Peru:
Regional Profiles

National Disaster Preparedness Baseline Assessment

Region: Puno

Population by Province
- Low
- Moderate
- High
- ☆ Region Capital

N

PUNO

CHUCUITO

0 25 50   100 Kilometers
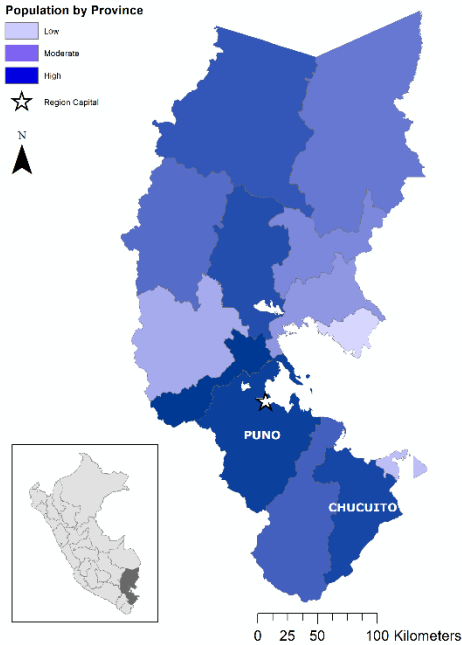
Region Capital: Puno
Region Area: 72,690 km^2

Puno is one of twenty-five regions in Peru. Located in the southeast interior of Peru, Puno is bordered by Bolivia and encompasses a geographical region known as the altiplano, home to Lake Titicaca, the world's highest navigable lake. Service industries (e.g., tourism), agriculture and livestock production, as well as commerce are the predominate economic activities. Puno is the region's capital. As of 2015, the region's population was estimated at 1,415,608; with the highest percentage residing in the provinces of Chucuito, Puno and San Romain. Relative to the rest of Peru, the population of Puno has lower than average life expectancy (70.5 years) and access to improved water (66.9%). Puno also has higher than average poverty (32.4%) and illiteracy (10.5%).

1,415,608 Population (2015)	70.5 yrs Average life expectancy	32.4% Population in poverty	10.5% Illiterate population	66.9% Access to improved water

Multi-Hazard Risk (MHR) [1]

Score = 0.594, Rank = 4 of 25

Of the twenty-five regions of Peru, Puno ranks 4th in multi-hazard risk (MHR = 0.594). Table 1 outlines the individual components that contribute to risk. As shown in the bar chart of Figure 1, Puno's very high multi-hazard risk is a function of its moderate multi-hazard exposure (MHE = 0.597), very high vulnerability (V = 0.557), and very low coping capacity (CC = 0.373). The ternary graph at right shows that Puno's exposure, vulnerability, and lack of coping capacity exceed the national averages for these components.
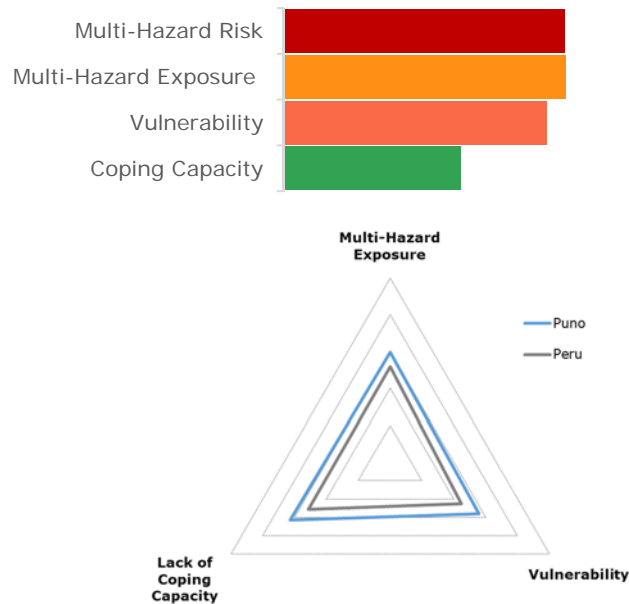
Multi-Hazard Risk
Multi-Hazard Exposure
Vulnerability
Coping Capacity

Multi-Hazard Exposure

Puno
Peru

Lack of Coping Capacity

Vulnerability

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

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[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)	
Moderate		Very High		Very Low	
Score	Rank (of 25)	Score	Rank (of 25)	Score	Rank (of 25)
0.597	12	0.557	4	0.373	22

Multi-Hazard Exposure (MHE) [3]

Score = 0.597, Rank = 12 of 25

Puno has moderate multi-hazard exposure relative to other regions of Peru (MHE = 0.597). 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.

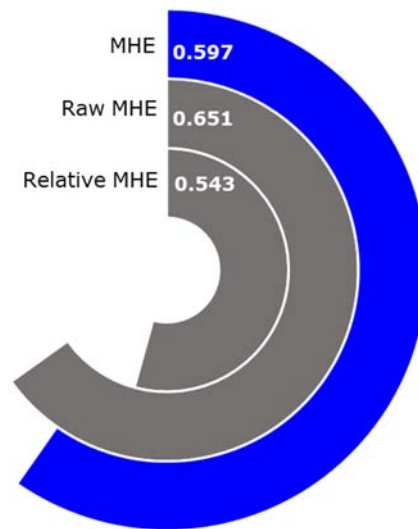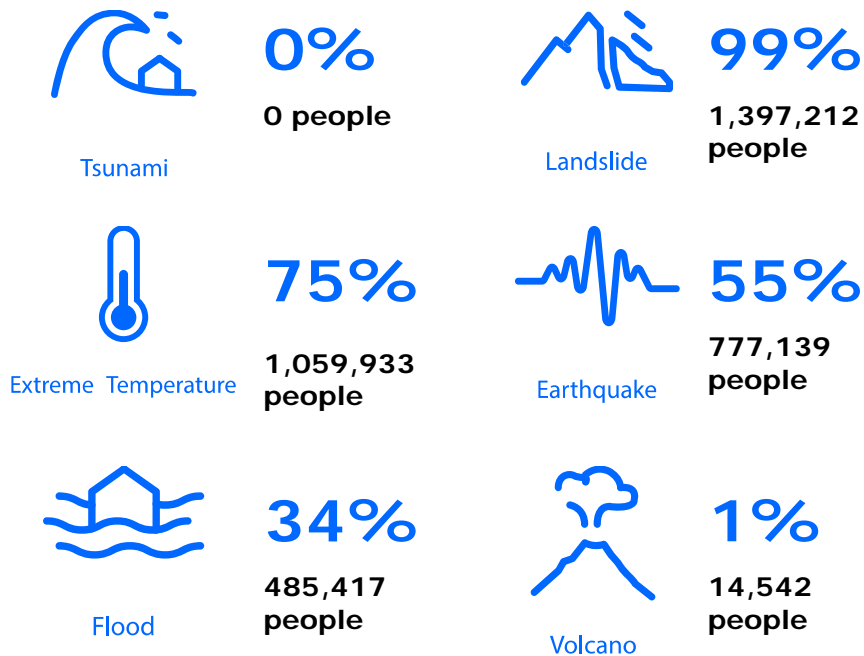*Table 2. Estimated ambient population[4] exposed to each hazard type.*

Tsunami	0% — 0 people
Landslide	99% — 1,397,212 people
Extreme Temperature	75% — 1,059,933 people
Earthquake	55% — 777,139 people
Flood	34% — 485,417 people
Volcano	1% — 14,542 people

MHE	0.597
Raw MHE	0.651
Relative MHE	0.543

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

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[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 = 0.557, Rank = 4 of 25

Puno has very high vulnerability relative to other Peruvian regions (V = 0.557). The bar chart on the right displays the composition of its overall Vulnerability Score. As shown, vulnerability in Puno is driven primarily by its vulnerable health status, clean water access, and recent disaster impacts. The table below summarizes the individual indicators within each socio-economic theme.
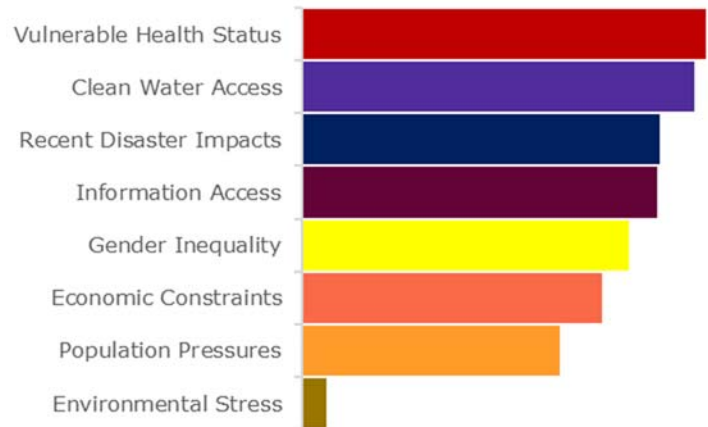

Figure 3. Components of the Vulnerability Score by relative contribution.

Table 3. Indicators of vulnerability grouped by theme.

	Theme					
	Environmental Stress	0.2 % of total regional area with irrigation-fed agriculture	0.0 % of total regional area with severe erosion			
	Vulnerable Health Status	30.2 Infant mortality rate per 1k births	111.7 Maternal deaths per 100k births	70.5 Average life expectancy (years) at birth	19.0 % of children under 5 years of age that are malnourished	5.9 % of population with 1 or more disability
	Clean Water Vulnerability	66.9 % households with access to improved water	54.0 % households with access to flush toilets			
	Information Access Vulnerability	10.5 % of population 15yrs and older that are illiterate	9.1 Average years of schooling	61.4 % primary school enrollment	6.3 % households with internet	63.5 % households with television	88.0 % households with radio
	Economic Constraints	0.62 Ratio of dependents to working age population (15-64 years)	54.89 Ratio of average monthly household expenses to income	32.4 % of population monetarily impoverished			
	Gender Inequality	0.50 Proportion of female representatives in local government	0.56 Ratio of female to male secondary enrollment	0.95 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	0.9 % Average annual population change (2010-2015)		
	Recent Disaster Impacts	972.3 Average annual hazard-related deaths per 10k persons (2010-2014)	6.5 Average annual number of homes destroyed by recent hazards per 10k persons (2010-2014)	

Coping Capacity (CC) [6]

Score = 0.373, Rank = 22 of 25

Puno has a very low coping capacity relative to other regions (CC = 0.373). The bar chart on the right displays the composition of its overall Coping Capacity Score. As shown, coping capacity in Puno is hindered primarily by its economic and infrastructure (especially healthcare) capacities. The table below summarizes the individual indicators within each socio-economic theme.
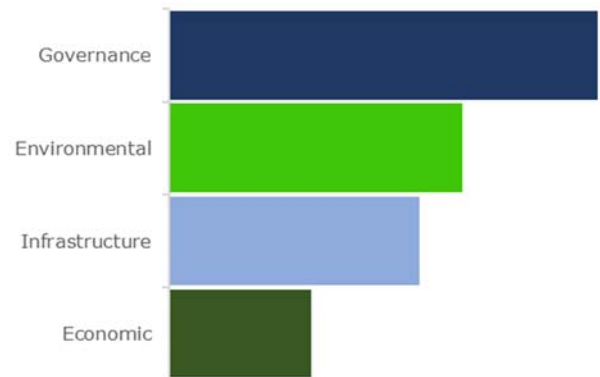

Figure 4. Components of the Coping Capacity Score by relative contribution.

Table 4. Indicators of coping capacity grouped by theme.

	Economic Capacity	$880 Average monthly income ($)	$8,594 Gross domestic product per capita	
	Governance	0.48 Registered cases of sexual violence per 10k persons	4.11 Registered cases of missing persons per 10k persons	0.010 Average annual number of social conflicts per 10k persons (active and resolved)	5,997 # of voters per 10k persons (2014 election)
	Environmental Capacity	11.9 % protected or reforested land		

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[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	**9.9** # of hospital beds per 10k persons	**19.3** # of nurses per 10k persons	**8.0** # of physicians per 10k persons
	Communications Capacity	**3.5** % households with fixed phone line	**78.0** % households with mobile phone	
	Transportation Capacity	**1.1** Port/airport density per 10,000 sq km	**1,524.1** Road/rail density per 10,000 sq km	

Resilience (R) [7]

Score = 0.408, Rank = 22 of 25

Resilience is a function of both vulnerability and coping capacity. Puno's resilience is significantly lower than the national average, and its very low Resilience Score (R = 0.408) is due to its very high vulnerability and very low coping capacity. The region's baseline indicators suggest a focus for resilience-building efforts. In Puno, 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.

Vulnerable Health Status   **Clean Water Vulnerability**   **Healthcare Capacity**

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[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.