GENERAL CHARACTERISTICS OF RISKS

AND NATURAL DISASTER

IN VENEZUELA

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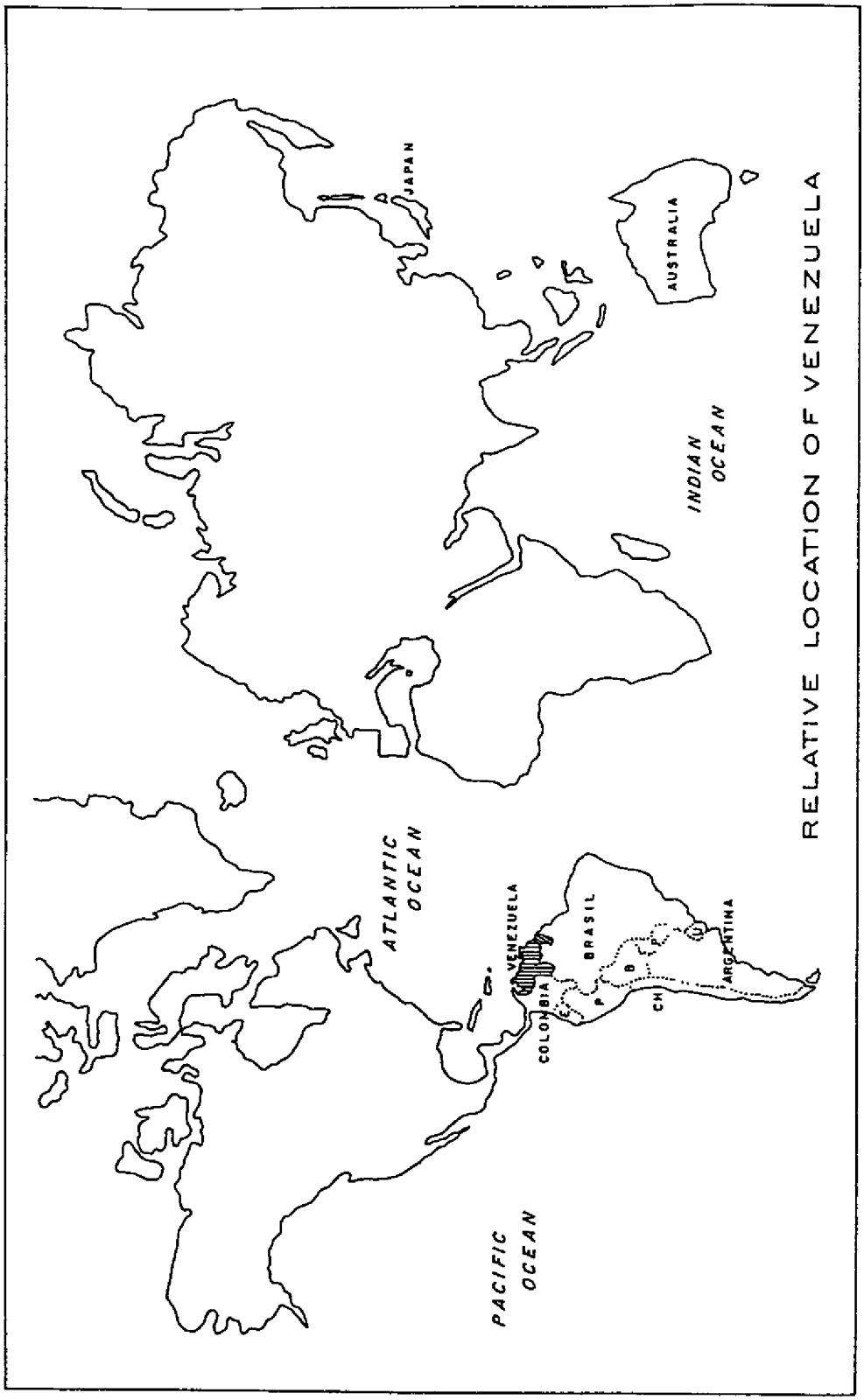
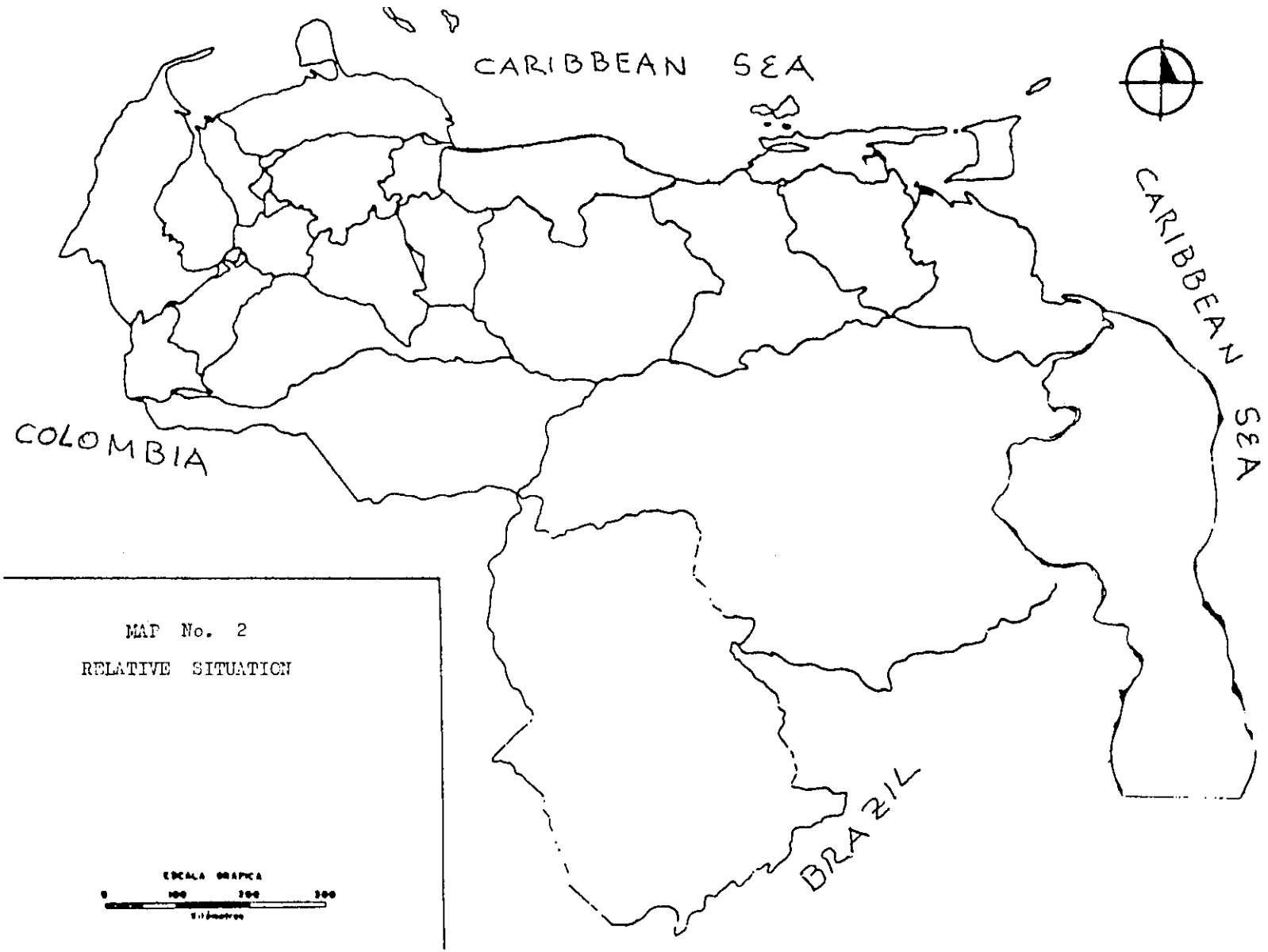
1.- GENERAL INFORMATION OF THE COUNTRY

Venezuela is a Latinamerican republic of northern South America, bounded by the Caribbean Sea (north and east),Brazil (south) and Colombia (southwest and west) with an area of 916.445 square kilometers and a population of approximately over 20 million inhabitants, 80% living in urban areas and 20% in rural areas. Out of this total population, 50% is younger than 21 years old, about 9% are illiterate,and about 10% of the labour force is unemployed.(see maps No. 1 and 2).

The country has a tropical climate with two seasons which are not very well marked. The rainy season is from April to November and the dry season from December to March and temperature ranges from 10 degrees centigrade in the mountain to 30 degrees centigrade in the lower plains. The anual precipitation varies from 250 mm to 4100 mm.

MAP Nr. 1


RELATIVE LOCATION OF VENEZUELA
JAPAN
AUSTRALIA
INDIAN OCEAN
ATLANTIC OCEAN
PACIFIC OCEAN
VENEZUELA
COLOMBIA
BRASIL
ARGENTINA



MAP No. 2

RELATIVE SITUATION

The relief varies greatly from one region to another. The total area is 13% is mountainous with altitude between 5.000 and 1.600 m.a.s.l., 45% are the upper plains with altitude betwen 1.500 and 500 m.a.s.l.and 42% of lower plains with elevation less than 500 m.a.s.l.

Economically, the country basically depend on its oil and oil by-products although it also exports iron, steel, aluminum, gold an minor volumes of agriculture and industrial products, such as cocoa, tropical fruits,home appliances,etc. Due to the increase in oil prices occurred in the early 1980`s, the gross natural productsfell from 25 billion dollars to less than 10 billion dollars per year, thus causing an economic and social crisis and an external debt which is currently of about 35 billion dollar. This year, the Venezuelan gross natural product, due to its export, is estimated in 12 million dollars. Similarly, the per capita income fell from more than one thounsand dollars to one hundred dollars annually.

Venezuela has had a democratic system for more than 35 years, with free elections every five years to elect a president,representatives for the congress, governors, etc.

The society is made up by a small upper class consisting of approximately 5% of the total population, then, there is a professional middle class of about 10% and a remaining 85% working class with different levels of poverty. It is important to men-

tion here, that recently, due to the economic crisis, the living standar of the middle class an the working class began to show an increasing rise in the poverty scale. However, this internal crisis has generated a process of re-estruturation of economical and social policies aimed at improving internal productivity in order to increase exports of the so-called non traditional commodities.

2.- ORGANIZATION CHART

The government agencies responsable for the disaster prevention in Venezuela are: the Ministry of the Environment and Renewable Natural Resourses, FUNVISIS (Venezuelan Foundation of Sismological Investigations), Venezuelan Civil Defense, PDVSA (Petroleum of Venezuela), Ministry of Urban Development, Ministry of Health and Social Assistance, and Venezuelan Fire Department.

3.- INTRODUCTION AND CHARACTERISTICS OF RISKS AND NATURAL DISASTERS

In Venezuela there are extensives areas exposed to the effects of natural disasters, as: floods, landslides, and earthquakes. As a consequence of those events we face year after year great economical losses and social calamities.

Venezuela is a tropical country with a fast growing population. Space occupation is anarchic due to the lack of policies or of preventive or corrective measures in the plans of territorial

order, which could help to classify the spaces to be occupied according to the natural risk to which these areas are exposed.

The geographical distribution of the Venezuelan population is closely related to the most dangerous area of natural risks in the country, as we can see in the coast-mountain line where an approximate 80% of the natural disasters take place (floods and landslides), and where 74% of the population is settled. This shows an extremely high concentration of the population in such places (see pictures No. 1 and 2, and maps No, 3 , 4)

The capital and central regions located in the extreme north-center of the country (see map No. 6) are a good example of dangerous areas and of multiple natural disasters (floods, landslides and earthquakes). Due to this reason, these regions are especially attractive for the study of risks and natural disasters, and the implementation of preventive and emergency plans, having in mind that almost 40% of the country`s total population is settled in these regions which cover an area of about 20.023,63 square kilometers, that is scarcely 2,3% of the national territory, and where a heavy number of losses are produced annually due to these natural events (see picture No. 3).

Historically, occupation of space in these regions, through different agricultural, urban, industrial and recreational activities, has demostrated that man has taken advantages of places near riverbeds, lakes and the seasides, or of areas of high risks

PICTURE NO. 1

POPULATION OF THE COAST-MOUNTAIN LINE OF VENEZUELA

ENTITY	YEAR 1991
VENEZUELA	18.105.265
DISTRITO FEDERAL	2.103.661
ANZOATEGUI	859.758
ARAGUA	1.120.132
CARABOBO	1.453.232
MERIDA	570.215
MIRANDA	1.871.093
SUCRE	679.595
TACHIRA	807.712
ZULIA	2.235.305
LARA	1.193.161
TRUJILLO	493.912
TOTAL	13.387.776
% In relation with the country	74%

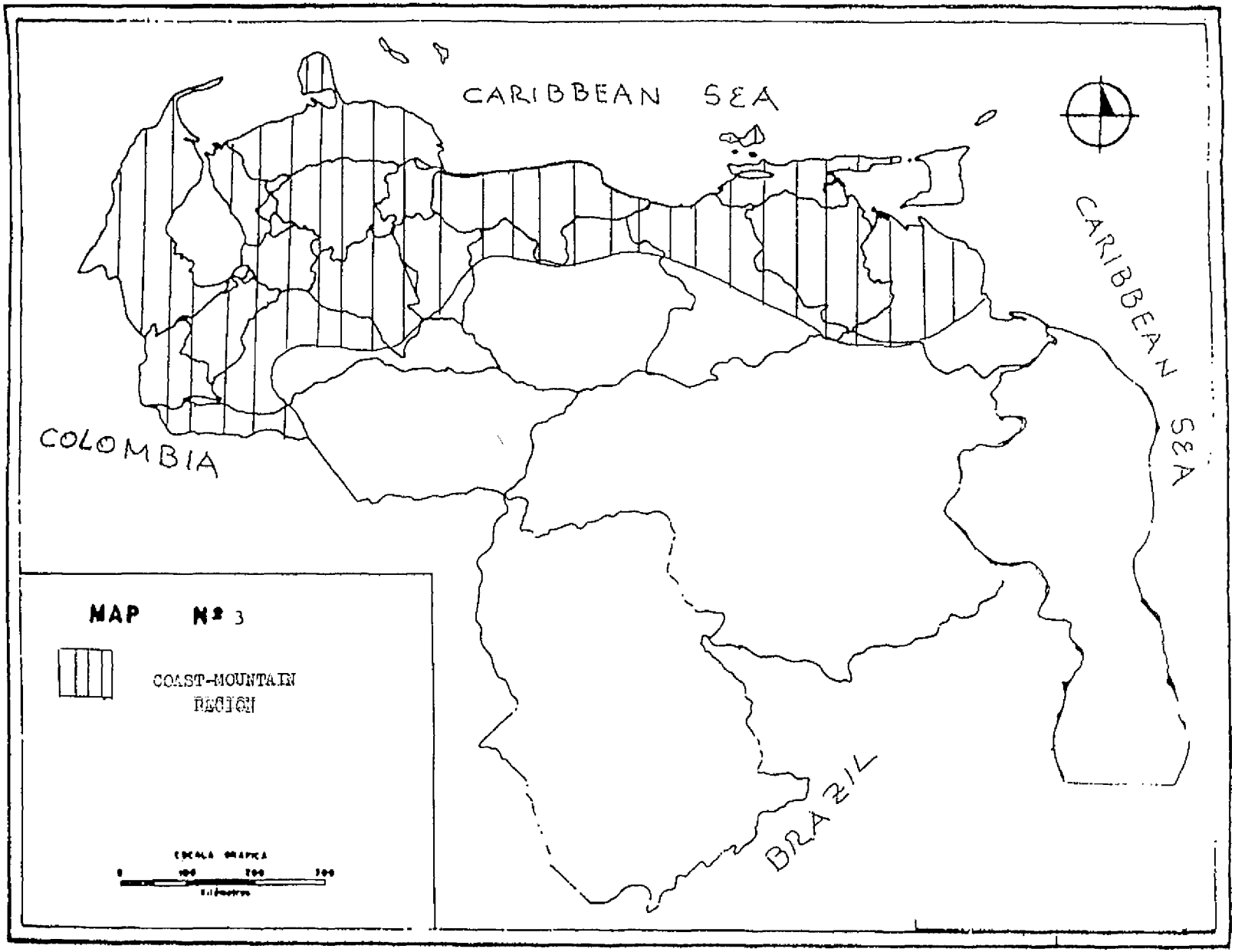
SOURCE: OCEI Census 1991

PICTURE NO. 2

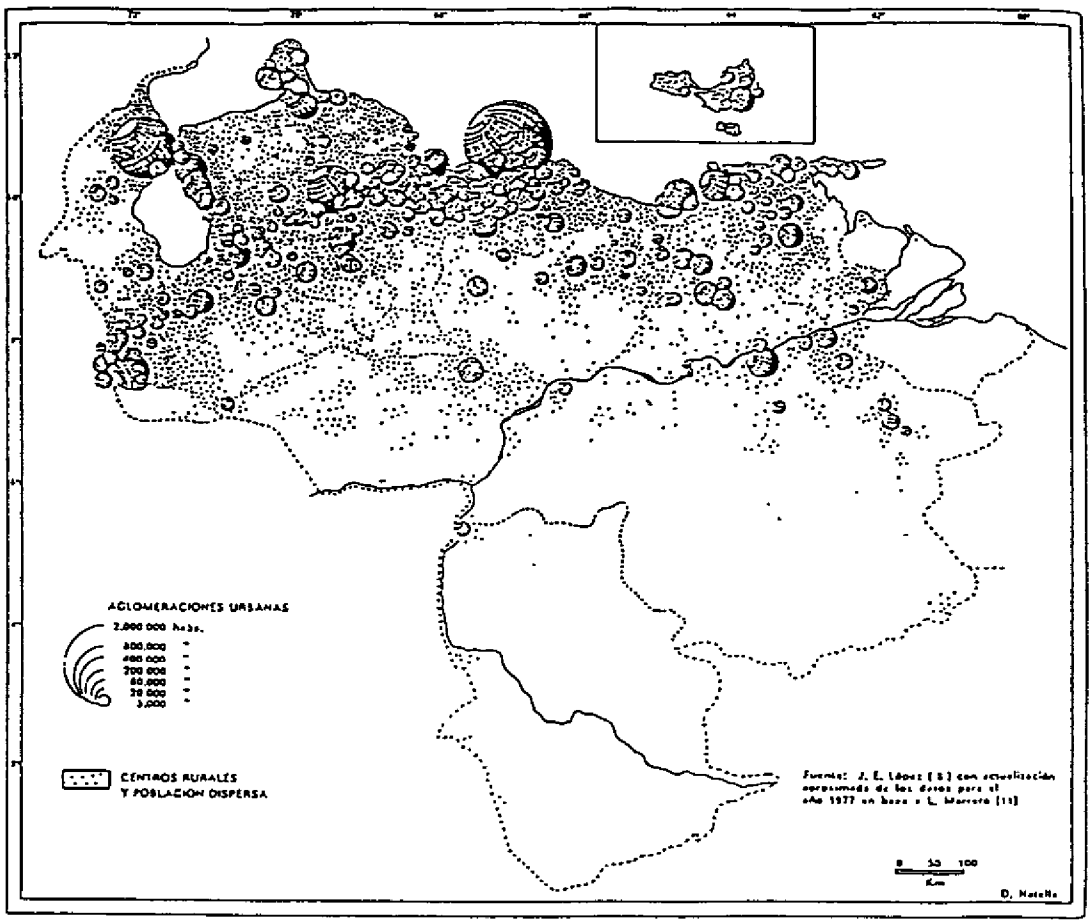
NATURAL DISASTERS IN VENEZUELA
YEARS 1966 - 1986

DATE	PLACE	EVENT	MAGNITUDE	NO. DEAD	NO. CASUALTIES
09 Sep.1966	Las Trincheras Edo. Carabobo	Flood			Many houses destroyed
29 Jul.1967	Caracas D.F.	Earthquake	5.6	502	+ 600
August 1974	Carora Edo. Lara	Flood			Economical losses
August 1974	Caracas D.F.	Flood			Economical losses
June July 1976	Catia La Mar D.F.	Flood			Economical losses
Nov. 1980	Caracas D.F.	Flood		17	+ 80 millions Economical losses
16 Aug. 1981	Bocono Edo. Trujillo	Flood		47	+ 100 millions Economical losses
18 Oct. 1981	San Josesito Edo. Tachira	Landslide		215	+ 60 millions Economical losses
11 June 1986	El Pilar Edo. Sucre	Earthquake	6.7	3	50 casualties, 880 flooded houses
06 Sep. 1987	Maracay Edo. Aragua	Landslide		91 dead 103 missing	1713 flooded houses, 200 million economical losses. Many casualties.

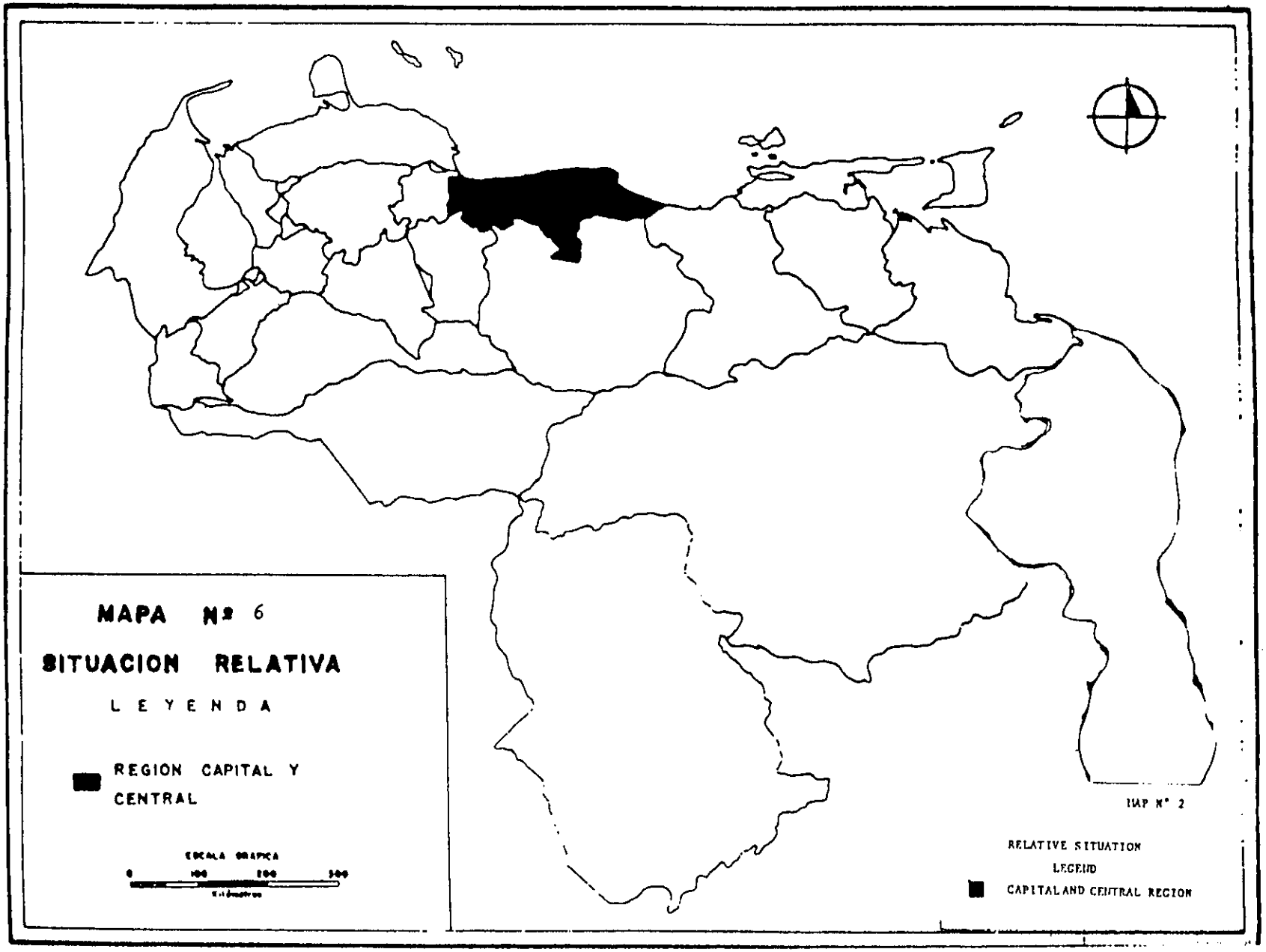
SOURCE: MINISTERIO DE RELACIONES INTERIORES. DIRECCION NACIONAL DE DEFENSA CIVIL 1989.


CARIBBEAN SEA
CARIBBEAN SEA
COLOMBIA
BRAZIL
MAP Nº 3
COAST-MOUNTAIN REGION

MAP No. 4



POPULATION GEOGRAPHICAL DISTRIBUTION


MAPA Nº 6
SITUACION RELATIVA
L E Y E N D A
REGION CAPITAL Y CENTRAL
ESCALA GRAFICA
0 100 200 300
MAP Nº 2
RELATIVE SITUATION
LEGEND
CAPITAL AND CENTRAL REGION

NATURAL DISASTERS WHICH OCCURED IN THE CAPITAL AND CENTRAL REGIONS DURING THE 1960-1970-1980 DECADES

LOCATION OF RISK		NO. OF EVENTS PER DECADE	NATURE OF EVENT	EFFECTS OF RISK	NO. OF VICTIMS OF THE DISASTER
DECADE	PLACE			MATERIAL DAMAGES	
1960	D.F.	18	Landslides, fall of rocks, floods and debris flows, sinking	Many damaged and destroyed houses	8 dead, 225 victims
1960	Edo. Aragua	11	Landslides, fall of rocks, floods and debris flows, sinking	Damaged houses, interrupted road traffic	--
1960	Edo. Carabobo	2	Landslides, floods	Over 300 farmers affected by floods of farms	—
1960	Edo. Miranda	1	Landslides		—
1970	D.F.	342	Landslides, fall of rocks, sinking, floods and debris flows, damming.	Many damaged and destroyed houses, interrupted road traffic.	132 dead, 10,604 victims
1970	Edo. Aragua	11	Fall of rocks, landslides, floods and debris flows.	Damaged and destroyed houses, interrupted road traffic, damage to public services.	19 dead, 300 victims
1970	Edo. Carabobo	8	Landslides, floods and debris flows	Damaged and destroyed houses. Aqueduct System (Tuy I and II) seriously damaged. Rupture of Anaco-Caracas gasduct. Damaged highway.	5 dead, 3007 victims
1970	Edo.Miranda	22	Landslides, fall of rocks, floods and debris flows	Destroyed houses, interrupted road traffic.	20 dead, 11,970 victims
1980	D.F.	32	Landslides, fall of rocks, floods and debris flows, land inestability, sinking.	Destroyed houses, interuupted road traffic.	194 dead, 8,565 victims
1980	Edo. Aragua	8	Landslides, floods and debris flows, damming.	Damaged houses	--
1980	Edo. Carabobo	--	Floods and landslides	Damaged houses, interrupted road traffic.	—
1980	Edo. Miranda	--	Floods, fall of rocks and landslides.		—

or landslides or fall of rocks, as it usually happensin cities like Caracas, Valencia, Maracay, Los Teques, Guarenas, Guatire, La Guaira, etc. Causing serious problems, especially during the rainy season, with heavy economical losses and of even human lives. Facts have shown, that if the activities of man on space are carried on without taking into account the potential which is related to natural risks, to which they may be exposed, for example , the potential of floods in now populated areas, the losses of human lives and material may reach very high levels.

According to official stadistics (see picture No. 4) in the distrito federal there have been in the previous four years, 30 natural disasters: floods, landslides, fall of rocks, etc. with the following results: 1.594 seriously damaged houses, and 2.394 families victims of the disasters. These stadistics are really alarming if we consider that Caracas, the capital of Venezuela is located in the Distrito Federal, and its population is almost 4 millions inhabitants distributed on a surface of 66.294 hectares, that is 0.01% of the national territory, and with an average of 60.3 inhabitants per hectare. This population is distributed in the mountain section as well as in the narrow plain of the Caracas valley, where there are serious limitations for the support of the substructure due to the high risks of floods, landslides and earthquakes tipical of the area.

PICTURE NO. 4

INVENTORY OF NATURAL DISASTERS IN THE DISTRITO FEDERAL
FROM 1984 TO 1988

YEAR	NO. OF EVENTS	IDENTIFICATION	CAUSES	MATERIAL DAMAGES	FAMILIES AFFECTED
1984	7	Fall of rocks Landslides	Leakage, rain Land inestability	Destroyed houses, Interrupted road traffic	69
1985	13	Fall of rocks Landslides	Rain, Land inestability	Damaged houses	179
1986	8	Mass movements, Floods	Rain, Land inestability	Damaged houses, Interrupted road traffic	826
1987	5	Floods, Fall of rocks, land-slides	Rain, Land inestability	Destroyed houses, Interrupted road traffic, Damage to public services	1005
1988	6	Fall of rocks, Landslides, Floods	Rain, leakage, Land inestability	Damaged houses, Interrupted road traffic	315
TOTALS:	39		Approximately 1,594 damaged houses.		2394

SOURCE: Direccion Nacional de Defensa Civil, 1989

4.-CONCLUSIONS

GENERAL CONCLUSION

The problem with the natural disasters produced in Venezuela, year after year, with heavy losses of money and of human lives is the absence of plans or programs which can help to prevent, or at least reduce the consequences of these natural events. Is is very important for the country to have specialized people on the prevention and evaluation of natural risks and disasters as such, and to be able to apply the right technology and methodology to reduce the effects of these natural phenomena on our population.

SPECIFIC CONCLUSIONS

- The erosion events that take place in the mountain areas of Venezuela are due to a series of natural factors, and the most important among them are strong rain which occurred in them, the kind of soil, geology and properties of materials, the relief an vegetation of these areas.

- The most of the damages which had taken places in the slopes and the riverbeds or gorges generally are those of irreversible ones.

- The correction of the slopes on the highways or in inhabilated areas must be very careful and precise in order to stabilized them.

- Most of these events produce great damages due to inadecuate territorial use, in plain ares as well as in the montainous ones.

ACKNOWLEDGMENT

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