United States Agency for International Development
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EL NIÑO SOUTHERN OSCILLATION - ENSO 1997/98 AND RISK MANAGEMENT IN THE LATIN AMERICAN AND CARIBBEAN REGION

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CONTENTS

ACRONYMS

ADC	Andean Development Corporation
CEPREDENAC	Regional Center of Natural Disaster Prevention in Central America
DMC	Meteorological Office of the Director of Chile
DOC/NOAA/OGP	Department of Commerce, National Oceanic and Atmospheric Administration, Office of Global Programs
ECLAC	Economic Commission for Latin America and Caribbean
ENSO	El Niño Southern Oscillation
FAO	United Nations Food and Agriculture Organization
IAI	Inter-American Institute for Global Change Research
IADB	Inter-American Development Bank
IDNDR	International Decade for Natural Disaster Reduction
IRI	International Research Institute for Climate Prediction
LAC	Latin America and Caribbean
MDRO	Mission Disaster Relief Officer
MEC	Mission ENSO Coordinator
NGO	Non-governmental organization
OCHA	Office for the Coordination of Humanitarian Affairs
OFDA	Office of U.S. Foreign Disaster Assistance
ONEMI	National Office of Emergency of Chile
PACIS	Pan-American Climate Information System
PAHO	Pan-American Health Organization
SST	Sea surface temperature
SHOA	Hydrographic, Oceanographic and Atmospheric Service of Chile
UNDP	United Nations Development Program
USAID	United States Agency for International Development
WB	World Bank
WFP	United Nations World Food Program
WMO	World Meteorological Organization

1. El Niño Southern Oscillation

For several centuries, Peruvian fishermen have considered the appearance of relatively warmer sea surface water, which arrives at the end of December along the northern coast of the country, to be a normal occurrence. This warm current was associated with Christmas – the celebration of the birth of the Christ child – thus the name "El Niño."

This change in the surface of the sea, which could linger for several months, was later associated with a reduction in the presence of anchovies (a vital resource to the Peruvian economy), changes in levels and distribution of rainfall, and alterations to Peru's flora and fauna. The occasional increase in temperatures of the Pacific Ocean's surface along the equatorial line was considered to be a local phenomenon until 40 years ago, when the effects were thought to be limited to Peru and Ecuador, and to a lesser degree, Colombia and Chile.

In 1920, Sir Gilbert Walker observed a pendulum-type relation in the barometric pressure of the southern Pacific Ocean. When the pressure was high in the western Pacific, it was low in the eastern Pacific and vice versa, which caused notable changes in the direction and the speed of the winds on the surface of the water. Walker called this phenomenon the "Southern Oscillation."

It was not until the end of the 1960s that a professor from the United States, Jakob Bjerknes, identified the relationship between the pendulum shifts in pressure that Walker discovered, and the periodic strong and warm current that moves along the coasts of Ecuador and Peru. An association was established between the two phenomena, El Niño in the ocean and the Southern Oscillation in the atmosphere, which explains the current name, El Niño Southern Oscillation, or ENSO.

Subsequent research has demonstrated that the warming of the sea surface from the central and eastern regions of the Pacific Ocean to Ecuador can interfere with so-called "normal" climatic patterns in far-off places around the globe. Scientists refer to these phenomena as "teleconnections."

During El Niño, the increase in sea temperatures and humidity in the atmosphere causes a change in normal convection patterns, thereby displacing "normal" areas of convergence and associated rains, and modifying atmospheric circulation.

The greater part of inter-annual variability in the tropics, and a substantial part of the variability in the subtropics of the Northern and Southern Hemisphere, is related to and linked with ENSO.[1] During an ENSO event, the atmospheric pressure is higher than normal in Australia, Indonesia, Southwest of Asia, and the Philippines. This event manifests itself in dry conditions, which occasionally turn into full-scale droughts. Dry

[1] Trenberth, Kevin, The El Niño – Southern Oscillation System, National Center for Atmospheric Research Boulder, Colorado, USA. - A Colloquium on El Niño-Southern Oscillation (ENSO): Atmospheric, Oceanic, Societal, Environmental, and Policy Perspectives 20 July - 1 August 1997 - Boulder, Colorado, USA

conditions also prevail in Hawaii and Central America, and extend into the northeast regions of Brazil and Colombia. On the other hand, excessive rains prevail in the eastern and central Pacific, along the west coast of South America, parts of South America near Uruguay, and part of the United States during the winter.

ENSO[2]-related changes often have a profound impact on society because of the droughts, floods, heat waves and other phenomena that cause chaos in health, agriculture, fisheries, and environmental systems, and thereby increase the demand on energy resources, and contaminate air quality. For example, the changes in oceanic conditions can have disastrous consequences for fish and sea birds, and for this reason, many industries along the South American coast related to fishing and guano (fertilizer obtained from the excrement of a specific type of bird) are forced to shut down. Other sea creatures are favored by these changes, such as wild shrimp, which are harvested in great quantities in places where they would otherwise be scarce.

The intensity of an El Niño depends on the magnitude of its associated anomalies and the area of influence.[3] Although important, the intensity of the event is distinct from its impact on climate and human activities. Climatic effect depends on the time of the year in which the phenomenon is present, and the socioeconomic impact is related more to the vulnerability of specific regions of a country and to certain sectors of national activity.[4]

In recent decades, great importance has been given to the observation of El Niño. ENSO brings monsoon rains, droughts, and other climate changes to a large part of the planet, including the equatorial Pacific, the United States, Canada, Latin America, and Africa. When ENSO presents itself, it rains in the east Pacific, and in the west Pacific it is dry. Unlike the annual climatic variations, which are predictable, ENSO appears at irregular intervals every two to seven years - always with different characteristics. Usually, it occurs around Christmas, and lasts from 12 to 18 months. The most serious episode registered thus far occurred in 1982-1983. Since then, there have been two – one from 1986-1987, and a prolonged event that lasted from 1990 until 1995. The anomalies of the last ENSO started in May 1997 and continued up to mid 1998, the magnitude and impact of which earned it a place in the category of severe events.

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[2] Adapted from Chapter 3, J.P.Sarmiento "El Niño Southern Oscillation 1997/98. Experiencias de América Latina y el Caribe" OPSOMS, Draft 1998.

[3] IDEAM, Fenómeno de El Niño, Colombia,1997

[4] J.P.Sarmiento "El Niño Southern Oscillation 1997/98. Experiencias de América Latina y el Caribe" OPSOMS, Draft. 1998.

2. Description of the ENSO 97/98

2. 1 Chronology[5]

The first forecast of the ENSO 97/98 was published in the Experimental Long-Lead Forecast Bulletin (NWS/NMC/CAC) December 1996. It was anticipated that during 1997 a warm event of weak to moderate intensity would occur. In May 1997, it was observed that wind intensity had weakened greatly, indicating the possible continuation and intensification of the positive sea-surface temperature (SST) anomalies. By June 1997, the various atmospheric variables, convectional cloudiness in the central equatorial Pacific, intensity of the trade winds, and oceanic variables (SST, sea level, depth of the thermocline) jointly indicated the beginning of an El Niño event. The transition toward a warm event was occurring earlier, and much more abruptly, than the norm in terms of SST predictions for the central equatorial Pacific.

The first effects appeared toward the end of May and ran until the third week of June, when a series of frontal systems affected Chile. Eighty-seven thousand people were affected, 10,000 of whom were left homeless. Significant damages occurred between Regions III and X, affecting housing, educational infrastructure, health, road networks and fishing sectors. Cumulative precipitation by June had greatly surpassed the average.[6]

While alterations in SSTs and other climatic indicators pointed to an intensification of ENSO conditions, things were relatively quiet after the events in Chile, and a sizable number of meetings and events were organized to develop action plans for confronting the likely impacts of a growing ENSO.

On October 9, 1997, Hurricane Pauline – a category 4 storm with windspeeds that surpassed 500 km/hr – pummeled the Mexican states of Oaxaca and Guerrero.[7] Fifteen people died[8], 22 were reported missing and 41,100 people were affected in Oaxaca. In the State of Guerrero 123 people died and 3 were reported missing.

Also in October, a rainfall deficit was reported in Colombia, which caused significant problems for agricultural and livestock activity, as well as for the dairy industry. The impact on coffee production was particularly severe. The lack of rainfall also caused a drastic reduction in river volume, rendering rivers, such as the Magdalena, difficult to navigate. Another effect of the climatic anomaly was the spread of large forest fires.

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[5] Adapted from Chapter 4th "Impacto del ENSO 97/98 en América Latina y el Caribe" OPSOMS, by Juan Pablo Sarmiento. Draft. 1998

[6] República de Chile, Ministerio del Interior, Oficina Nacional de Emergencia, INFORME CONSOLIDADO TEMPORALES JUNIO 1997. 30 DE Julio de 1997.

[7] Pan American Health Organization (PAHO), Informe de Situación Huracán Pauline, México, Reliefweb, 13 Oct 1997.

[8] UN Department of Humanitarian Affairs (DHA), Mexico Hurricane Pauline Situation Report No.1, DHAGVA - 97/0531, 12 Oct 1997.

In November, unusually heavy rains were reported along the coast of Ecuador and northern Peru, which were related to the size of both anomalies – the SSTs off the South American coast, and the southward displacement of the Inter Tropical Convergence Zone. In Ecuador, landslides, which were caused by the heavy rains as well as soil saturation and deforestation, were reported in the foothills and Inter-Andean region. Heavy surf also severely affected coastal communities. The most affected areas were the provinces of Bolivar, Cotopaxi, El Oro, Esmeraldas, Guayas, Los Rios, and Manabi. Approximately 7,000 families (35,000 people) were affected. Twelve hundred families (6,000 people) lost their homes or required special assistance. Nearly 5,500 people were evacuated to field shelters in Guayas, El Oro, and Esmeraldas. Twenty-three people were reported dead during the month of October.[9]

In November 1997, the U.N. Food and Agriculture Organization (FAO) reported that, "Agricultural production in Latin America is especially vulnerable to El Niño. The first manifestations of the phenomenon in 1997 affected the grain and bean crops of the first harvest in almost all of the countries of Central America and the Caribbean. Crop losses in 1997 in the sub-region were estimated to be on average between 15 and 20 percent, in comparison with the previous year. However, several other countries reported considerably higher losses. The second harvests, which were collected in October, have been affected principally by the excessive rainfalls in September (typical of the hurricane season), and secondly, by the exceptionally dry weather associated with El Niño. The prospects of recovering losses already suffered are almost nonexistent in most of the countries. Additionally, planting grain crops in the first season of 1998, which starts in March, would run a serious risk if the drought continued into March/April. In addition to the loss of corn harvests in the first season of 1997/98 caused by the initial effects of El Niño, considerable damages were also reported in rice and bean harvests. During the growing period the climate was predominantly dry for the harvests of the second 1997/98 season. In South America, the first 1998 planting season has started in the Andean countries. Most of the grain harvests of 1997 had already been collected when the first effects of El Niño were starting to be felt. However, in the Southern parts of the sub-region, the area of wheat planted in 1997 was reduced considerably in the principal producer countries because of excessive rains."[10]

In Brazil, floods and strong winds caused by El Niño were reported in the state of Rio Grande do Sul at the end of November, causing approximately 12,700 people to lose their homes. Itaqui was the area most affected, with 4 people reported dead.[11]

In Peru, intense rains were reported during the month of December, which generated floods and landslides in the departments of Tumbes and Pasco, affecting approximately 4,786 people. The first published figures indicated that 9,279 people were affected nationwide. Approximately 1,390 houses were damaged and 160 destroyed; 2,763

[9] DHA Ecuador El Niño Floods Situation Report No.2, 25-Nov-1997.

[10] Food and Agriculture Organization (FAO). Efectos de el Niño sobre la producción agrícola en América Latina, Date. 25 Nov 1997.

[11] DHAGVA - 97/0865, Brazil El Niño Preparedness Measures Situation Report No. 2, 4 Dec 1997.

hectares of banana and rice crops were destroyed; 24 kilometers of roads lost; 8 bridges destroyed; and 9 people were reported dead.[12]

Also in December, intense rains in Paraguay caused the overflowing of the Paraguay River, resulting in flooding in the urban area of Asunción, Alberdi, San Pedro, President Hayes, Alto Paraguay and in Concepción.. The National Emergency Committee indicated that nearly 13,000 families (60,000 people) were affected by the floods. Seven thousand, nine hundred families (35,000 people) were evacuated, and 1,500 families (6,700 people) were isolated by the floods.[13] By late December the Paraguay and Neembucu rivers had risen 8 meters above normal, surrounding Pilar, the capital of Neembucu province.[14]

Late January and early February were also critical for Ica, a provincial city located south of Lima, Peru. Flash floods feeding into the rain-swollen Ica River generated serious damage. There are no records of similar events during previous ENSOs.

At the beginning of February, ENSO brought torrential rains to the north of La Paz, Bolivia. An avalanche in a mining area left more than 65 dead and 125 injured. Yet, simultaneously, in the high valleys and sections of the altiplano, more than 300,000 people were affected by drought. Sources of drinking water became scarce, water for crops and animals dried up, and in some cases, people began migrating toward the cities.

The January rains in northern Peru were exceptional. The frequency of rains increased in February and in the first half of March, but the intensity moderated even though there were occasional strong rains. In the city of Piura, 412.2 mm of precipitation fell in February. In eastern parts of the city, precipitation surpassed 100 cm during this period. This situation generated exceptional increases in the flow of the Piura River – higher than any registered during the 1982-83 event. The observed maximum flow was 4,424 m3/s on March 12, whereas the maximum in 1983 was 3,200 m3/s. The excessive volumes in 1998 caused the destruction of roads and bridges, in addition to the flooding of populated areas, which was worse than in 1983.

In March, the Government of Peru (GOP) estimated that 600 kilometers of its road network had been destroyed, while more than 4 kilometers of destroyed bridges left a number of areas isolated around the country. The most affected departments were Tumbes, Piura, Lambayeque, La Libertad, Cajamarca, Cusco, and Lima. Meanwhile, a lake formed in the middle of the Sechura desert (1,100 kilometers to the north of Lima), which is one of the most curious ENSO-related effects.[15] For a short time, it was the

[12] UN Department of Humanitarian Affairs (DHA), DHAGVA - 97/0877, Peru El Niño Floods DHA Situation Report No. 2, Relief Web, 23 Dec 1997.

[13] UN Department of Humanitarian Affairs (DHA), DHAGVA - 97/0880, Paraguay El Niño Floods Situation Report No.1, Relief Web, 26 Dec 1997.

[14] UN Department of Humanitarian Affairs (DHA), DHAGVA - 97/0881 Paraguay El Niño Floods Situation Report No.2, Relief Web, 30 Dec 1997.

[15] USAID/OFDA Impacto de ENSO en Bolivia - Análisis del evento, J.P.Sarmiento, febrero 1998.

second largest lake in Peru (after Lake Titicaca), however, it is believed that the lake will disappear in less than a year.[16]

Paradoxically, in the same month of March, a devastating fire started in the state of Roraima, Brazil,[17] which required extensive national and international assistance. In Guyana, a group of 15,000 indigenous people were faced with a critical food shortage stemming from an extreme shortfall of rain, which was attributed to the ENSO.[18]

In April, the northern part of Argentina – the provinces of Entre Rios, Santa Fe, Corrientes, Misiones, Chaco, and Formosa – were subjected to fierce storms accompanied by intense rains, causing serious damages to agriculture and roads, and generating the need to evacuate about 32,800 people. In the Province of Chaco, floodwaters isolated approximately 100,000 people, while throughout Argentina, the floods affected close to 290,000 people and 5 people were reported dead.[19]

Also in April, Uruguay reported serious floods in various parts of its territory, comparable to the situation in 1959. The floods were due to the steady swelling of the Paraguay, Paraná, and Uruguay rivers. It was calculated that 8,000 people were affected in the cities of Artigas, Bella Unión, Salto, Paysandu, Rivera, Mercedes, Villa Soriano, Durazno, Treinta y Tres, Vergara and Melo. In the region of the Olimar and Cebollati rivers, 1,300 people had to be evacuated due to damages to homes roads and bridges, and nearly 10% of the rice production was lost.[20]

The NCEP-NOAA dynamic model predicted a slow decay of the phenomenon during the May-June period, meaning that during the winter and in the following spring (austral), positive SST anomalies would persist in the equatorial Pacific, although of a relatively small magnitude. In May, the dynamic-statistical model jointly developed by Scripps and the Max-Planck Institute, the statistical model by the Climate Diagnostic Center (CIRES-NOAA), and the two NCEP-NOAA statistical models (analog and canonic correlation) all expected an evolution toward a La Niña event, which would occur by the beginning of the next austral spring.

Paraguay continued experiencing torrential rains in May that caused the Paraná River to overflow its banks, resulting in floods in the southern part of the country. In the Province of Neembuco, floodwaters affected more than 15,000 people. In the regions of President Hayes, Boquerón, and Alto Paraguay there were more than 30,000 people affected by the floods. In Asunción, approximately 20,000 people were evacuated to 84 camps. Official

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[16] UN Department of Humanitarian Affairs (DHA), OCHA/GVA - 98/ Peru El Niño Floods OCHA Situation Report No. 7, Relief Web, 06 Mar 1998.

[17] UN Office for the Coordination of Humanitarian Affairs (OCHA), OCHA/GVA - 98/0176 Brazil - El Niño Forest Fires OCHA Situation Report No. 1, Relief Web, 27 Mar 1998.

[18] UNDP, Drought in Guyana draws international response, Relief Web, 30 Mar 1998

[19] UN Office for the Coordination of Humanitarian Affairs (OCHA), Argentina El Niño Floods OCHA Situation Report No 1, OCHAGVA - 98/0189, Relief Web, 22 Apr 1998.

[20] UN Office for the Coordination of Humanitarian Affairs (OCHA), Uruguay - El Niño Floods OCHA Situation Report No.1, OCHAGVA - 98/0192, 30 Apr 1998.

information indicated that 75,000 people were relocated to field shelters. Dairy production, crops of peanuts, cotton, and sorghum were damaged.[21]

Simultaneously, in Central America, Costa Rica experienced a reduction in rainfall during the rainy season (May/November 1997), associated with an especially dry season and high temperatures (December 1997/April 1998). The most affected sectors were water resources, agriculture, livestock, fishing, and electrical generation - even tourism was affected.[22]

In June, the majority of SST forecast models continued to predict a transition toward a cold event (La Niña) for the second half of 1998. The scientific community pointed out the success of the European community model (ECMWF) which, since the beginning of the year, had predicted a reactivation of the thermal anomalies during autumn in the Northern Hemisphere.

Another impact of El Niño were the forest fires in Mexico and Central America, which had been growing in intensity and frequency since January 1998. In June, the fires grew spectacularly in number and area, mobilizing the support of the international community. Only in July was it possible to control the fires. There were approximately 2,927,927 hectares[23] burned throughout the region, equivalent to the size of El Salvador, or 60% of the territory of Costa Rica. The U.S. State of Florida also underwent the ravages of the forest fires during the month of June, where initial calculations indicated that 200,000 hectares were burned.

During the ENSO 97/98 period, there were other phenomena unrelated to the climate changes that had a severe impact on the American Hemisphere, including the following:

- On October 14, 1997 there was an earthquake that registered 6 on the Richter Scale in the northern region of Coquimbo, Chile, which resulted in eight deaths, 55 injured, and severe damages to housing and infrastructure.[24]

- On May 22, 1998 at 00:39, an earthquake of 6.8 degrees on the Richter Scale shook 70% of Bolivian territory. A few hours later 71 inhabitants were confirmed dead in Totora and Aiquile,[25] approximately 400 kilometers southeast of La Paz. There were reports of 50 injured and more than 16,800 people affected. In Aiquile 80% of the houses were destroyed and in Totora 40%. These two towns, which are located in the department of Cochabamba, share an extended period of drought with Oruro and Northern Potosí, which has been accentuated by the ENSO 97/98.

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[21] UN Office for the Coordination of Humanitarian Affairs (OCHA), Paraguay El Niño Floods OCHA Situation Report No 4, OCHAGVA - 98/0198, 07 May 1998

[22] UN Office for the Coordination of Humanitarian Affairs (OCHA), Costa Rica El Niño Drought OCHA Situation Report No.1, OCHAGVA - 98/0201, 20 May 1998

[23] US Agency for International Development (USAID) OFDA Situation Report 1-20: Mexico & Central America - Fires , 1998

[24] Pan American Health Organization (PAHO),Terremoto de Chile informe de situación # 1. Reliefweb 14 Oct 1997.

[25] UN OCHA, Bolivia-Earthquake OCHA Situation Report No.3, OCHAGVA – 98/0209 26 May 1998.

- On August 4, 1998, an earthquake registering 7.1 degrees on the Richter Scale affected the Ecuadorian Pacific coast, in particular the Province of Manabí north of Caráquez Bay. The quake caused 3 deaths and left 40 people injured, while nearly 1,000 people lost their homes. This same area had been severely affected a few months previously by intense rains associated with the ENSO Phenomenon. One of the installations most damaged was the Caráquez Bay Hospital, which had transfer the patients to Portoviejo, the capital of the Province, because of the serious level of damage.[26]

These occurrences make the need for risk management all the more compelling, a process that would include the construction of complex scenarios for coping with various hazards, especially for highly vulnerable and under-developed communities.

2.2 Declared disasters

Based on the official declarations of the United States government, the following is the list of disasters related to ENSO at the global level. The disasters in Latin America are underlined:

Country	**Disaster**	**Declare Dates**
Indonesia	Fire/Health Emergency	10/01/97
Somalia	Complex Emergency	10/07/97
Mexico	Hurricane	10/10/97
Papua New Guinea	Drought	10/22/97
Djibouti	Floods	11/10/97
Kenya	Floods	11/17/97
Ethiopia	Floods	11/20/97
Kenya	Cholera Epidemic	12/24/97
Indonesia	Drought	02/02/98
Peru	Floods	02/03/98
Tanzania	Floods	03/04/98
Philippines	Fire	04/02/98
Brazil	Fire	04/07/98
Indonesia	Drought/Fire	04/28/98
Paraguay	Floods	04/30/98
Ecuador	Floods	05/05/98
Argentina	Floods	05/08/98
Mexico	Fire	05/15/98
Guatemala	Fire	05/16/98
Honduras	Fire	05/20/98
El Salvador	Fire	05/21/98
Costa Rica	Fire	05/22/98
Nicaragua	Fire	05/22/98

[26] UN OCHA, Ecuador-Earthquake OCHA Situation Report No.2, OCHAGVA – 98/0263 6 Aug 1998.

2.3 Impact of the ENSO 97/98

Obtaining objective and comparable damage statistics has been one of the greatest difficulties. Furthermore, there is no methodology that makes it possible to differentiate between the direct, indirect or secondary effects of the event. For example, there is not even agreement on establishing a common point of reference for evaluating direct effects - whether to use the current value of the damaged infrastructure, its depreciation, or the cost of replacement.

In order to establish a point of comparison between countries, the estimates of El Niño's socio-economic impact cited below are from a report by the NOAA,[27] which is a compilation of the global impact of the climatic event. The data included here focuses on El Niño's impact on the American Hemisphere.

Regional Cost of the ENSO 97/98 Warm Event

The following table shows the reported estimates of direct damage attributed to the ENSO warm event:

North America		19.50%
Meso & S. America		54.40%
Africa		0.40%
Asia		9.70%
Indonesia & Australia		16.10%

Total $ 33.2 Billion

Country Cost

This table records the estimates of direct damage attributed to the ENSO warm event by country:

Country	Total Cost
Argentina	3,000
Bolivia	1,200
Brazil	4,700
Chile	400
Colombia	420
Costa Rica	140
Ecuador	2,538
El Salvador	200
Guatemala	380
Honduras	350

[27] NOAA/OGP, ENSO COMPEDNDIUM, First Draft 09-09-98.

Nicaragua	220
Panama	160
Paraguay	260
Peru	3,600
Uruguay	220
Venezuela	280
Total	18,058

Area Affected

The following table presents forest and agricultural land lost to fires, flooding and drought:

Region	Hectares
Africa	193,704
Asia	1,441,442
Australia and Indonesia	2,845,526
Central and South America	5,056,574
North America	12,832,349
Total	22,369,595

Health Impact

In the following table:
- *Mortality* refers to lives lost in ENSO-induced disasters;
- *Morbidity* refers to persons infected with water or vector-borne disease associated with the ENSO (reported cases only – not statistical estimates); and
- *Affected* refers to persons injured or suffering (i.e. malnutrition) from an ENSO-induced disaster, but does not include the dead, homeless, or infected.

Country	Mortality	Morbidity	Affected
Argentina	17		
Bolivia	135		
Brazil	45	287,709	
Chile	35		
Colombia			
Costa Rica			
Ecuador	280		83,033
El Salvador			
Guatemala			
Honduras			
Nicaragua			290,000
Panama			
Paraguay	25		

Peru	441	3,483	350,000
Uruguay	18		
Venezuela		2,551	
Total	997	243,743	723,033

Displaced and homeless

The table below shows the number of persons either permanently or temporarily displaced as a result of ENSO-related disasters:

Country	Displaced/Homeless
Argentina	150,000
Brazil	12,700
Ecuador	13,500
Paraguay	35,000
Peru	200,000
Total	**411,200**