



SUSTAINABLE DEVELOPMENT UNIT ■ LATIN AMERICA AND THE CARIBBEAN

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

El Salvador



THE WORLD BANK



GFDRR

Global Facility for Disaster Reduction and Recovery



**COUNTRIES AT RELATIVELY
HIGH ECONOMIC RISK
FROM MULTIPLE HAZARDS**
(Top 75 Based on GDP
with 2 or more hazards)^a

1. Taiwan, China

2. EL SALVADOR

3. Jamaica

4. Dominican Republic

5. Guatemala

10. Costa Rica

11. Colombia

15. Trinidad and Tobago

18. Antigua and Barbuda

21. Ecuador

23. Mexico

24. United States

26. Nicaragua

38. Cuba

75. Bulgaria

^a Dilley et al. (2005). Table 7.2.

Natural disaster data from El Salvador published on the PreventionWeb website reported 41 natural disaster events for the period 1982 to 2007, with total economic damages estimated at US\$4.57 billion.

EL SALVADOR

Natural Disasters from 1982 - 2007^b

Affected People

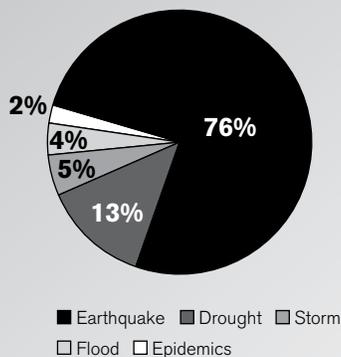
Disaster	Date	Affected (Number of People)
Earthquake*	2001	1,334,529
Earthquake*	1986	770,000
Drought	2001	400,000
Earthquake*	2001	256,021
Storm	1998	84,000
Storm	2005	72,141
Flood	1982	68,000
Epidemic	2003	50,000
Flood	1988	39,060
Earthquake*	1982	32,500

Economic Damages

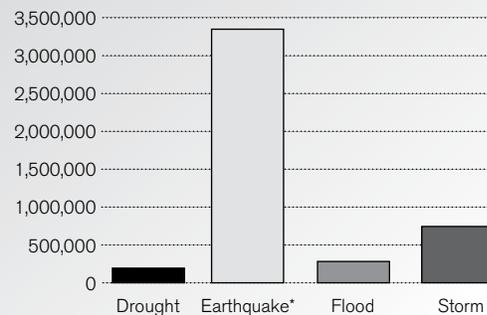
Disaster	Date	Cost (US\$ x 1,000)
Earthquake*	1986	1,500,000
Earthquake*	2001	1,500,000
Storm	1998	388,100
Storm	2005	355,700
Earthquake*	2001	348,500
Flood	1982	280,000
Drought	1998	170,000
Drought	2001	22,400
Flood	1999	1,500
Drought	1994	1,000

Statistics by Disaster Type^b

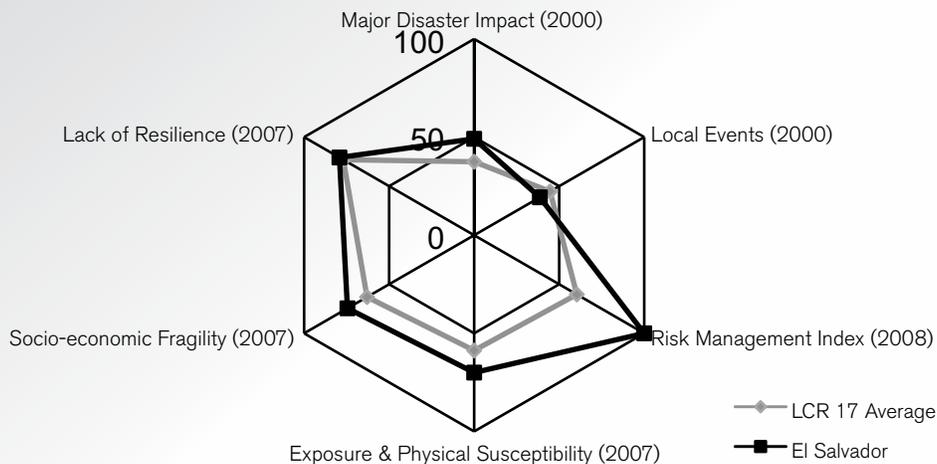
Population Affected by Disaster Type



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



Relative Vulnerability and Risk Indicators^c



^b UN (2009). <http://www.preventionweb.net/english/countries/statistics/?cid=55>. Source data from EM-DAT. Data displayed does not imply national endorsement.

^c 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

El Salvador has the second highest economic risk exposure to two or more hazards, according to the Natural Disaster Hotspot study² by the World Bank.

The same study also ranks El Salvador second among countries with the highest percentage of total population considered at a “Relatively High Mortality Risk from Multiple Hazards”.

Major Natural Hazards

Due to its geographical location and geotectonic characteristics, El Salvador is exposed to a variety of natural hazards, including hydrometeorological and geophysical. El

Salvador, along with the rest of Mesoamerica, is one of the most seismically active regions on earth, situated on three tectonic plates. The subduction of the Cocos Tectonic Plate under the Caribbean Plate created the deep Middle America Trench that lies off the coast of El Salvador and generates frequent earthquakes near the coast. The friction of the westward-moving North American Plate against the northern edge of the Caribbean Plate in southern Guatemala is the source of earthquakes in northernmost El Salvador.³

The number of natural disasters in El Salvador dramatically increased during the period of 1997-2007. A total of 21 events were recorded, representing 53 percent of all natural disasters of the last 100 years. Five events (23 percent) had a geophysical origin, while the remaining 16 (76 percent) were hydrometeorological. According to the

Ministry of the Environment and Natural Resources (MARN)'s Division of the National Service of Territorial Studies (D-SNET), economic losses directly linked to catastrophic events during the last 30 years amounted to almost \$US4 billion (equivalent to the total cost of building 33,000 new primary schools, or 298 regional hospitals, or 25 Cutuco-like seaports).⁴

Similarly, natural disaster data from El Salvador published on the PreventionWeb website⁵ reported 41 natural disaster events for the period 1982 to 2007, with total economic damages estimated at US\$4.57 billion.

Earthquakes accounted for US\$3.35 billion, storms US\$744 million, floods US\$281.5 million and droughts US\$193.4 million of reported economic damages, respectively. The number of people killed was reported as 3,995, with 58 percent of the deaths caused by earthquakes, 14 percent by storms, 16 percent by floods, and the remaining 12 percent caused by epidemics.

About 41 percent of the Salvadoran population resides in municipalities exposed to high risk of natural disasters (i.e. those municipalities that were affected during the period of 1980 to 2007 by three or more natural hazards: earthquakes, floods, storms, and droughts). These municipalities also concentrate 74 percent of disaster-related fatalities. During this period there was an average of 1.5 disasters per year. This highlights the continuous impact that natural events have on the national development process and their impact on society and the Salvadoran economy.⁶

Based on the Disaster Risk Index⁷ it can be inferred that 23 percent of the exposed population to floods, earthquakes or storms has

² Dilley et al. (2005). Table 7.2.

³ Library of Congress (1988).

⁴ Ministry of Environment and Natural Services (2009).

⁵ PreventionWeb (2009b).

⁶ INER (2009).

⁷ Cardona (2008).

a high probability of death in El Salvador. Four percent of the exposed population have their lives threatened by floods and 14.5 percent by earthquakes.

It is worth noting that El Salvador is the second most deforested country in Latin America after Haiti.⁸ Almost 85 percent of its forested cover has disappeared since the 1960s. According to the UN Food and Agriculture Organization's "Global Forest Resources Assessment 2005"⁹, El Salvador's total forest cover was estimated as 14.2 percent of total land area. About two percent of the remaining forests (less than 6,000 hectares) are classified as primary forest.

Flooding and landslides pose serious risks to El Salvador during the rainy season (June to November) as much of the natural land-cover of the country has been removed, increasing its vulnerability to these natural hazards. The Government of El Salvador data indicates that as of 2005, 65 percent of the country was threatened by landslides.

Storms and Floods

In 1998, Hurricane Mitch caused great damage throughout Central America.¹⁰ Over a decade since Hurricane Mitch struck Central America, its impact in the social and economic fabric of the region was still visible.¹¹ In El Salvador, Mitch produced huge amounts of precipitation, resulting in flash flooding and mudslides throughout the country. More than 10,000 homes were flooded, leaving 59,000 people homeless and forcing 500,000 more to evacuate.

Some 1,000 square kilometers of pasture and cropland were flooded, and 10,000 heads of cattle were lost. Total agricultural and livestock damage amounted to US\$154 million. Flood damage to infrastructure was also severe, with two bridges destroyed and 1,200 miles of unpaved roads damaged. In total, Mitch caused nearly US\$400 million in damage and 240 deaths.¹² In 2005, tropical storm Stan struck El Salvador at the same time that the Santa Ana volcano erupted near San Salvador¹³, leading to destructive floods and mudslides. According to Salvadoran authorities, 300 communities were affected by the floods, with over 54,000 people evacuated from their homes.¹⁴

In November 2009, during the passing of Tropical Storm Ida, some 355 mm of rainfall fell in a five-hour period, triggering floods and lahars. Even though this was a localized event that affected five out of the 14 Departamentos of El Salvador, 199 people lost their lives; an estimated 5,000 homes were damaged or destroyed, damage to transport infrastructure amounted to US\$106.2 million; for a total economic impact estimated at US\$315 million.

As recently as late May-early June of 2010, Tropical Storm Agatha - the first storm of the 2010 Pacific hurricane season- struck El Salvador. More than 400 mm of rainfall fell in just a few hours, triggering flashfloods and landslides that killed 12 people. Some 120,000 individuals were affected across 116 municipalities. Due to the widespread damage caused by the storm, the President declared a national state of emergency to facilitate the relief efforts. The events left behind an economic impact estimated at US\$112 million¹⁵, equivalent to more than 0.5% of the country's GDP.

⁸ Mongabay.com (2004).

⁹ Food and Agriculture Organization (2005a).

¹⁰ BBC News (1998).

¹¹ CATHALAC (2008).

¹² Wikipedia (2009a).

¹³ USAID (2005).

¹⁴ Wikipedia (2009b).

¹⁵ <http://www.presidencia.gob.sv/tecnica/>.

The economic impact of Agatha had a cumulative negative effect on the El Salvadoran economy; and exacerbated the environmental, social and economic impacts caused by tropical storm Ida in late 2009. This observed increase in the frequency of hydrometeorological events that have catastrophic effects reveals an increased vulnerability and loss of the population's resilience capacity.

Earthquakes and Tsunamis

El Salvador has a long history of destructive earthquakes and volcanic eruptions. San Salvador was destroyed in 1756 and 1854, and it suffered heavy damage in 1919, 1982, 1986, and twice in 2001³, when the country was hit by two major earthquakes within one month of each other. The first earthquake in 2001 struck on January 13, with a magnitude of 7.7 on the Richter scale. The epicenter was 60 miles southwest of San Miguel.¹⁶ Official reports indicated at least 844 people killed, 4,723 injured, 108,226 homes destroyed and more than 150,000 buildings damaged.¹⁷ The second earthquake shook the country on February 13 with a magnitude of 6.6. The epicenter was 15 miles east of San Salvador. At least 315 people were killed, 3,400 were injured, and extensive damage to public infrastructure was reported. Landslides occurred in many areas of El Salvador¹⁶ while clean water and sanitation became a matter of great concern in many areas due to the earthquakes' damage to municipal drinking water systems.

Fernandez, Ortiz-Figueroa, and Mora (2004)¹⁸ indicated that eleven historical tsunamis have been reported along the coast of El Salvador since 1859. Four of these tsunamis flooded villages and killed

at least 185 people. This article also reported that the most dangerous tsunami-generating earthquakes are those having magnitudes of 7.0 or higher, with epicenters offshore. With a growing population and urban expansion occurring along the Salvadoran coastline, the potential losses of human life and property as a result of tsunamis are increasing at an alarming rate.

Volcanoes

The country has over twenty volcanoes, although only San Miguel, Izalco, and Santa Ana have been active in recent years. The southern range of mountains is a discontinuous chain of about 20 volcanoes, clustered into five groups. Between the volcanic cones lie rich alluvial basins and rolling hills eroded from ash deposits where much of El Salvador's coffee plantations are located.³ In October 2005, the Santa Ana volcano erupted for the first time in 100 years. As many as 20,000 people were forced to evacuate from their homes. The volcano spewed hot rocks and plumes of ash into the air across a one-mile radius from the crater¹⁹, killing at least two people and injuring seven. About 10,500 hectares of land mainly planted with coffee trees were covered in ash from the eruption.²⁰

Landslides

Nearly one thousand people were reported dead in the aftermath of the 7.7 earthquake in January 2001. Approximately 585 deaths were caused by a single mudslide in Las Colinas in the Santa Tecla district of Greater San Salvador. Nearly 108,000 homes were damaged or destroyed.²¹ Utilities and roads

¹⁶ Wikipedia (2009c).

¹⁷ USGS (2004).

¹⁸ Fernandez et al. (2004).

¹⁹ Wikipedia (2009d).

²⁰ Taylor (2005).

²¹ Konagai et al. (2002).

were damaged by more than 16,000 landslides. The subsequent 6.6 earthquake in February also triggered a large number of landslides across the country.

During 2008, 618 sites throughout the country were identified as prone to landslides. In 2009, the number of critical locations increased to 723, representing an additional 105 sites over the previous year. An estimated 773²² areas are currently identified as prone to flooding.

During the heavy rainfall of November 2009, three deadly lahars fell off from the San Vicente volcano, as a result of the collapse and movement of mud, rocks and water detached from the saturated cone walls. The lahars flowed away from the volcano, on three separate 6-km long pathways, depositing an estimated 1.5 million m³ of debris over farmland and river courses, killing people and destroying hundreds of homes in several cities near the San Vicente volcano. According to the Ministry of the Environment and Natural Resources (MARN), the amount of debris from the lahar that reached the city of Verapaz was calculated at 240,000 m³, reaching a height of 2 meters upon entering the city. Concurrently, several lahars converged in the city of Guadalupe, destroying homes and bridges along the way. MARN estimated the amount of debris at 370,000 m³. The communities of El Refugio and Barrio San Jose near the city of Tetetipán - both located along the pathway of the lahars - suffered the loss of human lives, and the destruction of homes and farmland. The debris transported by the lahars created a heightened vulnerability condition for the affected communities, as riverbeds that drained the region became clogged with rocks and rock-hard mud.

Exposure and Vulnerability

El Salvador is one of the Western Hemisphere's poorest countries. Rural residents depend largely on natural resources for their survival. Deforestation-induced erosion and soil degradation has left much of the country unsuitable for agriculture and has put many people at risk during periods of tropical storms that regularly strike the region.

Vulnerability to floods and landslides (resulting from excessive water accumulation in the soil during periods of heavy rains over deforested slopes, sometimes exacerbated by the mechanical action of high-intensity earthquakes) resulted in the most devastating disasters in El Salvador in recent years. Severe land degradation, unplanned urban growth in areas unsuitable for development and weak enforcement of building codes and zoning regulations are the main drivers of most of the current vulnerability in El Salvador.

The table below shows estimates of the economic impact of recent disasters in El Salvador, based on assessments made using the Economic Commission for Latin America and the Caribbean (ECLAC)'s Post-Disaster Needs Assessments methodology.

Estimated Impact of Recent Disasters in El Salvador

Disaster	Year	US\$ millions adjusted for inflation		
		Damages	Losses	Total
Floods	1982	218.1	67.6	285.7
San Salvador Earthquake	1986	1,351.3	429.8	1,781.1
Hurricane Mitch	1998	219.9	283.8	503.7
Earthquakes	2001	1,137.6	805.8	1,943.4
Drought	2001	-	38.1	38.1
Hurricane Stan	2005	177.4	217.4	394.8
Tropical Storm Ida	2009	210.7	104.12	314.82

Source: Government of El Salvador (2009).

²² ElSalvador.com (2009).

The following table, also based on ECLAC’s Post-Disaster Needs Assessments methodology, shows the economic cost of several disasters in relation to the GDP.

Economic Cost of Recent Natural Disasters as Percentage of GDP

Disaster	Economic Cost (as percentage of GDP)
El Niño (1997–1998)	1.6
Hurricane Mitch (1998)	3.0
Earthquakes (2001)	12.0
Drought (2001)	1.2

Source: Government of El Salvador (2009).

Climate Change and Global Warming

Climate Change models²³ have predicted that El Salvador will undergo a warming and drying trend and is expected to endure more frequent heat waves and droughts, rainfalls with increased intensity, and rising sea levels as predicted for the rest of Mesoamerica. It is known that inter-annual climate variability of either the Pacific or Atlantic explains a significant amount of the total variance in rainfall in the Caribbean and Central America.²⁴ Probable climate change impacts in Central America and El Salvador include higher temperatures, higher storm intensities, and possibly, more frequent El Niño-Southern Oscillation (ENSO)²⁵ events, exacerbating existing health, social and economic challenges affecting El Salvador.

Changes in sea surface temperature as a result of climate variability could increase the intensity of cyclones and heighten storm surges, which in turn will cause more damaging flood conditions in coastal zones and low-lying areas. According to the World Bank study “Sea Level Rise and Storm Surges”²⁶, the impact of sea level rise and intensified storm surges in Latin America and the Caribbean will be relatively higher in El Salvador, with 53 percent of the coastal population exposed and potential losses of coastal GDP projected to exceed 50 percent. Furthermore, the inundation risk in El Salvador from storm surges will cover 100 percent of the coastal wetland.

El Salvador’s first National Communication on Climate Change (NCCC)²⁷ was released in February 2000 after two years of combined efforts between several institutions, local experts and members of the international scientific community, under the coordination of the Ministry of Environment and Natural Resources (MARN). According to the guidelines, El Salvador developed its greenhouse gas (GHG) inventory based upon 1994 population data. With 0.1 percent of the world’s population, El Salvador accounted for less than 0.1 percent of the world’s total carbon dioxide (CO2) emissions in 2004. With an average of 0.9 ton of CO2 per person, El Salvador’s emission levels are below those of Latin America and the Caribbean. Additionally, El Salvador signed, and ratified in August 2005, the Kyoto Protocol. As a non-Annex I Party to the Protocol, El Salvador is not bound by specific targets for GHG emissions.²⁸

²³ Hadley Centre Coupled Model, Version 2 (HADCM2), as reported in Mulligan (2003). Same modeling data as used by the Intergovernmental Panel on Climate Change (IPCC).

²⁴ Giannini et al. (2002).

²⁵ El Niño-Southern Oscillation; commonly referred to as simply El Niño, a global coupled ocean-atmosphere phenomenon.

²⁶ Dasgupta et al. (2009). In this study, the research team assessed 84 coastal developing countries around the world. They considered the potential impact of a large (1-in-100-year) storm surge by contemporary standards, and then compared it with intensification expected to occur in this century.

²⁷ UNDP El Salvador (2007).

²⁸ UNDP (2007).

El Salvador's first NCCC indicated that the nation's energy sector is becoming increasingly dependent on fossil fuels, and reported that, by 2020, 61.8 percent of the country's total electricity production will depend on oil and coal. As mitigating alternatives to such a scenario, the study suggested the development of renewable energy sources, including the construction of small to medium-size hydropower plants, an increase in geothermal power production investments, and increasing the use of biofuels such as sugar-cane bagasse.

DISASTER RISK MANAGEMENT

El Salvador has developed a sound legal and institutional framework for disaster risk management (DRM). The Civil Defense Law, created by Legislative Decree No. 498 of April 8, 1976, called for the creation of the Civil Defense System as an essential part of the National Defense for "the purpose of protecting and helping the population to overcome the consequences of public disasters or catastrophes". The primarily reactive focus of the Civil Defense System in the event of natural disasters turned out to be insufficient for adequate DRM.

For the purpose of improving the country's capacity to manage the natural and man-made risks, the "Civil Protection and Disaster Prevention and Mitigation Law" was enacted by Legislative Decree No. 777 of August 18, 2005 (Law No. 777). This Law mandated the creation of the National System of Civil Protection and Disaster Prevention and Mitigation "as an interrelated, operationally decentralized set of public and private agencies responsible for formulating and executing the respective work plans for Civil Protection, and work plans for disaster risk prevention and the mitigation of their impacts." This law repealed the Civil Defense Law and the Law of Procedures for Declaring a National Emergency (created by

Legislative Decree No. 44 of July 29, 1988), also defining a new mechanism for the declaration of a State of Emergency, assigning the National Civil Defense Commission the authority to request the President to declare a State of Emergency. To ensure the sustainability of the Civil Defense System, under Legislative Decree No. 778 (Law 778) of August 31, 2005 (and its regulation, Executive Decree No. 11 of February 6, 2006), the Civil Protection and Disaster Prevention and Mitigation Fund was created. Law 778 mandated the Fund's capitalization through an initial Government's General Budget allocation of US\$4 million, and mandated the additional allocation as a budget item in the Government's Ordinary Budget, at an amount appropriate for its purpose. Law 778 also authorized the Ministry of the Interior to request resources from the Fund's administrator (the Minister of Finance), to finance measures to cope with emergencies caused by disasters.

El Salvador's National Civil Protection System (the System) is composed of the National Commission for Civil Protection and Disaster Prevention and Mitigation (the National Commission), and the Departmental, Municipal and Community Commissions for Civil Protection (Law No. 777, Article 10). The System's objectives include: incorporating in development plans the prospective management of disasters; preparing and updating risk maps at each organizational level of the system; preparing and coordinating plans and actions to raise awareness and inform the population about possible catastrophic events; designing and executing Civil Protection plans to respond to catastrophic events; and maintaining cooperative relationships with similar regional and international agencies.

The National Commission is composed of the Minister of the Interior who presides over it; the General Director of the General Bureau of Civil Protection and Disaster Prevention and Mitigation (the General Bureau of Civil Protection); the heads of the Ministries of Foreign Relations, Public Health and Social

Assistance, Agriculture and Livestock, Environment and Natural Resources, Public Works, Transportation, Housing and Urban Development, National Defense, and Education; National Civil Police; two representatives of the National Association of Private Businesses; and three nongovernmental organizations that represent the country's western, central and eastern zones, respectively.

The National Commission's duties include: i) designing the National Policy for Civil Protection and Disaster Prevention and Mitigation; ii) proposing to the President of El Salvador the declaration of a State of Emergency and, in the case of such a declaration, providing immediate response and keeping public order, assisted by civil and military authorities, and humanitarian organizations; iii) supervising the implementation of Civil Protection and Disaster Prevention and Mitigation Plans in the country's most vulnerable areas; iv) coordinating the work of the subnational commissions; and v) submitting to the President, for his/her approval, regulatory instruments considered necessary to ensure compliance with the provision of Law 777, including regulations for human settlements in hazardous or potentially hazardous zones, and safe construction codes.

To ensure compliance with the National Civil Protection and Disaster Prevention and Mitigation Plan (National Plan) and other provisions, the National Commission relies on the General Bureau, which depends hierarchically and operationally on the Ministry of the Interior (Law 777, Article 17). The General

Director, with the assistance of the Advisory Council (a permanent inter-institutional scientific and technical body created under the authority of Law 777, Article 19), upon approval by the National Commission, is responsible for preparing the National Plan, in addition to declaring emergency warning levels, based on the monitoring of natural phenomena and the technical information provided by the Ministry of Environment and Natural Resources (MARN)'s General Bureau of the National Service for Territorial Studies (D-SNET).²⁹

El Salvador has adopted the recommendations and priority actions of the "Hyogo Framework for Action 2005-2015: Building the Resilience of Nations and Communities to Disasters" as part of the Government of El Salvador's efforts to improve its DRM capacity. El Salvador actively participates in regional and international DRM forums, including the Central American Coordination Center for the Prevention of Natural Disasters (CEPREDENAC) and the United Nations International Strategy for Disaster Reduction (UN ISDR).

The Government of El Salvador signed the Central American Policy for Comprehensive Disaster Risk Management in June 2010.

This legal agreement, adopted at the 35th Central American Integration System (SICA)'s Ordinary Meeting of Heads of State and Government, held in Panama, represents a major step towards mainstreaming DRM into the national development policies of the Central American nations.

²⁹ Law 777, Article 22 makes reference to the National Territorial Studies Service (SNET), which was created as a decentralized agency, assigned to MARN, by Decree No. 96 of September 14, 2001, for the purpose of developing an understanding of factors constituting risk, hazards and vulnerability as a basis for adopting measures to ensure adequate levels of safety for the population in the case of events and processes of disaster risk. The Government of El Salvador repealed Executive Decree No. 41 of May 2, 2007 and Executive Decree No. 96 which created the SNET. Executive Decree No. 42, published in the Official Gazette on May 18, 2007, transferred to MARN the environmental duties that had been assigned to the Ministry of Agriculture and Livestock (as stipulated by Executive Decree No. 24 on the Issuance of the By-laws of the Executive Agency, on April 18, 1989), together with the duties and responsibilities previously assigned to SNET, which now has the rank of a Directorate within the MARN.

ACTIVITIES UNDER THE HYOGO FRAMEWORK FOR ACTION

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

The Government of El Salvador's 2008 Interim National Progress Report on the Implementation of the Hyogo Framework for Action³⁰ highlights the country's accomplishments and challenges toward achieving the goals set forth in the HFA Priority #1, as follows:

There is a national disaster risk management (DRM) platform, which identifies actions and commitments. Some progress has been made; however, there is a lack of a national policy on disaster risk reduction (DRR). The government has defined some sector policies (for example, food security, drought, land management, environment) that address DRM, but they are not properly articulated or widely disseminated. There are many efforts that are not yet coordinated.

El Salvador has a good legal and institutional framework that is still in the process of consolidation. The Government has recently published its Quinquennial National Development Plan in which the Government pledges to integrate environmental sustainability and natural disaster risk reduction into all aspects of the development planning process. The Plan brings disaster risk reduction to the forefront of the Government's agenda as an overarching theme, from which policies, plans, programs, and projects could be derived. The Government recognizes the importance of developing environmental and disaster risk awareness campaigns as a critical component of its DRM strategies.

³⁰ PreventionWeb (2008a).

There are insufficient resources for DRM considering that additional research and technology are needed, as is the construction of additional public works for mitigation activities.

Executive Law No. 778 mandated the creation of the Civil Protection Fund, and defined the mechanism for its capitalization. It is important to ensure that the Fund has an appropriate amount of financial resources to be an effective instrument - among the portfolio of government tools - to prepare and respond to natural and man-made disasters. Even though the Fund was created to support disaster preparedness and response, the focus has been on the response. As a result, it is necessary to prioritize the allocation of adequate financial resources for DRR and mitigation into the planning of national public investments. Better planning and coordination of international disaster relief is also needed.

The Community Commissions for Civil Protection need additional support, both financial and technical, to become effective promoters of DRM at the local level. Local efforts are mostly isolated initiatives, driven by community-specific needs and emergencies. Although some progress has been made in the delegation of DRM responsibilities at the municipal level, the corresponding allocation of financial resources has not occurred. The vast majority of Municipal Commissions is still in the early stages and is constrained by insufficient resources.

The existing legal framework does not properly foster or encourage community participation and decentralization. The modernization of the state should emphasize implementing mechanisms that decentralize risk management and facilitate citizen participation.

HFA Priority #2: Disaster risk assessment and monitoring

The Government of El Salvador's 2008 Interim National Progress Report on the Implementation

of the Hyogo Framework for Action highlights the country's accomplishments and challenges in achieving the goals set forth in the HFA Priority #2, as follows:

Additional hazard and vulnerability assessments are needed in El Salvador. Studies of hazards are often found without the requisite vulnerability components. Such studies are done after an event has already impacted specific areas, exposing the fragility of the territory. Knowledge dissemination among decision-makers and the general public needs to be improved.

There is a need to coordinate efforts to standardize methodologies for risk assessment and its dissemination and for performing risk studies by sector. There are additional needs to strengthen capacities at all levels to assess risks and encourage the use of standardized terminologies.

The General Directorate of Civil Protection has made important efforts to keep the general public informed during potential emergencies. Civil Protection has improved its standing among the government authorities and the general public, making it more effective as the agency responsible for implementing the actions needed to cope with natural and man-made disasters. However, there is room for improvement in the coordination efforts with counterparts at the Department and Community levels. Additional financial and human resources are needed to ensure that all the subnational committees are well trained and well equipped, in addition to having an understanding of the risks within their jurisdictions.

The National Service of Territorial Studies (SNET)³¹ monitors El Salvador's five major rivers and active volcanoes and their seismic activity. Since the publication of the 2008 Interim National Progress Report, SNET has expanded

its river basin monitoring activities to include 5 additional smaller-sized river basins. However, they are very important because of the flood risk they pose to populations living along these rivers. Significant improvements have been made in terms of disseminating knowledge about risk information. There is still room to make additional efforts to (i) focus on hazards and knowledge dissemination, linking such knowledge to education and awareness; (ii) improve the mechanisms for incorporating community input, to improve the quality and relevance of the information about vulnerabilities; and (iii) strengthen DRR organizational capacities that help communities protect life and property, and develop awareness. Examples of national and regional DRM initiatives include earthquake and volcano information sharing, regional forums on climate, and a project to address tsunami threats in the Gulf of Fonseca (PTWC³²). In the case of risk information management and dissemination, a recent project was completed in collaboration with the Regional Disaster Information Center for Latin America and the Caribbean (CRID), resulting in the online publication of more than 250 studies and other reports about hazards, vulnerability, and risks. Additionally, there are ongoing efforts to increase the level of user access to related scientific information, including audiences such as students from primary and secondary schools, as well as university students.

Since the second semester of 2000, the Ministry of Environment has started a National Program for Disaster Risk Reduction (PNRDR). Among the topics covered by this Program is the development of a Dynamic Atlas of perceived risks through the implementation of vulnerability assessments using community participatory methodologies, aimed at improving the quality of information on existing vulnerability conditions. It is also important to note that there are specific projects, at the regional and

³¹ <http://www.snet.gob.sv>.

³² Pacific Tsunami Warning Center.

municipality levels, implemented by NGOs such as GTZ (in San Pedro Masahuat), JICA/BOSAI (four municipalities of the Department of La Libertad), and the DIPECHO Project (San Salvador, Ahuachapán, Peace, Usulután), among others, which are helping to increase response capabilities toward different natural hazards.

In addition, Civil Protection is currently implementing a national program that includes strengthening departmental and municipal committees in all 262 municipalities, with an emphasis on the most critical areas (including municipal and community organization, and equipment for disaster prevention and emergency management).

Continued efforts are needed to standardize and institutionalize early warning systems (EWSs).

Most of the work on such systems has been oriented toward flood, volcano, and drought hazards. Most EWSs are national in scope, issuing general warnings at the departmental and municipal levels. Further work is needed to expand and link efforts and to bring them to vulnerable communities. EWSs for landslides exist only as localized efforts at the municipal level. Many initiatives in the country are called EWSs, but in reality they are no more than loose networks of community radios. Through the PNRDR, the observation and monitoring network is being updated and expanded to monitor landslides, floods (including the acquisition of weather radar), seismic activity, volcanic surveillance, tsunamis, and coastal erosion processes.

A regional DRM framework already exists, supported by the Center for the Coordination of Natural Disaster Prevention in Central America (CEPRENAC). At the university level, there are also several regional initiatives, e.g. the System of Central American Universities (SUCA), the Inter-University initiative, the United States Army Corps (USAC), the Autonomous University of Mexico (UNAM), and the University of El Salvador (UES). The TRIFINIO project is considered a milestone because it represents an initiative that involves all

levels of government and civil society, from the presidency to the local communities. However, the above examples are geared toward the assessment of hazards. Vulnerability is not properly addressed by these initiatives; therefore it is important to incorporate vulnerability components into these efforts.

All international efforts should be elevated to a political level that can ensure adequate follow-up and sustainability of these projects.

All regional commitments should be disseminated to the proper audiences and have mechanisms in place to ensure their sustainability. Also, coordination of human and technical resources among international organization initiatives must be improved.

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

The Government of El Salvador's 2008 Interim National Progress Report on the Implementation of the Hyogo Framework for Action highlights the country's accomplishments in and challenges to achieving the goals set forth in the HFA Priority #3, as follows:

There remain significant constraints in accessing information at the national and local levels and information systems at the local level should be strengthened. Some information is available on websites and disseminated by the media (radio, TV broadcasting, newspapers, brochures, posters, fairs, among others) that has been generated by national and municipal government agencies, non-governmental organizations, and media sources. Some educational materials have incorporated risk reduction and have complemented these efforts nationwide, but increased focus should be placed on these activities.

Some progress has been made toward the incorporation of DRM into the formal education

process, including: (a) developing the 2021 National Plan that has incorporated risk reduction as a strategic objective, updating the official curriculums; (b) updating the “School Safety” plans as a tool to support and encourage a culture of prevention; and (c) the development and delivery of new educational materials to “educational advisers” and their multiplying effect through their interactions with local school principals and teachers. Concurrently, other entities are developing training opportunities in disaster risk prevention.

A letter of understanding and cooperation to adopt risk management strategies and incorporate them into their curriculums was signed in 2001 by eight universities in El Salvador, along with the Ministry of Education and the U.S. Agency for International Development/Office of U.S. Foreign Disaster Assistance. A group was formed to plan collaborative work and inter-institutional planning in this area, specifically to encourage the inclusion of risk management subjects in the universities’ research and community outreach activities.³³

There are still limitations on expanding the coverage of school safety plans and a need for creating culture of preparedness which would allow sustainability of risk reduction programs and projects. Higher education curricula should include disaster risk reduction. Although there have been several public and private efforts to develop research and standards on multiple hazards and some progress has been made, they have had little impact on policies or planning.

The weak enforcement of the existing legal framework is a constraining factor. There is a need for effective enforcement of territorial zoning and building codes, along with environmental regulations. Development projects should comply with the technical recommendations, eliminating the short-term

vision that has characterized urban development and land use practices, hindering the implementation of long-term, sustainable development alternatives.

Despite the lack of a national awareness strategy, some efforts have been made to help shift current attitudes toward a culture of disaster risk awareness, and toward becoming more resilient through the implementation of several governmental and non-governmental programs and projects. Although the results are still limited, in some areas of the country, where the incidence of disaster events has been higher, the population has begun to identify their own needs and their own potential to confront natural and anthropogenic hazards acting, in some cases, with autonomy.

The launching of the Government’s Quinquennial Development Plan 2010-2014 is a major step towards developing a culture of safety and resilience across all sectors of society. The Government pledged to make DRM a cornerstone of its development agenda, with an important component of public awareness campaigns aimed at mainstreaming environmental sustainability and risk prevention and mitigation issues. The effective implementation of this new policy will have a significant positive effect on the country’s efforts to reduce the social and economic costs of natural disasters.

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

The Government of El Salvador’s 2008 Interim National Progress Report on the Implementation of the Hyogo Framework for Action highlights the country’s accomplishments and challenges

³³ USAID (2007).

toward achieving the goals set forth in the HFA Priority #4, as follows:

There is a need to expand the types of development projects that are required to perform risk assessments, and also to disseminate information about those projects that are already preparing them for the purpose of enabling transparency and a better understanding of the progress made in this respect.

Municipal Civil Protection Plans are not implemented or included in the development plans. Risk has not been included in environmental management. Current land zoning plans are weak with regard to risk prevention. El Salvador's territory is not being utilized according to its optimal use types. There are land zoning and development plans, but these are restricted to certain areas. Even in those municipalities with these plans, disaster risk has not been included in a substantive way. The development plans and building codes need be updated and enforced to better address relevant threats.

Although disaster risk reduction is set forth in the national and municipal laws and regulations, there remains a need to strengthen and link environmental planning, natural resources, and climate change dimensions. It is expected that the implementation of the policies set forth in the Government's Quinquennial Development Plan 2010-2014 will help eliminate the cultural, organizational and regulatory constraints that precluded the effective integration of environmental, DRM and climate change dimensions into the development planning process at all levels of organization in the country.

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

The Government of El Salvador's 2008 Interim

National Progress Report on the Implementation of the Hyogo Framework for Action highlights the country's accomplishments and challenges toward achieving the goals set forth in the HFA Priority #5, as follows:

The country has made significant efforts at the institutional, departmental, municipal, and local levels with the objective of reducing disaster risk, although the emphasis has been on disaster response rather than on prevention and mitigation.

Until now, existing mechanisms have not yet provided for effective coordination. Although the legal framework establishes procedures and protocols, these are not always enforced. The development of DRM policies, mechanisms, and capacities aimed at the different levels of government are needed.

Although all levels of the administration are required by law to have contingency and preparedness plans, not all have established such plans. Legally required periodic emergency response drills and training events need to be performed, with proper scope and frequency, to prepare the population by raising its level of awareness, and to fine-tune the government's response capacity.

There is a need for an assessment—at all administrative levels—to gauge the achievements and to better understand outstanding challenges. There is also a need to revise and update current plans through a properly designated coordinating body.

The country has the Civil Protection and Disaster Prevention and Mitigation Fund, created to finance disaster preparedness and response activities. Law 778 mandated the allocation of seed money for the Fund, as well as budget allocation from the Ordinary Budget, to be complemented with an ordinary budget allocation, adequate for the purpose of the Fund. However, recent disasters in El Salvador

have shown the need to develop a better capitalization mechanism to ensure that enough financial resources are readily available to cope with emergencies.

Adequate amounts of international humanitarian aid combined with creative financial instruments to help the country prepare for and during an emergency may help reduce or eliminate the need of having government agencies redirecting funds from their ordinary budgets and core activities toward emergency response.

Ensuring that proper disaster mitigation measures are implemented to minimize potential damage will help reduce the need for additional resources for disaster recovery and reconstruction activities.

The Civil Protection Law mandates the compulsory exchange of disaster risk data among relevant bodies and the maintenance of up-to-date emergency response procedures; however, there are still gaps in their implementation.

It is necessary to strengthen and improve existing coordinating mechanisms between government agencies and civil society organizations. There is still a need to improve sharing of protocols and procedures among all institutions to ensure better coordination and adequate activity implementation. It is important to identify areas for improvement, building upon the experiences gained through past and recent disaster events.

ADDITIONAL OBSERVATIONS

The National Plan for Territorial Zoning and Development (*Plan Nacional de Ordenamiento y Desarrollo Territorial, PNOTD*) is viewed as a critical input for the development and implementation of effective national environmental and DRM policies and strategies.

The PNOTD organizes El Salvador's territory around

five central themes: (1) regional development, (2) expansion of a local business base, (3) municipal association and decentralization, (4) land management, and (5) Central American integration.³⁴

Even though in El Salvador compliance with the building code is mandatory by law, there are gaps on its enforcement (particularly in rural areas and in unplanned urban developments in the metropolitan areas). The National Registry of Architects, Engineers, Designers and Builders of El Salvador has the legal mandate to supervise the professional practice of its members, including their performance in design and construction procedures. However, low-income families who build their own homes - unsupervised by a professional - are particularly vulnerable, as they build without the proper building materials, usually in marginal, high-risk areas.

Conclusions and Expected Tangible Outputs and Outcomes in DRM

El Salvador is confronted with the challenge of strengthening its existing institutional capacities for disaster risk management (DRM) under policies of decentralization of authority, financial and human resources as mandated by Law 777 and its regulation and recommended best practices within the Hyogo Framework for Action. These policies make local governments accountable for designing and enforcing building codes and the regulatory framework for zoning and planned urban development. Mainstreaming DRM in El Salvador should be considered a major priority of the Government of El Salvador.

It is expected that El Salvador will continue enhancing its role within regional DRM organizations, developing synergies that can strengthen the country's natural disaster

³⁴ Millennium Challenge Corporation. Presidential Program. <http://www.mca.gob.sv/>.

preparedness and resilience. International cooperation has played a major role during natural catastrophes in El Salvador; however, the country should develop innovative mechanisms for capitalizing its funding for emergency response to ensure that it has the capacity to effectively respond to the effects of natural disasters, including developing risk transfer mechanisms to protect the country's public infrastructure and the nation's social and economic networks.

The World Bank and the GFDRR should continue supporting the Government of El Salvador's efforts to develop an effective legal and institutional framework that incorporates DRM as a cross-cutting theme into the national planning process and within critical sectors and levels of government administration.

KEY DONOR ENGAGEMENTS

Existing Projects with Donors and International Financial Institutions	Funding Agency / International Partners	Allocated Budget and Period (US\$)	HFA Activity Area(s)
The Earthquake Emergency Reconstruction and Health Services Extension Project (RHESSA)	World Bank	169.4 million 2003-2009	3, 4, 5
PREVDA (Allocated Budget reflects amount budgeted for 2009 activities in El Salvador)	European Commission CEPRENAC	1.24 million 2007-2010	1, 2, 3
Institutional Strengthening for Watershed Management, Protected Area Management, and Natural Disaster Risk Management in El Salvador. Phase I	Spanish International Development Cooperation Agency (AECI)	549,332 2007-2009	1, 2
Institutional Strengthening for Watershed Management, Protected Area Management, and Natural Disaster Risk Management in El Salvador. Phase II	Spanish International Development Cooperation Agency (AECI)	480,000 pending approval	1, 2
Development of Geological and Seismological Studies towards Seismic Risk Mitigation.	Spanish Fund for Retooling Aid/ Spanish Debt Swaps Fund	80,000	2
National and Local Capacity for Risk Prevention and Mitigation. National Reports on Risk and Vulnerability. Phase I	Spanish Trust Fund UNDP	1.27 million 2007-2008	1, 2, 5
Risk Reduction II	Spanish Trust Fund UNDP	1.36 million 2008-2010	1, 5
Study of the Tectonic and Structural Framework: Contribution to the knowledge of the tectonics of active volcanoes in El Salvador; Mapping Volcanic Hazard Scenarios	Secretary of Foreign Relations- National University of Mexico (UNAM)	2007*	2, 5
Seismic Micro-Zoning of San Salvador Metropolitan Area	Japan International Cooperation Agency UCA	2007*	2, 5
Seismic Risks in San Salvador Metropolitan Area	Research Council of Norway (NORSAR) UCA-SNET	2008*	2, 5
Central American Program for Regional Capacity Enhancement for Landslide Mitigation Measures	Norwegian Geotechnical Institute	2008	2, 3, 5
Mitigation of GeoRisk in Central America, Phase II	German Federal Institute of Geosciences and Natural Resources	2005-2009	2, 3, 4
Early Warning System for Central America: SATCA	United Nations' World Food Program	2008	4, 5

KEY DONOR ENGAGEMENTS CONTINUED

Existing Projects with Donors and International Financial Institutions	Funding Agency / International Partners	Allocated Budget and Period (US\$)	HFA Activity Area(s)
Flood Early Warning System for San Salvador Metropolitan Area	Inter-American Development Bank	pending approval	4, 5
Implementation of Vulnerability and Risk Indicators	Inter-American Development Bank	pending approval	2, 3
Risk Reduction Project	Japan International Cooperation Agency Civil Protection	pending approval	1, 2
Network of Atmospheric and Volcanic Change Monitoring (for the Santa Ana and San Miguel Volcanoes)	European Commission Chalmers University NOVAC	56,965 2007-2009	2
DesInventar	United Nations' World Food Program	2007*	2, 3
Support to Local Risk Management in 10 municipalities of the Department of Sonsonate	COSUDE	2008*	3, 5
Information System, Monitoring and Early Warning for Southern Ahuachapan	European Commission (DIPECHO)	2008*	2, 5
Preparation of the National Report on Risks and Vulnerability Project	United Nations' World Food Program	2007*	1, 3
Flood Risk Management in the Rio Grande de San Miguel and the Rio Paz watersheds	Inter-American Development Bank	1.2 million until 2009	2, 3, 4, 5
El Salvador - Central American Probabilistic Risk Assessment (CAPRA)	World Bank/ Inter-American Development Bank	450,000 (estimated)	1, 3, 4, 5
Flood Risk Prevention through Improved Forest Vocation Land Management in ES	Inter-American Development Bank	150,000 2008-ongoing	1, 2
Model for Water Resources Management	Inter-American Development Bank	720,000 2005-2007	2, 4
Environmental Action Plan at the Municipal Level	Inter-American Development Bank	388,700 2003-2007	1, 2, 4, 5
Sustainable Development Lower Rio Lempa Program	Inter-American Development Bank	298,650 2001-2005	2, 3, 4, 5
Desertification Initiatives	Inter-American Development Bank	110,000 2000-2002	2, 4
Tri-national Lempa Watershed Management Project	Inter-American Development Bank	175,000 1999-2000	2, 4, 5
National Environment Protection Program	Inter-American Development Bank	30.0 million 1997-2007	1, 2, 3, 4, 5
Safe School Program	World Bank/ GFDRR/ Government of Brazil	50,000 2010-2011	3, 4, 5
Central America Mitch + 10 Report and Summit	World Bank/GFDRR	270,000	1, 2, 3, 4, 5
Tropical Storm Ida Post-Disaster Damage, Loss, and Recovery Needs Assessment	World Bank/GFDRR	100,000 2009	1, 2, 3, 4, 5
Tropical Storm Agatha Post-Disaster Damage, Loss, and Recovery Needs Assessment	World Bank/GFDRR	125,000 2010	1, 2, 3, 4, 5
Disaster risk management development policy loan with a Catastrophe Deferred Drawdown Option (CAT DDO)	World Bank	50 million pending approval	1, 4, 5

* Amount unavailable

Given El Salvador's disaster risk profile and its existing framework for disaster risk management, the key priority in El Salvador is to mainstream disaster risk reduction at the sectoral level. Strategic actions are needed in the following areas to enhance disaster risk management in El Salvador: (i) strengthen institutional capacity of members of the National Commission and coordination among them; (ii) strengthen the human and financial resources of the General Directorate of Civil Protection; (iii) reduce vulnerability in urban areas; and (iv) develop a comprehensive risk assessment and monitoring capacity.

The most immediate activity sponsored by the GFDRR in El Salvador is the incorporation of a comprehensive risk assessment platform by joining efforts with other countries in the region that are actively involved with the Central American Probabilistic Risk Assessment (CAPRA).³⁵ CAPRA is expected to improve the country's capacity to prepare and respond to natural disasters.

The following activity recommendations respond to critical DRM needs in the country:

i) continued support and enhancement of Protección Civil's technical capacity and leadership role in risk prevention and mitigation; ii) capitalization of the Disaster Prevention and Mitigation Fund – incorporating innovative mechanisms to ensure adequate levels of funding; iii) developing strategies for mainstreaming DRM, as a cross-cutting theme, into the budgeting and planning processes of all ministries and other government institutions (e.g. ensuring that new hospitals and educational buildings are not built in areas prone to floods, landslides and other known hazards, and according to international anti-seismic standards; old buildings should be retrofitted to withstand the impact of earthquakes); iv) incorporation of disaster risk reduction and mitigation measures in the government's infrastructure construction and maintenance activities; and v) mainstreaming of DRM among local communities. This is especially important in the case of the Greater Metropolitan Area of San Salvador, where suitable land for urban development is becoming ever more limited, forcing low-income families to build in high-risk areas, without proper building materials or professional supervision.

³⁵ <http://ecapra.org>.



Global Facility for Disaster Reduction and Recovery

1818 H Street, NW
Washington, DC 20433, USA

Telephone: 202-458-0268
E-mail: drm@worldbank.org
Facsimile: 202-522-3227



Special thanks and appreciation are extended to the partners who support GFDRR's work to protect livelihood and improve lives: ACP Secretariat, Australia, Bangladesh, Belgium, Brazil, Canada, Colombia, Denmark, European Commission, Finland, France, Germany, Haiti, India, International Federation of Red Cross and Red Crescent Societies, Ireland, Italy, Japan, Luxembourg, Malawi, Mexico, the Netherlands, New Zealand, Norway, Saudi Arabia, Senegal, South Africa, South Korea, Spain, Sweden, Switzerland, Turkey, United Kingdom, United Nations Development Programme, United States, UN International Strategy for Disaster Reduction, Vietnam, the World Bank, and Yemen.