



SUSTAINABLE DEVELOPMENT UNIT ■ LATIN AMERICA AND THE CARIBBEAN

70123

# Disaster Risk Management in Latin America and the Caribbean Region: GFDRR Country Notes

## Peru



THE WORLD BANK



# GFDRR

Global Facility for Disaster Reduction and Recovery



**COUNTRIES AT HIGH ECONOMIC RISK FROM MULTIPLE HAZARDS**  
(Top 33 based on GDP with 3 or more hazards)<sup>a</sup>

1. Taiwan, China
2. Dominican Republic
3. Jamaica
4. El Salvador
5. Guatemala
8. Costa Rica
10. Colombia
12. Chile
15. Barbados
18. Ecuador
- 20. PERU**
21. St. Kitts and Nevis
24. Honduras
27. Mexico
32. Bolivia

<sup>a</sup> Dilley et al. (2005). Table 7.2.

**Peruvian cities are at high risk for earthquakes and there are a dearth of resilience-building programs for essential buildings and infrastructure.**

## Natural Disasters from 1980 - 2008<sup>b</sup>

### Affected People

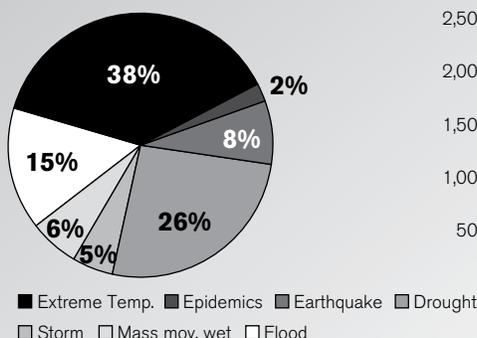
Disaster	Date	Affected (Number of People)
Drought	1990	2,200,000
Extreme temp.	2004	2,137,467
Extreme temp.	2003	1,839,888
Drought	1992	1,100,000
Extreme temp.	2007	884,572
Mass mov. wet	1983	700,000
Storm	1997	580,730
Flood	2008	495,000
Earthquake*	2007	479,955
Earthquake*	2001	349,978

### Economic Damages

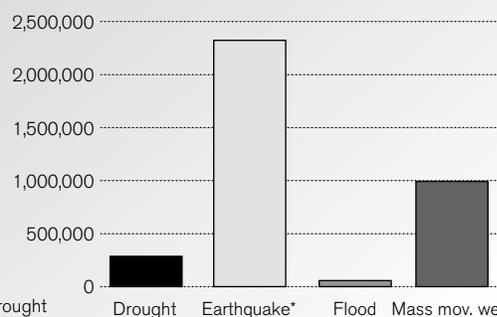
Disaster	Date	Cost (US\$ x 1,000)
Earthquake*	2007	2,000,000
Mass mov. wet	1983	988,800
Earthquake*	2001	300,000
Drought	1992	250,000
Flood	1994	50,000
Drought	1990	36,000
Earthquake*	1986	22,000
Storm	1997	12,000
Flood	1981	6,000
Mass mov. wet	1984	3,000

## Statistics by Disaster Type<sup>b</sup>

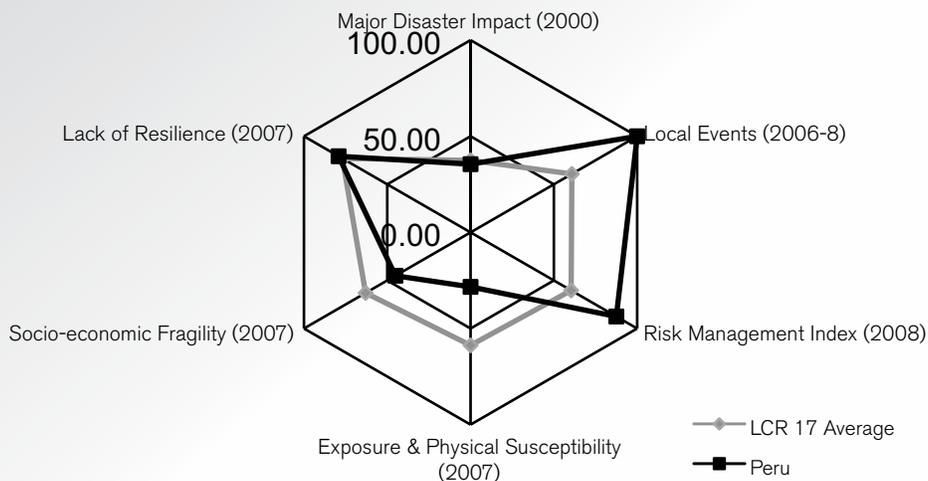
Population Affected by Disaster Type



Economic Damages / Disaster Type (1000s US\$)



## Relative Vulnerability and Risk Indicators<sup>c</sup>



<sup>b</sup> UN (2009). <http://www.preventionweb.net/english/countries/statistics/?cid=134>. Source data from EM-DAT. Data displayed does not imply national endorsement.

<sup>c</sup> Relative Vulnerability and risk Indicators are adapted from IADB-IDEA-ERN (2009). Values are normalized on scale of 0 – 100 and presented against the average for 17 LCR countries. Major disaster Impact taken from disaster deficit Index: the ratio of economic losses which a country could suffer during a Maximum Considered event and its economic resilience. Local events taken from Local disaster Index: the propensity of a country to experience recurrent, small-scale disasters and their cumulative impact on local development. risk Management Index is presented as the negative (i.e. 0 = optimal, 100 = incipient) of IADB's risk Management Index: measures a country's risk management capability in (i) risk identification, (ii) risk reduction, (iii) disaster management, and (iv) financial protection. resilience, Fragility and exposure are taken from the component indices of Prevalent Vulnerability Index. Date for local event data depends on information available for each country. Data, and the respective LCR 17 average, from 2000 is used for Dominican Republic, El Salvador, Guatemala, Jamaica and Nicaragua. Data, and the respective LCR 17 average, from 2006-08 is used for Bolivia, Colombia, Costa Rica, Ecuador, Panama and Peru. All LCR 17 averages are calculated based on available data.

## DISASTER RISK PROFILE<sup>2</sup>

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### Geological Hazards

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**Peru is a country with a high seismicity.** In Peru, as in its Andean neighbors, seismic activity originates in the subduction zone between the Nazca and South American plates and in the continental fault system in the Andes Mountains. Over the past 400 years, Peru has been hit by at least 30 major earthquakes, the most recent of them near the coast of Lima (1940), Arequipa (1948), Ancash (1970), Nazca (1996), Arequipa (2001), and Pisco (2007). The highly seismic hazard zones are concentrated along the coastal region, home to the nation's capital, Lima (see Figure 1).<sup>3</sup> This is Peru's disaster hotspot.

**The coastal region of Peru has a history of tsunamis.** Most of the destructive tsunamis that have struck the west coast of South America in the last four centuries have occurred from the Callao harbor, coast of Lima, southward. According to recent studies<sup>4</sup>, at least ten Peruvian Regions are at risk for tsunamis, notably Piura, Lambayeque, Lima, Ica, and Arequipa, where the bulk of the coastal port, oil and gas infrastructure is located.

**Volcanic hazards in Peru are localized in the southern part of the country.** The 15 existing active volcanoes pose a threat mainly to four Regions: Tacna, Moquegua, Arequipa, and Ayacucho (see Figure 2). The city of Arequipa is the most exposed because of its proximity to the Misti volcano, an area home to over a million people, and because of infrastructure development near the volcano's cone. The most recent event was the eruption of the Sabancaya volcano, 70 kilometers

northwest of Arequipa, where explosive activity was recorded between 1990 and 1992. The potential hazard in this case is ashfall toward the Arequipa region with lahars and flows into the Colca Valley.

**Landslides are a recurring hazard for Sierra communities and strongly affect infrastructure in the country.** The most landslide-prone zones are the steep mountainsides and flanks, the Coast and the high Amazonian valleys, and the inter-Andean valleys of the Huallaga, Marañón, Apurímac, and Urubamba rivers, among others. These events take their heaviest toll on road infrastructure. Also included in this disaster category are flash floods, avalanches, and torrential down-slope flows of water-saturated earth and rock ("huaycos"). The Machu Picchu sanctuary region experiences complex events of this type.<sup>5</sup> Such catastrophic slope failures have occurred primarily in the Andean Mountains, due to seismic activity or heavy rains, claiming thousands of casualties in communities downstream from the Huaytapallana, Huayhuash, Urubamba, and Vilcabamba cordilleras (1883, 1938 and 1970).<sup>6</sup>

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### Hydrometeorological Hazards

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**Peru's northern coast is especially vulnerable to El Niño oscillations,** which are typically characterized by prolonged torrential rains mainly in the Regions of Tumbes, Piura, Lambayeque, La Libertad, and Ancash (except for the high Andean provinces). The 1982-83 and 1997-98 El Niño events were devastating for Peru's economy and people, with losses tallying US\$2.277 billion and US\$3.569 billion respectively in destroyed and damaged homes, infrastructure and production equipment, cropland,

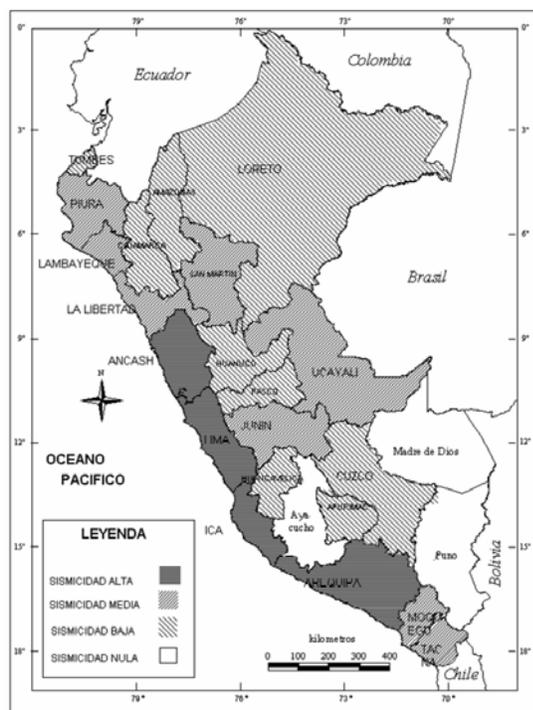
<sup>2</sup> One of the primary sources referenced to develop this profile was DIPECHO (2008).

<sup>3</sup> From Tavera and Bernal (2006) and Tavera (2008).

<sup>4</sup> Dirección Hidrográfica y de Navegación – Marina de Guerra del Perú (2007).

<sup>5</sup> See Vilcanota Valley Slope Monitoring for Flash Flood Prevention, Peru. Geophysical Flow Observatory, University of Maryland, Baltimore County.

<sup>6</sup> See Atlas of Natural Hazards in Peru (2004).

**Figure 1.** Seismic Hazard Map of Peru.

Source: Tavera (2008).

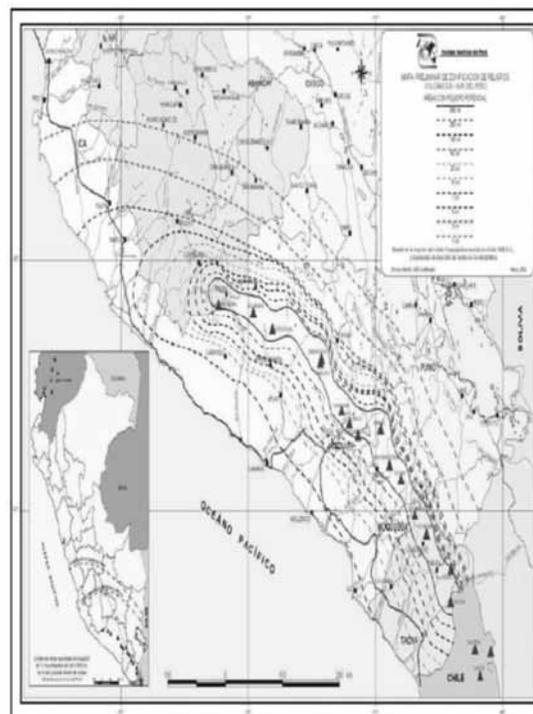
and transportation stock, among others.<sup>7</sup> Following the 1997-98 El Niño, the World Bank approved a US\$150 million loan for a project to assist the Peruvian Government's reconstruction efforts.<sup>8</sup>

**At least 23 percent of Peru's population lives in flood-prone areas.**<sup>9</sup> As is typical for the Andean region, the particular water regimen conditions in Peru favor flooding. In Peru, flooding is more intense along the rivers that flow toward the coast—which are dry most of the year—when they receive freshets during the Sierra rainy season between November and April. Major Amazon Basin Rivers also inundate floodplains, as Figure 3 illustrates. The Regions of Puno (Titicaca watershed), Piura, Lambayeque, and Ucayali have

<sup>7</sup> See ECLAC Economic Evaluation.

<sup>8</sup> See World Bank ICR P054667.

<sup>9</sup> UNDP (2004).

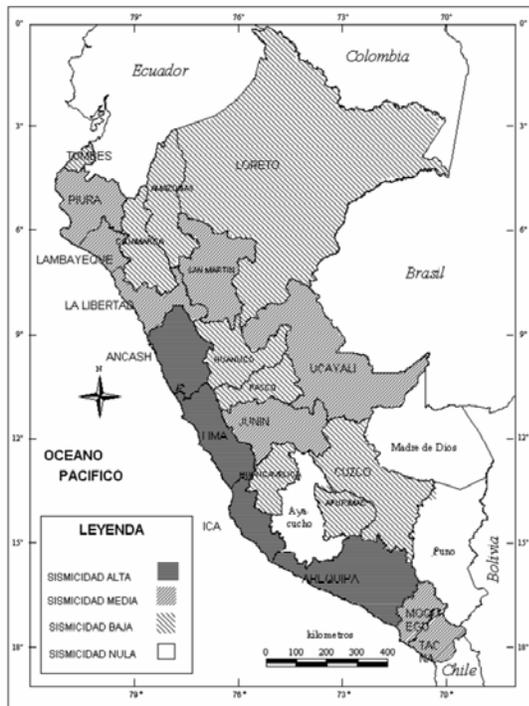
**Figure 2.** Volcanic Hazard Map of Peru.

Source: Instituto Geofísico de Perú.

a history of recurrent flooding. An assessment by the Multisectoral Commission on Risk Reduction in Development (CMRRD) classifies 55 Peruvian provinces as high flood risk (Figure 3).

**Southern Peru is prone to droughts, frosts, severe cold snaps and other hydrometeorological events.** The south Andean region (Puno, Cuzco, Apurímac, Arequipa, Moquegua, and Tacna) is the most recurrently drought-prone. Its 1.3 million people living beyond 3,500 meters above sea level are the hardest hit because farming and stock-raising is their livelihood. Frosts occur mainly from May to August and affect the Sierra regions (center and south) that lie above 2,900 meters above

**Figure 3.** Peru's Flood Hazard Potential.



Source: CMRRD (2004).

sea level. The cumulative effect of these events is devastating for agriculture and has long-term impacts on the livelihood of local populations.

### Determinants of Vulnerability to Adverse Natural Events in Peru

**Soil and water quality degradation are Peru's main vulnerability-heightening environmental factors.** Forty percent of the coastal region soils exhibit some degree of salinization resulting from over-irrigation and poor drainage. Water and wind erosion owing to sparse or no plant cover, overgrazing, and

stubble burning affects 60 percent of Andean farmlands. Pollution caused mainly by the mining and metal industry, household wastes, and farm chemicals has impaired water quality: 16 of the 53 rivers in the coast are partially polluted with lead, manganese, and iron. Moreover, water and sanitation system coverage (around 68 percent) and the quality of those services are limited, so several million people have no access to safe drinking water or sewer systems. Informal management of potable and wastewater is a structural driver of environmental degradation, primarily on the mountainsides.

### Unplanned urban development and the population distribution have intensified Peru's vulnerability.

Close to 76 percent of Peruvians are urban dwellers, and cities are growing quickly and haphazardly. There has been a sharp shift in population distribution by natural region; today the coastal area is home to 54.6 percent of the total population, the Andean regions to 32 percent, and the Amazon Basin to 13.4 percent—a lopsided land occupation pattern. One third of the provinces (home to over 71 percent of Peru's population) are at very high or high seismic risk. Informal and illegal settlements account for a large share of city growth, especially in Lima, with several consequences for sustainable development. More than 4,000 human settlements and 900,000 households countrywide have yet to see physical-legal title regularization problems resolved (50 percent of Lima settlements, for instance), so residents of these communities are living without essential services such as water and sanitation or access to public housing programs.<sup>10</sup>

### Peruvians' socio-economic conditions increase Peru's vulnerability to socio-natural hazards.

More than one-third of Peru's population (39.3 percent) is living below the poverty line and 13.7 percent subsists in extreme poverty (INEI<sup>11</sup> 2008), with a sharp disparity between urban and rural rates—25.7 percent and 64.6 percent, respectively. According to

<sup>10</sup> See Habitat International Coalition (2005).

<sup>11</sup> Instituto Nacional de Estadísticas e Informática.

the National Information System on Disaster Prevention and Management (SINPAD) figures for 1995-2007, the Regions hardest hit by disasters were Apurímac, Loreto, Lima, Cajamarca, Puno, and Cusco, where poverty rates are highest. Compounding the problem are weak institutions and a dearth of planning instruments to deliver social policies more efficiently.

## DISASTER RISK MANAGEMENT FRAMEWORK

**Peru's ongoing decentralization process is an opportunity to build institutional capacity and implement a comprehensive disaster risk management policy.** In the medium term, the bulk of disaster risk management responsibilities and resources will be handled by the regional, provincial, and district governments. Since decentralization is still in early stages, it is imperative to bolster the institutional capacity of these various levels of government through technical assistance.

**Monitoring systems and information technology tools need to be scaled up to provide the requisite knowledge to support subnational governments and relevant sectors.** It is critical for Peru to ensure that subnational governments have the appropriate technological tools and mechanisms to generate, manage, and access hazard and risk information pertinent to their particular needs. The Comprehensive Approach for Probabilistic Risk Assessment<sup>12</sup> (CAPRA) platform can be very useful at this juncture.

**Peru recently strengthened its environmental and planning institutions.** In 2008, the national Environment Ministry was created and began operating. The National Center for Strategic Planning (CEPLAN) was launched. These two events, indirectly, will help make the country more disaster-resilient. Countering watershed deterioration, assuring careful

reserve area management, and enhancing spatial and sector planning instruments are examples of actions to address the structural drivers of disaster risk.

**Peru's infrastructure and productive sectors are highly exposed to socio-natural hazards.** There is a need to scale up efforts to inventory, analyze, and prioritize interventions required to make existing infrastructure more resilient to earthquakes, flash floods, landslides, and flooding. Agriculture, tourism, the oil and gas industry, and fisheries are among the sectors most exposed to the impact of El Niño and other extreme hydrometeorological events.

**Peruvian cities are at high risk for earthquakes and there are a dearth of resilience-building programs for essential buildings and infrastructure.** Considering the direct and indirect toll that such catastrophes can have on people in major cities, as well as on the economy and social stability, the country is faced with the twofold challenge of fixing the unplanned urban development model and unregulated occupation of quake-prone areas while making the housing, health, education, urban infrastructure, and government sectors more earthquake resilient.

## ACTIVITIES UNDER THE HYOGO FRAMEWORK FOR ACTION

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**Hyogo Framework for Action (HFA)  
Priority #1: Policy, institutional capacity  
and consensus building for disaster risk  
management**

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**Peru's National Civil Defense System (SINADECI) is an institutional platform for disaster risk management.** Headed by the National Civil Defense Agency (INDECI), this network has five regional

<sup>12</sup> <http://ecapra.org>.

bureaus (Iquitos, Piura, Lima, Arequipa and Cusco) and Civil Defense offices in the different government agencies. INDECI brings together and coordinates with a number of ministries and science and technology agencies by way of Civil Defense Committees, the Multisectoral Commission, and the Advisory Council on Science and Technology. The country's two policy pillars in this sphere are the National Pact's Risk Prevention and Management Policy and the National Disaster Prevention and Management Plan.

**The ongoing decentralization process is an opportunity to build up institutional capacity and implement the risk management policy.**

The decentralization program launched in 2002 saw elected regional authorities institute a process to establish regions and the associated mechanics of transferring responsibilities and resources to the regional governments. As part of this exercise, INDECI began transferring powers and responsibilities to the regional governments where Regional Civil Defense Systems (SIREDECI) were set up. Under this arrangement, the regional governments take on responsibility for design and delivery of their own disaster prevention and management plans, guided by national government policies. Support and assistance to the regional, provincial, and district governments in those areas clearly could accelerate and bolster this process, which is still in the early stages.

**The SINADECI policy framework needs to be updated in line with the new organization of the State, the focus on risk management, and decentralization policies.** The Government is promoting the institutional reform (the original law dates back more than 36 years). This entails changes to disaster prevention provisions as well as greater attention to this issue in laws and policies governing environmental protection, land-use planning, and the Public Investment System (SNIP) in particular. These are key areas of focus for the country to overcome structural impediments to resilience-building for development.

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**HFA Priority #2: Disaster risk assessment and monitoring**

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**In recent years, Peru has made a considerable effort to produce and compile information on hazards and risk at the national level.** INDECI produced its 2004 Atlas of Natural Hazards in Peru in concert with 13 other science and technology institutions, which, for a year and a half, compiled data on potential adverse geological and hydrometeorological natural events and other kinds of hazards such as epidemics, pandemics, and environmental pollution. The Multisectoral Commission on Risk Reduction in Development (CMRRD) created by the Presidency of the Council of Ministers in 2003 also updated and unified several of these hazard, vulnerability, and risk maps.

**Many Peruvian science and technology institutions are engaged in the study of these natural events.**

Much of the country's hazard and risk assessment technical capacity is concentrated in six institutions represented on the SINADECI Advisory Council on Science and Technology.<sup>13</sup> A number of public and private universities run academic and research programs in this field. Although this is considered a strength, these efforts need to be optimized and targeted to concrete information needs, i.e., prioritize events, zones, scope, work scales, methodologies, and so on. Strengthening national technical coordination mechanisms and agencies will help achieve that aim.

**Monitoring systems and technology tools for modeling and assessment need to be scaled up to address subnational government and sectoral knowledge needs in particular.** It is critical for Peru to ensure that subnational governments have the right technology tools and mechanisms to generate, manage, and access hazard and risk information pertinent to their particular needs. CAPRA can offer valuable support for data management, analysis methods, and interactive tools. The tool will help in standard setting,

<sup>13</sup> Instituto Geofísico del Perú (IGP), Instituto del Mar de Perú (IMARPE), Instituto Geológico, Minero y Metalúrgico de Perú (INGEMMET), Servicio Nacional de Meteorología e Hidrología (SENAMHI), Dirección de Hidrografía y Navegación de la Marina de Guerra de Perú (DHN), and Japan-Peru Center for Earthquake Engineering and Disaster Mitigation (CISMID).

data sharing, and use of a common language to facilitate communication about disaster risk. CAPRA applications can be tailored to sector and user needs in such matters as emergency response, land use planning, investing in mitigation, and financial protection strategies. The CAPRA system's transparent models and open architecture will enable future users to understand this tool and adapt it to their needs.

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### **HFA Priority #3: Use of knowledge, innovation, and education to build a culture of safety and resilience at all levels**

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**INDECI's "Learning to Prevent" training program** has shown some 4,000 teachers how to integrate disaster risk management into the academic curriculum. Another initiative targeted at fourth-year high school students develops knowledge and skills in civil-defense-related activities. Several public and private universities offer post-secondary specializations, notably the National Engineering University (UNI), which has graduate programs in disaster risk management. These institutional programs need continuity within the SINADECI policy framework.

**NGO engagement in school- and community-based risk management projects in Peru is very important.** Numerous NGOs and agencies are running risk management projects with financial support from the United Nations, the European Union, USAID, and other international agencies. Though the outcomes of these separate projects are important, tighter coordination is needed to avoid dispersion and duplication of effort. Dialogue mechanisms likely would need to be instituted with partner organizations and NGOs to come to a consensus on policies and priorities in the SINADECI framework.

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### **HFA Priority #4: Reduction of the underlying risk factors (reduction of exposure and vulnerability and increase of resilience)**

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**Peru recently strengthened its environmental and planning institutions.** In 2008, the national Ministry of Environment was created and began operating and the National Center for Strategic Planning (CEPLAN) was launched—two events that will indirectly help make the country more disaster-resilient.<sup>14</sup> The Environment Ministry is now coordinating several institutions and existing programs involving watershed recovery, reserve area protection, and land use planning, among others.<sup>15</sup> CEPLAN, for its part, is starting strategic development area macroplanning. In both cases, technical assistance and capacity development, among other supportive mechanisms, will be very important to help roll out these long-term processes that will so heavily impact Peru's sustainable development.

**Reducing vulnerability of public investment projects has been a priority for the Ministry of the Economy and Finance (MEF).** Over the past few years, the MEF has developed methodology and technical tools that public institutions and local governments are now required to use to mainstream disaster risk reduction into the National Public Investment System project development and approval cycle.<sup>16</sup> Though this marks a significant move to make new projects more resilient, a great deal remains to be done to make existing infrastructure (roads, health, education, etc.) more disaster-resilient in the areas of analysis, quantification, and charting of strategies for adoption by the central and subnational governments and the production sectors. This should be given priority consideration in any initiative to support the Peruvian Government.

<sup>14</sup> Legislative Decree 1013 enacted on May 13, 2008.

<sup>15</sup> For example, *Instituto del Mar de Perú* (IMARPE), *Comisión Ambiental Regional* (CAR), and *Comisión Ambiental Municipal* (CAM).

<sup>16</sup> See *Guía metodológica para la incorporación del análisis de riesgo asociado a peligros naturales en la formulación y evaluación de proyectos en el Sistema Nacional de Inversión Pública. Dirección General de Programación Multianual.*

**Peru's productive sectors are highly exposed to socio-natural hazards.** Its hydrocarbon and fishing industries and agriculture are among the sectors most frequently buffeted by natural events. The 1997-98 El Niño, for one, caused an estimated US\$1.627 billion in production sector losses.<sup>17</sup> Assessing disaster risk in those segments of the economy and devising comprehensive risk reduction strategies is a country priority given the growth and development dynamic in the last decade. This will likely mean strengthening the government agencies that make, coordinate, and regulate these sector policies, dialogue with the private sector, and support for reactivating the Resilience-Building Program to Manage Recurring El Niño Events (PREVEN).<sup>18</sup>

**The concentration of the population in cities such as Lima (30.8 percent of the national total), Piura (6.1 percent), and Arequipa (4.2 percent)<sup>19</sup> and their exposure to seismic hazards constitutes the country's greatest disaster risk.** Since the direct and indirect impacts of an earthquake in these large urban centers are devastating for people as well as for the economy and social stability, Peru is faced with the twofold challenge of fixing the unplanned urban development model and unregulated occupation of earthquake hazard zones while making the housing, health, education, urban infrastructure, and government sectors more earthquake-resilient. Given the magnitude of the investment this will call for, an effective mitigation-project analysis, assessment, and prioritization process is required, as is a comprehensive financial protection strategy for the city.

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## **HFA Priority #5: Disaster preparedness, recovery and reconstruction at national, regional, and local levels**

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**The most recent earthquake to strike Peru, in**

**the south, provided valuable lessons about the country's capacity to manage major disasters and post-event reconstruction.** On August 15, 2007, an M8.0 earthquake (on the modified Richter scale) rattled Peru's southern coast, causing severe damage in towns such as Chincha, Pisco, Cañete, and Ica.<sup>20</sup> An INDECI self-evaluation of the emergency response, produced some months after the quake, identified the need for improvements in such areas as regional government capacity development, coordination, logistics, and communications, among other areas.<sup>21</sup> From the outset, the provisional agency (FORSUR), created to manage the reconstruction, had to surmount administrative, legal, and technical hurdles as well as resolve coordination problems with other public agencies and regional governments. Peru needs to maintain and enhance response capacity development programs at all levels and address post-disaster recovery issues as part of comprehensive risk management.

**A comprehensive financial strategy is needed to manage post-disaster situations.** Since Peru is exposed to frequent disasters and emergencies, a comprehensive financial protection strategy needs to be devised to establish financial vehicles (for risk transfer and retention) appropriate to resource needs and flows depending on the type of emergency. Regulations on states of emergency and other arrangements to ensure solid institutional coordination and efficient expending of resources are also important factors to address. As a result, the MEF has begun implementing some measures: to establish a contingency fund, to get a contingency credit with the *Corporación Andina de Fomento* (CAF), and to continue the negotiation process with the World Bank for a CAT DDO (catastrophe deferred drawdown option development policy loan).

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<sup>17</sup> Andean Development Corporation (2000).

<sup>18</sup> Executive Orders 073-2006-PCM and 024-2009-PCM.

<sup>19</sup> INEI, National Censuses (2007).

<sup>20</sup> According to INEI data, the quake destroyed close to 52,000 homes and severely damaged 23,600 and left 320,000 casualties and victims in its wake. Road infrastructure and the education and housing sectors were particularly hard-hit.

<sup>21</sup> See *Lecciones Aprendidas del Sur – Sismo de Pisco, 15 de agosto del 2007*, Instituto Nacional de Defensa Civil (INDECI).

## KEY DONOR ENGAGEMENTS

Ongoing Donor or IFI-Supported Activities	Funding Agency / International Partners	Allocated Budget and Period (US\$)	HFA Activity Area(s)
Disaster Risk Management in Urban Areas/Housing Sector	Inter-American Development Bank	1 million 2010-2011	1, 4
Disaster Risk and Risk Management Indicators	Inter-American Development Bank	750,000 (for 14 countries including Peru) 2009	1, 2
Catastrophic Seismic Risk Profile	Inter-American Development Bank	400,000 (for 4 countries including Peru) 2008-2009	2
Disaster Preparedness and Early Recovery for Earthquake and Tsunami in Lima and Callao	European Commission/ ECHO/ UNDP	2.6 million 2009-2011	5
Andean Program for Disaster Risk Prevention	PREDECAN	9.45 million Euros for the Andean Countries 2005-2009	1, 3, 4
Enhancement of Earthquake and Tsunami Disaster Mitigation Technology	Government of Japan/ JICA	5 million 2009-2014	
Integration of Disaster Risk Management Information in Peru's Planning System	The World Bank (SFLAC Grant)	300,000 2010-2011	1, 2, 4

**Peru's priority risk management objectives can be summarized as follows: (i) develop local government capacity through the decentralization process, (ii) ensure existing infrastructure and the productive sectors are disaster-resilient, and (iii) reduce disaster risk by making Lima, Arequipa, and other major cities earthquake-resilient.**

- **Regional, provincial, and district government capacity development for risk reduction policy design and delivery will require support,** primarily for risk diagnosis, technical assistance, and training.
- **Efforts to increase inventories in addition to the analysis and prioritization of interventions required to make existing infrastructure more resilient to earthquakes, flash floods, landslides, and floods, need to be scaled up.** GFDRR support in key sectors—such as roads, education, and health—can facilitate investment program selection and design.
- **Extreme weather disturbances such as El Niño could derail Peru's production and economic growth.** Support for the PREVEN program (focusing on northern Peru) and for

scaling up of event monitoring networks and early warning systems, partnering with the private sector, will help to considerably reduce exposure to socio-natural hazards.

- **To efficiently pursue the above-listed actions, it is essential to overcome impediments of technical data dispersion, methodology tools, and technology infrastructure for risk modeling at different scales.** GFDRR support will make it possible to develop initial activities toward structural solutions like CAPRA.
- **There is a dearth of disaster risk reduction programs to make essential buildings and infrastructure in Lima, Arequipa, and Piura earthquake-resilient.** The advances that can be achieved with GFDRR funding support for analysis and design of medium- and long-term programs will have a very strong impact.

**In addition to the above-mentioned activities, continued dialogue with the Government of Peru will lead to the prioritization of future initiatives to ensure adequate mainstreaming and implementation of disaster risk reduction measures.**



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