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## FOREWORD

The powerful earthquake which took place on 10 October 1986 caused considerable damage in the metropolitan area of San Salvador. News of the disaster deeply shocked the international community, which reacted by immediately sending to the country all types of help for the victims. In addition, on 14 October 1986, the United Nations General Assembly unanimously adopted Resolution A/41/L.4. In this Resolution the Member States express their solidarity and support to the government and people of El Salvador, and request "the Secretary General to mobilize resources to assist in the relief and reconstruction work undertaken by the government of El Salvador and to co-ordinate the multilateral assistance and, in consultation with the Government of El Salvador, to identify the emergency and medium-term and long-term needs in order to contribute to the reconstruction of the affected areas".

This document is in response to this mandate. It was prepared by the Economic Commission for Latin America and the Caribbean (ECLAC), in close collaboration with the authorities of El Salvador, and with financial support from the United Nations Development Programme (UNDP).

## INTRODUCTION

On the morning of 10 October 1986, the city of San Salvador was struck by a powerful earthquake. The earthquake left a toll of 1,200 dead and more than 10,000 injured; one fifth of the population of the metropolitan region was left without shelter. The city's economic activity was abruptly brought to a halt and the living conditions, particularly of the poorest segments of the population, were seriously affected through losses of housing, essential services and sources of income. The material damage reached more than 900 million dollars, representing approximately one quarter of the country's gross domestic product and more than 40% of its external debt. These are clearly unprecedented figures in comparison with recent disasters in other countries.<sup>1</sup>

The catastrophe caused considerable damage to housing and to the basic service infrastructure - water, drainage, electricity, telecommunications - and either totally or partially destroyed a large number of buildings in the health and education sectors, as well as constructions, equipment and inventories belonging to industry and trade. Moreover, the administrative functions of the government were temporarily interrupted by the destruction of public buildings and by the loss or destruction of archives and communication systems.

The losses caused by the catastrophe added to the intense economic and social crisis in which Salvadoran society was already plunged. The unfavourable conditions on international markets, together with six years of intense armed conflict have caused the country's economy to regress almost one quarter of a century in terms of per capita income. Such losses may well be the heaviest so far recorded in any Latin American country during the present decade. The number of people displaced from areas of conflict towards San Salvador surpasses 350,000, while almost a further million have left the country. Open unemployment in 1986 is in the region of 32% of the economically active population. In addition, in the last five years the external debt has doubled and its servicing represents already more than one half of export income.

The government immediately organized to handle the emergency. As was to be expected, priority was given to rescuing victims trapped under fallen buildings and to caring for the injured. Since the hospital sector was one of those which suffered most damage, posts to provide services were improvised. The electricity, water and telephone services were restored relatively quickly, and two weeks after the disaster, 90% of the area affected possessed electrical energy, the water supply had been restored to most of the zone affected, while tankers and standpipes

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<sup>1</sup> As an indication, it is worth pointing out that though total damage caused by the earthquake which struck Mexico City in September 1985 was four times higher, it represented barely 2% of the country's gross domestic product.

were used in the most damaged areas or in those where access was difficult; telephone services in the areas which had not been affected has been by and large normalized.

On the same day as the earthquake took place, efforts began to provide food, clothing and temporary shelter to the victims. For this purpose, several commissions, in which the entrepreneurial sector took an active role, were set up. A variety of non-government organizations also took part in the collection and distribution of food, medicines and construction materials. As of 22 October, the Emergency Committee declared that it had met the requirements of 104,600 families, while the armed forces had met those of 34,746. The Church Emergency Committee stated that it had provided relief for 150,000 people. In addition, the Red Cross directly channelled gifts, in kind and in cash, from abroad.

The population affected by the earthquake reacted admirably. No incidents of looting occurred and they immediately undertook clearing up the rubble, recovering material from damaged houses, to be used for building temporary dwellings, many of which were even more precarious than those which the victims inhabited before the earthquake. It is possible to observe the day by day changes taking place in the appearance of the city, with the construction of improvised housing and survival strategies are multiplying. Neighbours collaborated by exchanging construction material, taking care of children and in other tasks, and a large number of small commerces have reappeared in the streets.

The international community immediately and generously provided help. During the emergency period shipments of medicines, food, clothing and a variety of equipment worth approximately 63 million colones were sent to the country. Assistance in rescue operations, medical attention and relief for the population was also provided. For its part, the various organizations of the United Nations system quickly responded to the emergency, particularly the Office of the United Nations Disaster Relief Co-ordinator (UNDRO), the United Nations Development Programme (UNDP), the United Nations Children's Fund (UNICEF), the World Food Programme (WFP) and the World Health Organization (WHO).

The circumstances facing El Salvador are extremely serious. This is one opportunity for international solidarity to make a decisive contribution to relieving the social costs of the new crisis and providing a thrust for efforts at pacification and development which constitute the country's major goals. This document puts forward a set of technical assistance projects which countries and international and regional organizations could offer. Their estimated cost is one and a half million dollars. In addition, approximately 150 investment projects are proposed, divided into sectors, each with an individual profile. As a whole, they represent an investment of more than 1 billion dollars, whose funding will necessarily require collaboration from the international community.

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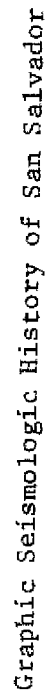
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# CHRONOLOGY OF THE MOST IMPORTANT EARTHQUAKES AND VOLCANIC ERUPTIONS IN THE METROPOLITAN REGION OF SAN SALVADOR

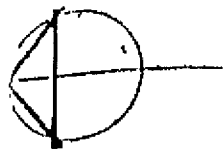


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SYMBOLS

SHANTIES AND ENCAMPMENTS

ILLEGAL SETTLEMENTS

PEASANTS AND OLD DWELLINGS

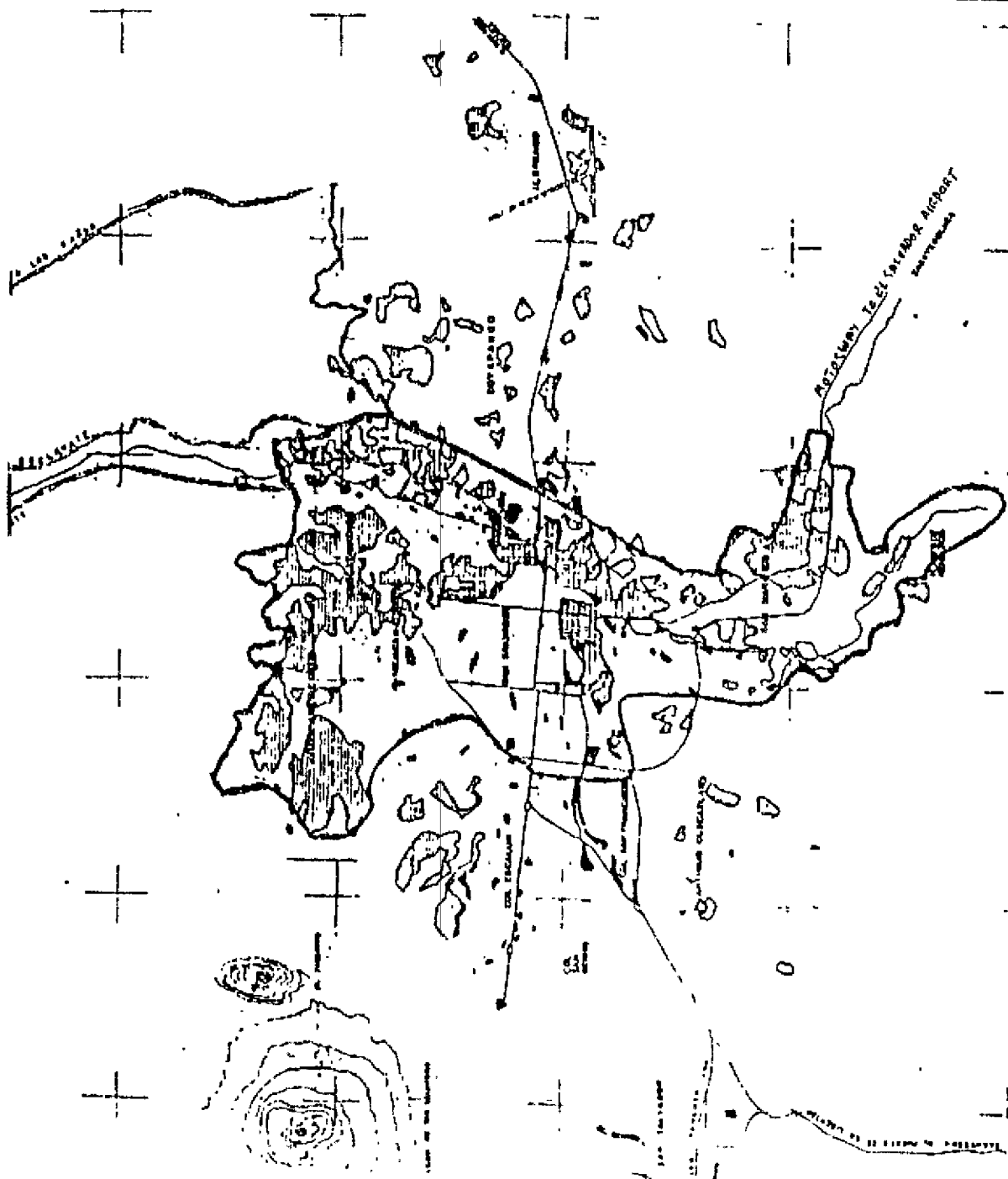
HIGHWAY

RIVER

AREA AFFECTED



METROPOLITAN AREA OF  
SAN SALVADOR, REPUBLIC OF  
EL SALVADOR,  
CENTRAL AMERICA



MAP 2

remainder, some 228,000, suffered lighter damage to housing and possessions.

The poorest sectors of the population, those living in shacks or "mesones", "desplazados"<sup>3</sup> or marginal sectors of the population were seriously affected, which further aggravated the precarious circumstances in which they lived prior to the disaster.

Authorities have estimated that, of 53,000 families whose housing was damaged approximately 40,000 will be unable to meet the cost of reconstruction.

One of the strata most seriously affected was that of small firms and businesses in the informal sector, wherein the dwelling is usually on the same premises as the workshop or place of business. These small units provide employment for thousands of workers.

#### C. Estimate of the damage

The data which was available barely 20 days after the earthquake took place, was obtained mainly from official and private sources. Some of the information was incomplete, and it was inexact in a number of areas, as a result of which it had to be complemented and checked with direct on-the-spot observations. The estimate provided here must be considered as an indicative assessment of the order of scale of the damage (see table 1). It will be possible to carry out more precise calculations once the country's authorities complete a series of studies and surveys which have already been initiated.

The estimate includes the value of the infrastructure, furniture and equipment which was destroyed or damaged, expressed in terms of its present replacement cost. It also includes indirect effects, such as the lower income which will be received as a result of lost production or the lack of some services, and the increased cost associated with providing others (see table 2).

In order to set an estimate of the net loss to the country as a result of the disaster, it was borne in mind that some of the installations affected and even part of the production, corresponding to the commercial and industrial sectors, public organizations providing electricity and telecommunications, were covered by insurance policies. Information provided by the association grouping the country's insurance companies indicates that claims received 15 days after the earthquake

<sup>3</sup> The term mesones refers to units in which several families live in cramped conditions; desplazados refers to family groups, for the most part of rural origin, which have recently migrated to leave the war zones.

Table 1  
ESTIMATE OF DAMAGES CAUSED BY THE EARTHQUAKE

Sector and subsector	Millions of colones			Millions of dollars <sup>a/</sup>		
	Total	Direct	Indirect	Total	Direct	Indirect
<b>Total</b>	<b>4 521</b>	<b>3 430</b>	<b>1 091</b>	<b>904</b>	<b>685</b>	<b>219</b>
Social infrastructure	1 968	1 894	74	393	378	15
Housing	1 174	1 132	42	234	226	8
Health	483	456	27	97	91	6
Education	311	306	5	62	61	1
Economic infrastructure	966	730	236	193	146	47
Water and drainage	153	100	53	31	20	11
Telecommunications	136	129	7	27	26	1
Electricity	95	30	65	19	6	13
Transport and urban highways	152	62	90	30	12	18
Public buildings	263	253	10	53	51	2
Banks	142	131	11	28	26	2
Others	25	25	-	5	5	-
Productive sectors	1 160	806	354	232	161	71
Industry	129	92	37	25	18	7
Trade	1 031	714	317	207	143	64
Emergency and immediate repairs	134	-	134	27	-	27
Demolition and removal of rubble	293	-	293	59	-	59

Source: CCLAC estimates.

a/ At 5 colones per United States dollar.

Table 2

## ESTIMATE OF THE DIRECT AND INDIRECT DAMAGE TO THE PUBLIC AND PRIVATE SECTORS

(Millions of colones)

	Total		Repairs		Construction		Equipment		Inventories		Indirect					
	Total	Public	Private	Total	Public	Private	Total	Public	Private	Total	Public	Private				
<b>Total</b>	<b>4 521</b>	<b>1 391</b>	<b>3 067</b>	<b>1 213</b>	<b>380</b>	<b>833</b>	<b>1 691</b>	<b>570</b>	<b>1 121</b>	<b>386</b>	<b>144</b>	<b>243</b>	<b>136</b>	<b>1 091</b>	<b>296</b>	<b>732</b>
Social sectors	1 968	621	1 347	640	171	469	1 095	399	696	160	25	135	-	74	27	47
Housing	1 174	-	1 174	446	-	446	571	-	571	115	-	115	-	42	-	42
Health	483	408	75	96	86	10	360	300	60	-	-	-	-	27	22	5
Education	311	213	98	98	85	13	164	99	65	45	25	20	-	5	5	-
Economic infrastructure	966	615	351	424	209	215	176	171	5	128	119	9	-	236	114	122
Water and drainage	153	153	-	42	42	-	54	54	-	4	4	-	-	53	53	-
Telecommunications	136	136	-	20	20	-	27	27	-	81	81	-	-	7	7	-
Electricity	95	19	76	30	19	11	-	-	-	-	-	-	-	65	-	65
Transport and urban housing	152	99	53	62	62	-	-	-	-	-	-	-	-	90	37	53
Public buildings	263	139	124	172	66	106	59	54	5	21	12	9	-	10	6	4
Banks	142	69	73	73	-	73	36	36	-	22	22	-	-	11	11	-
Others	25	-	25	25	-	25	-	-	-	-	-	-	-	-	-	-
Productive sectors	1 160	-	1 160	149	-	149	420	-	420	99	-	99	136	354	-	354
Industry	128	-	128	44	-	44	-	-	-	24	-	24	24	37	-	37
Trade	1 032	-	1 032	105	-	105	420	-	420	75	-	75	112	317	-	317
Emergency and immediate repairs	134 <sup>a/</sup>	51	20	-	-	-	-	-	-	-	-	-	-	134 <sup>a/</sup>	51	20
Demolition and removal of rubble	293	104	189	-	-	-	-	-	-	-	-	-	-	293	104	189

Source: ECLAC estimates.

a/ The total does not correspond to the sum of public and private sectors as it includes 55 millions in external aid.

were on the order of 600 million colones (120 million dollars). This would seem to indicate that the net value of the losses is 785 million dollars.<sup>4</sup>

# 1. Damage to the social infrastructure

## a) The housing sector

It is estimated that more than 22,800 dwellings were totally destroyed or will have to be destroyed in view of their heavily damaged state. In addition, 29,800 dwellings will require repairs.<sup>5</sup> These are essentially dwellings housing one family (60%) as well as units in which several families live (mesones) (20%), together with makeshift dwellings in the city's marginal areas. This significantly worsened both the housing deficit and the precarious living conditions which existed prior to the disaster.

The seism affected both old dwellings - constructed with traditional technologies which make no use of structure (bahareque) - and modern dwellings of mixed construction. Of the dwellings, 35% were inhabited by their owners, and the remainder, by tenants.

Furniture was almost totally destroyed in the case of those dwellings which were completely destroyed, while it was possible to recover it, albeit in a slightly damaged state, from those houses which were only partly damaged. In view of the danger of collapses and landslides in a number of marginal areas, it is vital to relocate some 8,900 dwellings on safer sites.

The cost of replacing the dwellings destroyed or requiring demolition is estimated to be 571 million colones, while that of repairing those damaged reaches 446 million. The value of the furniture lost or damaged is in the region of 115 million colones. The cost of relocating dwellings situated in unsafe locations is 24 million,<sup>6</sup> while the loss of earnings from dwellings is 18 million.

<sup>4</sup> Payment of the claims would not constitute a total loss for the national insurance companies, since they are reinsured by foreign companies. In 1987 the country will receive an inflow of foreign exchange amounting to 110 million dollars in the form of reinsurance.

<sup>5</sup> Ministry of Planning, Encuesta de Evaluación de Daños Causados a la Vivienda, San Salvador, 22 October 1986.

<sup>6</sup> Their replacement cost is already included in the direct cost already mentioned; this figure refers to the cost of new land and basic services.

Thus, the total direct cost of the damage to housing is estimated to be 1,132 million colones (232 million dollars), and the indirect cost of relocating dwellings and loss of earnings, a further 42 million.

The above estimates are based on an average of the characteristics and construction costs prevailing in San Salvador. A constructed surface of between 60 and 80 square metres was adopted for single middle-class family dwellings, and 25 to 50 square metres for mesones and dwellings in marginal areas. The replacement costs adopted vary from 400 to 1,000 colones per square metre of surface of dwellings to be reconstructed; those for repair were estimated at 30% of the former. The value of furniture was calculated on the basis of a standard inventory of dwellings representative of those in the damaged area.

The cost of relocating dwellings was estimated on the basis of the present value of developed sites with basic services. The loss of income from rented dwellings was calculated as the rent actually not received by landlords for a period of 6 months (4.8 million), and an estimate was made of the imputed rent for the remainder of the dwellings affected (13 million).

#### b) The health sector

The earthquake caused damage to more than 90% of the metropolitan area's installed hospital capacity, causing irreparable damage to part of the main hospital centres. It was necessary to evacuate more than six public and private hospitals - with a capacity of more than 2,000 beds - located in different parts of the city, to make use of field hospitals to provide emergency medical attention and to transfer patients requiring intensive care to hospitals located outside San Salvador. The administrative offices of the Ministry of Health were also seriously affected.

Moreover, the equipment and furniture of the sector suffered only minor damage, and it will, to a large extent, be possible to recover it. In order to provide attention to those injured during the emergency, special efforts and outlays were required at least two weeks after the disaster.

The direct damage to the sector, including the replacement or repair of hospitals - belonging to the central government, the social security, the armed forces and the private sector - and health centres, were estimated at 456 million colones (91 million dollars). Indirect costs incurred in meeting the emergency, including temporary repairs, were 27 million (6 million dollars).

The cost of rebuilding the hospitals was calculated on the basis of unit investment figures of 350,000 colones per bed, while those for repairs are figures provided by health sector authorities or were calculated as 30% of replacement cost.

The earthquake revealed the need to decentralize the hospital infrastructure outside the metropolitan area. Reconstruction plans have provided for the replacement of some of the hospitals concerned with others with less capacity, and the construction of health centres and units in 4 or 5 points of the outskirts.

c) The education sector

A considerable proportion of the metropolitan area's educational infrastructure was destroyed or damaged in varying degrees. Both public and private sector establishments were affected, including primary schools and colleges, as well as secondary schools, technical colleges and universities.

The structures of 11 public-sector schools were damaged (more than 400 classrooms) as well as several major buildings belonging to the national university, while minor damage was caused to 146 schools (more than 1,100 classrooms) and other university buildings. Major private colleges were either totally or partially destroyed. Fortunately, most of the furniture and equipment was only slightly damaged. It was necessary to relocate at least 5 public schools in undamaged buildings, and to make use of some school buildings to house earthquake victims.

Direct damage to the educational infrastructure, furniture and equipment is estimated at 306 million colones (61 million dollars), indirect cost, incurred in relocating some schools on secure sites and repairing those which were used as temporary shelters, are estimated at 4.8 million (960,000 dollars).

The cost of reconstructing the buildings was estimated on the basis of the surface to be replaced (some 34,000 square metres), and the present cost of construction varies between 2,500 and 3,000 colones per square metre. The cost of repairing some 60,000 square metres was set at 30% of the cost of reconstruction; the value of the equipment and furniture requiring replacement and repair was estimated at 40% of the cost of construction. The cost of relocating schools was provided by the education authorities.

When the disaster took place, the school year had virtually come to a close. It will be necessary for the repairs and reconstruction to be completed before the new school year starts in February 1987; these tasks are consequently of an urgent nature.

## 2. Damage to the economic infrastructure

### a) Water and drainage

The old water supply network serving a third of the capital suffered major damage, while the rest only suffered minor damage. More than 50 kilometres of the sewage network were damaged. Four supply reservoirs were affected by cracks and other major damage. No major damage was caused to the intake and feeder systems as these are located outside the metropolitan area.

Water supply to the whole of the city was cut off as a result of the lack of energy following the earthquake. The supply was gradually restored before a week was out, with the exception of the most damaged area supplied by the old aqueduct, from which losses through leakages were far too high. Leaks in the network and in domestic connections in the remainder of the city have been gradually repaired, but it is expected that many more will appear in the months to come, as seepage in the subsoil becomes apparent on the surface or is detected by other means. Similarly, it is expected that other leaks and damage, which are at present imperceptible, will appear in the sewage network.

The income of the enterprise responsible for the sector - a decentralized State organization - has diminished up as a result of the decline in the number of consumers. Moreover, operating costs increased as a result of the need to supply a greater volume of water than that required to offset leaks from the network.

The enterprise estimates that the cost of reconstruction and repair to the water supply and sewage systems will reach the sum of 96 million colones. If the estimated cost of repairs to damage which is expected to appear later is added, the total direct cost is 100 million colones (20 million dollars). The indirect cost of temporary and permanent repairs, and the loss of income together with the increased costs faced by the firm over 18 months are estimated to be a further 53 million colones (10.6 million dollars).

### b) Telecommunications

Four telephone exchanges - with a combined capacity of 30,000 lines - were destroyed or damaged by the earthquake; others suffered lesser damage. Considerable damage was also caused to the installations outside the exchanges, which it has not yet been possible to fully assess, in view of the extent of the telephone network and the fact that it is for the most part underground. The telephone company's administrative buildings were partly damaged.



Services within the city, and between the city and the rest of the country and abroad were immediately cut off following the disaster. With the exception of the areas covered by the four exchanges mentioned above, the service was gradually restored over a relatively short period. Part of the demand from the zone handled by the above exchanges was redirected towards areas of the capital where the service was available.

The cost of repairing the damaged exchanges and rebuilding those destroyed - which could be partly achieved by extending the capacity of other undamaged exchanges - as well as that of repairing external equipment, represents 136 million colones (26 million dollars). The indirect damage resulting from the telephone company's loss of income as a consequence of its inability to provide the service to part of the city during the period of repair and reconstruction, is set at 6.9 million colones (1.4 million dollars). Of this figure, 64% represents loss of currency resulting from the absence of an international service.

The cost of repairing and reconstructing the internal equipment which was damaged was estimated by the company itself. The cost of repairing the external equipment was provisionally set at 20% of the damage to the internal equipment. The loss of income was estimated on the basis of the operating results of the firm and on the basis of a period of 120 days necessary to restore the service to its pre-disaster level.

#### c) Electricity

The electrical distribution networks in various zones of the metropolitan areas were destroyed or damaged. Two of the substations supplying the networks were considerably damaged. The generating and transmission systems were unaffected as they were situated outside the disaster area. The electricity company's administrative offices and its furniture and equipment were partially damaged.

Immediately following the seism, the national electrical system's load fell off sharply; this led to the service being cut off throughout almost all the system. Services were gradually restored over the following hours, and returned to 90% of normal demand. The remaining 10% corresponds to the residential and commercial demand in that part of the metropolitan area which was most damaged.

Direct damage to the substations and the distribution network represents some 30 million colones (6 million dollars). The indirect consequences as a result of the absence of energy supply during the period of repair and reconstruction reach a figure of 65 million colones (13 million dollars).

The State and private enterprises responsible for generating and distributing electricity participated in estimating the costs of repair and reconstruction. In calculating the loss of income it was assumed that two years will pass before demand returns to its pre-disaster level.

d) Transport and urban infrastructure

The road and street system in and around the metropolitan area suffered direct damage as a result of subsided roads and streets and collapsed bridges, culverts and other works. The rainwater drainage system was affected by cave-ins, landslides and bursts to an extent which has yet to be assessed.

There were also indirect consequences, such as damage caused to streets by the use of heavy equipment to demolish and clear rubble; work to carry out repairs to the water and telephone networks, and higher costs incurred in transporting passengers and goods as a result of the use of longer routes made necessary by the temporary closure of the most damaged areas.

Direct damage to the urban infrastructure has been set at 62 million colones (12 million dollars), while the indirect impact thereon and upon transport has been calculated to represent 90 million (18 million dollars). Thus, total damage in this area would seem to be in the region of 152 million colones.

The cost of repairing streets and link roads, bridges and culverts was set at 42 million colones by the Ministry of Public Works on the basis of an inventory of damages. In the absence of more detailed information, repairs to the rainwater drainage network were set at 20 million colones. According to the same Ministry, repair work to streets after demolition, rubble removal and cleaning operations will cost 27 million; the figure for the indirect costs of street repairs in order to restore telephone, drinking water and sewage networks was set at 10 million colones, assuming a linear distance of 20 kilometres, at a cost of 500,000 colones per kilometre; the extra cost in fuel and lost time in urban passenger and goods transport as a result of longer journeys over a 90-day period was set at 53 million.

e) Public buildings

Dozens of buildings occupied by the public sector - in some cases privately owned - suffered differing degrees of damage. One of them completely collapsed, the structures of others were damaged and they will have to be demolished, while others may be repaired. This item, in which damage was among the heaviest, includes ministries, court buildings,

barracks and prisons, municipal markets, stadiums and other buildings. In most cases, the furniture and equipment has been recovered, with slight damage.

The need to relocate these offices in office or residential buildings on the outskirts of the city has involved indirect costs for the transfer, fitting out and rental of premises. It has also led to problems in the provision of services.

The reconstruction and repair of the buildings mentioned above represents a cost of 231 million colones, and the replacement or repair of the furniture and equipment, 22 million. Thus, the direct cost in this sector is 51 million dollars. Moreover, the indirect cost for the transfer to other buildings, rental and fitting out of premises has been set at 10 million colones (2 million dollars).

Calculation of the cost of reconstructing the buildings was based on the surface originally constructed ( $3,500 \text{ m}^2$ ) at a cost of 3,000 colones per square metre. The cost of repair was based on a surface of  $36,000 \text{ m}^2$  and a unit cost equivalent to 30% of the above. The value of the partial losses of equipment and furniture was set at 10% of the cost of repairs and at 80% of the cost of replacement of buildings. The indirect cost involved in transfer and modifications was set at 10% of the cost of repairs to buildings. The indirect cost resulting from the temporary suspension of services was not calculated.

#### f) Banks

At least five buildings occupied by nationalized banks <sup>7</sup> suffered structural damage and will have to be demolished; others will require minor repairs. The furniture and equipment - including computer systems - may be recovered, repaired and re-installed at a fraction of its original cost. Banking services have been hampered by the transfer of offices to other premises which had to be modified, as well as by the temporary absence of some equipment and electronic computer systems.

The figure for direct damage in the sector attains 131 million colones (26 million dollars), including repairs and reconstruction of buildings and the recovery and restoration of furniture and equipment. The indirect cost of the transfer and fitting out of premises represents around 11 million colones (2 million dollars).

As in the case of public buildings, reconstruction costs were based on the surface originally constructed ( $12,000 \text{ m}^2$ ) at a construction cost of 3,000 colones per square metre. The costs of repair were based on a surface of  $15,000 \text{ m}^2$ , assuming a unit cost equivalent to 30% of the cost

<sup>7</sup> Only the building occupied by the Central Reserve Bank headquarters was owned by the institution.

of construction. Recovery and repair of equipment and furniture was estimated at 20% of the cost of repair and reconstruction of the buildings. The indirect cost of the transfer and modifications was estimated to be 10% of the damage to the buildings. The indirect damage deriving from the increased cost resulting from the temporary suspension of and delays to the provision of services was not taken into account, nor was the prejudice resulting therefrom to users.

### 3. Damage to the productive sectors

The industrial sector located in the capital suffered losses of only relative importance. Approximately 5 major industries suffered damage to their buildings and machinery as well as to stocks; moreover, they temporarily ceased production. As far as medium-sized industry is concerned, after some repair work, it rapidly resumed production. Small industry located in the most damaged zones, as well as craftsmen working in their own dwellings suffered considerable damage to their premises and means of production.

Almost all large and medium-sized enterprises, both in the industrial and trade sectors will be able to replace most of their losses or direct damage thanks to their insurance against this type of disaster. However, small entrepreneurs, lacking any kind of protection, have to face almost total losses, and consequently require special assistance.

Repairs and restoration of the industrial sector's infrastructure and its equipment and furniture, as well as replacement of the stocks lost are estimated to represent 92 million colones (18 million dollars). The loss of earnings resulting from the temporary suspension of industrial production reaches the figure of 37 million colones (7 million dollars).

The cost of repairing the large industrial buildings was calculated on the basis of a surface of 15,000 m<sup>2</sup> and a unit cost of 1,000 colones per square metre. In calculating the cost of repairs to the infrastructure of medium-sized industry it was assumed that 50 factories suffered damage costing 150,000 colones each. Damage to small industrial buildings was assessed on the basis of a survey carried out by the sector's association. The cost of repairing equipment was estimated at 20% of its value, which in turn was calculated as being twice the value of the infrastructure. As far as the losses of products are concerned, the value of the production of large and medium-sized firms over a fortnight was calculated; as far as small firms are concerned, figures provided by the relevant association were adopted. With regard to loss of earnings, it was assumed that large and small firms will take a month to resume their activity, while medium-sized firms will require only 10 days.

The commercial sector suffered extremely high losses as a result of the total or partial destruction of major buildings, as well as the loss of furniture and stocks. Large commercial establishments lost mostly

stocks, but medium-sized and small concerns were also affected, although relatively speaking, the latter suffered most.

The cost of reconstruction and repair to commercial buildings, their furniture and equipment, and the merchandise destroyed is estimated to represent 714 million colones (143 million dollars); the loss of earnings has been set at a further 317 million colones (64 million dollars).

The cost of reconstructing the commercial buildings which were destroyed or which require demolition was calculated on the basis of a total surface of 140,240 m<sup>2</sup> and a reconstruction cost of 3,000 colones per square metres. The value of repairs was calculated for an area of 116,450 m<sup>2</sup> at a cost of 900 colones per m<sup>2</sup>, in addition to 28,000 m<sup>2</sup> which were slightly damaged, for an overall cost of 1.4 million colones. The value of the furniture destroyed was set at 50% of the value of the buildings destroyed, and at 10% in the case of those to be demolished or requiring repairs. The value of inventory losses was calculated to be 40% of the sales of the establishments during a typical month. The loss of earnings was based on the value added for a six-month period.

#### 4. Loss of employment and earnings in the informal sector

Prior to the seism, 41% of the economically active population in the metropolitan area of San Salvador worked in the informal sector, and centred their activity on small commerces, the service sector, and domestic manufacturing workshops. Many of these establishments were part of dwellings. A high proportion of them were temporarily closed down as a result of the damage caused by the disaster, leaving owners, active partners, unpaid family workers and salaried employees without work.

It is estimated that 38,100 jobs were lost in the informal sector as a direct consequence of the seism. The greatest losses were in the commercial and service sectors. Consequently, the rate of open unemployment in the metropolitan area rose from 26% to 35%. Gradually, a large number of these jobs are being recovered. The recovery or replacement of jobs in the small manufacturing workshops is proving rather more slow and difficult.

It is estimated that the lose of income in the informal sector represents a total of approximately 10 million colones.<sup>8</sup> As repair and reconstruction projects are implemented, the levels of unemployment in the metropolitan area will decline significantly.

<sup>8</sup> This figure is included in the losses affecting productive sectors (industry and trade).

## 5. Other sectors

Varying degrees of damage were caused to the installations and buildings of sports centres, as well as to religious buildings and historic monuments, whose replacement or repair has been set at an overall figure of 25 million colones (5 million dollars).

## 6. Other damage

### a) Emergency and immediate repair expenditure

It is estimated that relief and rescue operations for the victims of the earthquake together with immediate repairs, including the provision of temporary shelter and the supply of food, will continue some 30 days after the disaster. A preliminary estimate sets the cost of this at around 126 million colones (25 million dollars). International assistance received by El Salvador up to 31 October - according to UNDRO reports - amounted to 12.5 million dollars (62.5 million colones), of which 4.1 million were cash donations, 6.6 million were donation in kind <sup>9</sup> and 1.8 million covered freight expenses.

### b) Demolition and removal of rubble

The cost of demolition and removal of the rubble from the buildings which collapsed or were irreparably damaged was estimated to be 10% of the cost of rebuilding them; in the case of buildings which were partially damaged, the removal of rubble has been estimated to cost 5% of the value of repairs. It is estimated that this item represents 293 million colones (59 million dollars).

## 7. Summary of damage

An estimate of the damage, made on the basis of the information available less than three weeks after the disaster, seems to indicate a total figure of 4,521 million colones, or 904 million dollars. <sup>10</sup> (See table 3.)

<sup>9</sup> 100 metric tonnes of medicines, food and equipment, 5,200 tents, 47,500 blankets, 300 rolls of plastic for temporary shelter and 42 search, rescue, medical and evaluation teams, according to UNDRO report No. 14 on the situation.

<sup>10</sup> The exchange rate adopted is 5 colones per United States dollar.

Table 3

## SUMMARY AND BREAKDOWN OF THE DAMAGE CAUSED BY THE EARTHQUAKE

	Millions of dollars a/					Percentages				
	Total	Direct damage	Indirect losses	Sectors		Total	Direct damage	Indirect losses	Sectors	
				Public	Private				Public	Private
Total	904	685	219	278	613	100.0	100.0	100.0	100.0	100.0
Social infrastructure <sup>b/</sup>	393	378	15	124	269	45.0	57.2	7.0	44.6	46.0
Economic infrastructure <sup>c/</sup>	193	146	47	123	70	22.1	22.1	22.0	44.2	12.0
Productive sectors <sup>d/</sup>	232	161	71	-	232	25.7	23.5	33.2	-	37.8
Industry	25	18	7	-	25	2.9	2.7	3.3	-	4.3
Commerce	207	143	64	-	207	22.9	20.9	29.9	-	33.8
Emergency and immediate repairs <sup>e/</sup>	27	-	27	10	4	2.8	-	12.3	3.6	0.7
Demolition and removal of rubble	59	-	59	21	38	6.5	-	26.9	7.6	6.2

Source: ECLAC estimates.

a/ At 5 colones per dollar.

b/ Includes the housing, health and education sectors.

c/ Including damage to water and sewage networks, telecommunications, electricity, transport and urban highways, public buildings, banks and others.

d/ Includes large, medium sized and small firms, as well as entrepreneurial activities of a family nature.

e/ Figures for public and private sectors do not include international assistance received which amounted to approximately 13 million dollars.

Calculation of the net losses caused by the disaster must take into account that some of the installations affected were covered by insurance, as was part of the production of the commercial and industrial sectors as well as that of the public bodies supplying electricity and telecommunications. This coverage represents approximately 14% of the total damage.

These figures represent the estimated amount of the damage at present replacement costs. However, future reconstruction requirements will undoubtedly be higher, in particular if it is borne in mind that inflation will raise the costs during the period of repair and reconstruction, and that it will most likely prove necessary to relocate dwellings and buildings on sites of lower seismic risk and/or to incur greater unit investment as a result of anti-seismic design. According to preliminary estimates based on the profiles of projects identified to date, reconstruction requirements could be considerably greater than the cost of damages.