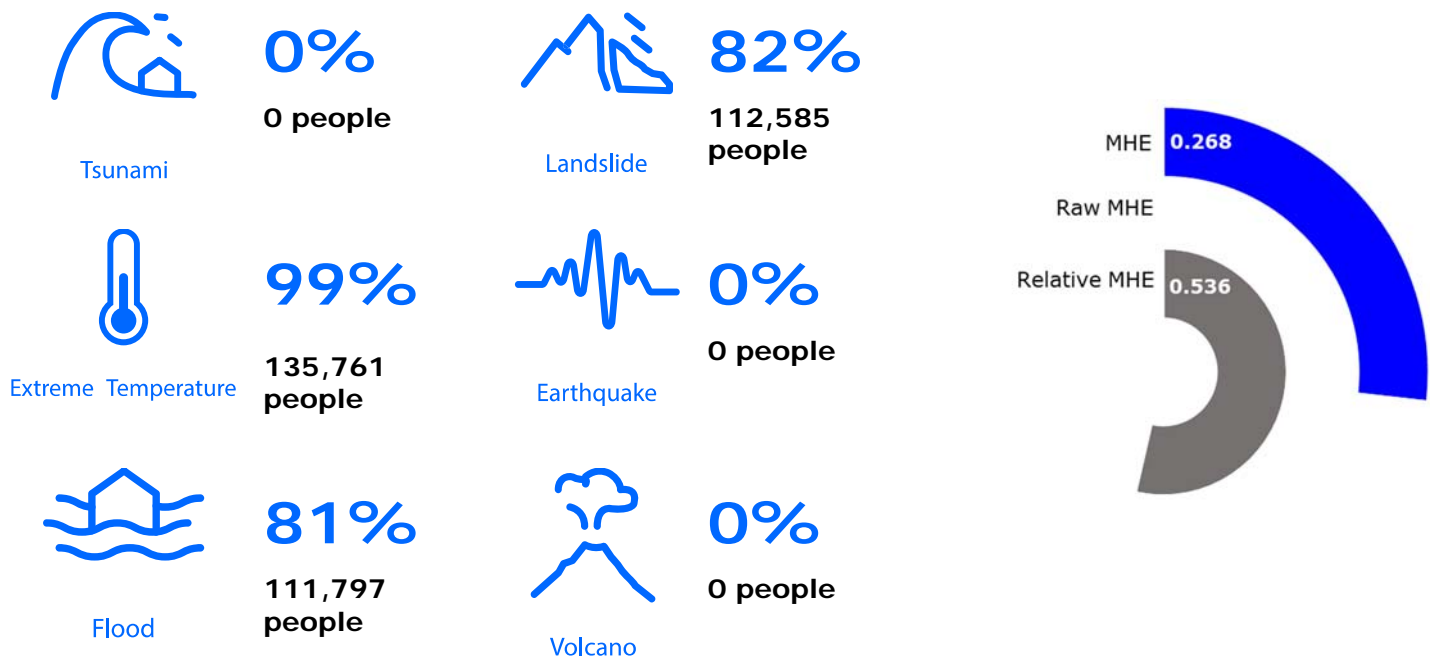


Figure 2. Average, raw and relative Multi-Hazard Exposure Scores.

² $MHR = (MHE + V + (1-CC))/3$.

³ **Multi Hazard Exposure (MHE)**: An index based on the estimated average exposure of the population to six hazard types: tsunamis, landslides, extreme temperature, earthquakes (MMI VII and above), floods and volcanos. Average exposure considers both raw average exposure and relative average exposure as a proportion of total population. Values range from 0-1.

⁴ **Ambient Population**: 24-hour average estimate of the population; typically differs from census population.

Vulnerability (V) ⁵

Score = 0.386, Rank = 18 of 25

Madre de Dios has low vulnerability relative to other Peruvian regions ($V = 0.386$). The bar chart on the right displays the composition of its overall Vulnerability Score. As shown, vulnerability in Madre de Dios is driven primarily by population pressures, clean water access, and vulnerable health status. The table below summarizes the individual indicators within each socio-economic theme.

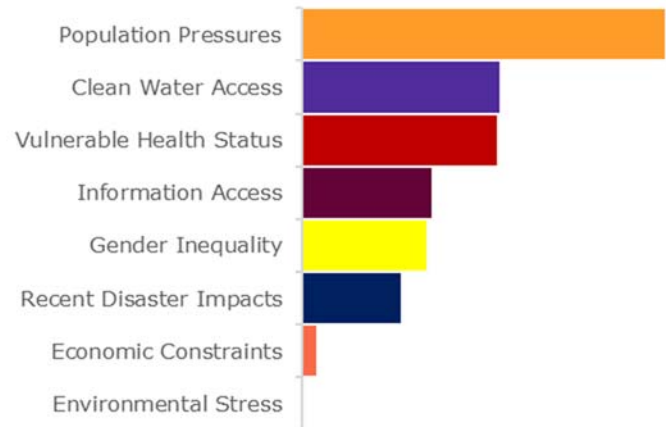








Figure 3. Components of the Vulnerability Score by relative contribution.

Table 3. Indicators of vulnerability grouped by theme.

	Environmental Stress	0 % of total regional area with irrigation-fed agriculture	0 % of total regional area with severe erosion				
	Vulnerable Health Status	22.0 Infant mortality rate per 1k births	163.2 Maternal deaths per 100k births	72.2 Average life expectancy (years) at birth	11.6 % of children under 5 years of age that are malnourished	3.7 % of population with 1 or more disability	
	Clean Water Vulnerability	82.6 % households with access to improved water	43.0 % households with access to flush toilets				
	Information Access Vulnerability	4.2 % of population 15yrs and older that are illiterate	9.6 Average years of schooling	89.2 % primary school enrollment	13.4 % households with internet	86.2 % households with television	70.6 % households with radio
	Economic Constraints	0.48 Ratio of dependents to working age population (15-64 years)	40.31 Ratio of average monthly household expenses to income	3.8 % of population monetarily impoverished			
	Gender Inequality	0.43 Proportion of female representatives in local government	0.82 Ratio of female to male secondary enrollment	0.79 Ratio of female to male labor participation			

⁵ **Vulnerability (V)**: An index that measures the socioeconomic conditions associated with susceptibility to disruptions in a region's normal functions. Values range from 0-1.



Population Pressures

2.5
% Average annual population change (2010-2015)



Recent Disaster Impacts

70.8 Average annual hazard-related deaths per 10k persons (2010-2014)

2.5 Average annual number of homes destroyed by recent hazards per 10k persons (2010-2014)

Coping Capacity (CC) ⁶

Score = 0.546, Rank = 7 of 25

Madre de Dios has a high coping capacity relative to other regions (CC = 0.546). The bar chart on the right displays the composition of its overall Coping Capacity Score. As shown, coping capacity in Madre de Dios is hindered primarily by its governance and infrastructure capacity (especially transportation). The table below summarizes the individual indicators within each socio-economic theme.

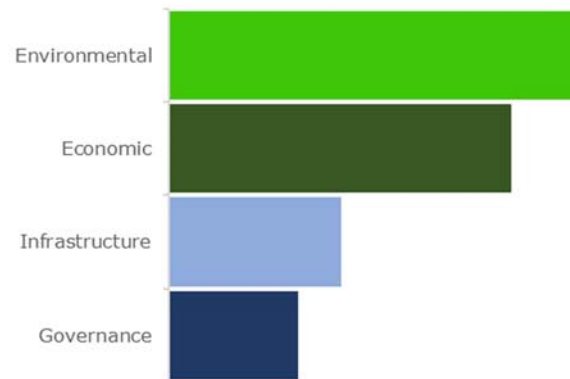


Figure 4. Components of the Coping Capacity Score by relative contribution.

Table 4. Indicators of coping capacity grouped by theme.



Economic Capacity

\$1,848 Average monthly income (\$)

\$18,829 Gross domestic product per capita



Governance

8.58 Registered cases of sexual violence per 10k persons

15.96 Registered cases of missing persons per 10k persons

0.007 Average annual number of social conflicts per 10k persons (active and resolved)

6,752 # of voters per 10k persons (2014 election)



Environmental Capacity

44.8 % protected or reforested land

⁶ **Coping Capacity (CC)**: An index that measures the systems, means and abilities of a region to absorb and respond to events that could potentially disrupt normal function. Values range from 0-1.



Infrastructure Capacity

	Healthcare Capacity	17.3 # of hospital beds per 10k persons	16.1 # of nurses per 10k persons	13.6 # of physicians per 10k persons
	Communications Capacity	11.2 % households with fixed phone line	87.1 % households with mobile phone	
	Transportation Capacity	0.7 Port/airport density per 10,000 sq km	380.9 Road/rail density per 10,000 sq km	

Resilience (R) ⁷

Score = 0.580, Rank = 6 of 25

Resilience is a function of both vulnerability and coping capacity. Madre de Dios’ resilience is higher than the national average, and its high Resilience Score (R = 0.580) is due to its low vulnerability and high coping capacity. The region’s baseline indicators suggest a focus for resilience-building efforts. In Madre de Dios, the thematic areas with the weakest relative scores are summarized in the table below. Readers can additionally consult Appendix 1 for a comprehensive assessment of its need for specific program types relative to other regions.

Table 5. The top 3 thematic areas with the weakest relative scores.



Population Pressures



Governance



Transportation Capacity

⁷ **Resilience (R)**: An index that offers a hazard-independent measure of current socio-economic conditions affecting the short-term ability to absorb, respond to, and recover from disruptions to a region’s normal function. Values range from 0-1.