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**EL SALVADOR: ASSESSMENT OF THE DAMAGE CAUSED
BY HURRICANE MITCH, 1998**

*Implications for economic and social development
and for the environment*

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PREFACE

This study has been carried out within the framework of United Nations support for the Central American region following the disaster caused by hurricane Mitch in the region.¹ The Economic Commission for Latin America and the Caribbean (ECLAC) prepared this socio-economic and environmental impact assessment for El Salvador in coordination with the United Nations Development Programme (UNDP), which also sponsored it. This document will provide the country with a national assessment of the effects of hurricane Mitch on the country's economy, society and environment, and will be submitted to the Ministries of Foreign Affairs and Finance, the Central Reserve Bank of El Salvador and the National Emergency Committee.

This is an overall study whose main goal is to analyse secondary macroeconomic effects and to propose guidelines for rehabilitation and reconstruction programmes; however, it neither replaces nor invalidates sectional or partial assessments conducted by national institutions, other international organizations or financial and bilateral cooperation institutions whose coverage and purposes differ from those of this study.

Both national authorities and international agencies and institutions assisted in the preparation of this study. Officials and consultants of the Pan American Health Organization (PAHO/WHO) and of the United Nations Children's Fund (UNICEF) joined the mission; this assessment complements the data collected by the Office of the United Nations Disaster Assistance Coordinator (UNDAC) through the Office of the Coordinator for Humanitarian Assistance (OCHA).

The interdisciplinary mission that visited the country from 22 to 28 November 1998 presented a detailed evaluation of the hurricane effects as it passed through El Salvador from 30 October to 3 November. Data were collected in accordance with ECLAC methodology and give an idea of the magnitude of direct and indirect damages, evaluate secondary macroeconomic effects and attempt to quantify environmental damage. The results are the mission's estimates, based on information available at the time. They show that the extent of the damage, coupled with the pre-existing vulnerability and poverty, has reduced the country's growth and development potential in the short and medium terms and exceeds the nation's capacity to tackle the reconstruction on its own, particularly since the aim is also to reduce the impact of future natural disasters.

This appraisal is designed to provide the government and countries concerned about extending aid to El Salvador and the Central American region in general, with guidelines for setting national and regional priorities in rehabilitation and reconstruction programmes.

It is important to point out that a strictly economic approach is very limited and that such programmes should therefore include social actions to alleviate the victims' suffering; priority should be placed on social productive projects that include sustainability and increased-governance criteria, and on allocating resources to the reconstruction and replacement of infrastructure and lost production.

¹ As part of project RLA/98/020, "Socio-economic impact assessment of natural disasters (hurricane Mitch)".

Finally it should be emphasized that, as is often the case after the occurrence of natural catastrophes, Salvadorian society and government have a unique opportunity to undertake the reconstruction with renewed values and criteria, giving “value added” to the process and taking steps towards the qualitative leap demanded by a modern and more equitable development process. It is a valuable opportunity to take a new approach to reconstruction and promote criteria to reduce economic, social and environmental vulnerability nationwide.

I. BACKGROUND

Hurricane Mitch is the most serious hydrometeorological disaster to have struck Central America in many years. Its force upon reaching the coasts of the region was exceptional, as were its diameter, the amount of moisture and rain it carried and the erratic path it followed for several days.

Catastrophic events have affected the country in a recurrent manner. Although earthquakes and volcanic eruptions have caused the greatest damage to society and the economy in El Salvador (see Table 1), the country's vulnerability to flooding, landslides and torrential rains is well documented.²

The disaster also affected Honduras, Nicaragua and Guatemala to varying degrees. In some of the countries, the accompanying devastation was enormous and aggravated pre-existing vulnerability; in others, it struck societies that had begun to enter the path of growth and development as they reached the final stages of difficult peace and reconciliation processes after years of extreme violence and confrontation that had led to setbacks and stagnation.

In Latin America, and particularly the Central American and Caribbean regions, annual losses caused by such phenomena have been estimated at more than US\$1.5 billion and almost 6,000 lives.³ These effects are multiplied and exacerbated by structural disparities that place population segments already living in precarious economic and social conditions at greater risk.

1. The mission

Owing to the extent and gravity of the effects in the region, UNDP requested ECLAC's cooperation in carrying out a project to assess the socio-economic impact of hurricane Mitch on the countries of Central America.⁴

Two technical teams coordinated by ECLAC were established to carry out the assessment in the four countries most affected; one of the teams was entrusted with the work in Honduras and El Salvador. The mission had the full support of the UNDP national offices and representatives of various United Nations agencies, and of three international financial institutions: the Inter-American Development Bank (IDB), the World Bank and the International Monetary Fund (IMF). In particular, PAHO/WHO and UNICEF provided officials or consultants to support the mission.

In El Salvador's case, this UNDP-sponsored study is being submitted to the government through the Ministries of Foreign Affairs and Finance, the Central Reserve Bank and the National

² See Moisa, Ana María (1994), "El efecto recurrente de las inundaciones en El Salvador" in *Actualidades sobre desastres*, journal of the Disaster Protection Centre, No. 10, year 2, August-September.

³ See, for example, Jovel, Roberto and Ricardo Zapata (1993), *Macroeconomic effects of natural disasters in Latin America and the Caribbean*, a paper presented at the Fortieth North American Meeting of the International Association of Regional Science, Houston, 11-14 November.

⁴ Project RLA/98/020, "Socio-economic impact assessment of natural disasters (hurricane Mitch)".

Emergency Committee. The work was carried out as a contribution to the country and the United Nations in response to the bilateral and multilateral cooperation initiatives that have been adopted to enable Central America, and El Salvador in particular, to address the challenges of rehabilitation and reconstruction, since, as stated above, those challenges cannot be met without generous assistance from the international community.

The team was made up of the following ECLAC officials, external consultants and officials of other international organizations:

- Ricardo Zapata, coordinator.
- Margarita Flores, in charge of assessing the primary sectors (agriculture, livestock, fisheries, forestry).
- Carlos Molina, consultant for the sectors of industry, trade and services (financial, tourism and others); he also contributed to formulating projects for the rehabilitation and reconstruction stages.
- Francisco Mojica, infrastructure consultant, who analysed the impact on energy, water, sewage systems, and irrigation and drainage.
- Pablo Serrano, consultant on the social sectors (population affected, education, health and others), with the support of Leonardo Garnier, UNICEF consultant on education and child care, who studied the effects of the disaster on social sectors; Claudio Osorio and Hernán Rosenberg of PAHO/WHO, who covered health and emergency care, and Enrique Gomáriz of UNDP, who provided a gender perspective to the assessment and to proposals for rehabilitation and reconstruction.
- Braulio Serna, who analysed overall and secondary macroeconomic effects.
- Daniela Simioni assessed housing damage.
- Alfonso Mata examined the environmental impact.
- Juan Orlando Torrealba acted as consultant for the transport and communications sectors.
- Jaime Baraqui, consultant in designing reconstruction projects.

Additionally, Roberto Jovel and Antonio Tapia worked as consultants who reviewed the assessments and were instrumental in making damage estimates more precise.

The mission followed a previous visit by ECLAC officials in which liaisons with government entities and technical collaboration with various multilateral agencies and the United Nations were established, with the support of the United Nations Resident Coordinator in El Salvador.

This document contains an independent and objective assessment of the disaster which sets forth the overall magnitude of direct and indirect damages and the secondary effects on the behaviour of the economy as a whole. It will serve as a basis in drawing up proposals for reconstruction priorities and needs, one of which should be the explicit incorporation of measures to reduce the country's high social, economic and structural vulnerability, in view of the recurrent nature of such disasters.

Damage suffered by women and children must be highlighted in view of the high percentage of victims these groups account for and their special status after the disaster. This situation is closely related to poverty, as poor social sectors usually receive the highest impact in these events. Similar considerations can be made as regards to children, who form a considerable percentage of the

country's population, and suffer a greater impact due to the high toll of orphans caused by the recent armed conflict.

The extent of the damage and the enormous efforts required for the recovery point up the need for the country —and the region as a whole— to receive support and cooperation from the international community. Funds will be needed to complement national efforts —both public and private— to carry out the reconstruction programme. The attached project profiles show the magnitude of the efforts involved and indicate the degree of urgency and the priorities to be set, with the participation of the international community.

2. Description of the phenomenon

The Atlantic Ocean hurricane season in the northern hemisphere (July to November) was unusually strong in 1998 and caused enormous devastation, loss of life, and economic, social and environmental damage. The concentration of very violent meteorological phenomena between August and October was historic: ⁵ a dozen tropical cyclones were given names during that period and affected densely populated areas throughout the Caribbean basin, including both the island countries ⁶ and the States of the Central American Isthmus. Table 1 shows the dates on which they occurred and the wind velocity. Their effects heighten and form part of other climatic disturbances affecting the region, such as the droughts and floods resulting from the El Niño phenomenon in the Pacific Ocean, ⁷ all of which have caused major damage throughout Latin America and the Caribbean.

⁵ National Hurricane Center (NHC) (1998), *Monthly Tropical Weather Summary*, prepared by the US National Weather Service (NWS) and posted on the Internet for October and November.

⁶ For an assessment of the damage caused in the Caribbean islands, see CEPAL (1998), *República Dominicana: Evaluación de los daños ocasionados por el huracán Georges, 1998. Sus implicaciones para el desarrollo del país* (LC/MEX/L.365), 4 December.

⁷ These climatic disturbances have seriously affected the Latin American and Caribbean region, as is the case with Mexico, which has been afflicted by droughts and floods at different times, just as the United States has, and the serious consequences of the El Niño phenomenon in the Andean countries and Central America. See CEPAL (1998a), *Ecuador: Evaluación de los efectos socioeconómicos del fenómeno El Niño en 1997-1998* (LC/R.1822/Rev.1 and LC/MEX/R.657/Rev.1), 16 July, and CEPAL (1998b), *El fenómeno El Niño en Costa Rica durante 1997-1998. Evaluación de su impacto y necesidades de rehabilitación, mitigación y prevención ante las alteraciones climáticas* (LC/MEX/L.363), 3 November.

Table 1

MAIN HURRICANES IN THE CARIBBEAN IN 1998 *a/*

Name	Dates	Maximum recorded wind velocity (kilometres per hour)
Danielle	24 August-3 September	170
Earl	31 August-3 September	160
Frances	8-13 September	105
Georges	15-29 September	240
Hermine	17-20 September	75
Ivan	20-27 September	145
Jeanne	21-30 September	170
Karl	23-28 September	170
Lisa	5-9 October	120
Mitch	21-31 October	290

Source: ECLAC, based on US National Weather Service (NWS-NHC) data, October and November 1998.

a/ As of 15 November.

Hurricanes Lisa and Mitch originated in the Atlantic basin in October. Lisa moved north-east from 5 to 9 October and became a minimum-level extra-tropical system with winds of 140 kilometres per hour on 9 October, but did not touch land. Mitch, in contrast, arose from a tropical front between Monday, 19 October and Tuesday, 20 October, developed into a low pressure zone and, at noon on 21 October, was classified as the thirteenth tropical depression of the season. At that time, it was located in the south-western Caribbean, some 580 kilometres south of Jamaica, with steady 50 km/h winds, moving west-north-west at 15 km/h.

On Thursday, 22 October, it was upgraded to a tropical storm (named Mitch); its centre was located 704 kilometres south-east of the Nicaraguan city of Bluefields, with steady winds of 72 km/h and gusts of more than 90 km/h. From that time on, it followed an apparently erratic path, varying in intensity and changing course several times between 23 October and 4 November (see Table 2 and charts 1 and 2).

As a result of the presence of two high pressure fronts —the anticyclone in the Gulf of Mexico and the inter-tropical convergence zone (ITCZ)— Mitch slowed down and gradually took a south-westerly path. On Saturday, 24 October, it became a hurricane, since the pressure in the eye fell 52 millibars to reach 924, with steady 150-km/h winds, moving at 9 km/h in a north-north-westerly direction. That day it was located at a point south-south-west of Jamaica (415 km) and to the east of Puerto Cabezas (600 km). It caused heavy rain along the Pacific coast of Costa Rica and Nicaragua and in north-western Nicaragua.

On Sunday, 25 October, Mitch gained strength as the pressure fell to the fourth lowest level recorded for Atlantic hurricanes so far this century.⁸ It was located 64 kilometres off Swan Island on the afternoon of 26 October, moving towards the northern Atlantic coast of Honduras, while its spiral

⁸ The measurement of 905 millibars is equal to that of Camille in 1969, according to NWS records, reaching 4 on the Saffir-Simpson scale and the lowest level of the century for an Atlantic hurricane in October.

bands had an impact on a low pressure centre that was almost stationary on the Pacific coast of Nicaragua, causing heavy rain.

Table 2
PATH AND EVOLUTION OF HURRICANE MITCH
(Statistical data from 23 October to 4 November)

Date (Day and local time)	Wind velocity (Maximum sustained km/hour)	Classification (Saffir-Simpson Scale)	Location		
			Latitude North	Longitude West	Barometric Pressure (BM)
23 October, 10 a.m.	95	Tropical storm	12.7	77.9	999
10 p.m.	95	Tropical storm	13.0	78.1	997
24 October, 10 a.m.	160	2	14.9	77.9	987
10 p.m.	195	3	15.7	78.4	965
25 October, 12 a.m.	200	3	15.9	78.9	953
12 p.m.	235	4	16.4	80.3	929
26 October, 12 a.m.	240	4	16.3	82.0	922
12 p.m.	273	5	17.0	83.2	906
27 October, 12 a.m.	285	5	17.4	84.5	918
12 p.m.	250	5	16.9	85.4	928
28 October, 12 a.m.	220	4	16.5	85.6	933
12 p.m.	195	3	16.4	85.6	948
29 October, 12 a.m.	160	2	16.3	86.0	970
12 p.m.	120	1	15.9	85.6	990
30 October, 12 a.m.	65	Tropical storm	15.3	86.5	997
12 p.m.	85	Tropical storm	14.0	87.0	1,000
31 October, 8 a.m.	55	Tropical depression	14.5	88.7	1,001
8 p.m.	55	Tropical depression	14.6	90.5	1,002
1 November, 8 a.m.	45	Tropical depression	14.9	91.6	1,005
3 November, 5 p.m.	70	Tropical storm	20.0	90.6	997
8 p.m.	65	Tropical storm	20.2	90.2	997
4 November, 12 a.m.	65	Tropical storm	20.3	89.9	997
2 a.m.	55	Tropical depression	20.8	89.4	998
8 a.m.	75	Tropical storm	21.8	88.3	998

Source: ECLAC, based on Internet data, <http://dyred.sureste.com>.

On that same day it was upgraded to 5 on the Saffir-Simpson scale and remained at that level on 26 and 27 October, causing heavy rainfall on Nicaragua's Atlantic coast and moving towards Honduras over the Islas de la Bahía. At its peak, its maximum sustained surface wind velocity reached 290 kilometres per hour.

At its greatest intensity, the hurricane passed over Guanaja island. At midday on 27 October, the pressure at the centre reached 906 millibars, as it moved along the northern coast of Honduras and slowly advanced southwards, going inland.

On 28 October, its intensity dropped to 4 and gradually weakened into a tropical storm on 29 October, when it caused torrential rains as it swept through parts of Honduras and was boxed in between hills and the Montecillos mountain range. On Friday, 30 October, it reached the capital, Tegucigalpa, by which time it was much weaker.

The extraordinary amount of rainfall caused rivers to overflow to an extent unprecedented in this century, with very serious flooding on the coastal plain, such as in the suburbs of San Pedro Sula, where several neighbourhoods and the international airport were inundated by mud that damaged housing, road, street, drainage and basic service infrastructure, as well as radionavigation equipment and facilities in the country's newest air terminal.

As the hurricane reached the steep mountainous areas of Honduras, it caused mud and landslides on the slopes and raging river rapids that swept away bridges, highways and infrastructure of all kinds. The capital in particular was hit by the flooding of the Grande de Choloteca and Chiquito rivers which, on sweeping through built-up areas, rose more than 10 metres above their riverbeds, causing devastation and death. The enormous amount of rocks, vehicles, tree trunks, furniture and all types of debris swept along by the current formed a dam that held back the waters and debris, blocking drains in the area of La Isla.

At dawn on 31 October, Mitch seemed to be bearing towards the gulf of Fonseca but, because of the ITCZ, it veered west, returning to its path of destruction over the south-western part of the country along the border with El Salvador. By 1 November, Mitch had become a tropical storm again, moving parallel to the Pacific coast over Salvadorian territory until it reached Guatemala. It then crossed the Isthmus of Tehuantepec in Mexico, entered the Gulf of Mexico, moved over Florida and finally disappeared in the North Atlantic. This path is exceptional in the annals of hurricanes, at least this century, since it twice crossed from one ocean to the other.

The effect on El Salvador was mainly indirect and was caused by the rains produced by Mitch when it joined a tropical disturbance over the Pacific coast of Nicaragua. Rainfall levels reached their highest point on 1 November, as shown in readings from several meteorological stations (see Graph 1).

The rains led to extraordinarily high waters in the country's main rivers and waterlogging of soil on unstable slopes, inducing floods and mud avalanches. Many rivers overflowed their banks and inundated adjacent areas, leaving silt, rocks, trees and other debris.

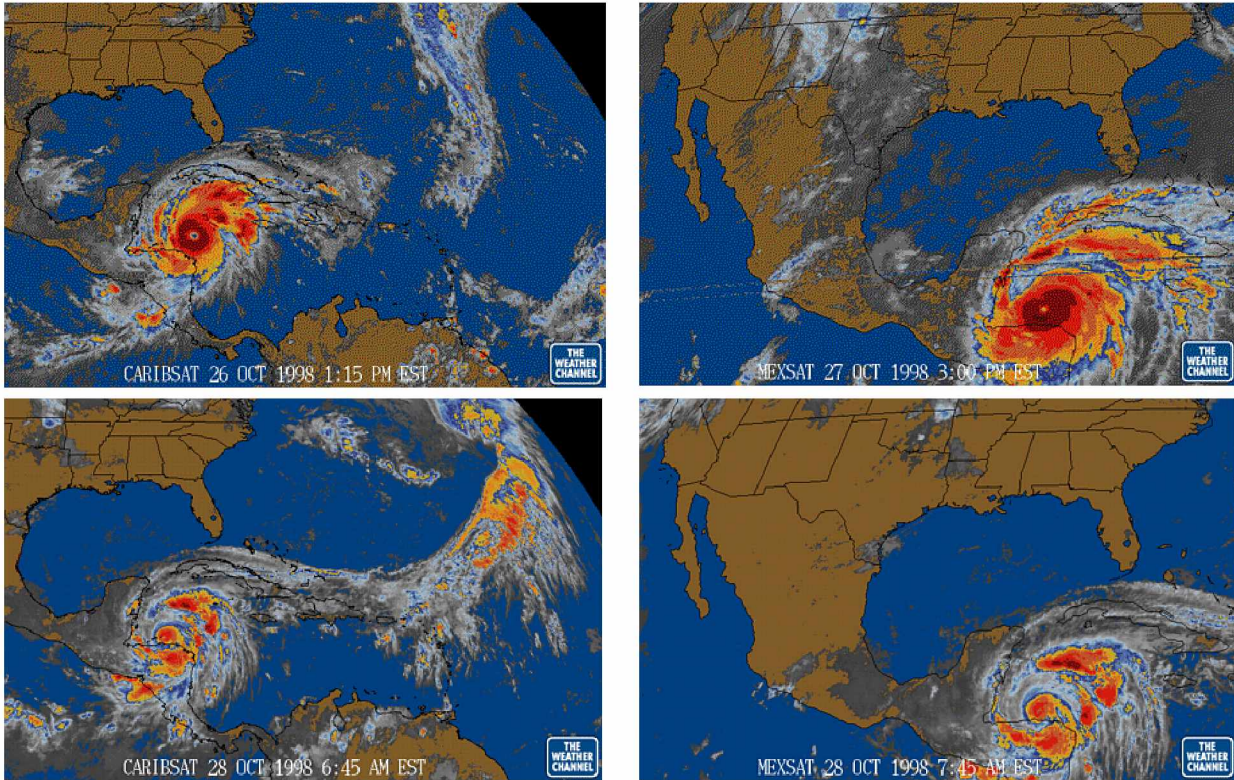
3. Population affected

Although the entire country was declared a disaster area and all Salvadorians suffered the uncertainty generated by the tropical storm, only a part of the population suffered severe damage. Most victims lived in the coastal region, particularly the plains of the departments of Ahuachapán, Sonsonate, La Paz, part of San Vicente, Usulután, San Miguel and, in the Gulf of Fonseca, La Unión.

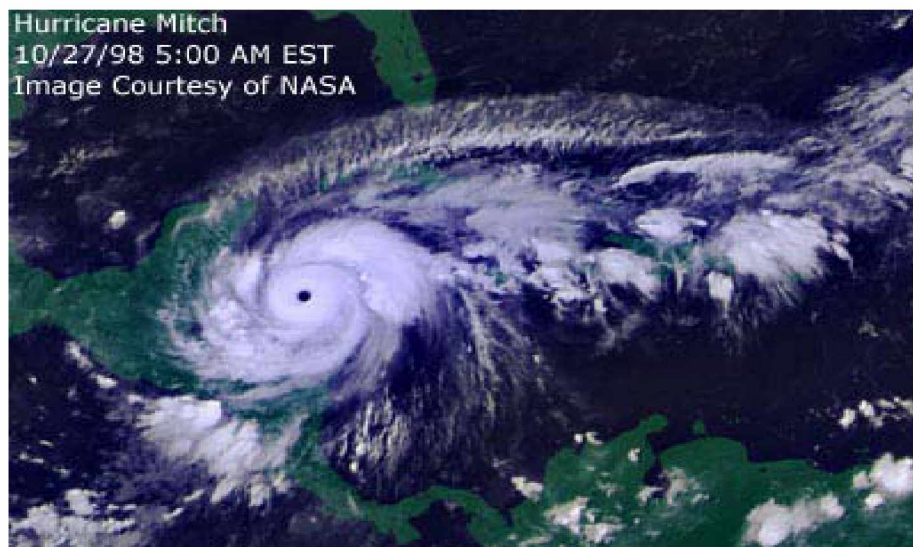
Figure 1

IMAGES OF THE PATH TAKEN BY HURRICANE MITCH

(Between 26 and 28 October 1998)



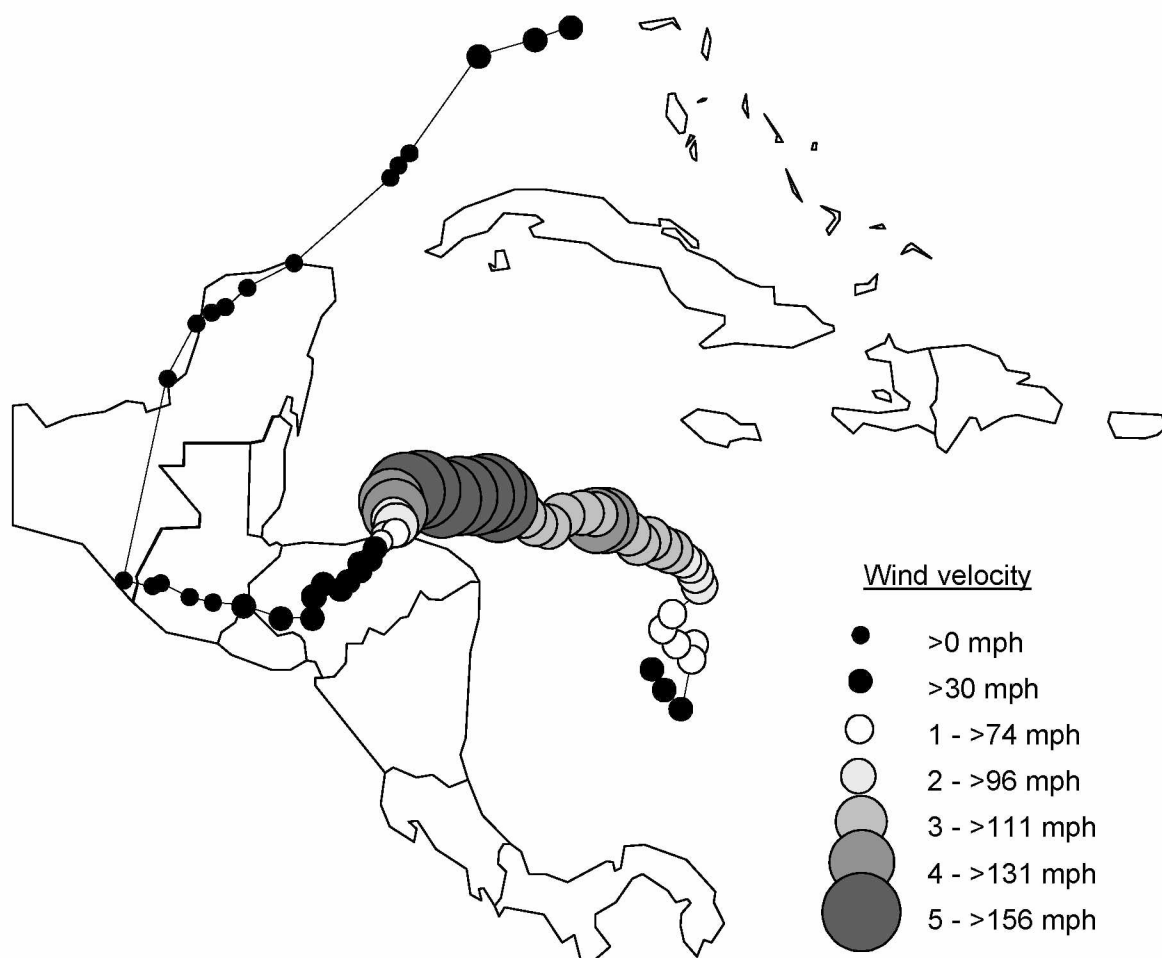
Source: The Weather Channel, Internet.



Source: NASA image, taken from the Internet.

Figure 2

PATH OF HURRICANE MITCH O
(Between 22 October and 5 November 1998)

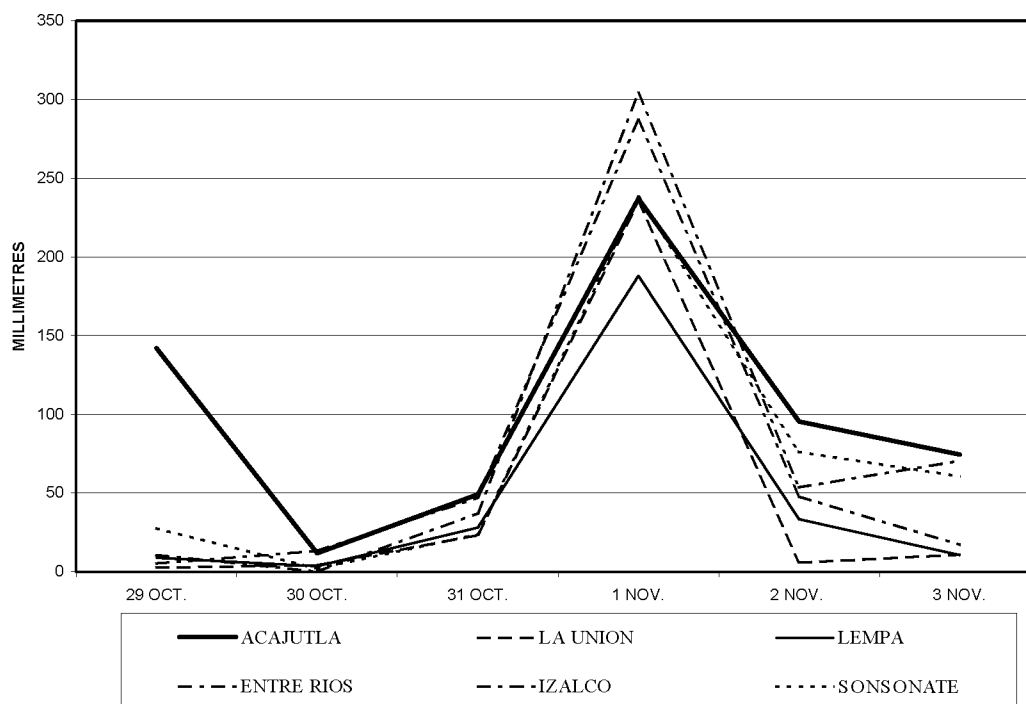


Source: Johns Hopkins University Applied Physics Laboratory. Copyright 1998 Ray Sterner and Steve Babin.

The country's geography lent itself to flooding, covering fields, isolating areas and forcing people to evacuate. The scale of the flooding and strength of swollen rivers was much worse than expected, and despite the alert and strong solidarity of the rural population, many were unable to evacuate. A total of 240 people were killed, many of them children; most of the deaths (173) were in the department of La Unión. A similar number of missing persons had dropped to 19 three weeks after the disaster (see Table 3).

Graph 1

EL SALVADOR: RAINFALL DURING TROPICAL STORM MITCH



There is no record of the number of directly injured because of Mitch, but the number of medical consultations for diseases is known. The most common were respiratory illnesses, conjunctivitis, and intestinal and skin problems, all typically related with the lack of clean water after disasters.

In the huge region around the mouth of the river Lempa, and inland in San Vicente, in addition to the rainfall during the storm, extra water overflowed from swollen rivers and the 15 de septiembre reservoir. As a result, people left their homes and took refuge in shelters;⁹ another 28,000 moved in with relatives and friends. In all, they amounted to 1.5 per cent of the country's population; the highest percentages were in Usulután (8.8 per cent) and San Vicente (3.6 per cent).

Government humanitarian aid concentrated on the shelters, with the backing of international and non-governmental organizations (NGOs) and the solidarity of the local population. Food, clothing, and medical care were provided in these improvised shelters. The census taken in shelters was the basis for subsequent food and housing programmes within the Solidarity Aid Packages programme (PAS) promoted by the National Department of the Family.

⁹ As often happens, many inhabitants refused to evacuate for fear of looting, thus endangering their lives. Others stationed community guards to look after possessions.

A total of 55,864 people were housed in 147 shelters in schools, churches, and village halls. Fifty-three percent were in Usulután —on the lower Lempa—, the department with the second-highest number of deaths (23). The census showed 10 per cent of these 10,000 families lost their homes and need to be relocated away from high-risk areas; another 2,000 lost their homes but will not need relocation, and 3,000 only suffered partial damage to their homes. They will all receive building materials as well as food. The 4,000 remaining families received food.

The indirectly affected population (named “tertiary affected”) was small, estimated at 4.3 per cent of the total population. Damage to property and infrastructure was localized, especially in poor populations, although the poorest areas in the north of the country were not badly hit. Damaged and closed roads and bridges have hampered the economy of these regions and their trade links with the rest of the country, mainly harming disaster areas. The loss of a month of middle school classes (the primary school year was over) also affected many young people.

Table 3

EL SALVADOR: POPULATION AFFECTED

Department	Total population a/	Population affected						Dead	Missing
		Primary b/	Percentage of total	Secondary c/	Percentage of total	Tertiary d/	Percentage of total		
Total	6,075,536	55,864	0.9	28,452	0.5	262,594	4.3	240	19
Ahuachapán	309,307	2,469	0.8	998	0.3	3,393	1.1	11	19
Cabañas	152,186	-	-	-	-	-	-	-	-
Chalatenango	195,287	198	0.1	55	0.0	1,562	0.8	1	-
Cuscatlán	200,099	-	-	30	0.0	600	0.3	-	-
La Libertad	646,866	4,000	0.6	1,327	0.2	5,822	0.9	7	-
La Paz	285,285	5,341	1.9	5,000	1.8	17,973	6.3	-	-
La Unión	285,322	-	-	3,200	1.1	14,080	4.9	17	-
Morazán	172,951	-	-	120	0.1	84	0.8	173	-
San Miguel	466,443	1,603	0.3	7,201	1.5	46,086	9.9	2	-
San Salvador	1,898,515	965	0.1	-	-	60,752	3.2	-	-
San Vicente	158,325	4,865	3.1	800	0.5	3,008	1.9	-	-
Santa Ana	535,412	397	0.1	1,250	0.2	6,960	1.3	-	-
Sonsonate	432,289	6,213	-	8,471	2.0	28,801	6.7	6	-
Usulután	337,249	29,813	8.8	-	-	72,171	21.4	23	-

Source: ECLAC, based on figures from the National Emergency Committee.

a/ Population estimated as of October 1998, based on projections by the Latin American Demographic Centre (CELADE).

b/ Severely affected population, housed in shelters.

c/ Homeless not in shelters.

d/ Indirectly affected, not necessarily in severely damaged localities.

4. Actions to address the emergency

Although the torrential rain affected the entire country to one degree or another, emergency work was helped by the fact that the worst hit areas were small, and concentrated on the coast. The country's decision-making and operations centre —San Salvador— suffered only slight damage, so aid could be distributed from the capital; departmental capitals were also able to extend support. Neither the

international airport (Comalapa) nor the border routes were damaged, and aid from abroad entered the country unhindered.

Many civil organizations, usually involved in economic and social development of communities, played an important role in the emergency. These NGOs showed their efficiency and dedication as they channelled aid, often difficult to quantify because of their unofficial status. In addition, the level of community development in the country was reflected in the affected population's ability to organize and the rapid response of disaster and emergency systems.

a) Government actions

The National Emergency Committee (COEN), a Ministry of the Interior body, took charge of disaster prevention, mitigation, and emergency response actions. One of its first tasks was to evacuate high-risk areas using Air Force and Navy launches and helicopters. The most vulnerable communities were immediately evacuated: Ahuachapán, La Paz, San Vicente, Usulután —the lower Lempa—, San Miguel and La Unión.

The improvisation of 147 shelters was another early action carried out by the government with the support of the Ministry of Education —85 schools were converted into shelters—, and the decisive collaboration of churches and the civil population (parish and village halls were also used). The Ministry of Public Health and Family Benefits (MSPAS) provided free preventive and medical aid, including a nationwide inoculation day,¹⁰ consultations, treatment, injections, minor surgery, anti-parasite and anti-malaria treatment, and environmental health care, involving major mobilizations of personnel (see under health sector damage). Trucks bearing aid of all kinds —food, clothing, blankets, etc.— provided support (33 trips were made between 1 and 3 November).

The Council of Ministers stepped up vigilance against stockpiling to prevent shortages of basic goods, bringing the full force of the law to bear on unscrupulous traders.¹¹

On 3 November, the Legislature passed decree No. 470 declaring a nationwide “State of public calamity and disaster area” and announced it was “proceeding from the emergency to the assessment (and preparation) stage to prepare for the reconstruction stage”.¹² Civil society played an important part both in the emergency and the repair stages, with their own initiatives and support for action by the government and NGOs.

People did not stay in shelters for more than two weeks. After the emergency stage, to facilitate the return of victims to their homes, the National Department of the Family announced the above mentioned PAS would focus on the 10,000 families in shelters. They were given cards in four

¹⁰ Measles, tetanus, whooping cough, diphtheria, and polio for children; tetanus and German measles for adults.

¹¹ Presidency of the Republic, Press Communiqué, San Salvador, 3 November, 1998.

¹² Ministry of Foreign Affairs, *Tercer Informe Preliminar de los Daños Causados por la Tormenta Tropical Mitch*, San Salvador, 4 November, 1998.

different colours, depending on their aid entitlement; food, equipment and building materials were distributed as of 27 November.¹³

b) International aid

Aid from abroad was also coordinated by the COEN, together with the Ministry of Foreign Affairs, which took charge of donations from the international community. The National Private Enterprise Association (ANEP) supervised foreign aid operations and cooperated in distribution, showing the close relationship between the public and private sectors in El Salvador.¹⁴ ANEP is also going to take charge of rebuilding the town of La Chilanguera, which was practically obliterated by the floods.

Foreign aid came quickly and generously both from governments —sometimes through Salvadorian embassies abroad— and organizations. Similar solidarity was seen in collections by many countries where events and festivals were held in support of the victims of Mitch. Donations were collected in special bank accounts, churches or on the street.

Food aid provided by international organizations was crucial during the emergency. The World Food Programme (WFP) implemented a regional emergency project to care for the victims in El Salvador, Guatemala, Honduras and Nicaragua (*Emergency Food Assistance to Households affected by Hurricane Mitch, EMOP*); it will last for six months (from 15 November, 1998 to 15 May, 1999) and cost US\$58 million, with US\$3 million for El Salvador.¹⁵ This amount is equal to almost 6,000 tonnes of food to meet the needs of 400,000 Salvadorians, based on a daily diet of 2,100 calories and concentrating on pregnant and nursing women, suckling and children under five. The WFP has proposed increasing this to US\$7 million from May 1999, during the reconstruction stage, with food for work programmes, using NGOs for distribution support.¹⁶

The contribution of the UNICEF concentrated on a large water purification programme, within the *National Comprehensive Sanitation Plan to deal with the Emergency Caused by Tropical Storm Mitch*, promoted by the MSPAS. UNICEF proposes US\$2.7 million in financing, apart from aid in the form of drugs (4.8 tonnes) and psychological health actions for children affected by the hurricane.

PAHO is participating in this sanitation plan and in drinking water, human waste disposal, and solid waste management programmes, contributing US\$1.2 million. Vaccines and drugs were supplied and the SUMA emergency supplies control system was installed. This proved a useful tool for the public and private bodies responsible for quantifying and controlling foreign aid.

¹³ As happens in similar circumstances in other countries, aid management was complicated by El Salvador's forthcoming elections.

¹⁴ ANEP hired Price Waterhouse to audit the aid received at the airport, and transport to and storage in the El Indio warehouse. However, the control did not apparently cover distribution to final recipients. See UNDAC team in El Salvador, *Situation Report*, No. 2, November 11, 1998.

¹⁵ To strengthen this action, Italy offered US\$100,000 to the WFP to buy food; Spain donated olive oil with a commercial value of approximately US\$2.98 million for the country's repairs programme.

¹⁶ These programmes are not diverting aid from other current projects, in effect in the country's poorest 143 municipalities —covering 600,000 Salvadorians—, basic food supplies for 8 per cent of the population.

In terms of bilateral government aid in kind —measured by weight—, of a total of 255 tonnes, 110 were from Mexico, 37 from Spain, 31 from France, and 15 from Argentina and the United States, among other donors.

Salvadorian embassies also held collections in several countries, gathering 183 tonnes of food, clothing, drugs, etc. The embassy in Mexico sent the largest shipment (69 tonnes), followed by Guatemala (56 tonnes) and the United States (41 tonnes), where there is a large Salvadorian community.¹⁷ Cash Contributions totalled US\$665,000.

The largest contributors among international NGOs (53 tonnes in total), were Médecins Sans Frontières (30 tonnes) and the Knights of St. John (13.6 tonnes). Private companies sent almost as much (50 tonnes).

Contributions and support facilities for the reconstruction stage from the international financial community, above all the IMF, the World Bank, the IDB, and the Paris Club, are especially important, as is project financing from the European Union and other countries. They are being proposed at the regional level, within the framework of the IDB's Advisory Group for the Reconstruction and Transformation of Central America.¹⁸

Visits by the presidents of several of these organizations and leading political figures from Europe and America reaffirmed the international community's commitment to helping El Salvador and the region to recover from the disaster.

¹⁷ The Office of US Foreign Disaster Assistance (OFDA) initially provided US\$25,000 for immediate food aid for flood victims. On 5 November it distributed plastic sheeting, polyester blankets, and water containers worth US\$98,000, including transport. See US Agency for International Development (USAID), Bureau for Humanitarian Response (BHR), Office of US Foreign Disaster Assistance (OFDA), Central America-Hurricane Mitch, *Fact Sheet 15*, November 1998.

¹⁸ The Group's first meeting was at IDB headquarters in Washington, from 9 to 11 December, 1998.

II. DESCRIPTION OF THE DAMAGE

1. Social sectors

a) Housing

According to figures provided by the COEN on the housing sector, 10,372 dwellings were affected. Damage was located along the coast, on flatlands of highly vulnerable river basins, and was mostly caused by flooding and landslides on hills and in gullies. Although the rains were heavy throughout the country, housing was particularly affected in rural areas. Damage in urban areas was concentrated in marginal housing located in gullies.

Sixty percent of all damaged dwellings were in Ahuachapán and in the Lower Lempa area, in the departments of Usulután and San Miguel.

The country has a total of 1,236,188 urban and rural private houses.¹⁹ Official figures estimate a housing shortage of 577,378 dwellings in 1996,²⁰ of which 542,727 (94 per cent) are houses in need of repairs and 35,651 (6 per cent) are new housing units required. This deficit is aggravated by the loss of 10,372 dwellings, mostly in rural areas.

Table 4 shows figures for rural and urban dwellings affected in each department.

Indirect and direct information show that damage affected farms and dwellings made of adobe, thatch and palm, or with waste materials. Field visits confirmed no major damage to rural concrete and brick dwellings, just damage from mud. Table 5 indicates the damage amount to the housing sector.

Total damage amounts to 118,105,000 colones. Direct damage includes estimated construction costs in the informal rural market and the average value of the furniture and fittings of rural families, all based on interviews and field visits. The cost of relocating dwellings in less vulnerable sites will be based on the values of the same plots. Because these are rural houses urbanization costs will be minimal and included in reconstruction costs.

¹⁹ Ministry of Economy, Statistics and Census Bureau, *Censos Nacionales V de Población y IV de Vivienda*, 1992.

²⁰ Ministry of Economy, Bureau of Statistics and Census, *Encuesta de hogares de propósitos múltiples*, 1996. There are discrepancies in data on the country's housing shortage: according to the Salvadorian Foundation for Development and Basic Housing, the deficit exceeds 480,000 dwellings. The National Popular Housing Fund (FONAVIPO) defines qualitative deficit as: walls made of corrugated sheet and plant materials, roof of corrugated iron and other materials, earth floor; no electricity, no drinking water or well, no private letrine or services.

Table 4

EL SALVADOR: NUMBER OF DWELLINGS AFFECTED

Departments	Total rural dwellings	Total dwellings affected	Dwellings destroyed	Uninhabitable damaged dwellings
<u>Total</u>	<u>562,944</u>	<u>10,372</u>	<u>2,295</u>	<u>8,077</u>
Ahuachapán	42,526	1,915	0	1,915
Santa Ana	57,584	442	151	291
Sonsonate	46,858	327	191	136
Chalatenango	25,337	79	44	35
La Libertad	65,999	505	247	258
San Salvador	74,688	803	146	657
Cuscatlán	23,695	0	0	0
La Paz	35,271	686	45	641
Cabañas	18,528	0	0	0
San Vicente	16,870	659	8	651
Usulután	39,891	2,868	689	2,179
San Miguel	47,022	1,295	605	690
Morazán	24,840	118	5	113
La Unión	43,795	675	164	511

Source: V National Population Census and IV National Housing Census, 1992 and National Emergency Committee.

Table 5

EL SALVADOR: DAMAGE IN THE HOUSING SECTOR

(Thousands of colones)

	Total	Direct damage	Indirect damage
<u>Total</u>	<u>118,105</u>	<u>48,300</u>	<u>69,805</u>
Dwellings damaged and destroyed	31,500	31,500	
Damage and losses in furniture and fittings	16,800	16,800	
Provisional dwellings	41,516		41,516
Losses in rent	28,289		28,289

Source: ECLAC, based on official figures and own calculations.

Indirect damage includes two items:

i) The cost of materials (corrugated sheeting, timbers and nails) and of the latrines distributed by the National Department of the Family, and the Under-Ministry of Housing and Urban Development; a percentage has been added for labour. Two types of aid packages are being distributed: those for families who lost their homes, and smaller ones for repairs. The aim is to provide the two groups with provisional housing until new homes can be built.

ii) The loss in rent, reflecting the loss of comfort (the damage) suffered by families due to the destruction of homes. This was estimated based on the average rent in rural areas, calculated on a decreasing scale in line with the time taken to rebuild dwellings (12 to 18 months).²¹

Lost property tax was not included because most homes in these sectors do not contribute to this item.

Reconstruction and repair costs are estimated at 419,195,000 colones (see Table 6).

Table 6

EL SALVADOR: COST OF RECONSTRUCTION IN THE HOUSING SECTOR

(Thousands of colones)

	Total	Repair	Reconstruction
<u>Total</u>	<u>419,195</u>	<u>58,316</u>	<u>360,879</u>
Reconstruction of damaged and destroyed houses	360,879		360,879
Replacement of furniture and fittings	16,800	16,800	
Construction of provisional housing	41,516	41,516	

Source: ECLAC, based on official figures and own calculations.

Repair costs are defined as the short-term costs of re-establishing normal conditions as far as possible, and amount to 58,316,000 colones. They include construction costs for provisional housing and replacement of lost furniture and fittings.

To support the reconstruction effort, the government has announced a housing sector programme to function as a FONAVIPO Credit and Construction programme.

The Contribution Programme (direct subsidy) grants beneficiaries a contribution of between 4 and 12 minimum wages, depending on socio-economic parameters. Families provide previous savings equal to a month's declared earnings and must prove ownership of the land where construction is done, or provide the funds needed to obtain the legal title.

The Credit Programme channels loans to a network of authorized institutions that grant housing loans, in market conditions, to families whose income is two minimum wages or less. These institutions assume the risk of loan recovery, and qualifying as an authorized institution is based on legal, administrative and financial criteria, credit solvency and minimal past-due loan ratings among them.

An important aspect of the programmes is that the title to the land where the contribution is made must be held by a woman, and may only be jointly held by a spouse with her agreement.

²¹ Central government's human settlements and housing contributions programme.

It must be underlined that since the Under-Ministry of Housing and Urban Development assumed a supervisory and regulatory role in housing policy and stopped executing projects, NGOs have played an important part in constructing dwellings for low-income sectors. In the period 1994-1996 51,392 dwellings were built in the country, 13,472 of them by NGOs for poor sectors using FONAVIPO schemes.²²

The amount needed to rebuild the 10,372 dwellings damaged by Mitch is calculated at 419,195,000 colones.

Costs calculations for each unit were based on the values used in the government FONAVIPO Credit and Contribution housing programme. Restating the value using the minimum wage current in January 1999, the cost per house is 31,245 colones and includes the cost of legalizing the title to the land and dwelling (see Table 7).

Table 7

EL SALVADOR: COST PER DWELLING

	Colones
<u>Total</u>	<u>31,245</u>
FONAVIPO contribution 12 minimum wages	16,632 a/
Administrative expenses (10 per cent)	1,663
Contribution of Under-Ministry of Housing and Urban Development for legalization (20 per cent)	3,000
Credit channelled through NGOs	7,200
Family work effort	2,750

Source: Prepared by ECLAC.

a/ January 1999, minimum wage equals 1,260 colones.

The programme's contribution covers 68 per cent of the value of the dwelling, and the remaining 32 per cent is provided by the family with a 10 per cent cooperation effort in mutual aid from the family group and the community, and the rest with a five-year loan. For groups in the Land Transfer Programmes, part of the 30 per cent could be calculated as a contribution of the value of the land for the dwelling, with land division for plot definition where required. Loans to families must take their reduced repayment possibilities into account and provide a grace period.

²² FUSAI (1997), *Evaluación del avance del Plan Nacional de Gobierno de El Salvador en el sector de vivienda 1994-1999 a noviembre de 1997*, San Salvador, El Salvador.

Families in high-risk rural areas will be relocated within their communities (the Salvadorian Chamber of Construction, CASALCO, is building new homes in nearby safer areas for the worst affected families in Chilanguera); in urban areas only dwellings in risk areas will be relocated, taking into account available municipal land.

Reconstruction aims not only to provide decent homes made of solid materials but also to promote local development by improving the population's access to basic services and community infrastructure.

A comprehensive approach for emergency, repair, and reconstruction efforts in human settlements require prevention planning to mitigate the effects of extreme and recurrent weather in the region.

Institutionally, the priority needs are:

i) The definition of a Land Regulation Act (national and municipal) to promote and regulate the location of human settlements, the population's economic and social activities, and land development, to ensure optimal use of natural resources and environmental protection and preservation.

ii) According to preventive planning, land-use regulation actions are needed to avoid people and settlements being relocated to vulnerable areas, especially in urban zones.

iii) Institutional coordination among government organizations, such as the Under-Ministry of Housing and Urban Development, the Strategic Planning Office (OPES), the San Salvador Metropolitan Area Planning Office (OPAMSS), the Ministry of Public Works, the National Water Main and Sewer Association (ANDA), FONAVIPO, the Freedom and Progress Institute (ILP), municipal mayors' offices, NGOs involved in the development of poor settlements, and community organizations.

Strengthening NGOs is a key factor of housing reconstruction policy. The Salvadorian experience shows positive results, but these institutions' housing supply is still too low to meet the demand from sectors affected by Mitch.

The network of NGOs working with FONAVIPO must also be expanded, while strengthening them and helping them to qualify as authorized institutions. Special promotion must be given to NGOs with the following characteristics:

i) The technical capacity to carry out housing, infrastructure, and latrine projects, and repair and replacement work in lost or damaged infrastructure.

ii) Experience in implementing the mutual aid system in communities.

iii) Capacity to support municipalities in coordination with public and private institutions to take greater advantage of available resources and avoid duplicating efforts.

One strategy for NGO strengthening is the creation of a trust fund to improve and rebuild settlements, managed by international organizations that work with local and international NGOs. The aim is first to strengthen these organizations' actions and capacities, so that rotating funds can be managed locally thereafter and NGOs will be able to join the institutions authorized to work in the government programmes.

Experience in different countries has highlighted the importance of women's organizations in housing programmes; granting aid and new homes with joint spousal ownership—to avoid discrimination—is a stabilizing factor and promotes development.

b) Health

Children suffered particularly in this emergency. They account for a disproportionate number of cases of the most prevalent diseases (skin, respiratory, diarrhoea) and become more vulnerable when water and other services are lacking. The total number of deaths and injuries among children deserves special mention. The shortage of water represents an extra burden for women (an indirect cost) because they have to go to great lengths to obtain it.

This analysis focuses on a gender approach, emphasizing the vulnerable situation of a quarter of the female population: pregnant, nursing, and elderly women, and young girls and adolescents. Reference is made to the effect of the initial dislocation on social relations and their effect on women, especially in terms of sexual violence. It is important to identify whether people in shelters are whole families, and to take steps to protect adolescents and young girls arriving on their own, since cases of abuse have been reported. There is also a need for psychosocial support.

The disaster placed additional demand on the Salvadorian health system, mainly to provide emergency care in the most affected areas and, subsequently, to carry out preventive work throughout the country.

Fortunately, material losses were not extensive. Hospital facilities—either MSPAS or Salvadorian Social Security Institute (ISSS)—were not damaged; the only losses were in the physical infrastructure and equipment of 22 small health units. The cost in infrastructure amounts to 10.3 million colones (almost US\$1.2 million) and in furniture and equipment to 4.7 million (around US\$540,000). Ten million colones have been set aside for repairs with financing from the Social Investment Fund. However, reconstruction of damaged medical infrastructure with minimal increases in functionality and more modern equipment is estimated at 37.5 million colones, with an imported component of 10.5 million (US\$1.2 million) (see Table 8).

These small units, located in the most flooded areas, had to suspend service. However, prompt action by the authorities enabled most to re-open and be re-supplied with drugs donated by international aid agencies. The heaviest losses, in six health centres, were in the department of Usulután, followed by Ahuachapán, with five centres damaged. The departments of San Salvador and San Miguel were also affected, as were La Libertad, La Paz and Sonsonate.

Table 8

EL SALVADOR: DAMAGE IN THE HEALTH SECTOR *a/*

(Thousands of colones)

Item	Total	Direct damage	Indirect damage	Cost of reconstruction	Imported component
<u>Total</u>	<u>101,177</u>	<u>14,984</u>	<u>86,193</u>	<u>37,460</u>	<u>10,538</u>
Partial or total destruction of health infrastructure <i>b/</i>	10,292	10,292		25,730	6,433
Losses of furniture and equipment <i>b/</i>	4,692	4,692		11,730	4,106
Increased spending on drugs during the emergency and after the disaster <i>c/</i>	26,581		26,581		
Disposal, treatment and recovery of victims	1,044		1,044		
Spending on community education <i>d/</i>	679		679		
Spending on water purification, latrines and solid waste management	30,090		30,090		
Spending on preventive actions, vaccines, pests and disease vector control <i>e/</i>	18,620		18,620		
Epidemiological monitoring and Control	254		254		
Increase in costs of hospital, outpatient and support care	8,700		8,700		
Greater care costs due to increased morbidity	174		174		
Cost attributable to reduced service provision capacity	52		52		

Source: ECLAC, based on Ministry of Public Health and Social Benefits (MSPAS) figures.

a/ Includes estimated costs to the public health system, social security and the private profit and non-profit sector.

b/ Rural MSPAS clinics. Neither the Salvadorian Social Security Institute (ISSS) nor the private sector reported losses in their facilities.

c/ Includes an estimate for international drug donations.

d/ Includes the 200,000 colones contribution from the ISSS.

e/ Includes purchases of bottled water by individuals and foreign donations of drinking water.

Indirect damage was larger than the direct losses and is estimated at 86.2 million colones (almost US\$10 million). As part of its emergency care, the MSPAS had to mobilise around 900

brigades and staff 159 temporary aid posts. Just over 2,000 people from the Ministry were mobilised, including doctors, nurses, health promoters and environmental health personnel, joined by those from the University, the Nursing School and personnel hired on specific contracts, bringing the total to 2,600. An estimated 70,000 consultations were given, with extra expenses totalling some 8.7 million colones.

Drugs, mostly from abroad, given to victims to treat common post-disaster ailments (respiratory diseases, diarrhoea, conjunctivitis and skin problems) were valued at 26.5 million colones.

Work was reinforced or complemented by the considerable direct efforts of NGOs working in the areas where most victims were located. They included not only large international organizations that mobilized enormous amounts of aid but many local ones, such as churches. There were cases of duplicated efforts and unattended needs, attributable to insufficient coordination in the distribution of medical services, food and clothing.

The ISSS went beyond its official duties (i.e., providing assistance for its members) and provided emergency medical services and drugs through its own brigades in shelters in the departments of San Miguel and La Unión. It also actively participated in preventive sanitation work—in conjunction with the MSPAS—, preventive health campaigns, mainly with the distribution of leaflets, and in epidemiological control actions.²³ In all, a budget of 5 million colones was allocated to these extra ISSS activities.

Once the immediate emergency was over, the prevention of epidemics became a priority for the Salvadorian health authorities. Due to the destruction or contamination of wells, water was chlorinated and distributed in small rural localities.²⁴ These actions were complemented with the rebuilding of destroyed latrines, with the help of the target population. The well-developed sense of organization shown by rural communities in El Salvador is impressive.

Important efforts were also made to control the outbreak of epidemics. A cholera outbreak was reported on the border with Guatemala, now controlled, but given the scale of the disaster in Honduras, work has been stepped up to ensure malaria, dengue and leptospirosis do not enter the country. Vector control campaigns are an important part of this strategy.

The MSPAS prepared the *National Comprehensive Environmental Health Plan to deal with the Emergency Caused by Tropical Storm Mitch*, to provide a coordinated framework for these and other efforts to prevent a range of epidemics that could break out in the coming weeks. The idea is to launch a huge national mobilisation from November 1998 to January 1999, involving ministries, NGOs and private companies specializing in this field (especially in well-cleaning and latrine construction), the support of United Nations agencies—UNICEF and PAHO—and, above all, large-scale financing from national and international aid communities. The plan will cost an estimated 52.7 million colones (approximately US\$6 million). The MSPAS contribution amounts to 575 million colones, the ISSS is contributing 210,000 and COSUDE, 122.5 million. UNICEF will finance 2.7 million for the drinking water programme, and PAHO 1.2 million in drinking water, solid waste and vector control measures. Most of the total—48 million colones—should be collected from national

²³ The ISSS is taking part in drafting the El Salvador National Environmental Health Plan.

²⁴ In urban areas, including the capital, families had to buy their own bottled water and other drinks.

and international donors. UNICEF has also contributed with its own programmes, delivering drugs (4.8 tonnes) directly and providing psychological health care for children directly affected by the hurricane.

In all, it is estimated that Mitch caused damage in the health sector totalling 101 million colones (US\$11.6 million).

c) Education

Children are at the heart of education, since they are its target population. The hurricane further affected a sector with substantial quantitative and qualitative deficiencies and unable to break the inter-generational cycle of poverty. Rebuilding what was lost is important, but it must be stressed that the government aims to take advantage of this tragedy to spur an educational reform aimed at “human and social development”, and including the consolidation of a culture of rights and values (respect for human rights and children’s rights) with the emergence of a modern economic culture (characterised by productivity, efficiency, quality, and competition).

The education sector was affected by hurricane Mitch; an estimated 7 per cent of schools suffered direct damage. Official figures show a total of 4,905 public schools, of which 326 reported damage of some kind, and 78 schools served as shelters during the emergency, making a total of 405 affected directly or indirectly.

According to primary estimates, 118 schools only need repairs; approximately 179 have to be partly rebuilt, since some classrooms were destroyed or left unserviceable, and 30 will need to be replaced. The schools used as shelters suffered damage that will need repairs similar to those in schools directly damaged by hurricane Mitch.

The total losses caused by hurricane Mitch to the education sector amount to 106.6 million colones. Just under 84 million is direct damage suffered by schools, distributed as follows: 16 per cent in schools totally destroyed, 58 per cent in severe damage, needing major reconstruction, and 26 per cent needing minor repairs to reopen —the cost in lost educational materials was similar in all cases. According to estimates, the use of schools as shelters will add 18 million colones.

Losses in infrastructure and school equipment (furniture, teaching aids and text books) must be added; these total more than 12 million colones and a replacement cost of more than 18 million colones. This is particularly important in the context of the EDUCO programme, which supports the development of the education system in communities without a government-provided building; these communities house their school in the church, village hall, or a community facility and receive the necessary equipment from the government. According to available figures, the EDUCO programme today covers more than 190,000 students throughout the country, from pre-school to seventh grade, with more than 6,000 classrooms and more than 4,000 teachers. This programme is especially important in rural areas, where it serves more than 35 per cent of all students.

Table 9

EL SALVADOR: SCHOOLS AFFECTED BY HURRICANE MITCH

Department	Public schools	Total damaged	Destroyed	Partial destruction	Shelters
<u>Total</u>	<u>4,905</u>	<u>405</u>	<u>30</u>	<u>179</u>	<u>78</u>
Ahuachapán	244	31	3	17	4
Santa Ana	429	28	3	23	2
Sonsonate	292	31	0	7	4
Chalatenango	360	4	1	3	0
La Libertad	440	40	2	19	6
San Salvador	667	5	0	0	5
Cuscatlán	197	0	0	0	0
La Paz	283	58	6	0	7
Cabañas	223	0	0	0	0
San Vicente	240	40	9	27	4
Usulután	424	78	3	25	33
San Miguel	458	52	3	24	9
Morazán	282	1	0	0	1
La Unión	366	37	0	34	3

Source: ECLAC, based on official figures.

Table 10

EL SALVADOR: SUMMARY OF DAMAGE IN THE EDUCATION SECTOR

	Total damage	Direct damage	Indirect damage	Cost of reconstruction	Imported component	Repair	Reconstruction
<u>Total</u> (millions of dollars)	<u>12.3</u>	<u>9.7</u>	<u>2.8</u>	<u>14.9</u>	<u>4.3</u>	<u>2.3</u>	<u>12.3</u>
<u>Total</u> (millions of colones)	<u>106.6</u>	<u>84.1</u>	<u>24.2</u>	<u>129.9</u>	<u>37.5</u>	<u>19.8</u>	<u>107.3</u>
Damage in schools	71.9	71.9		107.3	37.5		107.3
Use of schools as shelters	18.1		18.1			18.1	
Psychological rehabilitation			1.7			1.7	
Relocations	4.4		4.4	4.4			
Teaching material	12.3	12.3		18.3			

Source: ECLAC, based on official figures.

Available information suggests the worst damage was in the departments of Usulután, La Paz, San Vicente, San Miguel, La Unión and Libertad, in their order. Damage to schools was practically insignificant in Chalatenango, San Salvador, Cuscatlán, Cabañas and Morazán. Table 11 shows damage suffered by schools in each department.

Table 11

EL SALVADOR: DAMAGE BY DISTRICT
AND AMOUNT

	Percentages of damage
<u>Total</u>	<u>100.0</u>
Usulután	13.5
La Paz	13.4
San Vicente	13.3
San Miguel	12.9
La Unión	11.0
La Libertad	10.1
Santa Ana	8.9
Ahuachapán	8.6
Sonsonate	6.8
Chalatenango	1.5
San Salvador	0.0
Cuscatlán	0.0
Cabañas	0.0
Morazán	0.0

The modest amount of 4.3 million colones is required to support psychological treatment for the inhabitants of the areas worst affected by the hurricane. This basically consists of teams of psychologists and social workers in a three-month project to re-incorporate these populations into normal life.

Since the hurricane occurred with only one month left in the school year, the government decided to declare the 1998 cycle over, which prevented greater losses stemming from the use of schools as shelters and indirect damage caused by lost classes and interrupted schools programmes.

Higher education institutions reported no hurricane damage and no major damage occurred in the country's sports and cultural facilities.

To sum up, although the education sector—at least the public education system—suffered losses totalling 94 million colones, including direct and indirect losses alike, the estimated cost of reconstruction could exceed 107 million colones (US\$12.3 million) since the aim is to upgrade the sector at the same time.

Before the hurricane, the government estimated an educational shortfall of 1,685 schools. The construction of 118 (7 per cent of the deficit) is being financed with funds from the IDB's Middle Education Reform Project. It was hoped that a new IDB loan signed by the government on 25 November of this year would finance the construction of another 831 (49 per cent of the shortfall), which would have reduced the deficit to 736 schools (44 per cent of the shortfall before Mitch). The impact of the disaster, with 326 schools affected, was a strong setback to these plans. Some of the IDB funds will be used to repair and rebuild damaged schools, which will obviously have a negative effect on efforts to reduce the shortfall; the deficit will amount to more than 950 schools (56 per cent of the pre-Mitch gap, instead of 49 per cent as expected).

2. Damage to infrastructure

a) Transport and communications sector

This sector suffered direct and some indirect damage. The worst effects were due to the destruction of two Bailey bridges installed to replace the "de Oro" and "Cuzcatlán" bridges, the latter a double-track structure. Permanent concrete bridges were being built at these locations using box structures, and work was 65 per cent completed. After the disaster, communications were cut but quickly re-established. In the first case the old one-lane railway bridge was used, and in the second, the dam near the destroyed bridge served as a crossing. In both cases the crossing is limited, slow and somewhat risky. As the sugar cane and coffee harvests approach faster crossings must be built.

Damage to the main paved roads was a result of the deteriorated condition of most of the system. Potholes proliferated because of the intense and prolonged rains and the poor condition of road surfaces, which was due to insufficient periodical and routine maintenance. The Highway Directorate reports that the current maintenance system can only repair 15 to 20 per cent of the network (the rest must be contracted out, involving delays). This explains the state of the roads before the hurricane; the damage would have been less severe with proper maintenance.

Landslides were relatively slight due to the geography of affected areas.

The secondary paved road system suffered similar damage to the primary network, for the same reasons. Sporadic damage was reported in 1,281 of a total of 1,998 kilometres of paved roads.

The unpaved network (7,995 kilometres) sustained more extensive damages, due to drains blocked by silt, complicated by poor maintenance before the hurricane. This allowed water to run over the ballast, wearing it away or removing it. This type of damage affected points along 2,653 kilometres.

As shown in Table 12, total direct damage assessed in the country's road system amounts to US\$22.06 million. The government will have to spend US\$8.9 million in reserves on road construction and the replacement of Bailey bridges due to the imported component of these items.

Table 12

EL SALVADOR: DAMAGE TO ROADS AND BRIDGES

Road	Length (km)	Percentage damaged needing reconstruction or repair	Millions of colones	Millions of US\$
<u>Total</u>			<u>191.96</u>	<u>22.06</u>
<u>Primary paved roads</u>				
<u>Special work</u>				
Coastal Highway			0.90	0.10
La Unión del Río			1.28	0.15
Pan-American Highway			2.94	0.34
<u>Potholes and drains</u>				
Santa Ana-El Salvador	25.3	100	3.76	0.43
Other roads affected	1,281	40	19.06	2.19
<u>Bridges</u>				-
Oro bridge (Bailey) a/	340	100	6.26	0.72
Cuscatlán (Bailey, double-track) a/	608	100	12.48	1.43
Arce (damaged pile)			0.42	0.05
Bridges in Sonsonate (three minor) a/	65	100	1.71	0.20
Malahuela Ventana bridges (three minor) a/	45	100	0.16	0.02
El Esterito a/	15	100	0.05	0.01
San Francisco Javier a/	20	100	0.07	0.01
<u>Unpaved routes</u>				-
Loss of ballast				-
Roads affected by the hurricane	2,653	70	142.85	16.42

Source: ECLAC, based on official figures. Exchange rate: US\$1 = 8.7 colones.

a/ Length in metres.

Indirect damage is estimated at US\$48.3 million, or more than twice the direct damage. Indirect damage includes increased passenger and freight vehicle operating costs due to the damage to road surfaces (US\$44.6 million), and greater costs (some 3.7 million) stemming from longer travel times during the estimated seven-month reconstruction period. The government will need to use US\$49.7 million in foreign currency reserves for this purpose (see Table 13). The ports, airports and communications subsectors were not damaged and are not included in this report.

Table 13

EL SALVADOR: LOSSES CAUSED BY HURRICANE MITCH
IN THE TRANSPORT SECTOR

(Millions of dollars)

Roads subsector	Damage			Cost in reserves	Requirement	
	Total	Direct	Indirect		Repair	Reconstruction
<u>Total</u>	<u>70.36</u>	<u>22.06</u>	<u>48.3</u>	<u>49.7</u>	<u>6.6</u>	<u>23.1</u>
Primary paved						
Roads	51.50	3.21	48.3	41.54	0.6	6.2
Secondary unpaved						
Roads	16.42	16.42		4.44	2.5	16.4
Bridges	2.43	2.43		3.77	3.6	0.5

Source: ECLAC, based on official figures.

b) Energy

i) Electricity subsector. The floods and landslides stemming from the heavy rains registered nationwide did not cause major damage to power infrastructure. The worst losses were in distribution systems, including some substations. Table 14 shows a summary of damage to this subsector.

Electricity is generated by five companies, one government-owned and four private; the government company, CEL²⁵, accounts for 84 per cent of the system's total capacity and private companies²⁶ for the remaining 16 per cent. As a result of the hurricane, generating capacity fell temporarily by 10 MW, 1.1 per cent of total installed capacity (including private companies). The only power station directly affected was the Berlin Geothermal Station (under construction), with two 5 MW units and atmospheric discharge (at the well mouth); the damage was due to a landslide that moved a steam feeder pipe to the plant, shutting the units down for seven days while repairs were made. The energy was replaced by hydroelectric power, taking advantage of high water levels in the hydroelectric stations' reservoirs.

Swellings in the Lempa river and its tributaries dangerously increased water flows to the river's reservoirs. To avoid a major disaster, the sluice-gates of the hydroelectric power stations' reservoirs along the River Lempa (Cerrón Grande, 5 de Noviembre and 15 de Septiembre) were opened to release the extra water before an overflow could occur. According to CEL information, an estimated maximum volume of 11,500 m³/sec was released.

²⁵ River Lempa Executive Hydroelectric Commission (CEL).

²⁶ Private generating companies and their installed capacities as of 31 December, 1997 are: Nejapa Power (44.5 MW), CECSA (7.2 MW) and HSDM (0.7 MW).

Table 14
EL SALVADOR: DAMAGE IN THE ENERGY SECTOR
(Thousands of colones)

	Total	Direct	Indirect	Reconstruction	Imported component
Dollars	447.4	111.9	335.6	296.2	160.2
Colones	3,892.6	973.2	2,919.4	2,576.6	1,393.4
<u>Electricity subsector</u>	<u>3,631.6</u>	<u>973.2</u>	<u>2,658.4</u>	<u>2,576.6</u>	<u>1,393.4</u>
Generation a/	686.1	43.5	642.6	43.5	4.4
Transmission b/	-	-	-	-	-
Substations b/	-	-	-	-	-
Distribution	2,945.5	929.7	2,015.8	2,533.1	1,389.1
CAESS c/	-	-	-	-	-
CLESA d/	865.0	165.0	700.0	550.0	132.0
DELSUR d/	672.1	42.2	629.9	140.7	33.8
DEUSEM d/	112.5	43.3	69.2	144.3	34.6
EEO d/	1,295.9	679.2	616.7	1,698.1	1,188.7
<u>Oil subsector</u>	<u>261.0</u>	-	<u>261.0</u>	-	-
RASA e/	261.0	-	261.0	-	-

Source: ECLAC, based on figures from CEL, private generation and distribution companies, oil companies and own calculations.

a/ Steam feeder pipe moved at two well-mouth geothermal stations (2x5 MW) in Berlin.

b/ No reports of damage to the system's transmission lines and main substations.

c/ Information is being collected.

d/ The indirect costs are for provisional repairs and lost energy sales.

e/ The Refinería Acajutla S.A. (RASA) suffered indirectly due to delays in a shipment programmed in the days Mitch was crossing the country.

Since they came into operation, the reservoirs of CEL's hydroelectric power stations have been rapidly silting up, cutting their capacity.²⁷ Therefore, it is essential to monitor this problem to determine its significance. Measures must obviously be adopted to reduce the vulnerability of reservoirs, such as comprehensive watershed management, environmental protection, new land regulations and measurement systems enabling early flood warning. Although CEL's hydroelectric plants did not suffer physical damage and their protection systems functioned during the emergency, they remain vulnerable and measures must be taken to reduce risks and vulnerability in plants and in neighbouring settlements and river basins.

Although the transmission system and substations in the trunk network managed by CEL were not damaged by Mitch, minor networks and substations run by private companies were affected.

²⁷ See *Represas y desastres en El Salvador*, published by the Disaster Protection Center (CEPRODE) based on studies by AID, 1990.

Power is marketed by four large ²⁸ and two small distributors, ²⁹ one of which also generates electricity on a small scale. CLESA operates in the departments of Santa Ana, Ahuachapán, Sonsonate and part of La Libertad; CAESS in the departments of Chalatenango, Cuscatlán, Cabañas and the northern part of San Salvador; DELSUR covers the departments of La Libertad, La Paz, San Vicente and the southern part of San Salvador; EEO the departments of La Unión, Morazán, San Miguel and Usulután, outside the area served by DEUSEM; DEUSEM serves certain towns in the department of Usulután, such as the capital, El Triunfo, California, Jiquilisco, Ozatlán and others; HSDM Cía. provides service in small rural towns in the west.

The damage reported by the distributors was mainly caused by downed posts, broken cables, and flooding; this caused widespread disruption but was repaired promptly. However, some areas remain without electricity, especially where flooding persists or there are no access roads. In some flooded areas, distribution networks (lines and transformers) are still standing, with little or no damage apparent from the air, with the exception of Chilanguera, where the water swept away the primary and secondary lines.

The total cost of the damage reported in distribution accounts for 80.6 per cent of damage in the subsector, whereas indirect costs amount to 70 per cent of total costs (see Table 14), which are mainly for lost energy sales and spending on repair crews.

The worst affected areas were those served by EEO and CLESA, needing 1,698.1 and 550 million colones respectively for reconstruction work. The EEO system suffered damage in 55 communities and cities, affecting a total of 13,000 customers. Practically all the primary and secondary network was lost in Chinanguera, with severe damage to conductors, posts, insulators and transformers in Playa El Cuco and the line to Playa El Tamarindo. In addition, an estimated 2,000 meters will be needed to replace those damaged or lost. The CLESA system was damaged in many places along the coast, with partial losses similar to those reported by EEO. The worst affected municipalities are El Ixcamal, El Corozal, Bana Salada, Bana Santiago, Acajutla, Puente Arce, Resbaladero de Santa Ana, Lago Cuatepeque. One kilometre of primary line will have to be completely replaced, as will the Ixcamal 7 MVA substation due to flooding and mud, which damaged the main electrical equipment.

In conclusion, power cuts were mainly due to damage to distribution networks. Lines were downed in many places throughout the country, but repaired quickly except in flooded areas, where people have been without electricity for more than a month. Repairs in flooded sectors will begin as soon as access is possible.

ii) Oil subsector. The country has one privately-owned oil refinery ³⁰ that supplies the country's needs. The refinery has facilities for oil delivery by pipeline. No physical damage was sustained by the refinery or the pipeline, and sales were only lost in the first three days after Mitch struck, when they dropped between 10 and 20 per cent, but recovered immediately to normal levels.

²⁸ The four private distribution companies are: Compañía de Luz Eléctrica de Santa Ana S.A. de C.V. (CLESA), Compañía de Alumbrado Eléctrico de San Salvador, S.A. de C.V. (CAESS), Distribuidora de Electricidad del Sur, S.A. de C.V. (DELSUR) and Empresa Eléctrica de Oriente, S.A. de C.V. (EEO).

²⁹ The small companies are Distribuidora Eléctrica de Usulután, Sociedad de Economía Mixta (DEUSEM) and Distribuidora Eléctrica Roberto de Matheu y Cía. (HSDM Cía).

³⁰ Refinería de Acajutla S.A. (RASA).

These lost sales mostly affected exports to Guatemala, because roads were impassable. As a preventive measure, an oil tanker delayed delivery owing to the bad weather; this incurred an indirect cost due to delay charges (see Table 14).

c) Water and sewerage services³¹

Drinking water and sewerage services in 172 of 262 municipalities, including San Salvador, are provided by ANDA; the remainder are served by municipal authorities. The systems operated by ANDA suffered no major damage and problems were only reported in six municipalities (California, Berlín and Alegría in Usulután, San Miguel in the department of the same name, Colón in La Libertad and San Pedro Puxtla in Ahuachapán) where control panels and electrical connections need repairs, and pumps will have to be replaced in drinking water systems. ANDA has received no reports of damage from the other 90 municipalities, and is assuming that damage was slight. Pipelines and distribution systems were damaged in 16 municipalities (Mercedes Umaña, Berlín and Estanzuelas in Usulután; Santa Rosa de Lima, San Alejo and Conchagua in La Unión; San Miguel, Chirilagua, Sesorí and Carolina in San Miguel, Colón, La Libertad and Ayagualo in La Libertad; La Palma in Chalatenango; Sonsonate in Sonsonate department, and Sensembra in Morazán) where 4 to 12 inch diameter HFD and PVC pipelines and distribution and household connection pipes between ½ and 4 inches in diameter need replacing. The total cost of direct and indirect damage amounts to 20.7 million colones, of which 43 per cent are indirect costs, not including lost sales that have yet to be quantified. The total cost of reconstruction is estimated at 32 million colones (see Table 15).

Sewerage infrastructure was damaged in the following three municipalities: Chirilagua, in San Miguel; Berlín in Usulután, and San José de La Majada in Sonsonate; pumping stations, perimeter fences, retaining walls, and access roads will need repairs. Certain tanks need rebuilding. The River Lempa system suffered damage to pumping equipment, intake grids and filters; mud deposits also need to be removed (Table 15).

Since some settlements will be relocated to flood-free areas, ANDA has been instructed to dig simple wells to meet the needs of relocated groups. Indirect costs will arise from new wells, transporting water in tanks to supply the population while wells are dug, and chemical treatment (mainly chlorine) to disinfect deliveries of water and mains under repair. Wells will be sunk in the following localities: 16 wells in the municipality of Zacatecoluca and nine in the municipalities of San Juan de Nonualco and Cuyutitlán in the Central Region; 24 in the municipalities of El Cacao, San Julián, Tonalá, El Presidio, Barra Ciega and Cuisnahuat in the Western Region; 17 in the municipalities of Jiquilisco, San Agustín, Mercedes Umaña and Concepcion Batres and Juacarán in Usulután department; 15 in the municipalities of Chirilagua, San Miguel and Uluzapa in the department of San Miguel, and three in the municipality of Conchagua in the department of La Unión, in the Eastern Region (see Table 15).

³¹ Drinking water and sewerage services are operated and managed by ANDA in 172 of the country's 262 municipalities.

Table 15
EL SALVADOR: DAMAGE TO DRINKING WATER SYSTEMS
(Thousands of dollars)

Company	City	Total	Direct	Indirect	Reconstruction	Imported component
	<u>Total</u>	<u>20,700.2</u>	<u>11,812.2</u>	<u>8,888.0</u>	<u>35,204.2</u>	<u>8,268.5</u>
ANDA	San Salvador	-	-	-	-	-
	Other cities a/	3,055.5	3,055.5	-	10,185.1	2,138.9
	Rural areas b/	17,644.7	8,756.7	8,888.0	25,019.1	6,129.7

Source: ECLAC, based on Ministry of Farming (MAG) and National Administration of Water Mains and Sewers (ANDA) figures.

a/ ANDA manages water mains and sewerage systems in 172 of 262 municipalities. In all other municipalities, they are run by municipal authorities.

b/ Repairs to drinking water systems in rural areas have been assigned to ANDA.

d) Irrigation

The country has 35 irrigation associations, which form part of the Irrigation Federation of El Salvador (FEDARES). According to information furnished by MAG,³² irrigation infrastructure has been operating for more than 22 years, except for systems in the Lempa Acahuapa District, which are six years old. The age of the facilities is one reason the cost of direct damage was low compared to the cost of reconstruction. The MAG has valued damage to irrigation systems at 9.7 million colones, but no information is available on the indirect costs nor the calculation involved. Data from independent organizations that advise private associations show that some of the damage in the irrigation districts is due to inadequate maintenance and existed before the hurricane. However, it is difficult to obtain a break-down for the situation prior the disaster. The cost of reconstruction is estimated at 32 million colones (see Table 16).

The information prepared by the MAG breaks costs down by type of damage, but not by irrigation district. However, a break-down is available for the worst affected department (Lempa Acahuapa), with damage to 2,700 m² of secondary channel walls, 315 m² of secondary channel floors, 85 metres of dykes, 100 metres of sublateral channels, two supports with gabions and an undetermined length of silted drains. The MAG reports damage to 85 kilometres of roads, 75 kilometres of natural watercourses, 45 kilometres of drains, 550 m³ of gabion dykes and crossings, four irrigation channel sluices and 28 small open-channel irrigation systems with silting and breaks in structures serving irrigation areas of between 50 and 200 ha. Damage has also been reported in 20 per cent of the facilities in the weather forecasting and alert system, which needs finishing, improving, and repairing, at a cost of 3 million colones. This assessment of damages to irrigation networks does not include pumping systems, which have yet to be inspected.

³² Ministry of Agriculture and Livestock (MAG).

Table 16
EL SALVADOR: DAMAGE TO IRRIGATION SYSTEMS
(Thousands of colones)

		Total	Direct	Indirect a/	Reconstruction	Imported component
<u>Total</u>		<u>9,688.5</u>	<u>9,688.5</u>	-	<u>32,000</u>	<u>2,045.7</u>
Roads	Zapotitán, Atiocoyo			-		
	Lempa-Acahuapa	459	459		1,530	91.8
Drains with	Río Paz, The Rosario					
natural water-	Lempa and C. Baja					
courses	Río Grande San Miguel	3,600	3,600	-	12,000	720
Drains and	Zapotitán, Lempa-					
flood	Acahuapa and	1,249.5	1,249.5	-	1,470	249.9
irrigation	Atiocoyo					
Irrigation dykes	San Vicente and	403.3	403.3	-	1,344.2	
and channels	Usulután					80.7
Drains	San Vicente and	196.7	196.7	-	655.8	
	Usulután					39.3
General	Small systems	3,600	3,600	-	12,000	720
General	Weather forecasting	180		-		
	and alert system b/		180		3,000	144

Source: ECLAC, based on MAG and ANDA figures.

a/ Indirect costs have not been quantified.

b/ Only 20 per cent of the infrastructure was damaged; reconstruction costs include improvements to and completion of the network.

3. Productive sectors

a) Agriculture, livestock and fisheries

The agriculture and livestock sector ³³ was one of the worst hit by hurricane Mitch and the tropical storm it later became. Intense and persistent rain affected the whole territory, but its effects were more acute in rural areas. In mountain areas it caused landslides and soil creep, and destroyed crops on slopes and soil conservation and irrigation works. On the coastal plains, the combination of rain and the extraordinary increase in water volume in rivers caused floods which washed away crops and animals. Heavy seas were another factor, causing serious damage to fishing villages.

Lands affected by flooding —and landslides to a lesser degree— are estimated at 100,000 hectares, i.e. more than 10 per cent of land devoted to crops and pasture. Crops for domestic

³³ The agriculture and livestock sector accounts for 13.3 per cent of GDP. Of 1.9 million people employed, 800,000 work in the primary sector. ECLAC (1998c), *Información básica del sector agropecuario, subregión norte de América Latina y el Caribe 1985-1997* (LC/MEX/L.364), November.

consumption were the worst hit. Apart from the economic effects, combined with the reduction of local produce, the drop in production has had considerable economic and social impact on subsistence farmers, who lost crops and tools and suffered damage to their houses. Hence the importance of the Contingency Plan for Agricultural Recovery drawn up by the MAG to mitigate the effects of capital losses in farms. The plan includes the distribution of seed packages and farm tools. Their prompt distribution will enable farmers to sow a third crop, taking advantage of the damp soil. Equally important are the prevention of epidemics and health control measures.

b) Agricultural production

Forecasts for basic-grain harvests were very favourable compared with last year, when the drought caused by El Niño produced very poor yields. Although the drought continued through the first semester of 1998 and the area of cultivated land was reduced slightly, basic-grain harvests, particularly maize and beans, were expected to compensate for the previous year's losses. In fact, the decision to postpone sowing meant maximum advantage was taken of the abundant rains to obtain better yields.

The hurricane altered the expected yields of four basic crops. At the end of October part of the maize crop had been gathered while the remainder, as is customary, had been left in the fields for harvesting at a suitable time. In some areas, flooding water completely covered the mature crops, which was entirely lost, while in others the excess humidity caused rotting. All told, the harvest is expected to be reduced by almost a fifth (see Table 17).

As the maize crop had either been gathered or was about to be harvested, its value was calculated according to the price farmers would have received. Losses could increase if damp grain is not satisfactorily dried; the government has designed a "grain recovery" programme to help farmers in this regard. Table 17 shows estimated maize losses; the decrease will have serious repercussions on food supplies in rural areas and a negative effect on the balance of payments, since imports will increase in 1999. It should be pointed out, however, that imports have increased over the last four years. If the third harvest of the year is good this could reduce the need for imports.

The summer harvest of bean crops, which are the most vulnerable, was seriously affected. Estimates of losses have increased due to the effect of humidity on pods. As in the case of maize, the decrease in production will have to be compensated for by increased imports, although it will be difficult to resort to regional supplies, since they have been diminished by the effects of the hurricane.

In contrast, rice crops, which had nearly all been harvested, and sorghum, which was in different stages of growth, suffered only minor losses. However, imports may increase in 1999 as a result of a decrease in domestic supply. Basic imports could total up to 350 million colones.

Table 17

EL SALVADOR: ESTIMATE OF AGRICULTURAL LOSSES
CAUSED BY HURRICANE MITCH, NOVEMBER 1998

(Preliminary figures)

	Millions of tonnes		Percentages	
	Production anticipated before the hurricane /a	Estimated production after the hurricane	Lost production	Ratio of losses to anticipated production
Basic grains				
Paddy rice	58.1	52.9	5.2	9
Beans	67.4	42.4	25	37
Maize	673.7	546.4	127.3	19
Sorghum	181.1	165.1	16	9
Export crops				
Coffee b/	132.3	128.6	3.7	3
Sugar cane	5,500	4,400	1,100	20

Source: Estimates based on official information from MAG, PROCAFE and production sectors.

a/ Based on the results of the *Encuesta primera de propósitos múltiples 1998-1999*, MAG, Directorate of Agricultural Economics, September 1998.

b/ According to information supplied by PROCAFE, an additional 13,700 tonnes were lost due to the effects of El Niño.

Due to the expected decrease in production, but above all the difficulty of transporting supplies to markets, commodity prices rose immediately. According to Statistics and Census Bureau information, food, beverage and tobacco prices rose 6.1 per cent between October and November.

Among export crops, coffee was badly damaged by excessive humidity; losses are estimated at 3,700 tonnes, adding to the effects of the drought caused by El Niño, which affected plant development. As a result, the expected harvest before the hurricane was already lower to coffee plantations' potential, estimated at 150,000 tonnes of green coffee. The impact on the balance of payments will be a decrease in exports in 1999, estimated at almost 80 million colones at current prices. A rise in international coffee prices, should the delay in placing the Brazilian coffee crop on the market be maintained, could have a compensatory effect by raising the value of exports.

In the case of sugar cane, which was about to be harvested, crops were damaged by the long time they remained under water. The direct impact was on cane destroyed by swellings; since the cane ripened in damp conditions and was not harvested, the most important effect was a drop in sugar content.³⁴ These losses particularly affect the income of farmers who sell cane to sugar mills, since prices are determined by the sugar content per tonne of cane. Industrial production in affected areas is also expected to have lower yields. In general, production is expected to decrease by about 20 per cent. If the value of the cane is calculated on the basis of estimated prices to producers, which are

³⁴ The Pindar variety grown in El Salvador is less resistant than others which do not lose sugar content if harvesting is delayed once they reach full maturity.

determined by average sugar content, losses total nearly 140 million colones, with a reduction in export value of 90 million.

In other crops, such as vegetables and fruit, it has not been possible to determine losses as a proportion of total production, although losses in irrigated lands in northern Chalatenango department are estimated at more than 20 million colones. Due to the characteristics of the crops, agricultural activity has already resumed in some areas. Unfortunately, in the north, some of the seed that small-scale farmers had been successfully producing to substitute imports from Guatemala was destroyed. Access roads also sustained considerable damage, as did soil and humidity conservation works. The decrease in produce supplies led to a sharp rise in prices – almost 17 per cent in November, as compared to October.

The agricultural sector also suffered important losses to assets. These include certain types of infrastructure, such as fences around fields, tools which were lost or damaged, metal silos, some of which have been retrieved and need repairs, and above all topsoil (irrigation infrastructure was assessed in prior sections). Some flooded lands, which will become more fertile in the long run, cannot be used until they are drained. Direct costs for their recovery have been incurred on the banks of the Paz, El Rosario, Lempa and San Miguel rivers. In some communities, such as Chilanguera, the destruction caused by the San Miguel river will be difficult to repair. In addition, an indirect cost will be generated due to the crops which will not be sown in some areas, at least until the next season.

Some lands can be considered total losses, such as those that slid down mountain slopes, taking plant cover and crops with them, or those washed away by flood waters. The earliest preliminary reports mention several places affected in this manner; they amount to some 100 hectares of lost farmland. Their recovery cost is much higher than the cost of restoring flooded lands, and does not necessarily mean that they can be used again. Total direct damage is estimated at 148 million colones.

The combination of these effects —landslides and floods— has had serious repercussions on the daily life of rural inhabitants, as their assets and livelihoods were destroyed and such effects go beyond the limits of agricultural activity. It is therefore a priority to draw up a master plan for the sustainable management of catchment basins, particularly those that cover two or more countries. Corrective measures in resource management could lessen the effects of natural disasters in the future.

Including the loss of assets, total direct and indirect damages to agriculture are estimated at 886 million colones.

c) Livestock raising

Preliminary calculations show the loss of 10,000 head of cattle, including dairy cows, dual-purpose cattle and calves. The stress suffered by cows during the storm had an adverse effect on dairy production: it will be approximately six months before average yields are back to normal. The direct damage stemming from reduced supplies is estimated at 30 million colones and indirect damages due to lost production amount to over 300 million.

The poultry subsector suffered losses totalling some 60 million colones, in addition to losses of horses, hogs and other smaller species. It may still be possible to rescue some of the larger animals. A campaign to incinerate dead animals, including wild fauna, during the first week of the disaster made it possible to control potential outbreaks of diseases, which will be complemented by a vaccination campaign. In this regard the authorities have relied on the support of grass-roots organizations in disaster areas, whose work has facilitated aid to affected farmers and their families. In short, damage to livestock totalled 393 million colones.

d) Fisheries

Small-scale fishermen and the fishing industry were equally affected: infrastructure was damaged and catches were smaller. The wharves used by small-scale fishermen in Acajutla, Ahuachapán, Puerto Parada and Puerto El Triunfo were badly hit, approximately 62 boats were destroyed, 18 engines needed repairs and 1,365 lost nets will have to be replaced. The banks of the ponds in shrimp farms in Sonsonate, La Libertad and Usulután were also affected. Total damages are estimated at 6 million colones.

The storm and the partial destruction of infrastructure made fishing impossible for several days. Production losses refer to the quantity of fish that was not caught during the first week, valued at approximately 20 million colones, including the shrimp that escaped from the ponds. Indirect damage was incurred due to the reduction in fishing activities during the following three weeks, owing to a drop in demand for fish products and lower prices, reflecting the population's distrust. A campaign warning people not to eat live shell-fish to avoid health risks influenced the population, and the general consensus was that it would also be prudent to postpone eating fish. A well-documented report showing that fish is not harmful would no doubt favour the reactivation of fishing activities.

e) Industry and trade

The industry and trade sectors were also affected by hurricane Mitch. They mainly suffered indirect losses in production, although some damage was caused to infrastructure and stock in the commercial sector, particularly establishments —mainly small businesses— located in damaged or destroyed buildings. The value of damage to infrastructure is calculated under the heading "housing".

The industrial sector suffered two kinds of indirect damage. The first and most significant is lower production, stemming from losses in the agricultural and livestock sectors. This was relatively high in some areas —as mentioned in the previous section— so large volumes of sugar, milk, maize, beans and other produce could not be processed. The second stemmed from the insufficient supply of raw materials from the Atlantic basin, due to damage to roads in Honduras and problems in exporting many products to southern Central American countries, since highways, particularly in Honduras and Nicaragua, were impassable.

Table 18

EL SALVADOR: EFFECTS OF HURRICANE MITCH ON THE AGRICULTURE AND LIVESTOCK SECTOR, 1998

(Thousands of colones)

	Damage			Effects on the foreign sector	
	Total	Direct	Indirect	Increase in imports	Reduction in exports
<u>Total</u>	<u>1,376,971.2</u>	<u>1,971,464.2</u>	<u>405,507.0</u>	<u>352,068.3</u>	<u>174,866.8</u>
Agriculture	886,223.2	827,933.7	58,289.5		
Assets		154,660			
Infrastructure		7,000			
Land		147,660	58,289.5		
Production		673,273.7	-		
For domestic consumption		448,950			
Rice		9,200		23,601.2	
Beans		165,000		149,821.7	
Maize		252,000		144,188.7	
Sorghum		22,750		34,456.8	
For export		197,680.6	-		
Coffee		57,100.6			78,802.4
Sugar cane (sugar equivalent)		140,580			91,064.4
Others a/		26,643.1			
Livestock	453,305.5	117,088.0	336,217.5		
Infrastructure		25,000			
Cattle		30,000	336,218.5		
Poultry		59,922			
Others b/		2,166			
Fisheries	37,442.5	26,442.5	11,000		
Assets		6,322.5			
Production		20,120	11,000		
Industrial fisheries		11,500	5,750		
Small-scale fishing		2,500	5,000		
Shrimp farming		6,120	250		5,000

Source: ECLAC estimates based on official figures and information from production sectors.

a/ Fruit and vegetables.

b/ Horses and hogs.

The in-bond (maquila) industry was not directly affected, although there was an indirect impact resulting from diminished output, for the reasons mentioned above.

Total damage to the industrial sector is estimated at 643 million colones (US\$74 million) in indirect damage due to lower production in both the agroindustrial and in-bond sectors. This will have a negative effect on the balance of payments and trade, estimated at US\$24 million, due to loss of exports in both in-bond goods and those for the Central American market. Since industrial infrastructure was not damaged, no reconstruction costs are anticipated (see Table 19).

Table 19

EL SALVADOR: DAMAGE TO THE INDUSTRIAL AND TRADE SECTORS

(Millions of colones)

Sector and subsector	Total damage	Direct damage	Indirect damage	Effect on the external sector
<u>Total</u>	<u>1,124.4</u>	<u>78.3</u>	<u>1,046.1</u>	<u>377.5</u>
Industrial sector	802.5	-	802.5	210.5
National industry	672.0	-	672.0	80.0
Maquila	130.5	-	130.5	130.5
Commercial sector	321.9	78.3	243.6	167.0
Small businesses	156.6	-	156.6	80.0
Tourism	165.3	78.3	87.0	87.0

Source: ECLAC, based on official figures.

As mentioned, the commercial sector suffered damage to the infrastructure and stock of small businesses run from private houses in urban areas directly affected by floods and avalanches of mud; these damages were assessed in the housing sector.

Sales have dropped in small and medium-sized businesses owing to the downturn in economic activity and the resulting effect on purchasing power, which is expected to continue for some months. However, the impact of lower production of agricultural commodities can practically be discarded, given that businessmen themselves will channel the commodities that will have to be imported to replace those lost.

The tourism sector has been affected both in its facilities —buildings on the coast battered by the particularly heavy swells—and in sales due to cancellations in hotels and restaurants.

Total damages to the commercial sector are estimated at 322 million colones, or US\$37 million. Minor damages to tourism infrastructure account for 78 million colones, and the remaining 244 million are for indirect damages due to lower sales. These losses are expected to affect the balance of payments by US\$19 million due to decreased foreign sales. Reconstruction of minor tourism infrastructure will cost US\$10 million (see Table 19).

4. Environmental impact assessment

a) Definitions and methods used in environmental assessment

Natural disasters can cause moderate or serious damage to the environment, or even the partial or total deterioration of a natural heritage that provides society with environmental benefits. Quantifying the environmental impact of natural disasters on this heritage on the basis of relative indicators or in monetary terms is a relatively recent practice. This type of assessment has been applied, for example, in analysing the impact of El Niño (1997-1998) on Costa Rica,³⁵ of hurricane Georges on the Dominican Republic³⁶ and very recently on Honduras by hurricane Mitch.³⁷

The theory is that natural habitats or ecosystems are generally in a state of ecological balance; natural phenomena involving high energy dissipation are normal, although they may only occur once in several years or decades and affect geographical areas at random; these processes are believed to shape biosphere physiography over time. Their main impact is therefore on an ecosystem's sensitivity, depending on its geophysical characteristics and its environmental conditions, and its vulnerability to neighbouring regions with human settlements, particularly if such settlements lack appropriate preventive land-use measures and planned, sustainable management of natural resources.

This diagnosis is based on the average value of environmental services provided by forests in terms of carbon fixation, water protection and production, biodiversity, ecosystems and scenic quality. These values are relative, since economic assessment of the effects of damage on the natural environment still requires further studies, and other environmental services, such as soil, one of the most important, are not being taken into account. A preliminary assessment, carried out immediately after the emergency, was based on a rapid field study (by land and by air as far as possible) and on review and discussion of photographs and films, in addition to other preliminary information provided by technicians, specialists and government authorities, local NGOs (PRISMA, CEPRODE; Salva Natura, FUNDALEMPA, FUSADES), international cooperation programmes (World Bank, IDB, UNDP, AID, EU, among others) and international missions that are taking part in measures to address the emergency and optimize the country's recovery (UNICEF, PAHO and others).

The damage caused by hurricane Mitch (which turned into a tropical storm on entering Honduras) is measured as direct impact in this study, since it specifically altered natural assets through losses or serious damage in a few hours. Impacts are classified as primary and secondary; the primary impact is caused by the storm's *in situ* energy dissipation, whereas the secondary impact refers to subsequent, cumulative dissipation, such as the major flooding that occurred in densely populated alluvial valleys and near the rivers that run through them.

Two types of hurricane impact were defined:

³⁵ ECLAC (1998b), *El fenómeno El Niño en Costa Rica durante 1997-1998* (LC/MEX/L.363), 3 November.

³⁶ ECLAC (1998), *República Dominicana: Evaluación de los daños ocasionados por el huracán Georges, 1998. Sus implicaciones para el desarrollo del país* (LC/MEX/L.365), 4 December.

³⁷ ECLAC (1999), *Honduras: Evaluación de los daños ocasionados por el huracán Mitch, 1998* (LC/MEX/L.367), 26 January.

i) Immediate or primary direct impact (PDI) on the environment. This refers to the harmful or noxious impact of a large-scale natural phenomenon, which occur during the event itself and have a direct effect on the state of natural assets as they were when the disaster began. Examples include strong winds that knock down, twist and defoliate plants, disturb fauna, and produce large waves and groundswell; landslides and large-scale erosion of topsoil caused by heavy, sustained rainfall on mountain slopes (erosion is particularly strong when trees have fallen); and immediate erosion of beaches or coastal damage stemming from intense waves or from groundswell.

ii) Secondary direct impact (SDI) on the environment. In addition to their local impact, the direct effects can also have an impact on the vicinity and areas some distance away from where a disaster initially broke out; these may be felt immediately, in a few hours or even days later, with explicit damage caused in areas rendered vulnerable by human activities. Examples include landslides, the formation of gullies and ravines left barren by waterlogging of the topsoil after losing its original vegetation, large sedimentary deposits in river beds and estuaries, sedimentary deposits on beaches and reefs, the formation of river islands that subsequently flood, drowning animal species, and floods and avalanches, among others. These effects may be intensified by other factors resulting from primary direct damage, such as rivers dragging vegetation uprooted by gusts or sustained winds, mud and accumulated rubble from cave-ins and landslides.

iii) Indirect impacts (II) on the environment. These stem from the action of weather phenomena involving major energy dissipation, and their effects depend on the type and extent of primary and secondary direct impacts, both of which indirectly affect the condition of natural assets when the disaster struck. These consequences can arise as soon as the direct impact takes place, or may appear and continue over a period of days, months or even years. One example is the disappearance of nutrients in an aquatic system, thus causing changes in the food chain; another is the disappearance of seed, fruits or flowers, the food source of birds and mammals, owing to the lack of a habitat, such as a forest. Although a tree can regenerate and sprout new leaves when it has lost its branches in hurricane winds, it will take longer to flower and produce fruit. Additionally, the lack of natural insect predators, such as bats, when they have been driven from an area, owing to the lack of a forest habitat, encourages the proliferation of insects that could be harmful to crops adjacent to the forest or to riverbanks. The lost habitat could also have been producing pollinating insects or insects generally beneficial to the agricultural environment of neighbouring man-made surroundings.

b) Impacts on the environment prior to 1998: hydrometeorological events and impacts caused by man

El Salvador has suffered major damage from flooding throughout its history, with a cumulative total over 60 years (to 1994) of more than 360 deaths, 26,000 families directly or indirectly affected, more than 6,000 dwellings damaged or destroyed, almost 43,000 homeless and 17,000 hectares of damaged crops, as well as the loss of several thousand head of beef cattle (CEPRODE, 1994). Hurricane Mitch has tragically enlarged these figures. Furthermore, if the many small-scale disasters that take place every year were also officially recorded, the overall picture would undoubtedly be even bleaker. Certain studies have pointed to the vulnerability of areas near San Salvador, such as the middle and lower waterbasins of the Lempa River and Río Grande de San Miguel³⁸ and their coastal floodplains. Flows as high as 9,000 m³/s were registered in the late sixties,

³⁸ See, for example, UNDP/GOES (1982), *Doc. Básico N° 16*, El Salvador.

and a volume of just under 8,000 m³/s was recorded in 1974 in the wake of hurricane FiFi, double the volume that can normally cause flooding in the low-lying areas of La Paz, San Vicente and Usulután, and in the lower parts of San Miguel.

The middle or lower reaches of flood-prone areas near major rivers are not the only ones that suffer the onslaught of high waters (especially where there are human settlements); other smaller watersheds, such as the Chilanguera River—a tributary of the Grande de San Miguel, in the municipality of Chirilagua—have been highly vulnerable for almost two decades. The source of that river lies 6 km north of Chirilagua, and despite its short length (9 km), running from south to north, conditions are very conducive to disasters owing to run-off from the steeply sloping plots surrounding the small waterbasin and a clearly inadvisable use of land (CEPRODE, 1995).

This limited overview should be projected on a nationwide scale, bearing the following in mind: only 17 per cent of the country can be used for intensive agriculture and, as a result of inappropriate land use and the eradication of 85 per cent of forests, 75 per cent of the soil is undergoing sustained degradation (CEPRODE, 1995, p.17; CCAD, 1998). This situation will progressively affect agricultural yields, with consequences that have not yet been fully assessed. Furthermore, the amount of land protected or set aside as important for biodiversity conservation and production of environmental services is between 10 and 20 times less in El Salvador than in the country with the next least expanse of protected areas among the other Central American countries. It is worth noting that El Salvador still has large, healthy forested areas requiring prompt, major protection efforts, for the benefit of present, and particularly future generations; moreover, much more could be done through ecological restoration.

Human intervention in the environment ranges from the opening up of naturally forested but marginally productive lands—such as mountain slopes—and cultivation of stream beds and river terraces, to the opening of roads and the construction road and urban infrastructure, without taking into account environmental protection and land-use management measures (for agriculture and urban settlements), which are essential to reducing vulnerability and establishing a harmonious relationship between man and the environment. Unfortunately, such areas are generally the most sensitive to the forces of nature.

That situation poses the need for soundly planned reconstruction. The Salvadorian people are fully aware of this; the national press, for example, has expressed many pertinent opinions on important concepts that are already widespread in other areas of Central America. The following has been written: “a phenomenon like Mitch is compounded by a blend of factors that are beyond the environmental capacity of any region, but such storms have a far more severe effect on sites that are already ecologically damaged than on areas where the soil is protected by trees.” (Martínez, J. M., 1998, quoted in *SOS... reforestemos, El Diario de Hoy*, Sunday 15 November 1998, Medio Ambiente, page 3). Ernesto Leal, General Secretary of the Central American Integration System (SICA), has stated that “the Central American region should take a qualitative step forward in its development: it is not a question of remaining as we were before 20 October 1998, but rather that CA should be prepared so that no disaster ever happens again... have an infrastructure such that damage is much, much less severe” (quoted in *La Prensa Gráfica*, Sunday 22 November 1998, page 4C). In the opinion of various national experts, floods and landslides are not new to El Salvador, but they have been growing in magnitude over time as a result of the environmental vulnerability caused by human activities (*SOS... reforestemos, El Diario de Hoy*, 15 November 1998, pages 3 and 4). The generally accepted view is that problems posed by meteorological events will continue to worsen unless the

country, and Central America in general, develops a sound land-use and management policy to restore treeless, fragile mountain lands, halt and redirect disorganised urban development, and prevent the use of river beds and terraces for human settlement, among other aspects.

In this context, greater population density is inevitably leading to extensive, indiscriminate land use, with all the infrastructure and human activities it entails, and this will unquestionably increase vulnerability to natural disasters, unless alternative urbanization and resource-management approaches are taken. Furthermore, today's health, productivity and growth could be undermined "by under-investment in education and health and by uncontrolled deforestation, soil erosion and water and air pollution" (FUSADES, 1997, page 7).

This situation requires an action front to address prevention in every sense, because the population continues to grow rapidly, and with it, vulnerability. El Salvador's population is one of the densest on the continent and continues to grow relatively fast, with a higher average of births per woman in rural areas (five) than in San Salvador and other urban areas (a little over three); a notable drop in growth (almost 40 per cent) took place between 1978 and 1993 (PRISMA, 1995, page 7). The state of population growth must therefore be addressed in conjunction with land-use, nature conservation and environmental education policies and regulations, among others.

c) Direct impact on the environment of hurricane Mitch

Official information was very limited when this report was written. Flights over the main forested areas show that trees blown down are not a significant factor, as long as the timber can be recovered and used. Nevertheless, a value has been placed on the damage in this assessment, based on the ECLAC study group's observations and the preliminary assessment provided by government institutions such as the Ministry of the Environment and Natural Resources, the Ministry of Agriculture and Livestock, and NGOs such as Salva Natura, CEPRODE and PRISMA. In general the damages have been slight, but they should be considered and quantified. The impact on the timber industry has not been measured, nor is importance placed on the wind and ocean impacts produced by Mitch's more vigorous phases, in Honduras, for example.

i) Impact of rain. No major damage to natural assets has been reported following the direct primary impact of Mitch (Zepeda, E.L., Coordinator for Natural Assets, Ministry of the Environment and Natural Resources, personal note, 1998). However, the small amounts of damage reported, particularly to riverside forests, all add up and should be taken into account. Reports referring to El Imposible National Park (the country's largest conservation area, with the richest biodiversity) and the Ahuachapán mountains (Opaneca-Lamatepec Corridor) indicate negligible damage; only a few paths and access roads through areas affected by human activities were destroyed (Sources, J.E. and J.M. Álvarez, Salva Natura, personal note, 1998).

The riverside forests of the Chilanguera River watershed suffered very severe damage from the powerful high flows in that area (with devastating consequences on the inhabitants of the city); large, recently formed gullies in the Madre Cacao and El Mono hills were observed during an overflight. Inappropriate land use in the Jucoarán mountains has had an enormous impact in the area, in the form of major landslides. No specific reports have come in from the dam on Olomega lake. To the west, on the right bank of the Grande de San Miguel River, is the Jocotal Lagoon, an important

habitat for migratory fowl, whose volume increased, with repercussions even on the El Juco seaboard, but the damage is unknown.

A study will be needed to determine the volume of topsoil washed away during the course of the storm, evidently an enormous amount, although figures differ, the general assessment indicates that the country has sustained serious soil losses. FUSADES has calculated that between one quarter and one third of agricultural land, and around 83 per cent of fields on steep slopes, are affected by erosion (FUSADES, 1997, page 33), and has stated that “El Salvador’s chief export in gross tonnage, from which no profit is obtained, is the layer of fertile soil swept down the Lempa River into the ocean” (quoted by FUSADES, *op. cit.* 1997). In this regard it is also worth quoting the recent opinion (PRISMA, 1995, page 1) that “the current state of the environment in El Salvador and its increasing degradation are a threat to the country’s economic and political stability and a serious hindrance to future development”. According to studies carried out by the IDB on the effects of hurricane Georges in the Dominican Republic (Mora, S., personal note, 1998), 16 per cent—and up to 30 per cent in some sectors—of the general damage was due to the vulnerability caused by unsustainable use of land and natural resources, specifically from “deforestation, faulty design and inappropriate location of infrastructure, careless water management and conservation, watershed deterioration, overuse of land and other factors” (IDB, 1998, *op. cit.*). Although these estimates are preliminary and conservative, this factor should unquestionably be taken into account.

The direct but secondary consequences are clearly catastrophic, due to the high vulnerability of inhabited areas; the damage is described in other sections of this report. One reason why this assessment includes riverside ecosystems is that they are highly productive and have great potential for a possible ecological restoration of areas and corridors that are necessary in the country, but have been invaded and deforested, particularly as they pass through cities. If it becomes possible to promote a process of “re-vegetation” in El Salvador to provide environmental services, as has already been suggested (PRISMA, Newsletter N° 26, 1997), these forests and linear corridors could play an important role.

ii) Coastal ecosystems. Existing evidence shows a large deposit of mud and some debris on the southern coast, specifically in the risk areas described above, with sands washed away on El Cuco and El Espino Beaches, in the coastal area of the Jiquilisco Lagoon; in the former, a row of coconut trees suffered damage because of this effect; significant openings formed along the coastal strip to allow passage of currents of water from the plain. According to reports, the high tide coincided with the high water in the estuary, partly hindering the strongest outflow of the flood. An overflight of mangrove areas in the Lempa and Grande de San Miguel estuaries did not reveal serious damage, although a slight impact in Jiquilisco Bay and at the mouth of the Grande de San Miguel River was reported.

d) Indirect impact of Mitch on the environment

Since only three weeks have passed between the hurricane and this study, the effects that damage to plants, fallen fruit in forests and loss of foliage may have had on birds and mammals is still unknown; in fact the food sources (seeds, fruits, etc.) of various species are as yet unknown.³⁹ No

³⁹ This topic is mentioned here because of the interest it could awaken in the country’s academic circles.

information is available either on the status of small species (batrachians and fish) that are the food sources of mammals, reptiles and other creatures, owing to possible alterations in wetlands (Olomega and Jocotal Lagoons), or on depredation by batrachians (insects, mosquito larvae, etc.) and bats (insects). Certain processes may even have beneficial effects on public health. These unknown factors highlight the importance of scientific studies that are of great practical value.

This study also places emphasis on including the environmental value lost in rivers (see previous section), since they are highly productive ecosystems that extend throughout the country's farmlands. Other effects on important and valuable aspects of these habitats could be occurring or will occur, and should be studied. Research conducted in Guanacaste National Park, Costa Rica, has shown that the environmental services provided by protected areas to singlecrop farming are highly beneficial.

e) Calculation of environmental damage

In addition to covering agriculture, health, housing and other sectors, an economic assessment of the damage caused by hurricane Mitch should also consider the effects on natural assets of the loss of benefits provided by natural areas. "Environmental services" are benefits derived from natural ecosystems, such as timber, the genetic bank, medicinal plants and biodiversity in general, carbon fixing, oxygen production, soil protection, water production, and scenic and recreational areas; it is becoming widely accepted that such services should be paid for, since they are necessary for sustainable development now and in the future. The Central American area has become one of the most successful in applying "joint implementation" projects. Although not all the countries of the region have offices to develop this mechanism, 12 proposals⁴⁰ have been put forward, and further interest in this topic is expected, making use of the economic advantages of compensation for emission-absorption of greenhouse gases. Promotion of a "re-vegetation" process in the country could be supported by a system of payment for environmental services, as well as by "the joint-implementation opportunities that are opening up, which are an alternative to incentives for large-scale forestry production" (PRISMA, Newsletter N° 26, 1997, page 12).

This is a new market or export product that is being used to fund environmental conservation and sustainable development. This system is emerging as an opportunity for El Salvador in terms of ecological restoration of lands with potential use for protection. Honduras is considering the possibility of joining the Isthmus Group (SETCO, SAG, AFE-COHDEFOR, SERNA and others, *Forestry Agenda of Honduras, Priorities of the Forestry Subsector of Honduras, 1998-2002*, document for internal discussion, Tegucigalpa M.D.C., August 1998, page 52); Project for the Establishment of a Joint Implementation Office in Honduras, funded by the Canadian International Development Agency (CIDA); Zelaya, Sergio A., personal note, November 1998).

Four types of environmental services are considered in this assessment: 1) reduction of greenhouse gas emissions; 2) protection of water for urban, rural or hydroelectric purposes; 3) protection of biodiversity as a valuable genetic resource for future development and global stability, sustainable scientific and pharmaceutical uses, and genetic research and improvement; and 4)

⁴⁰ CCAD (Central American Commission on Environment and Development), 1998. *Estado del ambiente y los recursos naturales en Centroamérica 1998*, Rodríguez, J., coordinator, San José, Costa Rica.

protection of ecosystems, living organisms and natural scenic beauty for scientific, tourism and environmental education purposes. Some countries are issuing forestry conservation bonds as an important means of maintaining these services and ensuring ongoing production, thereby compensating the owners of environmental resources for the use of environmental services that benefit society. These bonds are for a minimum of 20 years and are a recent instrument since they were not previously available on the stock market.

One way of appraising the environmental damage caused by Mitch is to estimate the environmental benefits provided by an ecosystem in complete balance. Reference is made to the studies used by ECLAC (1998) to assess the environmental damage from the effects of El Niño,⁴¹ and to recent assessments carried out in the Dominican Republic.⁴²

Table 20 shows average values for each type of service. The values estimated by the ECLAC team for this assessment are featured on the right hand side of the table and are very similar to those of Zelaya (personal note, November 1998, Project to Create the Honduras Joint Implementation Office).

Table 21 shows damage to the natural heritage in annual terms and over a period of 20 years. Although total recovery time has not been established in many cases, approximate figures have been included; the estimated recovery period ranges from 15 to 20 years. The overall cost of damage is estimated at US\$7 million, without including an annual discount for differentiated carbon absorption, but as a first approximation the average is appropriate.

⁴¹ ECLAC (1998b), *op. cit.*, based on Carranza, *et al.* (1996), *Valoración de los servicios ambientales de los bosques de Costa Rica* (CCT/ODA/MINDA), San José, Costa Rica, Centro Científico Tropical; and Echeverría, J., *et al.* (1997), *Valoración económica de los beneficios del Área de Conservación Guanacaste* (CCT/PNUD), San José, Costa Rica, Centro Científico Tropical.

⁴² ECLAC (1998), *op. cit.*

Table 20

EL SALVADOR: FOREST DESTROYED BY THE EFFECTS OF RIVER FLOODING
AS A RESULT OF TROPICAL STORM MITCH

Type of area (extension)	Direct impact a/ and percentage of trees blown down, destroyed or swept away	Observations
Areas protected or in the process of protection (1,000 km ²)	Minimum (M-L), 1	Protected hilltops suffered very little damage while agricultural border areas sustained enormous damage (approx. 1:10)
Riverside forests (18,000 ha) b/	Very serious (L), 80	Impact from swells, rock deposits, boulders, sand and silt

Source: ECLAC, own estimate based on local mapping information (Geographical Information System of the Ministry of the Environment of El Salvador and the PRISMA organization).

- a/ As defined in this study. Minimum = Minor impact, Very serious = Major damage due to winds or flooding; (M) = Damage with recovery over the medium term, (L) = Damage with recovery over the long term.
- b/ Enjoy certain traditional protection; about 20 per cent of the middle and upper basins watershed of Lempa tributaries have been affected by human intervention.

Table 21

EL SALVADOR: AVERAGE VALUES OF ENVIRONMENTAL FORESTRY SERVICES

(Dollars per hectare per year)

Environmental service	Primary forest a/	Secondary forest a/
<u>Total</u>	<u>58</u>	<u>41.76</u>
Carbon fixing	38	29.26
Water protection	5	2.50
Biodiversity protection	10	7.50
Ecosystem protection	5	2.50

a/ Based on: Echeverría *et al.* (1996), Carranza *et al.*, (1995), *op. cit.*: values for Costa Rica.

River and riverbank systems —fairly well protected areas in El Salvador— have also been taken into account and should be assessed, since they were affected nationwide as a result of the high flows. Estimates indicate that 1,500 kilometres of rivers with watercourses on a scale of 1, 2 and 3, 20 per cent of which have been altered by human interference (fragmentation, destruction, logging, etc.) were affected. River and riverbank systems are highly productive and their value may be underestimated, since they run through agricultural and livestock-raising areas and produce important benefits.

i) Carbon dioxide fixation. CO₂ absorption from the atmosphere through photosynthesis is a crucial link in the biogeochemical carbon and oxygen cycle. This process of accumulation as

organic plant matter helps to prevent carbon dioxide levels from rising while simultaneously producing oxygen, for which highly industrialised countries are willing to pay to compensate for their own gas emissions. The loss of environmental services from the organic dysfunction of forests washed away (in the alluvial gullies of medium and high sub-basins) is taken into account in the calculations; such carbon will return to the atmosphere through rotting or burning, since it cannot be made use of except in certain cases.

ii) Water protection. The qualitative and quantitative protection of forests has different repercussions on their water cycle, depending on physiography, land quality, amount of incoming and outgoing water, seasonal flows, erosion, sedimentation, nutrient flows, etc. The value of brush areas is negligible.

iii) Biodiversity protection. Biodiversity provides innumerable benefits for science, recreation, the pharmaceutical industry, pollinating species, insect and pest control, genetic heritage, etc. The time taken for the environment to recover from damage to biodiversity is still not known precisely.

iv) Protection of ecosystems and natural scenic beauty. This category covers numerous subjects: biocenosis protection, ecological processes, corridors, recreation, tourism, etc., and is closely associated with the previous section. This value could be underestimated, for instance in the El Imposible forest, unique on the western coast of Central America, which covers a very important sector of very humid subtropical forest (*sensu* Holdridge).

The last important factor in this calculation concerns the intrinsic value of an ecosystem, since it is what provides environmental services. Damaged forests are considered a lost service, at least in the amount that will no longer be earned until the ecosystem returns to full production.

f) Short-term projection

If human activities that make use of the environment are carried out without taking into account their possible adverse consequences on natural resources, they will almost certainly affect the stability or sustainability of natural resources by making them more susceptible to alteration and destruction when the environment suffers the impact of a natural disaster. In other words, human technological activities can easily worsen the effects of natural disasters by increasing vulnerability. Moreover, if human settlements are not planned, do not take into consideration land-use management, prevailing biophysical factors and the risk involved in settling in high-risk areas, vulnerability increases in direct proportion to the lack of foresight.

For example, a basin that has been placed under strain through construction, road building, extensive farming, logging in natural forests, etc. will be unable to absorb exceptional, prolonged amounts of rainfall as well as it would under conditions of controlled and planned use. Water flows will be lower than their natural minimum during the dry season and rise excessively when it rains, even when there are no extraordinary weather patterns. If the dry season lasts longer than usual, groundwater storage will be insufficient; conversely, when there are large amounts of rainfall, the water flowing through the destabilised basin will be excessive. Either situation can be disastrous.

Another example is excessive population growth, a factor that heightens the impact of any disaster when a human settlement is located in an unstable area that can be devastated by the effects of exceptional natural phenomena. Here the consequences of a natural impact are multiplied by man's alteration of environmental conditions, by the precarious living conditions of victims (such as poorly constructed housing built on slopes subject to landslides), and by causes stemming from a lack of foresight, management and social improvement.

Urban planning, land-use management, land conservation measures, environmental restoration, structural prevention measures for roads, bridges, reservoirs and other works, and any other technical measures designed to change or improve a natural setting within a framework of sound and respectful use of the environment and the laws of nature are certain to improve the quality of life through sustainable development. These aims require scientific research, databases on natural phenomena and early-detection measures whenever possible, as well as continuous education to create awareness of environmental management in society (central section of chart 3) and provide an orderly response to natural disasters. Only thus will the necessary order be achieved to ensure sound use of the environment in urban matters, overland communications, land use and environmental protection (right-hand section of chart 3). These actions are in fact long-term preventive measures and will help to streamline efforts and improve coordination during the initial stages of an emergency, particularly if the country has good warning and civil-defence mechanisms (left-hand section of chart 3).

A number of important ideas and projects are being developed in El Salvador in this regard. Several organizations are devoting their efforts and part of their work to this cause. The Ministry of the Environment and Natural Resources recently launched a proposal for a set of regulations that could be the basis for implementing the new Law on the Environment. The Departmental Plan for Environmental Management of Chalatenango is worth mentioning as an example of the country's professional maturity in this field, relying on the decisive participation of the communities involved in the comprehensive environmental development of such a strategic region. Environmental management of the greater Lempa valley would undoubtedly have positive consequences, not only nationally but in the rest of the Central American Isthmus (Launching of the Departmental Plan for Environmental Management of Chalatenango, UNDP Auditorium, 26 November 1998).

Measures taken during the reconstruction stage following a natural disaster should be added to everyday conservation activities, so as to achieve an optimum approach to sustainable development. Government and international agencies have stated the need for a change of attitude in dealing with natural disasters, focusing on disaster prevention, reduction of vulnerability and early warning. The International Decade for Natural Disaster Reduction has undertaken the task of incorporating multidisciplinary approaches in order to gain further understanding of the actions needed to deal with these phenomena.

Table 22

EL SALVADOR: ESTIMATE OF THE DAMAGE CAUSED BY TROPICAL STORM MITCH TO ENVIRONMENTAL SERVICES IN PROTECTED OR PARTIALLY PROTECTED AREAS

Type of area (percentage of average damage)	Affected area (km ²)	Equivalent total damage (km ²) a/	Cost (thousands of dollars per year) d/					Annual total	Total d/
			CO ₂ capture	Water protection	Biodiversity	Ecosystem protection			
<u>Total</u>	<u>322</u>	<u>60.1</u>	<u>228.5</u>	<u>30.05</u>	<u>60.1</u>	<u>30.05</u>	<u>348.7</u>	<u>6.974</u>	
Areas protected and selected for protection (1) b/	250	2.5	9.5	1.25	2.5	1.25	14.5	290	
Riverside forests (80) c/	72	57.6	219	28.8	57.6	28.8	334.2	6.684	

Source: ECLAC estimates.

a/ The area equal to total destruction based on actual area and percentage of trees fallen or swept away was calculated for each area.

b/ Indicated on the Map of Protected Areas and Coffee Cultivation Zone, El Salvador Environmental Programme, Environmental Information System; State of Natural Resources and the Environment in Central America, 1998. CCAD.

c/ Human interference in riverside forests was estimated at 20 per cent and does not include the lowest part of the lower basin and estuary of the main rivers (Lempa and San Miguel), given the extent of the flooding and the high vulnerability of those stretches. The system was preliminarily estimated at 1,800 km.

d/ The overall cost for a 20 year recovery period is approximately US\$7 million.

5. Summary of damages

Calculations carried out by analysing the information available show the total damages caused by Mitch in El Salvador to be US\$388 million. Of these, US\$169 million (45 per cent) are for direct damage to assets, while the other 219 million refer to indirect damages affecting economic flows.

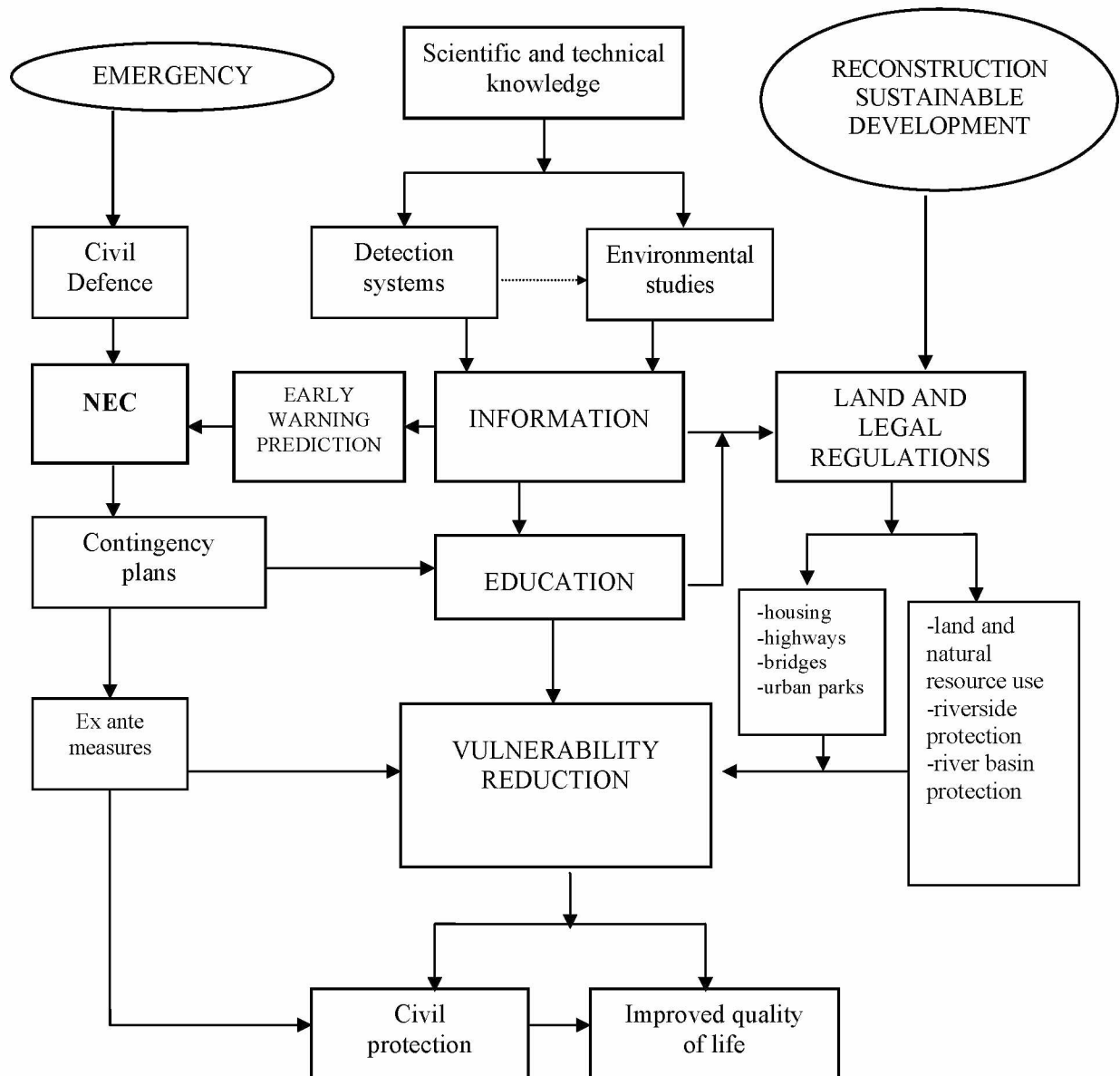
The total damage is equivalent to 6.4 per cent of the country's GDP, which shows that although the damage is substantial, an economy the size of El Salvador's can deal with their effects, providing adjustments are made and cooperation and appropriate financing conditions are forthcoming.

The following summary of the damages provides a better understanding of how the hurricane affected El Salvador's economy:

Type of damage	Amount in millions of dollars	Percentage
Loss of assets	82.8	21
Production losses	245.1	62
Higher costs	49.6	12
Other expenses	20.6	5

Chart 3

POSITIVE LINKAGE FOR INFORMATION, REACTION AND DEVELOPMENT PROCESSES TO REDUCE VULNERABILITY AND PROMOTE SUSTAINABLE DEVELOPMENT



It is clear that Mitch mainly affected production and, to a lesser extent, capital assets. Moreover, it caused the cost of many services to rise, especially overland transport. The other costs refer to those needed to deal with the emergency.

The type of damages caused by the disaster are easier to understand on comparing them with certain macroeconomic variables. Firstly, damage to property is estimated at 36 per cent of construction sector GDP, which suggests that reconstruction efforts will not exceed national installed capacity and should be completed in a relatively short period, two years or a little longer. Secondly, production losses amount to 4 per cent of GDP, which provides an idea of the scale of the damage.

The following summary shows the most affected sectors:

Sectors	Amount in millions of dollars	Percentage
Production sectors	269.2	69
Infrastructure	74.3	19
Social sectors	37.6	9
Environment	7	2

There can be no doubt that productive sectors were worst affected (69 per cent of total damage), followed by infrastructure (19 per cent), social sectors (10 per cent) and the environment. A more detailed break-down shows that the worst affected was the agricultural sector (26 per cent of total damage), followed by industry (19 per cent), road transport (18 per cent), livestock (13 per cent) and commerce (10 per cent). Nevertheless, the damage to social sectors —9 per cent of the total— is more significant because it has a direct effect on low-income groups, by reducing their already low standard of living. These social groups, composed mainly of subsistence farmers and inhabitants of poor urban areas, have not only lost their few belongings, but their income and livelihoods have disappeared or been substantially reduced. It must be recalled that many of the victims and homeless are women and children, many of whom have become widows and orphans. Furthermore, since men have gone elsewhere in search of work and income, women have had to become heads of households, giving them less time to earn income and fulfil their household responsibilities. Addressing these social problems must be a top priority on designing and carrying out reconstruction programmes.

These programmes will require an estimated investment of US\$155 million over a period of at least two years. During this period, there will be a negative effect on the country's balance of payments and trade —owing to a drop in agricultural, livestock and industrial exports, and an increase in imports of reconstruction materials and equipment and the fuel to sustain higher transport costs— estimated at US\$73 million. This will put pressure on El Salvador's foreign sector, as shown in the following section.

Table 23 shows details of the estimated damage to the whole country, divided into the sectors mentioned above.

Table 23

EL SALVADOR: SUMMARY OF DAMAGES CAUSED
BY HURRICANE MITCH

(Millions of dollars)

Sector and subsector	Total damage	Direct damage	Indirect damage	Cost of reconstruction	Effect on balance of payments
<u>National total</u>	<u>388.1</u>	<u>169.4</u>	218.7	<u>154.6</u>	<u>72.9</u>
<u>Social sectors</u>	<u>37.6</u>	<u>17</u>	<u>20.6</u>	<u>67.4</u>	<u>14.2</u>
Housing	13.6	5.6	8	48.2	8.7
Health	11.6	1.7	9.9	4.3	1.2
Education	12.4	9.7	2.7	14.9	4.3
<u>Infrastructure</u>	<u>74.3</u>	<u>24.7</u>	<u>49.6</u>	<u>37.7</u>	<u>51.2</u>
Transport and communications	70.4	22.1	48.3	29.7	49.7
Energy	0.4	0.1	0.3	0.3	0.3
Water and sewerage systems	2.4	1.4	1	4	1
Irrigation and drainage	1.1	1.1	...	3.7	0.2
<u>Productive sectors</u>	<u>269.2</u>	<u>120.7</u>	<u>148.5</u>	<u>42.5</u>	<u>7.5</u>
Agriculture	101.9	95.2	6.7	24.9	2.5
Livestock-raising	52.1	13.5	38.6	4	1
Fisheries	4.3	3	1.3	1	0.2
Industry	73.9	...	73.9
Commerce	37	9	28	12.6	3.8
<u>Environment</u>	<u>7</u>	<u>7</u>	...	<u>7</u>	...

Source: ECLAC estimates.

III. OVERALL EFFECTS OF THE DAMAGE

1. Recent economic development

After ten years of war, during which per capita GDP was 25 per cent lower than in 1980, the country entered into a period of recovery (1990-1995) which was characterized, first of all, by steady growth and a rise in per capita GDP spurred by private consumption and, to a lesser degree, by the growth of exports of goods and services. Secondly, greater trade liberalization had a positive effect on the ratio of foreign trade to GDP, which rose from 50 per cent in 1990 to 79 per cent in 1995. The investment coefficient rose 9 GDP points (24 per cent), mainly financed by national savings. Foreign savings played a decreasing role in this process.

Agricultural output was not very dynamic; its share dropped almost 4 per cent in relation to the total. This was due to the loss of capital investment in previous years and the effects of the war in general; in 1998 the value added in the agricultural and livestock sectors was 23 per cent lower than in 1979. Conversely, trade showed steady growth and became the sector with the highest share of GDP.

The unemployment rate gradually decreased to 7.7 per cent in 1995; the low productivity of agricultural workers in some urban sectors continued to be expressed in terms of underemployment and migration abroad.

Despite the favourable performance of the economy, a structural problem remained extant, this being the unequal distribution of the results of economic growth; real wages fell 9 per cent between 1990 and 1995, and a considerable part of the population continued to live in poverty.

Foreign trade was given impetus by trade liberalization policies; at the end of 1995 the volume of exports had doubled in comparison to 1990 and the supply of imported goods had grown at an even higher rate. This was aided by family remittances from abroad and relatively favourable terms of trade; non-traditional exports rose to 75 per cent of the total, with the in-bond processing industry showing a particularly significant share. Sales to Central America, although very strong, accounted for a smaller percentage of total exports.

The growing imbalance in goods and services trade was largely compensated for by the influx of family remittances, so the current-account deficit was reduced during the period. The current account in the balance of payments deteriorated in 1995, in spite of the growth of exports, due to a sharp increase in imports to replace stocks of consumer goods and machinery and equipment for industry, transport and construction.

The exchange rate remained overvalued due to the high influx of family remittances from abroad, while international reserves rose. The foreign-debt balance reached US\$2.243 billion, and servicing ratios improved significantly. Foreign-debt servicing as a proportion of exports of goods and services dropped from 27 to 14 per cent and showed positive net flows.

Table 24

EL SALVADOR: SOME LEADING ECONOMIC INDICATORS

	1996	1997	1998		1999	
			Before disaster	After disaster	Before disaster	After disaster
Gross domestic product						
Value a/	50,137.8	52,140.7	54,201.9	54,132.4	56,346.0	55,775.5
Growth rates	4.0	4.0	4.0	3.8	4.0	3.0
Per capita GDP b/	15,647.5	16,529.9	17,227.0	16,972.9	18,109.0	17,697.0
Exports of goods fob b/	1,788.2	2,414.2	2,469.7	2,468.7	2,609.1	2,603.4
Imports of goods fob b/	3,032.1	3,512.7	4,114.7	4,124.2	4,434.7	4,491.4
Consumer prices c/	9.8	4.5	3.1	4.0	4.5	2.5 - 4.5
Government current revenues d/	12,077.9	11,978.1	13,055.3		13,064.9	
Total government expenses d/	14,069.7	13,534.1	15,679.4		15,127.7	
Fiscal deficit (percentage of GDP) d/	2.0	1.1	1.6	2.2	2.2 - 3.0	3.0
Net internal credit	33,925.2	36,703.7				
			<u>Millions of US\$</u>			
Current account balance	-171.6	-95.9	-201.0	-162.9	-281.3	-246.3
Change in international reserves e/	-164.9	-362.6	-400.0	-237.9	-120.0	-9.4
Disbursed public foreign debt	2,517.4	2,679.7	2,642.0	2,642.0		
Foreign debt servicing	370.1	860.9				

Source: Official ECLAC data and Central Reserve Bank of El Salvador, 22 December 1998.

a/ Millions of constant colones.

b/ Millions of current colones.

c/ Average annual variations.

d/ Millions of current US\$.

e/ (-) means increase.

Inflation continued to drop as a result of restrictive fiscal and monetary policies and food imports, particularly basic grains.

The growth rate fell off in 1996 (1.8 per cent) due to the fall in coffee prices, the decreased purchasing power of other Central American economies, lower remittances and a restrictive monetary policy. The Mexican crisis also caused uncertainty among investors. Public investment was increased in June to prevent the growth rate from dropping further, and this, together with stagnating tax revenues due to sluggish economic activity, increased the fiscal deficit (2 per cent of GDP). Inflation remained at a similar level to 1995.

In 1997 the economy recovered the growth rates of the previous few years; GDP rose 4 per cent (1.7 per cent per capita) as a result of exports and private investment, with manufacturing, trade and financial services showing particularly strong growth. Agricultural production nevertheless continued to decline, although beans, rice and gama grass showed an upturn for the second consecutive year.

In foreign trade exports grew significantly, particularly in terms of volume (33 per cent) and overtook import growth, which, coupled with an increase in transfers (10 per cent of GDP), resulted in a positive current account in the balance of payments. The capital account has covered current deficits since 1993 and has also helped to increase international reserves; foreign direct investment levels have gradually begun to rise. The exchange rate continued to appreciate.

The consumer price index dropped by more than half (4.5 per cent), whereas the food price index reached 4.3 per cent. Blue-collar workers' wages continued to deteriorate; real wages were 30 per cent lower on average than in 1978, particularly coffee-harvesting wages, which were 16 per cent lower. Open unemployment stood at 8 per cent.

Greater control of current expenditure led to increased savings and a decline in capital outlays, reflected in a lower deficit to GDP ratio (1.1 per cent); the deficit was financed with external funds as in previous years.

During the nineties monetary policy has encouraged credit to the private sector while tightening public credit, so as to spur sustained growth levels in private investment and enterprise. The policy remained in force in 1997, as did measures to staunch excessive foreign-currency inflows through monetary management and monetary stabilization certificates.

2. Economic performance in 1998 prior to the disaster

A sustained economic recovery was expected to continue in 1998. GDP was forecast to grow 4 per cent and per capita GDP by 1.8 per cent, spurred by real investment and in-bond exports. The agricultural sector was showing signs of recovery and basic-grain yields were expected to be favourable. Industry was growing at a rate of 5 per cent, with particularly strong growth in construction. Prospects in the business sector were very positive, although commerce and construction were beginning to slow down.

The foreign sector was performing favourably. Remittances from families living abroad were substantial (the equivalent of 56 per cent of income from goods exports). Capital inflows were more than sufficient to cover the current account deficit, and net international reserves were rising — US\$1.8 billion at the end of September—, or the equivalent of almost eight months of imports. Debt indicators were among the soundest in Latin America, and public debt was being reduced. Foreign debt servicing amounted to approximately 16 per cent of exports, and the country had maintained positive flows with multilateral banks for several years.

Monetary policy, coupled with fiscal measures, was accomplishing its aim of financial stability. In October, the consumer price index had increased just 1.9 per cent in 12 months, while the nominal exchange rate remained stable and had improved in real terms. Interest rates were showing a downward trend.

Table 25

EL SALVADOR: SUMMARY OF DAMAGE TO THE FOREIGN SECTOR

(Millions of US\$)

Sector/subsector	Drop in exports	Increase in exports	Effect on balance of payments
Total	6.7	66.2	72.9
Social sectors		14.2	14.2
Housing		8.7	8.7
Health		1.2	1.2
Education		4.3	4.3
Infrastructure		51.2	51.2
Energy		0.3	0.3
Water and sewerage systems		1.0	1.0
Irrigation and drainage		0.2	0.2
Transport and communications		49.7	49.7
Economic sectors	6.7	0.8	7.5
Agriculture, livestock and natural resources			
Agriculture	2.5		2.5
Livestock	1.0		1.0
Aquaculture and fisheries	0.2		0.2
Industry			
Commerce	3.0	0.8	3.8

Source: ECLAC, based on official figures and own estimates.

Public finances were improving; tax revenue —particularly from value-added (VAT) and income taxes— increased 7 per cent to September, despite the inefficiency of tax collection. Recurrent expenses increased (8 per cent), while capital outlays diminished, so the non-financial public sector deficit was lower than expected. Sales of public assets raised capital income levels and foreign investment flows, and the domestic debt balance continued to decrease.

The weak spot in the country's situation was still inequity and falling income levels among subsistence farmers, low-income wage earners and people working in the informal economy, whose consumption levels would have fallen dramatically had it not been for highly significant remittances from relatives abroad. Employment levels grew at a higher rate than 1997, especially in industry, construction and the financial sector. The minimum wage was raised 9 per cent in May (for the first time since 1994), but barely improved real wages, which are still 22 per cent lower than they were in 1988, even after the raise. In urban areas it would have taken 60 days of work paid at the current wage level to purchase a large basic basket of goods.

In short, when the hurricane struck El Salvador's economy was relatively stable, with moderate growth and a steady exchange rate and prices. The country's external position was solid and remittances continued to increase, albeit at a lower rate; the current account imbalance in the balance of payments stood at 1.7 per cent of GDP and was easily covered by capital inflows, which also led to an increase in international reserves. Although it was rising, the fiscal deficit remained low for the fifth consecutive year, despite the low tax burden and inefficient revenue collection, thus reflecting the effectiveness of monetary policy.

3. The situation after hurricane Mitch

a) Overall economic effects of the disaster

Fortunately the hurricane only affected parts of the country and certain productive sectors. Capital losses were valued at US\$180 million and mainly affected the agricultural sector, and transport to a lesser extent. In terms of productive activities, the hurricane had the strongest impact on industry and on livestock raising losses (see Table 26). The agricultural loan portfolio was affected in the financial sector.

Table 26

EL SALVADOR: LOSSES IN GROSS VALUE AND IN VALUE ADDED OF GOODS AND SERVICES PRODUCTION

(Millions of US\$)

	Total	Gross production value		Value added	
		1998	1999	1998	1999
Commodities sector	46.6	6.7	39.9	4.9	29.1
Agriculture, hunting, forestry and fisheries	46.6	6.7	39.9	4.9	29.1
Agriculture	6.7	1.0	5.7	0.7	4.2
Livestock	38.6	5.5	33.1	3.8	22.8
Fisheries	1.3	0.2	1.1	0.1	0.8
Utilities sector	75.2	0.2	75.0	0.1	36.0
Manufacturing industry	73.9	0.0	73.9	0.0	35.0
Electricity and water	1.3	0.2	1.1	0.1	0.5
Energy	0.3	0.0	0.3	0.0	0.1
Water and sewerage services	1.0	0.1	0.9	0.1	0.4
Irrigation and drainage	...				
Services sector	96.9	13.8	83.1	10.1	60.8
Trade, restaurants and hotels	28.0	4.0	24.0	3.0	18.1
Transport and communications	48.3	6.9	41.4	4.6	27.8
Housing ownership	8.0	1.1	6.9	1.1	6.6
Social and community services	12.6	1.8	10.8	1.4	8.3
Gross domestic product	218.7	20.7	198.0	15.1	125.9

Source: ECLAC estimates to 22 December 1998.

The secondary effects of hurricane Mitch were relatively limited in macroeconomic terms and were added to other circumstances that did not favour economic growth. Firstly, although the international financial crisis has not affected the country, the continued growth of its main trading partner is not encouraging greater investment in El Salvador.

Secondly, the damage sustained by El Salvador's neighbouring countries could reduce its exports to such countries. Thirdly, the upcoming presidential elections appear to be keeping investors on hold, and fourthly, problems in the administration of justice, corruption and high crime rates tend to have an adverse effect on productive activities. The hurricane's effects added to these factors, giving rise to uncertainty and reducing the economy's momentum.

b) Effects on economic growth and employment

During the first 10 months of 1998 trade and agriculture registered a downturn, which, coupled with the hurricane's effects on productive activities—mainly farming—reduced expected GDP growth from 4 to 3.8 per cent. Agriculture will stagnate due to losses in basic grains. Default rates will rise in the financial sector because of the cumulative damages in agriculture: the drought caused by El Niño, normal production losses, and flooding caused by the hurricane (see Table 27).

In 1999, growth of total value added will depend on the following favourable factors: an increase in construction stemming from the damages caused by the hurricane; the reconstruction will place emphasis on technological change and thus revitalize the productive sectors; family remittances will probably rise in response to victims' needs, and private investment should increase after the elections.

In contrast, other adverse circumstances will tend to restrict GDP growth; coffee exports and exports of industrial products to other Central American countries will fall off, whereas food imports will rise. Here there could be a contrary trend owing to the growing demand in Honduras and Nicaragua for goods used in reconstruction activities. In short, GDP will grow 3 per cent, as against forecasts of 4 to 5 per cent.

Agriculture is undercapitalized, as mentioned earlier, and has not been promoted by economic policy, but may be boosted through credit to expand basic-grain croplands. Construction will show more vigorous growth as more housing is built and highways and roads in affected areas are repaired.

c) Effects on the foreign sector and the balance of payments

Slight growth was forecast for exports affected by low coffee prices, which could not be offset by non-traditional exports to Central America. The hurricane will have two effects: a reduction in coffee exports and a downturn in sales to the rest of Central America. Exports of goods are therefore likely to grow by 2.2 per cent in 1998.

Table 27

EL SALVADOR: EFFECTS OF THE DISASTER ON THE ECONOMIC GROWTH RATE

(Millions of constant 1990 colones)

	Projections						Growth rates						
	1997	1998			1999			1998			1999		
		Before the disaster	After the disaster	the disaster	Before the disaster	After the disaster	the disaster	Before the disaster	After the disaster	the disaster	Before the disaster	After the disaster	the disaster
Gross domestic product	52,140.7	54,202.0	54,132.4	55,775.4	55,788.4		4.0	3.8		4.0		3.0	
<u>Commodities sector</u>	<u>18,486.3</u>	<u>19,573.2</u>	<u>19,550.3</u>	<u>20,460.1</u>	<u>20,147.6</u>		<u>5.9</u>	<u>5.8</u>		<u>4.6</u>		<u>4.5</u>	
Agriculture	6,827.4	7,096.7	7,073.7	7,320.7	7,176.1		3.9	3.6		3.2		1.5	
Working of mines and quarries	227.0	239.5	239.5	246.6	246.6		5.5	5.5		3.0		3.0	
Manufacturing industry	11,431.9	12,237.07	12,237.1	12,892.8	12,724.9		7.0	7.0		5.4		4.0	
<u>Utilities sector</u>	<u>12,628.4</u>	<u>12,891.1</u>	<u>12,877.3</u>	<u>13,287.1</u>	<u>13,207.9</u>		<u>3.1</u>	<u>2.0</u>		<u>3.0</u>		<u>3.0</u>	
Electricity and water	331.0	349.3	349.1	366.9	366.1		5.5	5.5		5.1		4.9	
Construction	1,974.2	2,047.2	2,047.2	2,110.7	2,110.7		3.7	3.4		3.1		3.1	
Transport, storage and communications	10,323.2	10,494.6	10,481.0	10,481.0	10,731.1		1.7	1.5		3.0		2.4	
<u>Services sector</u>	<u>17,944.8</u>	<u>18,498.4</u>	<u>18,467.9</u>	<u>19,207.0</u>	<u>19,030.5</u>		<u>5.5</u>	<u>2.9</u>		<u>3.8</u>		<u>3.0</u>	
Commerce, restaurants and hotels	3,975.8	4,249.4	4,229.6	4,568.1	4,452.9		6.9	6.4		7.5		5.3	
Banks, insurance and other financial institutions	1,727.8	1,762.4	1,762.4	1,824.0	1,824.0		2.0	2.0		3.5		3.5	
Real estate and lending services to companies a/	1,747.5	1,782.5	1,782.5	1,836.0	1,836.0		2.0	2.0		3.0		3.0	
Housing ownership	4,603.9	4,695.9	4,690.4	4,789.9	4,758.3		2.0	1.9		2.0		1.4	
Community, social, personal and domestic services b/	2,895.3	2,998.7	2,993.5	3,119.3	3,089.6		3.6	3.4		4.0		3.2	
Government services	2,994.5	3,009.5	3,009.5	3,069.7	3,069.7		0.5	0.5		2.0		2.0	
Plus direct tax	3,081.2	3,239.3	3,236.9	3,391.8	3,389.4		5.1	5.0		4.7		4.7	

Source: ECLAC estimates, based on Central Bank of El Salvador data, 22 December 1998.

a/ Includes leasing and use of non-residential real estate, professional legal and accounting, auditing, data processing, tabulation, architectural and publicity services.

b/ Includes private education and health-care services and other services such as veterinarian, associations, etc.

Imports could increase in view of the need to purchase staples to ensure supply. The current-account deficit would rise slightly, but this would be amply covered by capital inflows and allow a new increase in international reserves.

One possible development in 1999 could be a drop in the growth rate (5.4 per cent) of exports of goods and services. Sales to Central America could increase in response to reactivation programmes in Honduras and Nicaragua and because of the increase in in-bond exports. This could be partly offset through higher imports of goods. Public and private transfers could rise in support of reconstruction activities, as a result of which the balance of payments current-account deficit may be higher than in 1998. Nevertheless, inflows of official capital would rise because of the funds earmarked for reconstruction, resulting in a further rise in international reserves, which could reach around US\$1.9 billion in 1999.

Table 28

EL SALVADOR: GROSS VALUE OF PRODUCTION AND VALUE ADDED
IN GOODS AND SERVICES, INCLUDING LOSSES
CAUSED BY THE HURRICANE

(Millions of constant colones)

	1997	Value added including losses a/			
		1998		Percentage	
		Before the disaster	After the disaster	1998	1999
Total	52,140.7	54,132.4	55,775.5	3.8	3.1
Commodities sector	6,827.4	7,073.7	7,176.1	3.6	1.5
Agricultural	6,827.4	7,073.7	7,176.1	3.6	1.5
Utilities sector	15,738.7	16,815.8	17,554.0	7.0	4.2
Manufacturing industry	11,431.9	12,237.1	12,724.9	7.0	4.0
Electricity and water	331.0	349.1	366.1	5.5	4.9
Transport and communications	3,975.8	4,229.6	4,453.0	6.4	5.3
Services sector	17,822.4	18,164.9	18,579.0	1.9	2.3
Commerce, restaurants and hotels	10,323.2	10,481.0	10,731.1	1.5	2.4
Housing ownership	4,603.9	4,690.4	4,758.3	1.9	1.4
Social and community services	2,895.3	2,993.5	3,089.6	3.4	3.2
Other sectors b/	8,671.0	8,841.1	9,087.0	2.0	2.8
Plus indirect taxes	3,081.2	3,236.9	3,389.4	5.1	4.7

Source: ECLAC estimates, 22 December 1998

a/ Calculated on the basis of the ratios between Added Value and Gross Value in Table 26.

b/ Includes working of mines and quarries, construction, banks, insurance and other financial institutions, real estate, services, lending services to companies and government services.

d) Implications for public finances

A slight drop in the growth rate of tax revenue could take place in 1998 and 1999, hand in hand with an increase in current expenditure and investment to address reconstruction needs in affected areas. Funds set aside for the government's priority agenda will also be rechannelled to that end. The deficit to GDP ratio will be 2.2 per cent in 1998 and could reach almost 3 per cent in 1999, financed mainly with foreign capital. Given this setting, it will be important to take measures aimed at greater efficiency in tax collection.

Table 29

EL SALVADOR: EFFECTS OF THE DISASTER ON THE BALANCE OF PAYMENTS

(Millions of dollars)

	1998				1999			
	Before the disaster		After the disaster		Before the disaster		After the disaster	
	Revenues	Outlays	Revenues	Outlays	Revenues	Outlays	Revenues	Outlays
Total	2,482.3	4,114.7	2,467.2	4,124.2	2,621.1	4,434.7	2,606.6	4,491.4
Exports of goods fob	2,469.7		2,468.7		2,609.1		2,603.4	
Imports of goods fob		4,114.7		4,124.2		4,434.7		4,491.4
Net services (exports and imports)	12.6		-1.5		12.0		3.2	

Source: ECLAC estimates, 22 December 1998.

e) Consequences on inflation and wages

Inflation will rise by up to 4 per cent in the final months of 1998 due to price increases in foods (basic grains, green goods and vegetables) as a result of a slight drop in supply, and speculation. The consumer price index will probably rise between 2.5 and 4.5 per cent, partly owing to the increased liquid assets needed to rebuild affected areas.

Cumulative inflation will continue to erode real wages. Per capita income will grow slightly, although personal income may rise in view of increased transfers.

Employment levels are expected to improve following the increase in public spending and private investment, and measures to promote agricultural production and construction.

The inhabitants of areas damaged by flooding lost their personal assets and part of their earning power this year, with negative effects on real wages for 1999.

f) Preliminary estimates of financial requirements

Preliminary estimates indicate that approximately US\$155 million are required for the reconstruction, 89 per cent of which will be used for reconstruction activities as such, and the remainder for rehabilitation tasks already under way. A considerable portion of this expenditure will be made in foreign currency.

These outlays could have at least two possible sources and financing mechanisms, which would make it possible to minimize the effects on public finances and generate excess liquidity in the financial system. Firstly, a special budget for reconstruction could be considered, aside from the central government's and other public-sector agencies' regular budget. This budget could be financed by using part of the funds already generated by the sale of state-owned assets.

Secondly, the use of multilateral and bilateral external resources would make it possible to channel funds into the banking system, which is in a position to launch new credit mechanisms for

small-scale businessmen in affected areas and for private investment in reconstruction. In addition, those funds could finance part of the reconstruction activities which by their very nature have to be carried out by the government.

IV. GUIDELINES FOR A REHABILITATION AND RECONSTRUCTION PROGRAMME

Although different emphasis is required in each country depending the type of damage and the vulnerability existing prior to the disaster, the devastating consequences of hurricane Mitch in Central America call for the adoption of new rehabilitation and reconstruction criteria to prevent the inhabitants of the region from being as exposed to damages as they were in this case.

It will be important to set priorities and consider the time frame and the necessary changes to design, construction and land use regulations in keeping with the situation in each country. In any event, reconstruction should be carried out on the basis of a significant qualitative improvement over the previous circumstances. Another fundamental factor regarding the viability of any reconstruction process is a country's internal capacity to conduct the process and programme it so that national capacity is not exceeded. Each country must decide on the time frame and priority of its actions and strike a balance between the urgent task of replacing what has been lost and its capacity to accomplish such works.

Once the emergency phase is over, rehabilitation and reconstruction programmes must be established in order to restore the facilities, assets and services damaged or destroyed by the devastating effects of the hurricane in each country. The content, priorities and scope of such programmes must necessarily be a national, sovereign decision of each country and respond as much to the magnitude of the damages as to a country's pre-existing conditions and economic and social policy criteria. Its foreign debt commitments and stabilisation policies must also be taken into account on determining the content, scope and scheduling of the programmes.

On addressing this topic, it is important to compile and analyse extensive background data so as to draw up investment and management programmes that will make optimum use of available resources while following the country's economic and social development objectives.

One factor to be borne in mind at this stage is that reconstruction cannot be carried out by a country on its own; it requires international cooperation. Each country's rehabilitation and reconstruction programme must therefore be structured in line with the international community's offers, which are due to take shape within the framework of the special Advisory Group convened by the IDB; after an initial session in December 1998, the Group will meet again to establish the bases for cooperation in reconstruction work. This section was included in this report to provide an idea of the investment projects deemed pertinent for repair and reconstruction, but are merely profiles at this stage. The list of projects neither replaces nor runs counter to the proposals submitted by national authorities to the Advisory Group. In many cases the proposals encompass more than just actions to tackle the damage caused by the hurricane, since each country's development strategy must also establish bases for sustained, less vulnerable development with growth, including components to reduce vulnerability to natural disasters and promote a more effective, competitive integration into a globalise world.

Consequently, rather than focusing on a national strategy —which, as stated above, must be devised by each country— the purpose of the following sections is to develop the guiding principles behind the generation of projects and the basic guidelines to be followed on preparing rehabilitation

and reconstruction plans and programmes. We believe this could be of assistance to national authorities on defining their strategy, which should be devised on the basis of consensus-reaching with society, particularly civil society, economic players, academic and non-governmental organisations and local authorities, among others.

1. Project generation

The main aims of the proposed projects are to attend to victims of the disaster, rebuild and improve destroyed and damaged assets, re-establish productive and export processes, and in general help to reactivate the process of economic and social development.

The initiatives presented here are a list of investment projects currently being developed as profiles to provide basic information on their aims, scope, expected results, activities and tasks to be carried out, investment to be made, expected financing, and the special characteristics of each project.

Each profile will subsequently be analysed in depth in order to draw up definitive projects and prioritise them so as to design repair and reconstruction programmes. This will make it possible firstly to improve the living conditions of disaster victims and recover the material and economic losses stemming from hurricane Mitch's devastating effects; secondly to enhance the design standards in use prior to the disaster, and thirdly to carry out works and establish mechanisms to control and mitigate the enormous damage caused by hurricanes and floods.

It should be mentioned in that regard that the main physical damage caused by the hurricane—aside from its tragic aftermath of death and suffering—was to infrastructure and agriculture and livestock production facilities. The after-effects are not limited to such losses, however, since the initial damages unleashed a multiplier effect with serious economic and social consequences; rural and semiurban population groups lost their housing, livelihoods and access to public services, and were subjected to other equally serious hardships stemming from environmental and sanitary crises, in addition to food shortages.

As a result, many victims that were already poor prior to the hurricane were left in conditions of extreme poverty. Government and international community support should therefore focus on addressing the problems described above and in preceding chapters.

To carry out the projects efficiently—once they have been definitively assessed and ranked—it will be essential to develop execution programmes so as to bring resources into line with needs. It would first be advisable to draw up a rehabilitation programme to deal with the emergency situations facing disaster victims, followed by a reconstruction programme to overcome economic and social adversities, restore and improve infrastructure and production facilities, and prevent or reduce the effects of similar events.

2. Rehabilitation stage

This initial phase will focus on normalising the living conditions of victims —while also reactivating the economy— by meeting their vital needs and delivering basic services. The victims' food, health care and employment needs must take priority, and should be met expeditiously through the following actions:

- a) Provision of food.
- b) Provision of potable water.
- c) Medical attention to the wounded.
- d) Control and thorough prevention of diseases, particularly contagious diseases.
- e) Housing repair.
- f) Establishment, albeit provisional, of sanitation services.
- g) Generation of productive jobs.
- h) Provisional repair of access roads to affected areas.
- i) Supply of seeds and basic inputs to affected small and medium-scale farmers, along with financial support and soft loans.
- j) Repair of different types of infrastructure.

The suggested rehabilitation programme should be implemented as swiftly as possible, partly to meet vital and basic needs that are an ethical imperative, and partly due to the need to control and check the spread of diseases and epidemics in order to prevent hardships from becoming more acute. It is important to remember that the rainy season begins in April, so the rehabilitation programme must be concluded by that time.

Timely implementation of the above actions will bring the victims' living conditions back to relative normality and help to reactivate the country's economy.

3. Reconstruction stage

This is the most crucial stage in economic and social terms, since it will lead to the full re-establishment of normal living conditions and the country's economic and social development momentum prior to hurricane Mitch.

This phase will bring about the implementation of specific projects —duly assessed, ranked, and coordinated— in line with available resources, i.e., fully programmed and provided for in the reconstruction programme, which should be worked out as soon as possible.

The main aim of the reconstruction stage and the projects thereof is to effectively overcome the direct and indirect problems stemming from the hurricane, although hurricane-prevention infrastructure and management deficiencies and flaws will also have to be addressed. For instance, the effects of the hurricane showed that a number of structures were unsafe and that other types of infrastructure, such as roads, bridges, hospitals, potable water systems, schools, etc. were inappropriately located; there is also an absence of watershed, infrastructure and environmental management schemes, and a lack of natural disaster prevention and control facilities —particularly for floods— to manage and mitigate their after-effects.

Moreover, on designing the reconstruction programme it will be important to take into account macroeconomic principles so as to prevent the undesirable consequences of overly ambitious reconstruction programmes. These include inflation, divergences in the exchange rate or in the supply and demand of certain resources such as labour and building materials, or undesired, disorderly migration.

There follows a summary of the basic considerations that should guide the process of designing the reconstruction programme.

a) Restoring lost support infrastructure

This mainly implies building the infrastructure needed to conduct economic and social activities, and includes roads and bridges, potable water and sewerage systems, power networks, and other lesser works.

It should be borne in mind that current conditions call for new approaches in designing infrastructure works. The aim is not merely to replace the facilities in existence prior to the floods, but to take advantage of the opportunity to modernise infrastructure by building it to meet current and future demand, incorporating recent technological developments, and constructing on sites that will minimise the after-effects of future disasters; the idea is to construct modern, adequate, efficient and safe structures.

For example, numerous bridges are located in places where they can be swept away by high water flows; this risk can be reduced by building them on higher ground, which in turn means rerouting roads. Similarly, many works in existence prior to the hurricane were built many years ago and were defectively laid out, whereas recent technological developments have reduced costs, thus providing the possibility of building works of much greater magnitude. Moreover, many facilities in existence prior to the hurricane already lacked the capacity to meet current demand.

It will also be important to establish alternate routes to prevent similar events from paralysing regions left inaccessible, or from leaving productive areas without access to the capital or export-shipping ports. In short, the country's highway system needs to be expanded.

b) Replacing lost social infrastructure

This guideline is similar to the one above and focuses on providing the population with basic services and facilities such as housing, hospitals and schools. As above, improving design and capacity will be an important consideration, particularly as regards hospital and school services.

Ironically, natural disasters often damage or destroy the facilities needed to deal with emergency situations, and this must be taken into account in the reconstruction programme. New hospitals should be built in safe, risk-free locations, since their services are essential in emergency situations. Schools must be made safe for the same reason, since they are often turned into shelters for disaster victims.

It is a known fact that many facilities were already overburdened prior to the hurricane, so it will be necessary to increase their capacity. Technological improvements must also be made, particularly in hospitals.

The main consideration in regard to the housing sector is to extend support to the most disadvantaged groups by securing them relocation and housing to meet their basic needs. This can be achieved through donations, material contributions, "work for food" programmes, and other such mechanisms. Less needy groups can be given support in the form of soft loans.

c) Re-establishing agricultural activities

The hurricane led to the partial or total loss of many agricultural assets; much cropland (bananas, sugar cane, palm, pineapple, grains, etc.) became unusable. Earth dikes, feeder roads and farm roads were seriously damaged by overflowing rivers, mud and debris such as large rocks, tree trunks and sand. Many rivers are full of silt, stones, trees and other material swept along by the current, and large deposits have formed where rivers meet the ocean. The living standards of farmers have also deteriorated significantly, since many lost their livelihood and housing.

Investment should therefore focus on reclaiming farmland and restoring production infrastructure —irrigation and drainage systems, fruit packaging and canning facilities, etc.— and on facilitating fruit crops.

d) Food support

One of the most severe consequences of the hurricane is that many subsistence farmers lost their crops, and their land will remain unproductive for many years. This group lost their housing, livelihood and income. Semiurban and low-income population groups are in a similar position, since they also lost their homes and jobs. It is therefore imperative to support them, especially by satisfying their basic needs.

As suggested above, "work for food" plans could be put into practice in view of funding shortages and the need for efficiency and equity. People working to improve their housing or fields could thus be given food in exchange for work performed in their own benefit.

e) Generating productive jobs

This is a very important social consideration, since one of the worst indirect consequences of the hurricane was the loss of thousands of jobs.

The main idea is to create efficient jobs in productive activities, among them the construction of support infrastructure, community facilities and housing, and agricultural jobs.

Programming of construction works and of work in general should therefore focus on making intensive use of unemployed workers, in accordance with their skills.

f) Control of epidemic risks

The aim here is to make every effort to provide medical care to infected patients and check the spread of diseases. Cases of cholera, malaria, rabies, hepatitis and classic dengue, among others, have been reported in most disaster areas, so there is risk that contagious diseases will spread.

g) Waterbasin management and environmental conservation

There are some initiatives related to this issue aiming to the rational and efficient usage of existing natural resources and to environmental management works. Thus, there is a need for improving the information network, strengthening the protected areas system, adopting proper management and sustainable development techniques on the country's waterbasins, strengthening those institutions in charge of sanitation and urban solid waste management services, controlling environmental pollution, promoting reforestation in wide areas and training public servants and farmers on reforestation methods and advantages.

h) Flood control and prevention

The countries of Central America have been suffering the consequences of natural disasters for many years. However, the frequency and intensity of such disasters have increased to an alarming degree in recent years, and the material damage and victims are higher every time.

In the past large sums were not invested in disaster prevention, partly because statistical records showed disasters to be relatively infrequent, so prevention measures were not considered a worthwhile investment.

The situation today has obviously changed, since hurricanes are more frequent (Joan, Georges, Cesar, and Mitch among them), as are forest fires, the effects of El Niño, etc. It would therefore be advisable to carry out an in-depth study of this complex subject so as to design policies to prevent natural disasters, particularly floods.

A fundamental aim would be to ensure that prevention policies contain appropriate guidelines to regulate and manage a country's natural resources.

Another would be to identify socially beneficial investment options to prevent or reduce the costly consequences of natural disasters. Studies should focus on the type, location and scale of infrastructure designed for that purpose.

In keeping with that approach, it will be important to conduct studies in the following fields: identifying which areas are prone to disasters (floods, landslides, droughts, fires and earthquakes), establishing land use management measures to prevent settlements and construction on land frequently subject to the effects of natural disasters, designing infrastructure to control the forces of nature (drainage, river dikes, dams, etc.), establishing appropriate design and layout criteria for civil works threatened by river overflows and floods (road routing, bridges, potable water and sewerage systems, public services works , etc.), restructuring and extending the highway system to provide alternative routes, etc.

It is worth noting that reservoir construction is becoming increasingly easier to justify, partly because natural disasters are occurring more frequently, and partly because reservoirs can be used for several purposes by different sectors. For example, a flood-prevention reservoir can also be used for irrigation during the dry season, and for interannual regulation of the El Niño and La Niña phenomena, among others. Moreover, since natural disasters are becoming more frequent and more intense, they are leading to ever higher losses, so one of the benefits of multipurpose infrastructure works is that they reduce building costs.

i) Strengthening national emergency or civil defence committees

In view of the recurrence of disasters and the experience gained as a result of hurricane Mitch, it will be essential to strengthen national emergency and civil defence institutions, not only by increasing their budgets but also by adapting their regulatory frameworks whenever necessary. These institutions should also establish regional links and an effective network for early warning and cooperation purposes; existing regional institutions as CEPREDENAC could extend support in this regard.

Appendix

PROJECT PROFILES FOR THE REHABILITATION AND
RECONSTRUCTION STAGE

Table 1

EL SALVADOR: LIST OF PROJECTS

Sector	Title of project	Investment required (Millions of dollars)
1. Agriculture and livestock		
1.1	Rehabilitate and protect 75 kilometres of natural river beds in farmlands in Río Paz, El Rosario, Lempa and the lower basin of the Río Grande de San Miguel	1.4
1.2	Recovery of 28 small irrigation systems	1.4
1.3	Reforestation training for government officials, technicians and farmers	33.0
1.4	Pilot reforestation programme	3.0
1.5	Rehabilitation of flooded farmlands	1.7
1.6	Improvement of drainage and flood control in the Lempa River on the coastal plain	3.0
1.7	Protection and restoration of natural assets in the lower reaches of El Tránsito gorge	10.2
1.8	Mitigation of the effects of Mitch in critical farmlands	2.2
1.9	Rehabilitation of bean crops in affected areas	1.4
1.10	Rehabilitation of Santa Cruz Porrillo and Jiquilisco produce assembling points	0.3
1.11	Provision of metal basic-grain silos in areas affected by Mitch	0.4
1.12	Stabilization of soil creep areas on Meanguera Island	0.3
1.13	Sustainable rural development in fragile ecological areas in Trifinio region	10.2
1.14	Provision of fishing equipment and tackle and vessel and engine repairs	2.0
1.15	Rehabilitation of unloading facilities for small-scale fishing fleets	3.4
1.16	Reactivation of shrimp farming in affected areas	1.7
1.17	Productive rehabilitation of 50 farming cooperatives	1.5
	Sectoral subtotal	77.2
2. Technical assistance		
2.1	Design of natural-disaster prevention policies and identification of investments	1.0
2.2	Programming of works	0.1
	Sectoral subtotal	1.1

/Cont.

Table 1 (Cont.)

Sector	Title of project	Investment required (Millions of dollars)
3. Education		
3.1	Rehabilitation and reconstruction programme for damaged schools	16.5
	Sectoral subtotal	16.5
4. Emergency		
4.1	Emergency food assistance for affected families	2.0
4.2	Emergency epidemiological control	5.0
4.3	Resettlement of victims	7.0
	Sectoral subtotal	14.0
5. Energy		
5.1	Electrification programme for new settlements in the country's least developed areas	3.0
	Sectoral subtotal	3.0
6. Environment		
6.1	Assessment of forested areas	3.5
6.2	Installation of real-time networks	0.6
	Sectoral subtotal	4.1
7. Health		
7.1	Construction and equipping of Chalatenango Health Care Unit	0.7
7.2	Construction and equipping of the San Francisco Gotera Health Unit, Department of Morazán	0.7
7.3	Programme for immediate rehabilitation and reconstruction of 22 damaged health care centres	4.0
7.4	Modernization and reconstruction of San Rafael General Hospital in the Department of La Libertad	24.0
7.5	Reconstruction and rehabilitation of Santa Gertrudis Hospital in the Department of San Vicente	18.0
	Sectoral subtotal	47.5
8. Sanitation		
8.1	Rehabilitation programme for drinking water and sewerage systems administered by ANDA	2.0
8.2	Well construction programme in rural areas	3.0
	Sectoral subtotal	5.0

/Cont.

Table 1 (Cont.)

Sector	Title of project	Investment required (Millions of dollars)
9. Transport and communications		
9.1	Emergency programme to rehabilitate the highway system	6.6
9.2	Programme to rehabilitate the highway system	23.0
9.3	Planning and feasibility studies to extend the main and access road system	0.9
	Sectoral subtotal	30.5
10. Housing		
10.1	Assessment of physical risk and vulnerability in San Salvador	0.1
10.2	Progressive housing programme for rural areas	37.5
10.3	Land use plan for sustainable national development	1.0
	Sectoral subtotal	38.6
	TOTAL	237.4

El Salvador**No. 1.1**

Rehabilitate and protect 75 kilometres of natural riverbeds in farmlands in Río Paz, El Rosario, Lempa and the lower basin of the Río Grande de San Miguel

Sector: AGRICULTURE AND LIVESTOCK

Subsector: IRRIGATION

Background: The strong currents stemming from the rainfall caused by Mitch dragged rocks, trees and refuse that damaged riverbeds in the farmlands of Río Paz, El Rosario, Lempa and the lower basin of the Río Grande de San Miguel. These need to be cleared, rehabilitated and protected.

Project objectives: Clean and protect 75 km of natural river beds in irrigated farmland affected by hurricane Mitch.

Tentative duration: 5 months

Estimated starting date: December 1998

National agency in charge: MAG.

Description of activities and tasks: Cleaning, rehabilitating and protecting 75 km of river beds in the aforementioned areas.

Expected results: Drained irrigation and rain water to make affected farmland productive again while also generating employment.

Total investment required (US\$): 1,400,000

- Labour
(person/months)

- Domestic inputs:

- Imported inputs: _____

Financing (US\$)

- Local:

- Foreign:

- Donation: _____

Potential financing sources:

External credit:

Donor:

Special observations:

El Salvador	No. 1.2
Recovery of 28 small irrigation systems	
Sector: AGRICULTURE AND LIVESTOCK	Subsector: IRRIGATION
<p>Background: The currents and floods caused by Mitch damaged 28 small irrigation systems (50 to 200 hectares) that must be rehabilitated to re-incorporate 3,000 hectares into farming.</p>	
<p>Project objectives: Rehabilitate 3,000 hectares of irrigated land in Ahuachapán, Sonsonate, Santa Ana, La Libertad, Chalatenango, La Paz, San Vicente, Usulután, San Miguel, Morazán and La Unión.</p>	
<p>Tentative duration: 12 months</p> <p>Estimated starting date: January 1999</p>	<p>National agency in charge: MAG.</p>
<p>Description of activities and tasks: Cleaning the silt from irrigation ditches in 28 small irrigation systems in the aforementioned areas, and repairing damaged and destroyed systems.</p>	
<p>Expected results: Rehabilitated farmlands.</p>	
<p>Total investment required (US\$): 1,400,000</p> <ul style="list-style-type: none"> • Labour (person/months) • Domestic inputs: • Imported inputs: _____ <p>Financing (US\$)</p> <ul style="list-style-type: none"> • Local: • Foreign: • Donation: _____ <p>Potential financing sources:</p> <p>External credit: IDB and CABEL</p> <p>Donor:</p>	<p>Special observations:</p>

- Labour (person/months)

- Domestic inputs:

- Imported inputs: _____

Financing (US\$)

- Local:

- Foreign:

- Donation: _____

Potential financing sources:

External credit: IDB and CABEL

Donor:

El Salvador**No. 1.3****Reforestation training for government officials, technicians and farmers****Sector: AGRICULTURE AND LIVESTOCK****Subsector: FORESTRY**

Background: Farmers have been using land that should be reserved for forests. This has had serious environmental consequences, as highlighted by hurricane Mitch.

Farmers are unaware of the importance of reforesting forest areas, and lack the required technological knowledge.

As a reference, in the past when exports of agricultural products were being promoted, those interested were offered training and technology transfers.

Project objectives: Create awareness among public officials, agricultural technicians, and especially farmers, of the need for and importance of reforestation; transfers of technical knowledge in planting of timber-yielding, forestry pasture, and fruit-bearing species to allow natural regeneration of forests.

Tentative duration: Ongoing**Estimated starting date: 1999**

National agency in charge: Government, NGOs, farmer's associations and cooperatives.

Description of activities and tasks: Creation of training and technology-transfer facilities; acquisition of financial and technological resources; promotion of initiative among farmers, and holding of corresponding courses over a ten-year period.

Expected results: Training and creating awareness among the people involved.

Total investment required (US\$): 33,000,000

- Infrastructure 3,000,000
- Technology transfer and training 1,000,000

Financing (US\$)

- Local:
- Foreign:
- Donation:

Potential financing sources:

External credit:

Donor: Donations by governments and international institutions.

Special observations: It would not be appropriate to reforest and improve the environment if priority is not first given to meeting the needs of the farmers involved.

El Salvador	No. 1.4
Pilot reforestation programme	
Sector: AGRICULTURE AND LIVESTOCK	Subsector: FORESTRY
Background: At least one million hectares used for farming must be reclaimed for forestry.	

Project objectives: Reforestation beginning with a 5,000-hectare nation wide pilot programme.

Tentative duration: 24 months Estimated starting date: May 1999	National agency in charge: Government, NGOs, farmer associations and cooperatives.
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Description of activities and tasks: Plant 2,000 hectares with timber-yielding, firewood, grazing and fruit species, and permit natural regeneration of 3,000 hectares that protect watersheds.

Expected results: 5,000 hectares of forest; and improved environmental conditions.

Total investment required (US\$): 3,000,000 <ul style="list-style-type: none"> • Labour (person/months) • Domestic inputs: • Imported inputs: _____ Financing (US\$) <ul style="list-style-type: none"> • Local: • Foreign: • Donation: _____ Potential financing sources: External credit: Donor:	Special observations:
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El Salvador	No. 1.5
Rehabilitation of flooded farmlands	
Sector: AGRICULTURE AND LIVESTOCK	Subsector: AGRICULTURAL
Background: 35,000 hectares of farmlands were flooded in San Vicente, Cara Sucia, Bahía de Jiquilisco and La Unión.	

Project objectives: Recover flooded areas by building or rehabilitating drainage works.

Tentative duration: 12 months Estimated starting date: January 1999	National agency in charge: Directorate of Renewable Natural Resources (DGRNR).
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Description of activities and tasks: Rehabilitation or contracting of drainage works, and redirecting of gully and stream beds to evacuate water from flooded farmlands.

Expected results: Recovery of 35,000 hectares.

Total investment required (US\$): 1,706,485 <ul style="list-style-type: none"> • Labour (person/months) • Domestic inputs: • Imported inputs: _____ Financing (US\$) <ul style="list-style-type: none"> • Local: • Foreign: • Donation: _____ Potential financing sources: Under study. External credit: Donor:	Special observations:
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El Salvador**No. 1.6****Improvement of drainage and flood control in the Lempa River on the coastal plain****Sector: AGRICULTURE AND LIVESTOCK****Subsector: INFRASTRUCTURE**

Background: Borders were built on both banks of the Lempa River to protect the Lower Lempa Project areas prone to floods every year in the winter season. These have been partly destroyed, and the area lacks a proper drainage system.

Project objectives: Supervise, build and rebuild drainage and flood-control works for the Lempa River and its tributaries on the coastal plain.

Tentative duration: 2 years

Estimated starting date: January 1999

National agency in charge: MAG, through its Natural Resources Directorate (DGRN).

Description of activities and tasks: Construction and supervision of drainage and flood-control works on the Lower Lempa and preparation of an environmental-impact study.

Expected results: Improved safety of human settlements in the area, incorporation of up to 8,000 hectares of Class I, II and IV farmlands, and improved living conditions for 2,740 farming families in the departments of San Vicente (Jiquilisco municipality: Pacún, San Carlos, Mata de Plátano and La Pita districts) and Usulután (Jiquilisco municipality: Zamorán, El Morillo, La Canoa, La Mesita, Montecristo, Potrerillo and Sisiguayo districts).

An estimated 16,440 persons are expected to benefit; 10,530 in Jiquilisco municipality and 5,918 in Tecoluca municipality.

Total investment required (US\$):	3,022,400
• Labour (3,500 person/months)	1,057,840
• Domestic inputs:	1,208,960
• Imported inputs:	755,600

Financing (US\$)

• Local:	165,200
• Foreign:	
• Donation:	2,857,200

Potential financing sources:

External credit:

Donor: Japan.

Special observations: Drainage and flood-control works have been divided into 3 stages; the first is about to begin, at a cost of US\$1,146,800. Financing for the second and third stages has yet to be approved by the Japanese government.

El Salvador**No. 1.7****Protection and restoration of natural assets in the lower reaches of El Tránsito gorge****Sector: AGRICULTURE AND LIVESTOCK****Subsector: NATURAL RESOURCES****Background:** Land in the lower reaches of this gorge is prone to flooding and continuous erosion.**Project objectives:** Systematize land use in keeping with its potential throughout the lower reaches of El Tránsito, in order to reduce damage from flooding and erosion, which cause economic and material losses to the region's inhabitants.**Tentative duration: 84 months****Estimated starting date: June 1999****National agency in charge: MAG.****Description of activities and tasks:** Establishment and management of nurseries and plantations, training in and construction of soil conservation and flood control works, and training of teachers, students, parents and farmers on environmental protection and preparedness for natural disasters stemming from rainfall and currents.**Expected results:** Establish 260,000 lineal metres of living natural barriers, build 78,000 lineal metres of irrigation ditches, protect 12.5 km of borders from torrential rainfall, sow 220,000 trees and bushes of different species every year, and train 160 teachers, 150 housewives, 7,000 heads of households and students, and some 1,000 farmers a year.

Total investment required (US\$):	10,238,229
• Labour (42,000 person/months)	3,583,380
• Domestic inputs:	6,654,849
• Imported inputs:	
Financing (US\$)	10,238,229
• Local:	2,047,696
• Foreign:	8,190,533
• Donation:	
Potential financing sources:	
External credit: Spanish government.	
Donor:	

Special observations:

El Salvador
No. 1.8

Mitigation of the effects of Mitch in critical farmlands

Sector: AGRICULTURE AND LIVESTOCK
Subsector: AGRICULTURE

Background: The effects of the hurricane left numerous farmers dependent on their land for subsistence in poverty and without their livelihood.

Project objectives: Contribute to the country's food security by reactivating agricultural activities in affected areas.

Tentative duration: 2 years
Estimated starting date: January 1999

National agency in charge: MAG, through the National Farming and Forestry Technology Centre (CENTA).

Description of activities and tasks: Step up agriculture in stable (valley) and unstable (slope) ecosystems by taking maximum advantage of the current humidity and encouraging the participation of local groups and governments; promote a basic package of agricultural inputs needed for high-humidity or irrigated crops in 5,000 plots turned over to short-cycle crops such as cucumber, corn on the cob and watermelon; transfer technology to 5,000 small-scale irrigated crop farmers in Chirilagua, La Cañada, Usulután, Lempa Acahuapa, Las Pilas, Cara Sucia, Guaymango, La Libertad, Metapán, San Miguel, Santa Cruz Porrillo, Rosario de la Paz, Jiquilisco, Zapotitán, San Pedro Nonualco and Santa Elena.

Expected results: 5,000 subsistence farmers will have recovered their livelihoods and regular income levels.

Total investment required (US\$): 2,184,300

- Labour
(person/months)

- Domestic inputs:

- Imported inputs: _____

Financing (US\$)

- Local: 136,519

- Foreign: 2,047,781

- Donation: _____

Potential financing sources: Under study.

External credit:

Donor:

Special observations:
El Salvador
No. 1.9

Rehabilitation of bean crops in affected areas

Sector: AGRICULTURE AND LIVESTOCK

Subsector: AGRICULTURE

Background: Excessive rainfall caused considerable damage to basic crops, particularly maize and beans, directly affecting the food security and subsistence of farmers and their families. The drop in supply has led to higher consumer prices and will have to be complemented through imports.

Project objectives: Help to stabilize national food security by reactivating productive activities in affected areas.

Tentative duration: 5 months
Estimated starting date: December 1998

National agency in charge: MAG, through the National Forestry and Farming Technology Centre (CENTA), and NGOs.

Description of activities and tasks: Reactivate agricultural production by small-scale farmers by providing seeds, inputs, technical assistance and equipment for 35,000 hectares of bean crops.

Expected results: 35,000 hectares of bean crops.

Total investment required (US\$):	1,400,000
<ul style="list-style-type: none"> • Labour (person/months) • Domestic inputs: • Imported inputs: _____ 	
Financing (US\$)	Under study
<ul style="list-style-type: none"> • Local: • Foreign: • Donation: _____ 	
Potential financing sources: FAO.	
External credit:	
Donor:	

Special observations:

El Salvador**No. 1.10****Rehabilitation of Santa Cruz Porrillo and Jiquilisco produce assembling points****Sector: AGRICULTURE AND LIVESTOCK****Subsector: AGRICULTURE**

Background: Produce assembling point were destroyed by hurricane Mitch, making farmers unable to store their produce.

Project objectives: Contribute to the food security of the inhabitants of the Lower Lempa area by rehabilitating the Santa Cruz Porrillo and Jiquilisco produce drying and storage centres.

Tentative duration: 1 year

Estimated starting date: November 1998

National agency in charge: MAG, through the Farming Development Bank (BFA).

Description of activities and tasks: Rehabilitate assembling points, reactivate grain storage warehouses, build sets of silos for municipal storage centres, and provide crop drying and storage services to farmers.

Expected results: Direct provision of grain drying and storage facilities for 2,500 farmers in affected areas, indirectly benefiting 11,500 settlers in need of produce stored in the Jiquilisco and Santa Cruz Porrillo municipalities, departments of Usulután and San Vicente.

Total investment required (US\$):	341,297
• Labour (person/months)	
• Domestic inputs:	
• Imported inputs: _____	
Financing (US\$)	
• Local:	85,893
• Foreign:	255,404
• Donation: _____	
Potential financing sources: Under study.	
External credit:	
Donor:	

Special observations:

El Salvador**No. 1.11****Provision of metal basic-grain silos in areas affected by Mitch****Sector: AGRICULTURE AND LIVESTOCK****Subsector: AGRICULTURE**

Background: Numerous storage sites were destroyed or damaged by the hurricane, preventing farmers from storing their crops.

Project objectives: Facilitate basic-grain storage facilities in the most affected areas, to support families' food security by reducing harvest losses and improving grain management.

Tentative duration: 2 year

Estimated starting date: As soon as funds to purchase metal sheeting are available

National agency in charge: MAG, through the National Farming and Forestry Technology Centre (CENTA), the Farming Development Bank (BFA), and an NGO (COSUDE).

Description of activities and tasks: Coordinate acquisition of metal sheeting and other silo materials with donated funds, coordinate silo construction, select beneficiaries, distribute silos among beneficiaries and report on project progress.

Expected results: 8,500 silos (one per family) to benefit approximately 50,000 people.

Total investment required (US\$): 409,556

- Labour
(person/months)

- Domestic inputs:

- Imported inputs: _____

Financing (US\$)

- Local: 97,697

- Foreign: 311,860

- Donation: _____

Potential financing sources: Under study.

External credit:

Donor:

Special observations:

El Salvador**No. 1.12****Stabilization of soil creep areas on Meanguera Island****Sector: AGRICULTURE AND LIVESTOCK****Subsector: NATURAL RESOURCES****Background:** "Lagooning" has formed between La Laguna and La Gloria hills.

Project objectives: Stabilize areas where soil creep, landslides, flooding and erosion have occurred on Meanguera Island through different types of biomechanical and hydraulic structures to protect the island's inhabitants, and build biomechanical and hydraulic structures to stabilize other areas where such events could take place in future.

Tentative duration: 12 months**Estimated starting date: June 1999**

National agency in charge: Catchment Basin and Soil Conservation Service of the Renewable Natural Resources Directorate.

Description of activities and tasks: Identification, assessment and presentation of design alternatives, including land survey and soil mechanics studies, technical specifications, terms of reference, design of works and design plans. Execution of works.

Expected results: Stabilization and drainage of the tops of hills, where "lagooning" effects and soil creep have occurred, in order to avoid endangering the lives of neighbouring villages. Reforestation of 1,000 ha, construction of 500 m³ of gabions, 1,000 lineal metres of stone masonry, mortar-coated drainage works, 2,000 lineal metres of artificial barriers and 2,000 lineal metres of natural living barriers.

Total investment required (US\$): 342,857

- Labour (600 person/months) 137,143
- Domestic inputs: 205,714
- Imported inputs: _____

Financing (US\$)

- Local: 34,285.72
- Foreign: 308,571.43
- Donation: _____

Potential financing sources: Spanish government.

External credit:

Donor:

Special observations: Works to ensure the stabilization of slopes near human settlements, where "lagooning" occurs in old craters, are urgently needed. Rising water levels in such craters can make crater walls cave in, placing the lives of neighbouring villagers at risk.

El Salvador	No. 1.13
Sustainable rural development in fragile ecological areas in Trifinio region	
Sector: AGRICULTURE AND LIVESTOCK	Subsector:
<p>Background: The countries involved in the Trifinio Plan (Guatemala, Honduras and El Salvador) have stated, through the Plan's Trinational Secretariat, that the region's natural renewable resources are deteriorating rapidly. The area is characterized by the conditions of marginalization in which the majority of the population live; this has hindered the development of productive activities, making their impoverishment all the more extreme.</p> <p>This Plan was prepared in order to address this situation with the cooperation of technical-assistance agencies; its aim is to provide farmers with food-production opportunities and alternatives, while also improving sound management and conservation of renewable natural resources and the environment.</p> <p>The Plan has placed priority on semi-arid zones with forestry and farming potential; in El Salvador these areas are Anguiatú, El Pital and San Francisco Guajoyo.</p>	
<p>Project objectives: Help to generate a dynamic process of self-sustaining development in ecologically fragile areas in El Trifinio while improving the quality of life of its inhabitants through the sustained use of renewable natural resources and other income-generating and infrastructure activities.</p>	
<p>Tentative duration: 5 years (6 months)</p> <p>Estimated starting date: June 1999</p>	<p>National agency in charge: MAG.</p>
<p>Description of activities and tasks: Organization of farmers, support for agricultural and forestry production, repair of local roads and water catchment works, support for the creation of small-scale enterprises and activities, and construction or improvement of local roads.</p>	
<p>Expected results: Farming and forestry production will have been significantly improved.</p>	

Total investment required (US\$):	10,172,000
• Labour (1,200 person/months)	881,000
• Domestic inputs:	8,639,000
• Imported inputs:	652,000
Financing (US\$)	
• Local:	2,320,000
• Foreign:	7,852,000
• Donation:	
Potential financing sources:	
External credit: CABEL.	
Donor:	

Special observations: A loan has already been approved by CABEL; Legislative Assembly authorization is pending.

El Salvador**No. 1.14****Provision of fishing equipment and tackle and vessel and engine repairs****Sector: AGRICULTURE AND LIVESTOCK****Subsector: FISHERIES**

Background: Small-scale fishing equipment such as vessels, engines and tackle were damaged or destroyed by the hurricane.

Project objectives: Rehabilitate the small-scale fishing activities of cooperatives and fishermen affected by Mitch.

Tentative duration: 3 months

Estimated starting date: January 1999

National agency in charge: MAG, through the Fisheries Development Centre (CENDEPESCA).

Description of activities and tasks: Recover damaged or lost tackle, repair damaged fishing vessels and engines, and provide production inputs, particularly fuel.

Expected results: 544 nets, 62 vessels and 18 engines will be ready for use.

Total investment required (US\$): 2,000,000

- Labour
(person/months)

- Domestic inputs:

- Imported inputs: _____

Financing (US\$)

- Local:

- Foreign:

- Donation: _____

Potential financing sources: Under study.

External credit:

Donor:

Special observations:

El Salvador**No. 1.15****Rehabilitation of unloading facilities for small-scale fishing fleets****Sector: AGRICULTURE AND LIVESTOCK****Subsector: FISHERIES****Background:** Unloading facilities for fishing were also damaged.**Project objectives:** Rehabilitate or rebuild unloading facilities in affected areas to normalize small-scale fishing and recover fishermen's income and employment levels.**Tentative duration: 3 years****Estimated starting date: March 1999****National agency in charge:** MAG, through the Fisheries Development Centre (CENDEPESCA) and Ministry of Public Works and Mayor's Offices.**Description of activities and tasks:** Rehabilitation, reconstruction and desilting of five quays in Puerto Parada, Puerto El Triunfo, La Libertad, Acajutla and Meanguera del Golfo.**Expected results:** Fish-product unloading, processing, conservation and marketing facilities for 5,500 small-scale fishermen will be placed back in operation. This will benefit 300 fishermen in Acajutla, 896 in La Libertad, 1,935 in Puerto Parada, 1,642 in El Triunfo and 727 in Meanguera del Golfo.**Total investment required (US\$):** 3,412,969

- Labour
(person/months)

- Domestic inputs:

- Imported inputs: _____

Financing (US\$)

- Local: 568,828

- Foreign: 2,844,141

- Donation: _____

Potential financing sources: Under study.

External credit:

Donor:

Special observations:

El Salvador**No. 1.16****Reactivation of shrimp farming in affected areas****Sector: AGRICULTURE AND LIVESTOCK****Subsector: FISHERIES**

Background: Shrimp-farming infrastructure and production capacity was affected by hurricane Mitch; most of the damage was to pond perimeters and internal divisions, but all the shrimp in ponds at the time were lost as a result. Some pumping equipment was also damaged.

Project objectives: Rehabilitate damaged infrastructure to reactivate shrimp farming.

Tentative duration: 5 years

Estimated starting date: June 1999

National agency in charge: MAG, through the Fisheries Development Centre (CENDEPESCA).

Description of activities and tasks: Rebuild or repair damaged pond infrastructure: edges (topographical survey, levelling, compacting and soil protection); water gates (canal construction or repair, and lining); drainage canals (ditto); donation of production equipment (supply —with financing— of pumps, motor pumps, physical and chemical parameter measuring equipment, trammel nets, cast nets, and work tools); technical assistance for entire production cycle (training in pond and shrimp management, feeding techniques, disease diagnosing and control, and business development and marketing). Most damaged infrastructure is in Jiquilisco Bay in Usulután department, and in La Paz and La Unión departments to a lesser extent.

Expected results: Rehabilitation of ponds to recover productive capacity, technical adaptation of semi-intensive shrimp production infrastructure, permanent, year-round job generation, training producers in new production method (semi-intensive), and incorporating women into the different stages of production. A total of 832 families in 15 cooperatives and private projects will be benefited.

Total investment required (US\$):	1,714,300
• Labour (person/months)	
• Domestic inputs:	
• Imported inputs: _____	
Financing (US\$)	
• Local:	690,000
• Foreign:	1,024,300
• Donation: _____	
Potential financing sources:	
External credit: Cooperating agencies.	
Donor: Cooperating agencies.	

Special observations:

El Salvador**No. 1.17****Productive rehabilitation of 50 farming cooperatives****Sector: AGRICULTURE AND LIVESTOCK****Subsector:**

Background: 50 cooperatives in the southern part of San Miguel, Usulután and the coastal area of the La Paz department were damaged or destroyed by the hurricane.

Project objectives: Alleviate the health, housing and food security situation in cooperatives.

Tentative duration: 12 months

Estimated starting date: January 1999

National agency in charge: Confederation of Salvadorian Agrarian Reform Federation (CONFRAS).

Description of activities and tasks: Organization of reconstruction committees and purchase of materials for 200 dwellings, purchase and distribution of food and medicines for 2,500 families, purchase and distribution of farming inputs for 350 hectares.

Expected results: Improved living conditions for 2,500 families.

Total investment required (US\$): 1,500,000

- Labour
(person/months)

- Domestic inputs:

- Imported inputs: _____

Financing (US\$)

- Local:

- Foreign:

- Donation: _____ 1,500,000

Potential financing sources:

External credit:

Donor:

Special observations:

El Salvador**No. 2.1****Design of disaster-prevention policies and identification of investments****Sector: TECHNICAL ASSISTANCE****Subsector:**

Background: El Salvador and the rest of Central America have suffered the consequences of various types of natural disasters for years. The recurrence and intensity of these phenomena has been increasing in recent years, and material and personal damages are becoming alarmingly progressive and cumulative.

No major disaster-prevention investments were made in the past, partly because disasters were statistically infrequent, making prevention investment insufficiently profitable. The situation has changed, since hurricanes (Joan, Georges, Cesar, Mitch, etc.), forest fires and the El Niño phenomenon are occurring frequently.

Project objectives: Carry out studies to design an appropriate natural-disaster prevention policy, especially for floods. An important aim is to provide authorities with criteria and guidelines for natural-resource management and regulation. Another is to identify socially profitable investment options to prevent or reduce the negative and costly effects of natural disasters. Studies will focus on the identification, location and sizing of various infrastructure works.

Tentative duration: 24 months**Estimated starting date:****National agency in charge: UNDP.****Description of activities and tasks:**

- Identification of critical areas (floods, mudslides, droughts, fires and earthquakes);
- Sound land-use management to prevent settlements, irregular or otherwise, on land subject to the effects occurring frequently. Efforts and resources must therefore be invested in a formal and exhaustive study of this complex subject-matter, so as establish well-grounded data for subsequent policy setting of natural disasters;
- Preliminary design of infrastructure works to control the forces of nature, such as drainage works, river levées, dams, etc.;
- Design criteria for civil works often threatened by floods (road routing, bridges, drinking water and sewerage systems, public service facilities, etc.);
- Formulation of proposals to rebuild the highway system and extend it to provide alternative links, especially between the country's central region and the coast.

As extreme weather becomes more frequent reservoirs must be built that can also be used for irrigation in the dry season or in years of drought and to regulate inter-annual phenomena (such as El Niño and La Niña). The intensity of such phenomena is increasing and becoming more frequent so investment in prevention infrastructure will be easier to justify in that it will offset natural-disaster losses.

Expected results: Expert studies for use in adopting a disaster-prevention policy.

Total investment required (US\$):	1,000,000
<ul style="list-style-type: none"> • Labour (person/months) • Domestic inputs: • Imported inputs: _____ 	
Financing (US\$)	
<ul style="list-style-type: none"> • Local: • Foreign: • Donation: _____ 	
Potential financing sources:	
External credit:	
Donor:	

Special observations: Resources must first be assigned to scaling and describing the scope of the project, following the corresponding terms of reference. This prior stage should take around two months, and once it is completed, it will be easier to determine the amount of pre-investment required. This project is of regional scope, because some river basins extend to two or more countries.

El Salvador	No. 2.2
Programming of works	
Sector: TECHNICAL ASSISTANCE	Subsector:
<p>Background: The process of rebuilding and repairing damaged assets is based on the prior execution of various urgently needed works, so this document contains numerous building-project proposals. However, there is a shortage of certain goods and inputs, such as building materials, machinery and equipment, and skilled labour. Works must therefore be programmed accordingly, on the basis of available resources.</p> <p>The disaster has paralyzed many productive activities, leading to high levels of unemployment, so programming must be brought into line with available resources.</p> <p>Project objectives: Programming of works to be executed, giving priority to labour-intensive activities as far as possible; this mainly applies to construction and agricultural activities.</p>	
<p>Tentative duration: 6 months</p> <p>Estimated starting date:</p>	National agency in charge: UNDP.
<p>Description of activities and tasks: Studies to make efficient use of labour, by sector and skills.</p>	
<p>Expected results: Technical data for efficient labour use in programming of works.</p>	
<p>Total investment required (US\$): 100,000</p> <ul style="list-style-type: none"> • Labour (person/months) • Domestic inputs: • Imported inputs: _____ <p>Financing (US\$)</p> <ul style="list-style-type: none"> • Local: • Foreign: • Donation: _____ <p>Potential financing sources:</p> <p>External credit:</p> <p>Donor:</p>	<p>Special observations: This project is of regional scope, since unemployment could lead to undesired migration.</p>

El Salvador**No. 3.1****Rehabilitation and reconstruction programme for damaged schools****Sector: EDUCATION****Subsector: SCHOOL INFRASTRUCTURE**

Background: Several of the country's 4,905 public schools were damaged; 405 need refurbishing, 117 repairs, 179 partial reconstruction and 30 total replacement.

Project objectives: Restore public schools to offer the same educational opportunities as before the hurricane.

Tentative duration: 12 months**Estimated starting date: Immediate****National agency in charge:** Ministry of Public Education.

Description of activities and tasks: Assess the risks of certain plots, identify new sites, repair structures, rebuild various schools and re-equip all renovated schools.

Expected results: Restoration of school infrastructure prior to Mitch.

Total investment required (US\$): 16,500,000

- Labour (25,000 person/months) 5,000,000
- Domestic inputs: 6,500,000
- Imported inputs: 5,000,000

Financing (US\$)

- Local: 3,300,000
- Foreign: 13,200,000
- Donation:

Potential financing sources: World Bank, IDB, European Union, bilateral cooperating institutions, etc.

External credit:

Donor:

Special observations: This plan should be executed immediately.

El Salvador**No. 4.1****Emergency food assistance for affected families****Sector: EMERGENCY****Subsector: FOOD**

Background: Numerous rural families devoted to subsistence farming lost their crops and livelihood, as did semi-urban families who lost their homes and jobs. Both groups are in high-risk situations due to their lack of food security.

Project objectives: Provide food rations to 30,000 individuals on the basis of "work for food" programmes.

Tentative duration: 6 months**Estimated starting date: January 1999****National agency in charge:** Ministry of Health.

Description of activities and tasks: The agencies in charge will provide food rations to selected groups, who in turn will rehabilitate their housing and basic social infrastructure, and productive capacities in the case of rural groups.

Expected results: This initiative will provide food rations during the reconstruction period, while accelerating and reducing the cost of social and productive infrastructure works and providing temporary jobs.

Total investment required (US\$): 2,000,000

- Labour
(person/months)

- Domestic inputs:

- Imported inputs: _____

Financing (US\$)

- Local:

- Foreign:

- Donation: _____ 2,000,000

Potential financing sources:

External credit:

Donor: United Nations World Food Programme.

Special observations:

El Salvador	No. 4.2
Emergency epidemiological control	
Sector: EMERGENCY	Subsector: HEALTH
Background: Cases of cholera, malaria, rabies, hepatitis and dengue have been reported in most disaster areas and are increasing the risk of spreading contagious diseases.	

Project objectives: Provide medical treatment to infected patients and contain contagious diseases.

<p style="text-align: center;">Tentative duration: 3 months</p> <p>Estimated starting date: Immediate</p>	<p>National agency in charge: Ministry of Health.</p>
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Description of activities and tasks: Bury the dead in accordance with health regulations, incinerate dead animals, vaccinate the population, and treat and monitor the sick.

<p>Expected results: Curing of patients and containment of contagious diseases.</p>
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<p>Total investment required (US\$): 5,000,000</p> <ul style="list-style-type: none"> • Labour (person/months) • Domestic inputs: • Imported inputs: _____ <p>Financing (US\$)</p> <ul style="list-style-type: none"> • Local: 1,000,000 • Foreign: • Donation: _____ 4,000,000 <p>Potential financing sources: Search for donors in process.</p> <p>External credit:</p> <p>Donor:</p>	<p>Special observations: This project if of regional scope to prevent trans-border epidemics.</p>
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El Salvador	No. 4.3
Resettlement of victims	
Sector: EMERGENCY	Subsector: SETTLEMENTS
Background: Thousands of people, most of them already living in poverty, were left homeless by the hurricane.	
Project objectives: Improve victims' living conditions and prevent migration from rural areas to cities and abroad by resettling the homeless on the basis of comprehensive actions to provide them with acceptable, sustainable living conditions; promote equal access and opportunities to men and women project beneficiaries.	
Tentative duration: 36 months Estimated starting date: January 1999	National agency in charge: International Organization for Migration.
Description of activities and tasks: Carry out studies and actions to resettle affected groups, including labour training, technical and financial support, employment opportunities in productive, full-time activities, support men's and women's community organizations, and the most vulnerable groups, particularly the elderly and the handicapped.	
Expected results: Labour training and employment for project beneficiaries, and reincorporation into communities.	
Total investment required (US\$): 7,000,000 <ul style="list-style-type: none"> • Labour (person/months) • Domestic inputs: • Imported inputs: _____ Financing (US\$) <ul style="list-style-type: none"> • Local: • Foreign: • Donation: _____ Potential financing sources: External credit: Donor:	Special observations: Due to its social content, this project should secure financing through donations in order to expand coverage.

El Salvador**No. 5.1****Electrification programme for new settlements in the country's least developed areas****Sector: ENERGY****Subsector: ELECTRICITY**

Background: Minor damages were reported to electricity distribution infrastructure; these have been covered by distribution companies, which are all private. On average, electricity coverage reaches 68 per cent of the population and it will be difficult to expand electrification and incorporate low-income groups.

Project objectives: Provide electricity to new settlements and communities in marginalized and rural areas and support the development of the poorest population sectors. Small extensions from the primary network and larger investments in secondary distribution networks are required.

Tentative duration: 12 months
Estimated starting date: November 1998

National agency in charge: Lempa River Hydroelectric Executive Commission (CEL).

Description of activities and tasks: Determine location of new settlements and urban and rural areas to be electrified; draw up designs, quantify costs, contract for and execute works.

Expected results: Provision of electric power to 15,000 dwellings and families.

Total investment required (US\$):	3,000,000
• Labour (2,000 person/months)	600,000
• Domestic inputs:	1,200,000
• Imported inputs:	1,200,000
Financing (US\$)	
• Local:	600,000
• Foreign:	2,000,000
• Donation:	
Potential financing sources:	
External credit: AID, IDB and EEC.	
Donor:	

Special observations:

El Salvador**No. 6.1****Assessment of forested areas****Sector:** ENVIRONMENT**Subsector:**

Background: The problems posed by destructive meteorological events will continue to worsen as long as the country, and Central America in general, lacks a land-use and management policy for effective watershed management.

Project objectives: Assess the feasibility of adding new lands to current reserves; establish whether these lands form part of Central American biological corridors, and include them in ecological restoration processes.

Tentative duration: 6 months**Estimated starting date:** 1999

National agency in charge: Ministry of the Environment, MAG, NGOs.

Description of activities and tasks: Establish criteria for selecting the country's remaining forested areas (natural, with little human interference or with ecological restoration possibilities); review and update the Environmental Information System's database; conduct an on-site inspection of remaining forested areas; study land-tenure conditions; establish incorporation priorities, and prepare the necessary background information to carry out the incorporation and protection process.

Expected results: Incorporation of various areas into the system of protected areas, thus reducing their vulnerability to natural disasters.

Total investment required (US\$):	3,500,000
• Labour (person/months)	
• Domestic inputs:	2,800,000
• Imported inputs:	700,000
Financing (US\$)	
• Local:	1,000,000
• Foreign:	2,500,000
• Donation:	
Potential financing sources: Under study.	
External credit:	
Donor:	

Special observations:

El Salvador

No. 6.2

Installation of real-time networks

Sector: ENVIRONMENT

Subsector: METEOROLOGY

Background: Central America and the Caribbean have suffered the consequences of natural disasters for many years, but disasters are now occurring more frequently. Much infrastructure is destroyed every time, in addition to the tragic toll of human lives and victims. Production stockpiles are also destroyed, leading to considerable economic losses and the elimination of productive jobs.

Despite recent progress, hurricane Mitch pointed up the need for the countries involved and the international community to increase efforts and resources in the field of hydrometeorological precautions in Latin America.

Project objectives: Specify, design and install early-warning networks on adverse meteorological conditions in the most vulnerable Central American and Caribbean countries to provide timely information to prevent and mitigate the effects of natural disasters.

Tentative duration:

Estimated starting date: December 1998

National agency in charge: Ministry of Agriculture.

Description of activities and tasks: Evaluate the current condition of the region's hydrological and meteorological networks; determine minimum geographical and strategic coverage needs by country as regards number and type of stations; acquire and install automatic stations to measure parameters by satellite; acquire and install in each country a receiving station to gather data from automatic measuring stations, and train personnel in management and maintenance.

Expected results: An effective early-warning system to facilitate decision-making to protect the exposed population. Each country will also have the information needed to evaluate situations of regional or trans-border scope, such as flood control and dam management.

Total investment required (US\$): 600,000

- Labour
(person/months)

- Domestic inputs:

- Imported inputs: _____

Financing (US\$)

- Local:

- Foreign:

- Donation: _____

Potential financing sources: Under study.

External credit:

Donor:

Special observations:

1) Funds should be earmarked for this initiative, since its benefits will be significantly greater than the small investment required to establish the system.

2) The project will have technical assistance from the World Meteorological Organization.

El Salvador**No. 7.1****Construction and equipping of Chalatenango Health Care Unit****Sector: HEALTH****Subsector: HOSPITALS**

Background: The Dr. Luis Edmundo Vásquez Hospital in Chalatenango is an inpatient-care, second-level facility of medium complexity but is also providing primary care because no health unit exists. The preventive and remedial care it offers is costly and low-quality, and coverage is insufficient.

Project objectives: Build a primary-care health unit.

Tentative duration: 10 months

Estimated starting date: 1999

National agency in charge: Ministry of Public Health and Social Welfare.

Description of activities and tasks: Build 996 m² of different rooms and complementary areas; equip and furnish the unit; build 1,375 m² of outdoor works, including terraces, gardens, parking lot, sidewalks, access road, etc.

Expected results: Provision of primary care in a specialized unit, thus improving the quality of the hospital's services by easing its burden. Estimated capacity: 28,800 patients a year.

Total investment required (US\$): 741,982

- Labour
(person/months)

- Domestic inputs:

- Imported inputs: _____

Financing (US\$) Under study

- Local:

- Foreign:

- Donation: _____

Potential financing sources: World Bank, IDB, European Union and bilateral cooperation.

External credit:

Donor:

Special observations:

El Salvador**No. 7.2****Construction and equipping of the San Francisco Gotera Health Unit, Department of Morazán****Sector: HEALTH****Subsector: HOSPITALS**

Background: Current hospital infrastructure is insufficient, in both quantity and quality, to cover the services required. Primary care takes up 30 per cent of the hospital's rooms, hampering proper service in its fields of specialization. All three levels of care suffer seriously from equipment shortages, and the infrastructure needed for contingencies is also lacking.

Project objectives: A new, functional health unit.

Tentative duration: 10 months

Estimated starting date: 1999

National agency in charge: Ministry of Public Health and Social Welfare.

Description of activities and tasks: Build 996 m² of different rooms and complementary areas; equip and furnish the unit; execute 1,375 m² of outdoor works, including terraces, gardens, parking lot, sidewalks, access road, etc.

Expected results: Provision of primary care in specialized facility, thus improving the hospital's services by easing its burden. Estimated capacity: 28,800 patients a year. Direct beneficiaries of the project: 17,423 patients a year.

Total investment required (US\$): 741,982

- Labour
(person/months)

- Domestic inputs:

- Imported inputs: _____

Financing (US\$) Under study

- Local:

- Foreign:

- Donation: _____

Potential financing sources: World Bank, IDB, European Union and bilateral cooperation.

External credit:

Donor:

Special observations:

El Salvador**No. 7.4****Modernization and reconstruction of San Rafael General Hospital in the Department of La Libertad****Sector: HEALTH****Subsector: HEALTH SERVICES**

Background: San Rafael Hospital in Nueva San Salvador (Santa Tecla) has one building erected between 1880 and 1890; the pediatric service was inaugurated in 1925, and maternity in 1947. A five-storey tower was completed in 1976 and is the only functional part of the hospital, but needs to be modernized.

Project objectives: Improve outpatient and inpatient hospital services in Nueva San Salvador, and strengthen disaster prevention and mitigation in the country's health care infrastructure.

Tentative duration: 36 months**Estimated starting date: 1999****National agency in charge:** Ministry of Public Health and Social Welfare.

Description of activities and tasks: Based on the existing feasibility study, demolish the buildings, except for the oldest one —a cultural site and— the five-storey tower, and construct a complementary building on the adjacent lot to relocate services.

Expected results: More comprehensive health care in the area, together with increased prevention, early diagnosis and rehabilitation. Conversion into a secondary care reference hospital offering basic specialties and hospitalization in the four areas of medicine, benefiting 622,000 patients.

Total investment required (US\$): 24,000,000

- Labour (33,000 person/months) 10,000,000
- Domestic inputs: 6,000,000
- Imported inputs: 8,000,000

Financing (US\$) Under study

- Local:
- Foreign:
- Donation:

Potential financing sources: World Bank, IDB, European Union and bilateral cooperation.

External credit:

Donor:

Special observations:

El Salvador**No. 7.5****Reconstruction and rehabilitation of Santa Gertrudis Hospital
in the Department of San Vicente****Sector: HEALTH****Subsector: HOSPITALS**

Background: The hospital has been in operation since 1820 and is experiencing exponential growth in outpatient visits. The Ministry of Public Health intends to expand its capacity to address this growth, and to cover extraordinary demand in cases of disaster.

Project objectives: Rehabilitate and rebuild the hospital to offer a comprehensive solution to the new needs, including disaster emergencies.

Tentative duration: 36 months**Estimated starting date: 1999**

National agency in charge: Ministry of Public Health and Social Welfare (MSPAS).

Description of activities and tasks: Demolition, modifications and new construction, without interrupting services, as follows: stage one (two phases), stage two (one phase) and stage three (seven phases).

Expected results: Improved health care services, particularly outpatient visits and emergencies; the new hospital will be functional and meet local needs as regards second-level care and certain specialities. Upgrading of the hospital as the most important within the Department of San Vicente Health Care System, benefiting 155,000 patients.

Total investment required (US\$): 18,000,000

- Labour (person/months) 7,500,000
- Domestic inputs: 4,500,000
- Imported inputs: 6,000,000

Financing (US\$)

- Local: 2,000,000
- Foreign: 16,000,000
- Donation:

Potential financing sources:

External credit: World Bank, IDB, European Union and bilateral cooperation.

Donor:

Special observations:

El Salvador**No. 8.1****Rehabilitation programme for drinking water and sewerage systems administered by ANDA****Sector: SANITATION****Subsector: INFRASTRUCTURE**

Background: Some drinking water and sewerage systems administered by ANDA were damaged, reducing or halting the drinking water supply.

Project objectives: Rehabilitate drinking water and sewerage systems damaged by Mitch.

Tentative duration: 4 months

Estimated starting date: January 1999

National agency in charge: ANDA.

Description of activities and tasks: Repair pumping systems (motors, control panels, power intakes, etc.) in the cities of California, Berlín, Alegría, San Miguel, Colón and San Pedro Puxtla; rehabilitate conveyance and distribution pipes in the systems of Mercedes Umaña, Berlín, Estanzuelas, Sta. Rosa de Lima, San Alejo, Conchagua, San Miguel, Chirilagua, Sesorí, Carolina, Colón, La Libertad, Ayagualo, La Palma, Sonsonate and Sesembra; repair sewers in Chirilagua, Berlín and San José de la Majada and damaged masonry at the Lempa River water purifying system.

Expected results: Re-establishment of normal drinking-water and sewerage system operating parameters, reducing risks of disease.

Total investment required (US\$): 2,000,000

- Labour (2,000 person/months) 400,000
- Domestic inputs: 900,000
- Imported inputs: 700,000

Financing (US\$)

- Local: 400,000
- Foreign: 1,600,000
- Donation:

Potential financing sources:

External credit: IDB, CABI, EU.

Donor:

Special observations:

El Salvador**No. 8.2****Well construction programme in rural areas****Sector: SANITATION****Subsector: INFRASTRUCTURE**

Background: Flooding caused by the hurricane irreparably damaged artesian wells that supplied drinking water in many high-risk, flood-prone communities that now require relocation, and a drinking water supply must therefore be established in new settlements.

Project objectives: Supply drinking water to relocated rural settlements, to reduce vulnerability to flooding; restore the drinking water supply in rural localities that have suffered irreparable damage or contamination and disinfect water mains.

Tentative duration: 3 months**Estimated starting date: January 1999****National agency in charge: ANDA.**

Description of activities and tasks: Perforate and equip 83 artesian wells to depths between 80 and 120 feet, distributed as follows: 25 wells in the Central Region, 16 of them in the municipality of Zacatecoluca and nine in the municipalities of San Juan de Nonualco and Cuyultitlán; 24 in the Western Region, 17 located in the municipalities of El Cacao, San Julián, Tonalá, El Presidio, Barra Ciega and Cuisnahuat; 17 in the municipalities of Jiquilisco, San Agustín, Mercedes Umaña, Concepción Batres and Juacarán in the Department of Usulután; 15 in the municipalities of Chirilagua, San Miguel and Uluazapa in the Department of San Miguel and three in the municipality of Conchagua in the Department of La Unión, all in the Eastern Region. Installations will be completed with the construction of public cisterns, distribution systems and household intakes.

Expected results: Drinking water supply in those localities.

Total investment required (US\$):	3,000,000
• Labour (1,500 person/months)	300,000
• Domestic inputs:	1,800,000
• Imported inputs:	900,000
Financing (US\$)	
• Local:	600,000
• Foreign:	2,400,000
• Donation:	
Potential financing sources:	
External credit: IDB, CABI and EU.	
Donor:	

Special observations:

El Salvador**No. 9.1****Emergency programme to rehabilitate the highway system****Sector: TRANSPORT AND COMMUNICATIONS****Subsector: HIGHWAYS**

Background: Mitch caused considerable damage to highway infrastructure, hampering direct links between localities and in some cases seriously obstructing transport of farm produce to consumption centres.

Project objectives: Rehabilitate damaged infrastructure and normalize domestic and international transport at low operating costs.

Tentative duration: 8 months**Estimated starting date: First quarter of 1999****National agency in charge:** Ministry of Public Works.

Description of activities and tasks: Execute provisional repair works, including placement of metal bridges and required earthworks, reconstruct drains and improve road surfacing.

Expected results: Re-establishment of highway infrastructure and normal traffic flow.

Total investment required (US\$):	6,600,000
• Labour (10,000 person/months)	2,000,000
• Domestic inputs:	3,000,000
• Imported inputs:	1,600,000
Financing (US\$)	
• Local:	1,650,000
• Foreign:	4,950,000
• Donation:	
Potential financing sources:	
External credit: IDB and World Bank.	
Donor:	

Special observations: Works should be executed using as much available labour as possible.

El Salvador**No. 9.2****Programme to rehabilitate the highway system****Sector:****Subsector:**

Background: Mitch caused considerable damage to highway infrastructure, hampering direct links between localities and in some cases seriously obstructing transport of farm produce to consumption centres.

The improvements provided for in the Rehabilitation Programme are provisional. Therefore, it is necessary to establish the final infrastructure required for the normal development of the country.

Project objectives: Rehabilitate damaged infrastructure and normalize domestic and international transport at low operating costs.

Tentative duration: 12 months

Estimated starting date: Third quarter of 1999

National agency in charge: Ministry of Public Works.

Description of activities and tasks: Carry out feasibility studies based on experience gained from the hurricane, especially as regards layout of works and availability of highway options; programme works with intensive use of labour, and execute works.

Expected results: Definitive, safe highway works to support the country's economic and social development.

Total investment required (US\$):	23,000,000
• Labour (35,000 person/months)	7,000,000
• Domestic inputs:	11,000,000
• Imported inputs: _____	5,000,000
Financing (US\$)	
• Local:	4,500,000
• Foreign:	18,500,000
• Donation: _____	
Potential financing sources:	
External credit: IDB and World Bank.	
Donor:	

Special observations:

El Salvador**No. 9.3****Planning and feasibility studies to extend the main and access road system****Sector: TRANSPORT****Subsector: PRE-INVESTMENT**

Background: Main highways were obstructed as a result of the hurricane, making it difficult and costly to provide links between localities; indirect costs to the sector were estimated at more than US\$200 million.

The Salvadorian highway network is incomplete, i.e., there is a shortage of road links between cities, the capital and ports. Secondary and tertiary networks are also incomplete, and lack sufficient feeder roads to the highway system.

Ironically, a similar amount could have been used to significantly expand the country's road capacity.

Project objectives: Study highway linkage alternatives between the country's main urban and productive centres and identify the best ways of completing the highway system and its feeder roads.

Tentative duration: 12 months

Estimated starting date: March 1999

National agency in charge: Ministry of Communications, Transport, Public Works and Housing.

Description of activities and tasks: Develop an extensive highway planning study (traffic engineering, demand, projections, alternative routes, etc.) and conduct project feasibility studies.

Expected results: Technical and economic information for well-founded decision-making on the most cost-effective projects to be executed in the short and medium terms.

Total investment required (US\$): 900,000

- Labour
(person/months)

- Domestic inputs:

- Imported inputs: _____

Financing (US\$)

- Local:

- Foreign:

- Donation: _____

Potential financing sources:

External credit: IDB, IBRD and CABEL.

Donor:

Special observations:

1) Judging by the insufficiencies of the highway system, the study is likely to offer profitable and attractive investments amounting to some US\$200-300 million.

2) This initiative has been included in the government's Reconstruction Plan, and programmed resources within the above range have been envisaged.

El Salvador**No. 10.1****Assessment of physical risk and vulnerability in San Salvador****Sector: HOUSING****Subsector: HUMAN SETTLEMENTS**

Background: Urban expansion in the San Salvador metropolitan area has caused rapid deterioration of natural resources and the socio-economic and physical segregation of part of the population. Mitch provoked cave-ins in vulnerable gully settlements.

Project objectives: Conduct a socio-economic and environmental diagnosis of the most vulnerable municipalities in the San Salvador metropolitan area; design a follow-up system on municipal land development and draw up a municipal disaster-prevention plan.

**Tentative duration: 6 months per
municipality**

Estimated starting date: February 1999

National agency in charge: San Salvador Metropolitan Area Planning Office.

Description of activities and tasks: Develop the necessary tools to compile information; systematize, process and analyse the data collected and implement municipal disaster-prevention and vulnerability-reduction plans.

Expected results: Ongoing follow-up system on disasters and urban development, and disaster-prevention and vulnerability-reduction plans.

Total investment required (US\$): 100,000

- Labour
(person/months)

- Domestic inputs:

- Imported inputs: _____

Financing (US\$)

- Local:

- Foreign:

- Donation: _____

Potential financing sources: Under study.

External credit:

Donor:

Special observations:

El Salvador**No. 10.2****Progressive housing programme for rural areas****Sector: HOUSING****Subsector: HUMAN SETTLEMENTS****Background:** More than 10,000 dwellings were destroyed or seriously damaged during the storm.

Project objectives: Improve and rebuild housing infrastructure in rural and semi-urban settlements; strengthen certain NGOs for them to take part in the execution of works; create a trust fund to support local development in rural settlements; construct housing and basic services with the participation of the homeless through "work-for-food" schemes.

Tentative duration: 24 months**Estimated starting date: July 1999****National agency in charge:** Under Ministry of Housing and Urban Development and Office of Strategic Planning.

Description of activities and tasks: Project planning and design of housing units; tendering and purchase of building materials and tools; tendering to contract for NGOs providing technical assistance services; train beneficiary families, and execute works and complementary projects.

Expected results: Permanent improved housing for those affected through a work-for-food scheme during construction or repair of their own home.

Total investment required (US\$): 37,500,000

- Labour (170,000 person/months) 23,300,000
- Domestic inputs: 8,600,000
- Imported inputs: 5,600,000

Financing (US\$)

- Local:
- Foreign:
- Donation:

Potential financing sources:

External credit: Government, IDB, IBRD and private banks.
Donor:

Special observations: The government has a subsidy mechanism to finance housing for low-income groups.

El Salvador**No. 10.3****Land use plan for sustainable national development****Sector: HOUSING****Subsector: HUMAN SETTLEMENTS**

Background: Inappropriate land use worsened the effects of hurricane Mitch. Inappropriate selection of housing sites exposed them to the consequences of severe natural phenomena such as hurricanes, floods and large-scale landslides, among others.

Project objectives: Reduce the country's vulnerability by incorporating prevention and improvement criteria into risk-management procedures.

Tentative duration: 24 months**Estimated starting date: January 1999**

National agency in charge: Under Ministry of Housing and Urban Development and Office of Strategic Planning.

Description of activities and tasks: Conduct studies on the vulnerability of human settlements to different risks, micro-zoning of watersheds and mapping of environmentally sensitive and catastrophic natural disaster risk-prone areas. Proposed activities include use of satellite images and domestic and international databases; identification of those involved in tapping natural resources and the environment for their possible incorporation into land management procedures, and field work.

Expected results: Land management plans at the national and municipal levels and basic data for preparing land-use and building regulations.

Total investment required (US\$): 1,000,000

- Labour
(person/months)

- Domestic inputs:

- Imported inputs: _____

Financing (US\$)

- Local:

- Foreign:

- Donation: _____

Potential financing sources: Governments, IDB, World Bank and OAS.

External credit:

Donor:

Special observations: