

IANAS MEETING
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Water in Metropolitan Regions Agua en Centros Urbanos

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Peru

Overview of Peru

- Located in Western South America.
- Area: 1 285 216 km². (Sixth largest country in America)
- Population: 28 200 000. (Seventh most populated country in America).
- Annual water production: 2 047 287 millions of cubic meters.
- Average: 72 510 m³/person/year.

Peruvian Rainforest (Lower Jungle – Eastern Slope)

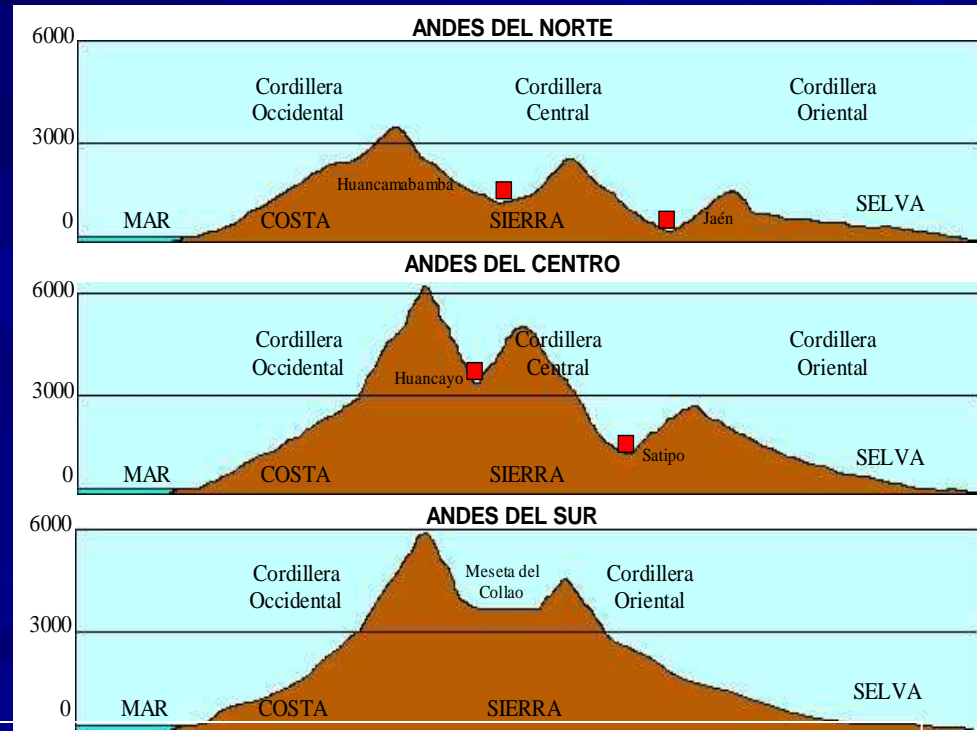


Therefore, all of Peru
should look like this. Is
this true?



MAIN FACTOR THAT INFLUENCE PERU'S CLIMATES

Wide variety of Climates Influenced by Peru's Latitude, the Pacific Anticiclone, the cold Peruvian Current, the Andes and El Niño current.



Peruvian Andes. Three cross sections are shown on the right side of the slide.

Peru's three major geographic regions

- Coast
- Sierra (Mountains)
- Jungle

In reality: arid areas (Coast and Mountains)



Water availability in Peru's three catchment areas

Basin	Area (1000 km ²)	Water Availability (MCM/yr)	% Water Availability	Population	% Population	Water availability (m3/inh/yr)
Pacific	279,7	37 363	1,8	18 315 276	65	2 040
Amazon	958,5	1 998 752	97,7	8 579 112	30	232 979
Titicaca	47,2	10 172	0,5	1 326 376	5	7 669
Total	1 285,2	2 046 268	100,0	28 220 764	100	72 510

Largest populated metropolitan areas of Peru.

City	Altitude (m)	Basin	Geographical Area	Population (2007)
Lima-Callao	154 (Downtown Lima)	Pacific	Coast	8 472 935
Arequipa	2335	Pacific	Mountains	749 291
Trujillo	34	Pacific	Coast	682 834
Chiclayo	29	Pacific	Coast	524 442
Piura	29	Pacific	Coast	377 496
Iquitos	106	Amazon	Lower Jungle	370 962
Cuzco	3399	Amazon	Mountains	348 935

Coverage of Sanitation Services in Peru

Service	Coverage (%)		
	1990	2005	2015
Water	63	76	82
Sewage	54	57	77
Wastewater Treatment	5	22	100

Total annual volumes and percentages of wastewater with and without treatment.

Wastewater produced by sanitation services	Volume per year (m ³ /s)	Q (m ³ /s)	% Treatment
With treatment	217253807	6,89	29,10
Without treatment	530027896	16,81	70,90
Total	747281703	23,70	100,00

Sanitation Coverage in Selected Cities of Peru

Metropolitan Area	Number of Connections	Water Coverage (%)	Sewage Coverage (%)	Wastewater treatment Coverage (%)	Micro measurement	Unaccounted water (Non-billed water)	Company
Lima-Callao	1194879	88.1	83.7	13.3	70.1	37.5	SEDAPAL S.A.
Arequipa	201144	82.2	71.6	16.1	64.2	35.9	SEDAPAR S.A.
Trujillo	135883	84.1	71.2	80.1	37.7	45.7	SEDALIB
Chiclayo	133767	84.0	75.8	89.2	9.3	41.6	EPSEL
Piura	163824	82.7	64.9	50.6	19.9	55.9	EPS Grau
Iquitos	56684	68.2	47.5	0.0	23.7	57.9	SEDALORETO S.A.
Cuzco	57497	96.7	85.8	75.4	78.2	46.0	SEDACUSCO S.A.

Lima-Callao

- Lima and Callao are two Metropolitan areas that, in practice, form the second largest city located in a desert, after el Cairo.
- Served by SEDAPAL, a central government sanitation company.
- Water availability close to $150 \text{ m}^3/\text{inh}/\text{yr}$.
- Low quality water.

Water diversion from the Amazon Basin into the Pacific Basin



Source: www.sedapal.com.pe

Other Cases

- Iquitos

- Cuzco

Iquitos – Belen neighborhood



Iquitos – Belen neighborhood – High water



Inadequate technology and planning wastewater treatment plant

Settling of Sand and Sludge



(SUNASS, 2008)

Eutrophication



Remarks

- Very high variability in the distribution of water resources.
- Lima-Callao well under the threshold value for scarcity.
- Low wastewater treatment coverage.
- Total coverage large cities by 2015.
- Inadequate technologies