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NICARAGUA: THE FLOODS OF MAY 1982 AND THEIR EFFECTS
ON THE SOCIAL AND ECONOMIC DEVELOPMENT



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FOREWORD

Nicaragua has once again suffered from the aftermath of a natural disaster which imposed losses of life and material damages which will adversely affect the living conditions of the population.

Within the past ten years, the country has been struck by three disasters which have attracted world-wide attention. The earthquake that destroyed Managua in 1972, whose damages were never fully repaired, was followed by the internal armed conflict that ended in mid-1979 with the victory of the revolutionary movement. This civil war imposed a virtual standstill of economic activity, an unprecedented flight of capital, and heavy losses in human life and infrastructure. The new Government which came to power in mid-1979 formulated a development plan based on policies aimed at creating a more egalitarian society, and the adoption of a series of measures designed to improve the efficiency of production, within the context of a mixed economy to be consolidated in due time.

The recovery after the 1978-1979 civil war has been extremely difficult. The high cost of repairing material damage has coincided with an increasingly unfavorable international situation for Nicaragua's export products. In addition, many tensions had been created by the re-orientation of the previous regime's economic policy in the present development programme of the National Reconstruction Government Junta. Such state of affairs is felt internally by the reluctance of important private groups to continue with their normal activities - let alone expanding them - and, in the international arena, an increasing restriction of credit from Nicaragua's traditional sources, which could be noticed during the past twelve months.

The previously described situation was further aggravated at the end of May 1982 by the occurrence of a meteorological phenomenon of special and abnormal characteristics. Intensive and persistent rainfall which lasted for a period of 10 days, killed approximately 80 people - the death toll could have been higher were it not for the timely and efficient action taken by the Government - and produced very high material damages, especially referred to agricultural resources and to social and

physical infrastructure. Taking into account both the immediate damage and the indirect effects on economic activities in the near future, the losses would amount to 357 million U.S. Dollars. This figure may be divided into three components: material damage (220 million), loss or damage of land resources (55 million) and indirect losses (82 million). In addition, it is expected that these losses will be largely responsible for the reduction of the 5 per cent economic growth which was anticipated for 1982 before the disaster.

The magnitude of the damages imposed by the rains and the ensuing floods can be understood when considering the extensive total and agricultural area which they covered, the type of losses suffered which have very slow recovery periods, the fact that they affected a key sector - the one which generates foreign exchange - of the economy and, above all, that they occurred when the country was striving to recover from the effects of the two previous disasters and to overcome the many problems which its development entails.

This document - prepared at the request of the Nicaraguan Government - describes the effects which this new disaster has had on the social and economic development of the country. CEPAL sent a special field mission which during a 10-day period collected and analyzed the necessary information. The CEPAL mission received full support from the United Nations Development Programme (UNDP) and many governmental organizations, especially from the General Directorate of State Information (DIGE), the International Reconstruction Fund (FIR), the Ministry of Planning (MIPLAN), and the National Committee for Disasters. The mission received some basic data on direct material damage, collected by several ministries and organizations coordinated by the General Directorate of State Information of the Government Junta.

The mission verified the expediency and efficiency of the Government and popular organizations to face the problems imposed by the disaster. Within a short period of time, part of the 70 000 people who had been moved to temporary shelters, was returning to normal life. Had not the popular organizations been available, there is no doubt that the human loss would have been much higher.

/In spite of

In spite of its internal efforts, Nicaragua requires international assistance to efficiently attend the long-term effects of this disaster which - as stated before - are superimposed on the situation previously described. This document - in addition to describing the characteristics of the natural phenomenon, the direct damages it caused and estimations of the short and medium term effects on the economy - outlines the additional requirements of technical and financial international assistance.

I. CHARACTERISTICS OF THE DISASTER AND ACTIONS IMPLEMENTED
IMMEDIATELY THEREAFTER

1. Origin and Characteristics of the Disaster

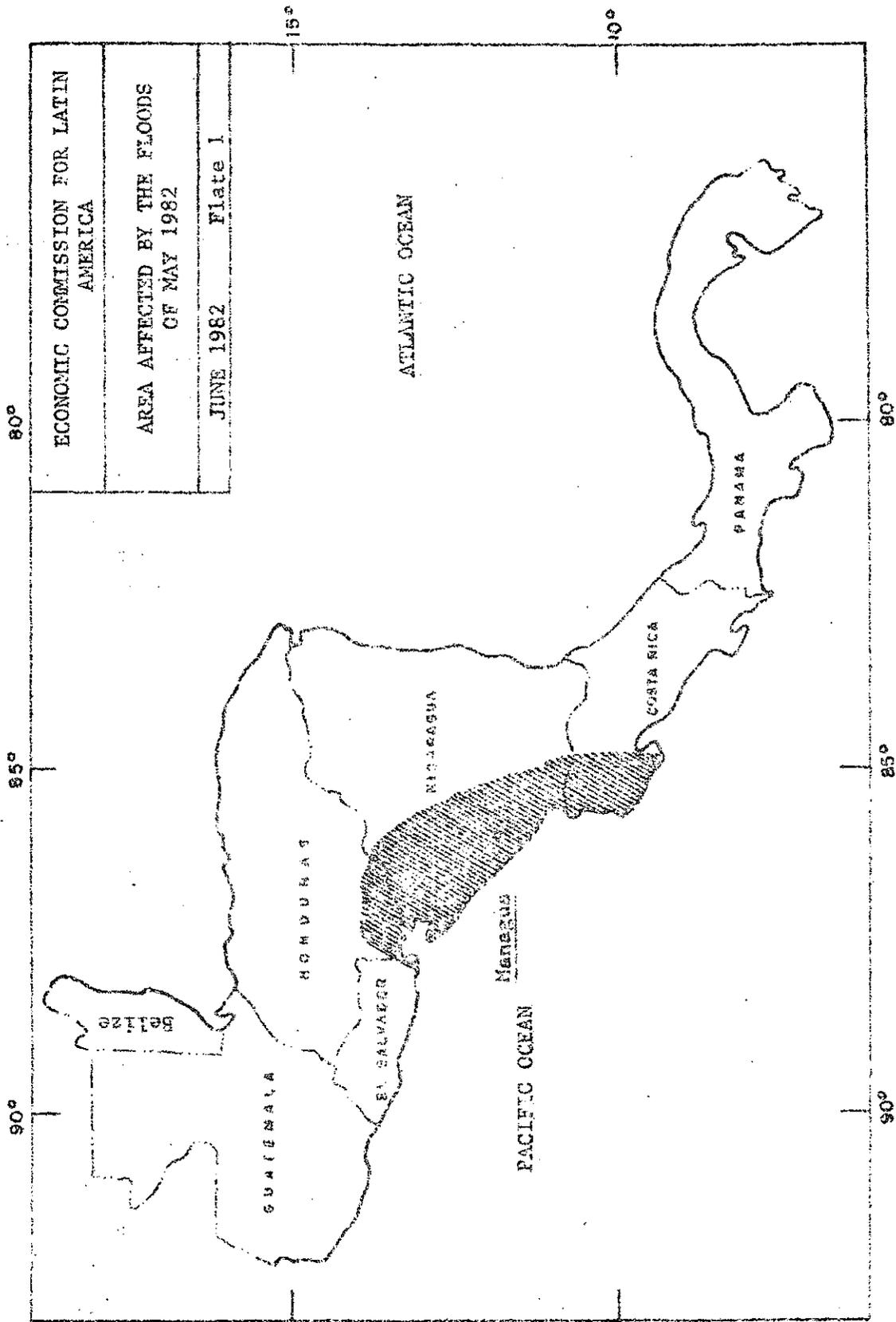
The floods which occurred in Nicaragua - and to a lesser degree in Honduras - at the end of May 1982, were caused by intensive precipitation produced by the simultaneous presence of two meteorological phenomena. The first one is a low atmospheric pressure zone which was born near Punta Cosigüina around May 20th; it nearly remained motionless until it slowly began to move North towards the Caribbean Sea. The second one is the presence of the Inter-Tropical Convergence Zone (ITCZ) - the equatorial band wherein the main windstreams of the Northern and Southern hemispheres converge, and which shifts along a North/South axis during the year - over the Central American mainland. The latter reinforced the tropical depression mentioned above.^{1/*}

The simultaneous presence and interaction of these two phenomena, each of which is capable of generating heavy precipitation, caused the intense and persistent rainfall which fell over a very extensive area of the Central American Pacific watershed - from the Nicoya Peninsula in Costa Rica to the Gulf of Fonseca in Honduras - and the great lakes basin in Nicaragua on the Caribbean Sea watershed. (See enclosed map.)

The areas most affected by the tropical depression were the North-West of Nicaragua and the Southern coast of Honduras. Precipitation in these areas exceeded not only the long-term average and maximum rates, but - in some cases like the City of Chinandega - produced more than 500 millimeters in a single day, and - during the period 20 to 31 May - about 70 per cent of the typical-year rainfall.

Rainfall was truly extraordinary. After the first days of precipitation - during which the soils absorbed a sizable fraction of the rainfall - practically all of it flowed toward the drainage system, carrying soil, rocks, trees and other materials. Runoff was so large that river discharge capacities were exceeded, especially at those points where the uplands join the coastal plains. The sudden decrease in slope and, in some cases,

* Please see notes on page 75.



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AREA AFFECTED BY THE FLOODS OF MAY 1982

JUNE 1982 Plate I

The designations employed and the presentation of material in this publication do not imply the expression of any opinion whatsoever concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries.

/the obstruction

the obstruction of bridges by trees and other materials carried by the water flow, originated river overflows which resulted in the flooding and erosion of adjacent lands and dwellings located in the upper areas of the plains, in the destruction of bridge structures and approaches, and in the deposition of the river solid load in lands located near the coastline, in estuaries and in open wells used by the peasants for drinking water purposes.

The loss of vegetative cover and the soil erosion in the uplands were very significant. Equally important were the artificial widening of the upper river and stream reaches, and the deposition of sand and rocks in river beds and lands of the lower areas. Therefore, a sizable fraction of soil cover was lost in very large areas; large tracts of arable lands were also lost due both to river-bed widening and to sedimentation of low-lying areas near the coast. In addition, groundwater became polluted with sediments and pesticide and fertilizer residues which penetrated the water table through flooded wells, thus rendering it unusable for human and animal consumption. Also significant were the damages inflicted on Lake Managua; its level rose considerably due both to the direct rainfall and to the runoff received, which caused the flooding of dwellings located along its shoreline, the obstruction of sewerage and garbage discharge from the capital city, and additional silting of its already polluted water. In short, within a few days, the ecological equilibrium was significantly modified.

With the overflow of rivers, agricultural, physical and social infrastructure was damaged in varying degrees; the same happened to agricultural production and to cattle stock. Terraces and other soil conservation works in cotton-growing areas were destroyed or damaged as well. Road and railroad bridges and culverts were either carried away by the floods and/or damaged at their footings or approaches. Many dwellings located in adjacent low-lying areas were flooded and, in some areas, carried away. Finally, crops already planted and/or ready for harvest as well as lands prepared for sowing, were severely affected, and a large number of livestock drowned.

/Natural

Natural and man-made drainage systems were insufficient to discharge the resulting runoff in the cities, especially in Managua and Chinandega. Many dwellings, commercial and industrial facilities and public sector buildings located in low areas near rivers and canals and Lake Managua were completely or partially flooded. Heavy damages were also imposed on water-supply, sewerage, telephone and electricity networks.

The road system was severely affected. The asphalt layer of long stretches of paved roads was washed away. Secondary and production roads were flooded and heavily silted. Electricity and telephone services were disrupted due to the falling of poles and the breaking of physical lines.

The danger, however, has not completely disappeared. In fact, there exists the distinct possibility that new intensive rains may occur which, coupled with the significant soil erosion in the uplands, may generate new floods and mud flows. In this connection, it should be borne in mind that the rainy season has only just started and that soils are at their field capacity. According to available statistical data, similar flooding may occur in the future, particularly when the highest tides coincide with the usually persistent rains which take place during September and October.

It is therefore of utmost importance to immediately rebuild the terracing in agricultural areas and to desilt river beds. The strengthening of meteorological forecasting facilities to timely detect these phenomena, thus diminishing possible damages, is also considered of high priority.

2. Actions Undertaken to Face the Emergency

At the end of May 1982 - and in contrast with what usually occurs in other places and circumstances - Nicaragua had available an extensive and efficient system for mass mobilization. Such civil organization, in close cooperation with the Army, enabled the expedient evacuation of people from the areas affected by the floods, and the provision of shelter and assistance to refugees in special facilities improvised for the occasion. This fact explains the relatively low number of deaths caused by the extensive flooding.

/After determining

After determining the extent of the damages brought about by the floods, the National Reconstruction Government Junta declared the affected area a disaster zone, and created a National Committee for Disasters. This organization is entrusted with the tasks of assisting the refugees, determining their most pressing needs are, and receiving and distributing outside assistance. These tasks have been undertaken with efficiency and fairness.

The Government Junta made a very preliminary assessment of the flood damages and on May 27 made an urgent appeal for assistance to the international community.^{2/} Due to the urgency in preparing such assessment and to the fact that many towns and villages were still isolated, the Junta's report only provided an order-of-magnitude estimation of the direct damages and outlined priorities for the required assistance.

Such appeal - supported by a similar one made by the United Nations Disaster Relief Office (UNDRO) - was accepted by some countries and international organizations. Aid began to flow to Nicaragua, even though on an insufficient scale when compared to the magnitude of the disaster.

The National Committee for Disasters distributed all the aid it was receiving, assisting up to 12 000 families. Other Government and civil and mass organizations directed their efforts to attend other urgent requirements.

The relocation in safe places of the inhabitants of city slums - who had lost their dwellings and household effects - was initiated. The re-establishing of communications, electricity and water-supply basic services was also started efficiently. The temporary repairs of partially-damaged bridges and the construction of river fords to enable traffic through rivers where bridges had been washed away, was undertaken as well.

School activities were suspended. Their buildings were used as temporary shelters for refugees; students were incorporated in cleansing and rehabilitation squads. A food-for-work programme was established in some areas to allow the undertaking of desilting operations in river beds and roads.

/While drinking

While drinking water and sanitary disposal of excreta services were unavailable during a relatively long period of time - and this situation prevails in some still-isolated towns and villages - immunity levels of the population were very satisfactory due to the recently-undertaken sanitation campaign, and no epidemics have been detected up to now. This does not mean, however, that there will be no epidemics in the future since refugee centres are very crowded.

In spite of the above-described activities, and the arrival of food and medicines from abroad, as well as medical and reconstruction personnel, Nicaragua still requires considerable assistance in order to fulfill the basic needs of the refugees and to undertake rehabilitation and reconstruction of the works and facilities destroyed or damaged.

The additional assistance most urgently required strives in foodstuffs in order to alleviate its present scarcity due to the loss of crops which were ready for harvesting, as well as heavy equipment for re-opening access to production areas in time to initiate sowing activities.

II. ASSESSMENT OF DAMAGES

A preliminary assessment of damages imposed by the floods is presented heretofore. It is based upon information provided by Nicaraguan authorities and estimates made by a CEPAL field mission which reconnoitred the affected area.

The preliminary quality of this assessment is to be stressed since information was available on direct effects only. In many cases, estimates were based upon the number of lost or damaged units, to which unit prices were assigned. In other cases, improvised methodologies had to be devised to estimate the losses, particularly those referring to land erosion and sedimentation.

An attempt has been made to quantify income which will not be earned due to the paralization or disruption of economic activities in some productive and service sectors.

1. Effects on the Population and its Living Conditions

Even though the meteorological phenomenon affected 35 to 45 per cent of the national territory, the number of casualties was indeed very limited. This is unusual for this type of disasters. An updated calculation indicates that a total of about 80 lives were lost and that nearly 70 000 refugees have been temporarily located in improvised shelter facilities.

The very limited number of casualties - as explained elsewhere in this report - can be described by the existence of an effective and extensive mass organization in Nicaragua, as well as by the expedient action of the Sandinista Army. They played a key role in the evacuation and temporary sheltering of the affected population, thus preventing a larger death toll and easing the situation of the affected population. Due to the cleansing and rehabilitation work undertaken by the mass organizations, many refugees will be able to return promptly to their place of origin or be relocated in other, specially-constructed dwellings.

/2. Damages

2. Damages in the Social Sectors

The actions undertaken during the past three years by the Government to improve living conditions of the population were adversely affected. It must be recognized, however, that damages to social infrastructure were of a lesser extent when compared to those suffered by physical infrastructure and the productive sectors.

a) Health

Before the floods, the National Reconstruction Government had initiated a special program aimed at the improvement of health conditions of the population. Hospital and other health centers damaged during the 1978-1979 war, had been restored and re-equipped. Preventive-medicine campaigns had been implemented and their results were already in evidence.

Three different types of effects were produced by the rains: damages or destruction of public health infrastructure; destruction or loss of medicines and equipment; and the need to initiate or reinforce some preventive campaigns.

The damages to the hospital at Chinandega - its footings were undermined, which will make it absolutely necessary to evacuate a large part of its facilities - and the flooding and partial destruction of other, smaller health centers can be included among the first type of effects. Damage to X-ray and laboratory equipment, the loss in medicine stocks and the additional requirements of medicines resulting from the disaster, belong to the second type. Finally, the pooling of water in low-relief areas - which stillexists- may induce the appearance and dissemination of malaria, yellow fever, dengue and other epidemics; preventive campaigns are to be initiated shortly in order to avert them. It should be pointed out, however, that due to the relatively-high immunization levels reached with the health campaigns undertaken before the disaster, no outbreaks of these epidemics have been detected. The crowding of refugees in provisional shelters and the damages to the water-supply and sewerage systems, however, do require the immediate implementation of said preventive campaigns.

/In view

In view of the above, and of the need to provide health care in the new human settlements centers which will be mentioned elsewhere in this report, it will become imperative to create new modular-type health centers and to build new water supply, sewerage and/or latrine systems for these centers.

It is estimated that total damages in the health sector could be repaired with a 15-million U.S. Dollar investment. Of this, 6.5 million dollars would be required for the reconstruction and repairs of the Chinandega Hospital; 3 million for the repair and reposition of equipment and medicines and, finally, 3.5 million more for the preventive campaigns against malaria, dengue and yellow fever. (See Table 1.)

b) Education

Before the disaster, the expansion of enrollment in pre-school and primary levels, the improvement of the educators' capacity and the massive education of adults - as a follow-up to the National Alphabetization Campaign - had first priority in this sector's agenda. Important investments had been made to expand physical infrastructure, to acquire educational materials and didactic equipment, and to the establishment of a national network of Mass Education Centers.

Although material damages in this sector are relatively minor when compared to losses in other sectors, the education program has received a severe blow, especially as refers to adults' education. Rural Mass Education Centers - which account for about 80 per cent of the total - were housed in temporary facilities which were washed away by the floods. Several teachers' schools were gravely damaged, and the first and only national center for production of didactic material was destroyed.

On the basis of information supplied by the Ministry of Education (MED), it is estimated that - besides the Mass Education Centers - about 60 school buildings were damaged or destroyed, including their material and equipment. A first estimate indicates that in order to replace and/or repair these facilities, equipment and material, a total of 3 million dollars would have to be invested. Of said amount, about 1 million refers to material and equipment to be imported from abroad. (See Table 2.)

/Table 1

Table 1

NICARAGUA: DAMAGES TO THE HEALTH SECTOR

(Thousands of US Dollars)

<u>Item</u>	<u>Replacement Cost</u>	<u>Imported Component Cost</u>
<u>Total</u>	<u>15 000</u>	<u>9 850</u>
<u>Infrastructure</u>	<u>6 500</u>	<u>1 950</u>
120-bed hospital	2 500	750
Repairs to other hospitals and health centers	4 000	1 200
<u>Damaged equipment and medicines</u>	<u>3 000</u>	<u>3 000</u>
<u>Preventive campaigns</u>	<u>5 500</u>	<u>4 900</u>
Malaria	4 000	3 600
Dengue and yellow fever	1 500	1 300

Source: Estimates made by CEPAL on the basis of information furnished by the Ministry of Health and the Pan-American Health Organization (PAHO/WHO).

Table 2

NICARAGUA: DAMAGES TO THE EDUCATION SECTOR

(Thousands of US Dollars)

Province	Number of Educational Centers Affected	Replacement Cost	Imported Component Cost
<u>National Total</u>	<u>58</u>	<u>3 055.6</u>	<u>916.7</u>
Managua	14	50.4	
Estelí	1	139.2	
Jinotega	1	37.2	
Carazo	5	315.3	
Masaya	3	10.6	
Chinandega	23	1 716.1	
León	1	270.0	
Boaco	2	11.0	
Chontales	1	320.0	
Granada	7	40.3	
Others (Mass Educational Centers)	...	145.5	

Source: Estimates made by CEPAL on the basis of information provided by the Ministry of Education (MED).

c) Housing

The Ministry of Housing and Human Settlements (MINVAH) had recently initiated a Programme of Progressive Urbanization which involved assigning land lots with minimum infrastructure - including water supply, drainage and sanitary latrine facilities - to families located in slum areas.

The floods affected most precisely the inhabitants of slum areas, which are located in low-lying areas adjacent to city drainage canals and in the shores of Lake Managua. Many other urban and rural houses located in other areas of the country were also subjected to flooding. Due to the high tides near the Port of Corinto, many houses located in the seashore were washed away as well.

It is estimated that 6 400 houses were completely destroyed by the floods, and that 4 700 more were partially damaged. Their replacement cost, in adequate conditions and location, is estimated at 20 million U.S. Dollars. Unrecoverable household goods can be replaced with a 6 million Dollar additional investment. In other words, the total damage in this sector would require 27 million Dollars to be repaired; of said amount, 3.5 million refer to goods which must be acquired abroad. (See Table 3.)

MINVAH's envisaged plans to provide minimum housing facilities to the population of the lower strata will have to be notably strengthened and accelerated, in order to furnish such facilities - as soon as possible - to the 12 000 families affected by the disaster.

3. Damages on Infrastructure

As will be described, the floods of May 1982 affected infrastructure inflicting heavy damages and causing high income losses.

a) Road Transport

Flood flows damaged or destroyed the asphalt layer of 732 kilometers of paved roads; 1 000 kilometers of secondary roads and 2 500 kilometers of production roads were also notably damaged. This represents about 40 per cent of the paved-road network and nearly 5 per cent of the

Table 3

NICARAGUA: DAMAGES TO THE HOUSING SECTOR

(Thousands of US Dollars)

Item	Number of Units	Replacement Cost	Import Component Cost
<u>Total</u>		<u>26 660</u>	<u>3 500</u>
Units destroyed ^{a/}	6 400	18 560	3 136
Units damaged	4 700	2 100	364
Household goods	-	6 000	-

Source: Estimated made by CEPAL on the basis of information provided by the Ministry of Housing and Human Settlements (MINVAH).

a/ Includes the cost of minimum services for the relocation of houses.

secondary and production roads network. Seven main bridges - including the Guasaule bridge which connects Honduras and Nicaragua - and 18 secondary bridges were affected; their approaches were washed away and/or their structures were damaged.

Bridges were destroyed by abnormal floods which washed away their superstructure and/or undermined their footings. Other bridges were virtually "plugged" by the materials - trees, trunks, rocks, etc. - carried by the floods, thus becoming temporary dams, which fact explains the breaking of the weaker approaches. Culverts were insufficient to discharge flood waters, and were broken or totally submerged when river beds became enlarged.

Due to the above-described facts, and that some feeder and production roads acted as discharge canals for flood waters, the runoff reached paved and secondary roads washing away the asphalt surface of the first and earthfills of the latter.

The main damages to road transport occurred along the Managua-Leon-Chinandega-Guasaule route and some of its branches, through which most of the inter-Central American Trade and the Nicaraguan foreign trade circulated. In spite of the provisional repairs of some bridges and the construction of fords in some of the rivers where bridges had been destroyed entirely, most of the heavy traffic will have to be re-routed through the alternate Pan-American Highway. This will undoubtedly result in higher transport costs since this is a longer mountain road.

Damages to the road network are estimated at 111 million U.S. Dollars. To this figure, 6.6 million must be added for the replacement and/or repair of bridges, as well as a possible loss of 1.8 million in 1982-1983 due to the previously-mentioned increase in transport costs.^{3/} It is estimated that of said figure, about 48.5 million Dollars refer to imported construction materials - asphalt, structural steel, etc. - and to thermal energy generation for cement manufacturing. (See Table 4.)

Table 4

NICARAGUA: DAMAGE TO ROAD TRANSPORT

(Thousands of US Dollars)

Item	Affected Stretch (km)	Replacement Cost	Imported Component Cost
<u>Total</u>		<u>117 475</u>	<u>48 465</u>
<u>Highways and roads</u>		<u>110 900</u>	<u>44 000</u>
Paved	732	65 900	39 500
All-Weather	1 000	25 000	2 500
Production	2 500	20 000	2 000
<u>Bridges</u>		<u>6 575</u>	<u>4 465</u>
Guasaule ^{a/}		1 125	900
Other bridges destroyed (6)		2 800	2 240
Bridges damaged (18)		2 650	1 325

Source: Estimates made by CEPAL on the basis of information provided by the Ministry of Construction and by MIDINRA.

a/ Since Honduras is expected to share equally in its reconstruction, only 50 per cent of the total bridge replacement cost is included.

The reconstruction and/or repair of bridges and culverts will require a thorough revision of the hydrologic criteria used for their original design. There are now available longer and more accurate hydrological and meteorological data series which can be used for that purpose. Higher reconstruction costs of said structures may then result.

b) Railway Transport

As in the case of road transport, the main railway line - which joined Managua and the Port of Corinto, and which provided an alternate route for incoming and outgoing Nicaraguan international trade - was affected.

Eighteen kilometers of railroad and 9 bridges were completely destroyed. The railway flow to the North-Western area of the country, which produced more than 90 per cent of the service's total income, was interrupted. Only the stretch between Managua and Granada is still operating; it is mainly used for passenger transport.

The upgrading and modernization of the railway was under consideration before the disaster. It was the intention of the authorities to widen the track and to renew the existing railroad units (cars and engines). After the disaster, a study must be undertaken to determine whether it would be more convenient to build a new route instead of improving the existing one. In addition, a financial analysis should be undertaken to determine whether existing tariffs should be modified or if Government subsidies are to be continued.

If the existing system is only to be repaired, a 7.7 million U.S. Dollar investment would be required. Of said amount, 4 million would be assigned for reconstruction of the railway and 3.7 million for reconstruction and repair of bridges. If such repairs and reconstruction were to require a period of 15 months, the railway company stands to lose 1.7 million U.S. Dollars. (See Table 5.)

Table 5

NICARAGUA: DAMAGE TO RAILROAD TRANSPORT

(Thousands of US Dollars)

Item	Replacement Cost	Imported Component Cost	Expected Loss of Income <u>a/</u>
<u>Total</u>	<u>7 668</u>	<u>4 547</u>	<u>1 730</u>
Railway (18 km)	3 960	1 580	-
Bridges (span larger than 40 m)	2 712	2 170	-
Bridges (short span)	996	797	-
Service	-	-	1 730

Source: Estimates made by CEPAL on the basis of information provided by the Ministry of Transport (MITRANS).

a/ Loss of income during a 15-month period.

c) Ports and Airports

The infrastructure of the main port terminal on the Pacific seaboard - the Port of Corinto - was severely damaged due to the simultaneous presence of heavy rainfall, strong winds and high tides. Wind and tides destroyed the lighthouse and damaged some pier piles; they also severely eroded the seashore and damaged the breakwater which provides protection to the port. As stated in the previous chapter, many houses were destroyed and there exists a definite threat for the road and railway - which run along the coast - to be cut off by the sea. Rivers discharged large amounts of sediments in a recently dredged section of the port. It will be therefore necessary to reinforce and extend the breakwater in order to prevent further inland movement of the sea waters and to ensure safe port operations - since Corinto is the main port of exit and entrance of Nicaragua's exports and imports - and to re-dredge the port to enable the berthing of large-draft vessels.

In addition, about 25 airfields used for agricultural spraying purposes - especially of cotton - located inland throughout the affected area, were severely eroded by the floods. Their repair is also of priority importance in order to protect crops against disease.

An investment of 13 million U.S. Dollars would be required for the reconstruction and replacement of port facilities as well as for the extension of the breakwater. The rehabilitation of airfields would cost about 125 000 Dollars. Thus, the total cost of rehabilitation and replacement in this sector would amount to about 13 million Dollars, of which 5.7 million refer to imported materials. On the other hand, the income of the port authority is not expected to decrease since the loading and unloading facilities in the port were only slightly affected.

d) Urban Infrastructure

Infrastructure in flooded cities was badly affected; 35 bridges and culverts were destroyed or damaged; water control structures and drainage canal lining were eroded or destroyed; and more than 30 kilometers of paved roads, 56 kilometers of cement-block streets and 90 kilometers of compacted earth roads were affected.

/These damages

These damages will increase city - individual and massive - transport costs due both to the longer paths which will be necessary to travel in order to bypass destroyed and/or damaged bridges and the increased maintenance costs of transport units.

An estimated 16 million U.S. Dollars will be required for the replacement and/or repair of urban infrastructure. Of this figure, 8.7 million will be required for bridges, culverts and drainage channels, and 7.3 million, for road repairs. Imported materials and thermal electricity generation for cement manufacturing will cost 10.4 million. (See table 6.)

e) Electrical Services

During 1981 electricity was generated equally by hydropower stations and thermoelectric plants; the latter requires imported fuel for its operation. Before the floods occurred, the Nicaraguan Energy Institute (INE) was rapidly working towards the completion of the Momotombo geothermal unit and of the electrical interconnection line with Costa Rica; these works will allow the savings of foreign exchange by reducing fuel imports and by the acquisition of less-expensive, Costa Rican hydropower.

Except for the fall of an access bridge to a hydropower plant, the electricity generating capacity was not damaged by the floods. Damages to transmission lines, however, were considerable and affected long stretches of 69, 138 and 230 kilovolts lines between León-Chinandega, León-Pavana and León-El Viejo. Nearly 100 kilometers of electricity distribution networks in the cities of Managua, León, Chinandega and others were badly damaged.

Two projects under construction were damaged as well. Access roads and drainage protection canals for the production wells and the geothermal power plant at Momotombo were severely eroded, and an expensive drilling outfit was entirely flooded. Access roads and excavation works for the interconnection lines were similarly flooded.

In the Western area of the country, electricity conduction lines were broken, and the zone became isolated from the rest of the national grid. It then became necessary to start up a local vapor power plant in

Table 6

NICARAGUA: DAMAGE TO URBAN INFRASTRUCTURE

(Thousands of US Dollars)

Item	Replacement Cost	Imported Component Cost
<u>Total</u>	<u>16 022</u>	<u>10 361</u>
<u>Streets</u>	<u>7 281</u>	<u>4 917</u>
Paved (30 m)	5 272	4 745
Cement-Block (56 km)	342	162
Hardened Earth (90 km)	1 436	-
Sidewalks	32	10
<u>Bridges and drainage channels</u>	<u>8 741</u>	<u>5 444</u>
Footbridge (1)	492	246
Streetbridges (22)	5 763	4 322
Culverts (17)	205	102
Accommodation Ramps	447	224
Flood Channels	1 835	550

Source: Estimates made by CEPAL on the basis of information supplied by the Municipal Secretariat (SAMU) and the Managua Reconstruction Junta (JRM).

order to provide electricity in that area, which requires imported fuel for its operation. The delay in the completion of the Momotombo geothermal project and of the interconnection line to Costa Rica, will force Nicaragua to increase its oil imports in 1982 and part of 1983.

Estimates made by INE indicate that repairs of infrastructure and the replacement of the drilling equipment will require a 2 million U.S. Dollar investment. Indirect damages due to diminished electricity sales and to increased oil imports for thermal power generation, will amount to nearly 13 million. That is to say, total losses in this sector would amount to 15 million U.S. Dollars, and foreign exchange expenditures to 3.8 million. (See Table 7.)

f) Water Supply and Waste Disposal

Floods affected water-supply systems in approximately 40 cities; two waste-water disposal systems were damaged as well. Drinking water service was disrupted in nearly all of these communities, but provisional repairs were made at the earliest possible date; however, by mid-June, several towns were still without drinking water. Water catchment and diversion works, conduction lines, distribution networks, pumping equipment and their electrical facilities, and sanitary waste disposal works were affected.

Reconstruction and replacement of the damaged or destroyed works would cost over half a million U.S. Dollars; one half of said amount would be used to import equipment and materials. In spite of the relatively low value of the damages, Nicaragua does not presently have the necessary equipment, materials and human resources; it is therefore expected that these services will be - totally or partially - interrupted for at least six months. The National Institute for Water Supply and Waste Disposal (INAA) will lose an estimated income of just over 4 million Dollars, which by far exceeds the direct damages. (See Table 8.)

In order to avert the possible occurrence of epidemics due to the lack of drinking water and to the use of polluted water, it would be necessary to re-orientate at the earliest all existing foreign loans towards the rehabilitation and reconstruction of the affected systems.

Table 7

NICARAGUA: DAMAGES AND LOSSES IN THE ELECTRICAL SECTOR

(Thousand of US Dollars)

Item	Damages to Infrastructure	Losses in Production	Imported Component Cost
<u>Total</u>	<u>2 113</u>	<u>12 850</u>	<u>3 785</u>
Power plants	190	2 550 ^{a/}	2 686
Transmission System	295	-	102
Distribution Network	458	10 300 ^{b/}	272
Other Items ^{c/}	1 170	-	725

Source: Nicaraguan Energy Institute (INE).

a/ Thermo-electric power generation caused by the delay in the conclusion of Momotombo power plant and of interconnection line with Costa Rica.

b/ Decrease in sales due to reduction of envisaged demand.

c/ Includes drilling and miscellaneous equipment.

Table 8

NICARAGUA: DAMAGE TO WATER SUPPLY AND SEWERAGE SYSTEMS

(Thousands of US Dollars)

Item	Replacement Cost	Imported Component Cost
<u>Total</u>	<u>629</u>	<u>315</u>
Water Intake Works	51	5
Conduction and Distribution Networks	412	206
Pumping and Electrical Equipment	47	47
Sanitary Waste Disposal Systems	116	56
Miscellaneous	3	1

Source: Estimates made by CEPAL on the basis of information provided by the National Institute for Water Supply and Waste Disposal, the Secretariat of Municipal Affairs and the Managua Reconstruction Junta (JRI).

g) Other Sectors and Services

In addition to the above-described sectors, the following other activities were affected as well, although on a lesser magnitude: culture, cargo and passenger terminals, warehouses, telecommunications and tourist facilities.

Damages in the cultural sector refer to undermining and sedimentation of several art schools and popular cultural centers as well as the cultural heritage. Their repair and rehabilitation costs amount to 1.3 million U.S. Dollars.

Undermining, erosion and flooding damaged cargo and passenger terminals in Managua and other cities, as well as machinery and equipment for cargo handling. The amount of 475 000 Dollars is required to repair these damages.

The telecommunications network suffered damages in physical lines, telephone exchanges and telex systems; some stored materials were lost due to flooding of warehouses. By utilizing materials initially earmarked for other projects, it was possible to very rapidly repair all damages. The cost of these repairs is estimated at 150 000 Dollars. In addition to this direct loss, the telecommunications utility incurred in a sales reduction of 85 000 U.S. Dollars.

Flooding and erosion affected the infrastructure of some popular tourist resorts such as Xiloá. An estimated 150 000 U.S. Dollars are required for their rehabilitation.

In summary, it is estimated that a total of 2 million U.S. Dollars is required to repair material damages, of which 150 000 Dollars are to be spent abroad to import equipment and materials not available locally. In addition, these activities will incur in a loss of 120 000 Dollars during 1982 in non-received income. (See Table 16.)

4. Agriculture and Livestock Sector

Nicaragua, since the end of the 1978-1979 civil war, had made special efforts to rebuild the productive stock of the agricultural and livestock sector; before 1979, machinery stock had been considerably depleted due

/to its use

to its use for non-agricultural tasks. In addition, the breeding herd had been reduced by about 20 per cent due to excessive slaughtering and exports made by the previous regime.

Since mid-1979 this sector was organized in a mixed-property system. Now, the People's Ownership Area produces about 14 per cent of the total value, while private enterprise accounts for the remaining 86 per cent. Since then, agricultural production has slowly but steadily increased and reached the output level of 1978.

The agricultural plan for 1982 called for an increase in cotton - the main export crop - and corn production, one of the main staples in the Nicaraguan diet which, in previous years, had been complemented with exports. In broad terms, this plan called for output growths similar to the historical trends. All crops earmarked for internal consumption were required to grow in a similar fashion, except sorghum for which a surplus was produced in 1981.

Rain and runoff adversely affected the agricultural and livestock sector in its capital stock, inventories and infrastructure. Damages were of such magnitude that they were only surpassed by losses in physical infrastructure.

a) Damage to Soils and Capital Goods

While the main damage under this heading refers to eroded or washed away soils and to livestock death, production infrastructure was also severely affected.

Some 2 800 hectares of intensive-agriculture lands were practically destroyed by runoff when river courses were notably widened and/or when sediments, rocks and tree trunks were deposited on them; 5 600 hectares of additional arable lands were eroded, losing several centimeters of its uppermost layer, which will result in a reduction of productivity; 77 000 hectares of land already prepared for sowing were affected as well; soil terraces in 24 500 hectares of lands devoted to cotton growing were partially or totally destroyed.

/In addition,

In addition, the floods caused the drowning of 11 600 heads of cattle - 3 500 breeding cows, 5 400 calves and 2 300 steers. - which caused a further reduction of the stock which was just beginning to recover after the 1978-1979 war.

Rains also damaged equipment, facilities and raw materials in a fertilizer mixing plant. Farm fences, nurseries and other forest facilities, irrigation and fishing equipment, and agricultural materials were destroyed as well. Finally, 1 200 hectares of banana and 1 500 hectares of coffee plantations were destroyed by the rain and floods; it will take this and the following year for their complete recovery.

The total or partial destruction of access or production roads - as noted previously - used for transport of inputs and commodities required for crop sowing during the coming season - which begins by mid-July and must be concluded at the end of August - was also of great significance.

Total losses in land and capital goods - excluding the damage to production roads - exceeded 68 million U.S. Dollars. The highest losses refer to eroded or sedimented land (55 million), since some of these soils cannot be sown for an estimated period of 10 years and/or will have much lower productivity. Damages to capital goods amounted to 13 million Dollars; about 4 million of which are required to import inputs and equipment. (See Table 9.)

The fact that the above-described losses represent a severe blow to Nicaraguan agriculture must be stressed. Besides losing a considerable extent of its best soils, productivity will be reduced in another extensive area, soil terraces for the next harvest will have to be rebuilt or repaired, cattle stock was reduced and an input-processing plant was damaged.

b) Losses in Agricultural Production

Rains and floods affected both export and internal-consumption crops. The effects of the first will be felt more intensely in the 1983 calendar year; those of the latter will occur during 1982.

Table 9

NICARAGUA: DAMAGE TO LAND AND CAPITAL GOODS
IN THE AGRICULTURAL SECTOR

(Thousands of US Dollars)

Item	Replacement Cost	Value of the Imported Component
<u>Total Losses</u>	<u>68 177</u>	<u>4 185</u>
<u>Land</u>	<u>54 882</u>	<u>1 085</u>
Lost due to runoff ^{a/} (2 800 hectares)	44 800	-
Eroded (5 600 hectares) ^{b/}	6 272	-
Destroyed Terraces (14 000 hectares)	360	300
Damaged Terraces (10 500 hectares)	150	125
Land prepared for sowing (77 000 hectares)	3 300	660
<u>Capital Goods</u>	<u>13 295</u>	<u>3 100</u>
11 600 heads killed ^{c/}	3 500	1 600
Damage to fertilizer-mixing plant	1 608	1 000
Destroyed fences	420	270
Damage to nurseries and other forestry projects	297	-
Damage to fishing equipment	100	60
Damage to machinery and equipment	170	170
Banana plantation, destroyed (1 200 hectares)	1 200	-
Coffee plantation, destroyed (1 500 hectares)	6 000	-

Source: Estimates made by CEPAL on the basis of information provided by MIDINRA, the Ministry of Planning (MIPLAN), the International Reconstruction Fund (FIR) and the Department of Information and State Operations (DIGE).

a/ Estimate based on value of production during a ten-year period.

b/ Estimate based on the reduction in productivity over a five-year period (35 quintals of cotton at 1981 prices).

c/ Of these 3 850 are breeding cows, 5 400 calves and 2 300 steers.

i) Export crops. Losses in export commodities production were the largest since the disaster affected more intensely the heart of the main cotton and banana production areas, which products generate most of Nicaragua's foreign exchange.

Even though cotton had not been sown at the time the disaster struck, the land had already been prepared. To be sure, terraces are built and soils are broken and plowed just before the start of the rainy season; these tasks had already been completed and were partially or totally lost.

In view of the large number of terraces destroyed, it seems very difficult - if not outright impossible - to make all land preparations again before the end of the sowing period in late August. In addition to lands which were completely washed away or covered with sediment, extensive areas of Nicaragua's best soils devoted to cotton growing, were eroded by runoff and leaching, which fact will reduce their productivity.

Banana plantations are also located in the area where rainfall was heaviest. Bananas are highly sensitive to water excess, and they were severely damaged. The total land area of banana plantation, with an extension of about 3 000 hectares, remains vulnerable to fungus disease - mainly Sigatoka - as well. It is estimated that a total of 1 200 hectares of banana sowings were completely destroyed, and one million boxes of the product, which were ready for export and stored in warehouses, could not be shipped in time. Physical infrastructure - including access roads, fruit transport cables, packing facilities, etc. - was also affected, but its recovery is not as difficult as that of the plantation. It is estimated that total recovery will take approximately one year, so that exports in 1982 and 1983 will be reduced.

Damages to coffee plantations were less severe since they are more resistant to humidity and are located in the uplands where rainfall was less intense. Estimates indicate that only 1 500 hectares were affected - a small fraction of the total cultivated area - so that production will not decrease greatly.

The harvest of sugar cane had almost been completed at the time of the rains, so that only 3 500 to 7 000 hectares were not harvested. This crop has a good recovery capacity; it is expected that cane-growing

activities may be initiated as soon as soil humidity decreases. There were plans - before the disaster - to extend the area of sugar cane production in the present agricultural year. The main damage, therefore, refers only to the loss of about 80 000 quintals of refined sugar, which were stored at the Corinto warehouses ready for export.

Minimal damage was inflicted on other crops such as sesame and tobacco, since they had not as yet been sown. The only loss refers to 25 tons of sesame seed which was to be used for the 1982 crop.

ii) Losses in Domestic Consumption Crops. At the beginning of the year, the Government promoted the production of grains in irrigated areas, in order to alleviate a temporary shortage. Sufficient production was thus expected to meet the demand of corn and rice, until the summer harvest at the end of August. These crops were in their growing stage; some were flowering while others were in the process of ripening. Since rice is resistant to excess water, corn was the most affected of the two. Even though corn crops were not completely destroyed, it is estimated that 31 500 tons of this grain will have to be imported in order to meet the demand until the summer harvest is collected.

All other domestic consumption crops were not affected since they had not been sown as yet. In the case of sorghum - which has temporarily substituted corn in the people's daily diet - there was a surplus in 1981, which ought to suffice to meet the demand in the main affected areas. It is not believed feasible now to reach the production goals initially set for 1982.

It is estimated that, on the whole, agricultural production in 1982 will decrease by 35 million U.S. Dollars. This would mean that the growth rate envisaged for 1982 will be cut from 16 to 9 per cent.
(See Table 10.)

c) Losses of Inputs

The necessary inputs for sowing the different crops were already available before the floods. As a result, a large amount of fertilizers, 9.5 tons each of rice and cotton seeds, corn seeds and other inputs were

Table 10

NICARAGUA: AGRICULTURAL PRODUCTION VALUE AND DAMAGE
CAUSED BY THE FLOODS a/

(Millions of US Dollars at 1982 prices)

Crop	1981	1982		Difference (Damage)
		As Planned	After the Floods	
<u>Total</u>	<u>524.5</u>	<u>606.8</u>	<u>570.7</u>	<u>34.9</u>
<u>Export Crops</u>	<u>352.8</u>	<u>396.4</u>	<u>361.7</u>	<u>34.7</u>
Ginned Cotton ^{b/}	106.8	126.4	96.4	30.0
Sesame	6.5	10.6	10.5	0.1
Bananas	9.7	10.0	6.9	3.1
Coffee ^{b/}	180.7	189.5	188.8	0.7
Sugar Cane	42.6	50.3	49.5	0.8
Havana Tobacco	6.5	9.6	9.6	-
<u>Domestic Consumption Crops</u>	<u>171.7</u>	<u>210.4</u>	<u>209.0</u>	<u>0.2</u>
Maize	55.8	72.8	72.8	-
Beans	41.1	45.2	45.1	0.1
Rice	53.7	67.7	67.7	-
Sorghum	17.1	19.9	18.7	<u>c/</u>
Virginia Tobacco	4.0	4.8	4.7	0.1

Source: Estimates made by CEPAL on the basis of data supplied by the Planning Ministry.

a/ The 1982 information refers to the calendar year, except in the case of cotton, sesame and bananas, where it refers to the agricultural year (season).

b/ For 1982, calculated on the basis of international prices for mid-June 1982.

c/ The decline in production is not due to flood damage but to the fact that there were surpluses in 1981.

lost. Their replacement cost is estimated at 1.7 million U.S. Dollars. (See Table 11.) Apparently only a small fraction of such inputs was ensured.

d) Losses of Products ready for Consumption

Due to the flooding of packing enterprises and port warehouses, there was a large loss of agricultural products, ready for consumption and export. The losses refer to the 1981/1982 crop and were mainly banana - 1.2 million boxes - and, to a lesser extent, plantains, sugar, cotton and coffee. The loss is estimated at 4.2 million U.S. Dollars, although most of these products were insured. (See Table 12.)

e) Effects on Livestock

The main damages in the livestock sector refer to the loss of about 11 600 heads of cattle, as previously stated. This was due, on the one hand, to lack of food for several days since sediments were deposited on the grasslands of extensive areas; on the other, to the stress imposed on the animals by the floods, which prevents them from moving and eating properly, and which may last beyond the present rainy season.

Even though only a small fraction of the total cattle stock in the country was lost, it must be noted that the loss occurred precisely when this activity was beginning to recover from the effects of the war. In this respect, it should be remembered that the war involved the slaughtering of nearly 20 per cent of the stock of cattle which in 1978 had reached a peak of 2.4 million heads.

The effects of the rains can be noted through the main livestock indexes - a larger number of abortions, a decline in milk production, a further decrease in the calving index, etc. - so that the losses will surely exceed those indicated in Table 13 since they will undoubtedly affect productivity during the three following years.

Poultry and pork production was also affected, and will decrease during the present year. These species, however, have a high reproduction rate so that these adverse effects can be easily overcome by means of a special recovery program.

Table 11

NICARAGUA: LOSSES OF INPUTS FOR AGRICULTURAL PRODUCTION

Item	Estimated Value (Thousands of US Dollars)
<u>Total</u>	<u>1 683</u>
Fertilizers	1 240
Rice seed (9.5 tons)	10
Corn seed (30 000 hectares sown)	300
Cotton seed (9 tons)	9
Miscellaneous inputs	124

Source: Estimates made by CEPAL on the basis of information provided by the Agricultural Development Ministry (MIDINRA), the Planning Ministry (MIPLAN), the International Reconstruction Fund (FIR), and the General Directorate for State Information (DIGE).

Table 12

NICARAGUA: LOSSES OF AGRICULTURAL PRODUCTS READY
FOR CONSUMPTION

Item	Estimated Value (Thousands of US Dollars)
<u>Total</u>	<u>4 192</u>
Cotton (1 000 quintales), destroyed	64
Cotton (4 000 quintales), damaged	128
Sesame seeds	14
Coffee (9 000 tons), damaged	180
Sugar (9 450 tons), damaged	175
Bananas (1.2 million boxes)	3 000
Plantains (17.5 million units)	175
Vegetables	10
Fish	372
Milk (46 000 gallons)	74

Source: Estimates made by CEPAL on the basis of information furnished by the Agricultural Development Ministry (MIDINRA), the Ministry of Planning (MIPLAN), the International Fund for Reconstruction (FIR) and the General Directorate for State Information (DIGE).

Table 13

NICARAGUA: LIVESTOCK PRODUCTION AND FORECASTS

(Millions of US Dollars at 1982 prices)

Produces	1980	1981	1982 ^{a/}	
			As Planned	After the Floods
<u>Total Livestock</u>	<u>279.2</u>	<u>252.9</u>	<u>269.1</u>	<u>268.2</u>
Cattle	145.3	106.4	105.3	104.4
Pigs	20.4	24.3	23.0	23.0
Poultry	11.0	14.2	19.3	19.3
Milk	78.0	81.0	85.0	85.0
Eggs	24.5	27.0	36.5	36.5

Source: Estimates made by CEPAL on the basis of information provided by the Ministry of Planning.

a/ Estimates only.

/Estimated

Estimated losses in livestock production for 1982, determined by comparison to the expected increase before the disaster, reach a figure of one million U.S. Dollars, which is equivalent to a decrease of from 6.4 to 6.0 per cent in the production index. (See Table 13.)

f) Effects on Forestry

Damages to forestry occurred exclusively in several projects under implementation by the Natural Resources Institute (IRENA). They refer to losses of plants in nurseries - which were ready for permanent transplanting - and of agricultural machinery and tools. In addition, expenses for repairs were incurred and there was unused labor during the time of the floods. In summary, these damages are estimated at 300 000 U.S. Dollars, amount already included in the losses of capital. (See Table 9.)

g) Effects on Fishery

Damage to fishery activities include losses in equipment and machinery, and a small reduction in the catch of shrimp and lobster since fishing boats could not operate under the storm. These damages were also included in the losses of capital. (See Table 9.)

h) Effects on the Medium Term

The direct and indirect losses of lands, capital goods and agricultural and livestock production, were estimated in previous sections. However, other damages are present whose results will only be felt in the medium term. These refer mainly to productivity of lands devoted to cotton growing, since they were greatly affected. Part of them was washed away and deposited in the sea; another part received a great load of sediment, sand, rocks and trees; and one more was badly eroded by excess rain and runoff. The soils in this area are highly productive but - since they are very loose sands - are very erosion-prone to wind and rainfall action. Their productivity will therefore be reduced in the coming years.

/Even though

Even though the worst effects of the rain and floods are already over, it is essential to undertake some programmes - such as the incorporation of humus - to restore the previously existing productivity, to prevent wind erosion of soils through windbreaking screens and to prevent soil erosion by runoff through the construction of conservation works in the uplands which are badly eroded and entirely unprotected. At the same time other protection works should be constructed in ravines which were subjected to erosion in their banks and which would otherwise continue to deteriorate during the normal rainy season.

Those lands which were covered with sediments, sand, rocks and wood debris must be cleared in order to rehabilitate them for production, an activity which may take a relatively long time period. The river courses which became silted must also be rehabilitated in order to avoid new flooding in the near future. There is no doubt that it will be necessary to excavate and widen river courses and to protect their banks.

The medium-term outlook for other crops seems less serious since - except in the case of banana which can only begin to produce again in 1983 - recovery can be very fast depending on the country's ability to rehabilitate the lands in time for sowing at the end of August.

5. Damages to Industry and Commerce

a) Industrial and Mining Sectors

Even before the disaster the industrial sector had been suffering from a progressive deterioration due to the scarcity of foreign exchange for the acquisition of imported inputs. The foreign exchange situation was so difficult that the Government had imposed a restrictive list of priority inputs which could be imported. The 1982 development plan which initially envisaged a 4.9 per cent annual growth for the sector, had already been adjusted before the floods in order to take into consideration the above-described situation; the growth of the industrial sector was then expected to be only 2.2 per cent. The negative effects of the May 1982 floods must be superimposed on that already ailing situation for the sector.

/After the

After the floods - and as will be seen later in this report - the growth rate for the industrial sector will now become negative (-0.4 per cent).

Serious damages were imposed on the subsector of food, drinks and tobacco, as well as on the chemical industry.

In accordance with the results of a special survey of affected industries (see Table 14) and with preliminary calculations, it is estimated that the industrial sector suffered damages of around 19 million U.S. Dollars; these refer especially to losses of raw material stocked in warehouses and customs, as well as to damage of industrial facilities. Only a small fraction of these items were insured. Most of the industrial plants located in the area affected by the floods stopped production during the emergency; production and sales decreased. The larger damage occurred in industries of the private sector, although some chemical and metal-mechanical industries belonging to the People's Ownership Area were highly affected by the floods.

Even though only preliminary information is available, the estimated losses are so great that, in spite of efforts undertaken, it will not be possible to achieve total recovery during this year; this is especially true due to the limitations in foreign exchange to acquire imported machinery and raw materials. Preliminary calculations indicate that the total loss of production about equals 2 per cent of gross industrial production in 1981 (estimated at 770 million U.S. Dollars). The effect of this loss, however, may prevent achieving the goals set by the Government.

Total damage in the mining sector is estimated at 500 000 U.S. Dollars, and refers to the gold and non-metallic mineral subsectors. Three gold mines decreased their production and some access roads were affected. Production of lime, gypsum and other products was temporarily halted.

b) Commerce

According to very preliminary estimates, damage to local commercial establishment amounted to 3.5 million U.S. Dollars; they refer mainly to damage in stock, infrastructure - including markets and slaughterhouses - and to ENABAS' warehouses and stock, which were only partially insured. (See Table 15.) In some cases, as for 25 city markets, all activities

Table 14

NICARAGUA: ESTIMATED DAMAGE TO INDUSTRIAL
AND MINING SECTORS

(Thousands of US Dollars)

Item	Cost
<u>Total</u>	<u>19 113</u>
<u>Industrial Sector</u>	<u>18 613</u>
Fixed Assets	2 477
Buildings	34
Machinery and spare parts	216
Transport equipment	260
Other facilities	1 917
Stock	2 299
Raw materials	1 783
Finished goods	511
Decrease in production and sales	13 837
<u>Mining Sector^{a/}</u>	<u>500</u>
Gold	250
Non-metallic minerals (lime, gypsum, etc.)	250

Source: Estimates made by CEPAL on the basis of information
furnished by the General Directorate of State Information (DIGE).
a/ Production losses.

Table 15

NICARAGUA: DAMAGE TO COMMERCE

(Thousands of US Dollars)

Item	Replacement Cost
<u>Total</u>	<u>3 482</u>
Damage to warehouses and stock (ENABAS)	1 180
People's Commercial Enterprise	100
Municipal markets and slaughterhouses	462
Estimated small-commerce losses ^{a/}	500
Estimated losses due to paralization of activities ^{b/}	1 240

Source: Estimates made by CEPAL on the basis of information provided by the General Directorate of State Information (DIGE).

a/ It was estimated that 1 000 commercial outlets - 10 per cent of the country total - suffered an average loss of 500 Dollars.

b/ Assuming that 10 per cent of commercial establishments did not sell during two weeks, and utilizing the gross material product value of commerce during 1981 (approximately 300 million US Dollars).

/were halted

were halted during the rains. Estimates made include loss of sales by commercial establishments for a period of two weeks. Nevertheless it is estimated that damages imposed by the immobilization of assets can be easily overcome, and that their repairs can be completed by mid-1982. The interruption or obstruction of internal road transport and its corresponding cost increase - as well as that to and from other Central American countries - has reduced the inflow of supplies, which fact has correspondingly reduced sales even in undamaged commercial establishments. This situation is expected to continue until road transport can be fully restored.

Finally, the 3 per cent growth foreseen by the Government for internal commerce and banking in 1982 will be impossible to achieve. It is estimated that growth for the year will be nil due to the above-described damages.

6. Summary of the Damage

The analysis of damages clearly shows that the most affected sectors are those of - road and railway - transport; agriculture, which lost both capital assets and production; and housing, especially for the lower income strata of the population.

The industrial and mining, electrical energy and commerce sectors suffered damages which mainly refer to loss of stocks and future sales. Urban infrastructure was significantly and equally affected. Finally, the breakwater works at Port Corinto were damaged as well.

Health and education facilities received relatively minor material damage. However, these losses were qualitatively very important because they severely affected the strong efforts to improve the living conditions of the population which the Government was undertaking.

In summary, it can be said that the floods disrupted transport infrastructure, which is essential for internal and foreign trade as well as for access to production areas; jolted the strategic agricultural sector which generates foreign exchange and produces basic staples for domestic consumption; and affected the basic services for the population.

/Due to the

Due to the type and magnitude of these damages, their recovery can only be completed in the medium term. The productive capacity of other sectors was virtually undamaged, although losses in stock and temporary sales reduction did affect them. These sectors, however, ought to have a speedy recovery.

Table 16 presents a global perspective of the damages imposed by the floods. The total estimated losses amount to some 355 million U.S. Dollars.^{4/} Of this amount, 55 million refer to temporary or permanent losses of land - one of the main resources of the country - estimated through the present value of the opportunity cost of the crops that would have been produced in such lands. An additional 82 million represent indirect losses, either as income losses due to reduced economic activity or additional operation costs imposed by the floods. Finally, nearly 220 million Dollars worth of the country's capital stock will have to be replaced. About one half of said replacement will have to be imported (see Table 16). It is estimated that only about 10 million Dollars can be recovered through outside reinsurances.

In order to better understand the magnitude of the - direct and indirect - damages inflicted by the floods, it can be stated that they represent about 20 per cent of the country's gross national product and about 40 per cent of exports made in 1981. There can be no doubt, therefore, of the significant magnitude of the damages. Their effects on national economic development are analyzed in the following pages.

Table 16

NICARAGUA: SUMMARY OF FLOOD DAMAGE ESTIMATES

(Millions of US Dollars)

Item	Total Damages	Direct Damages	Indirect Effects	Import or Export Component ^{a/}
<u>Total</u>	<u>356.5</u>	<u>274.7</u>	<u>81.8</u>	
<u>Social Sectors</u>	<u>44.8</u>	<u>39.3</u>	<u>5.5</u>	
Health	15.0	9.5	5.5	9.9
Education	3.1	3.1	-	0.9
Housing	26.7	26.7	-	3.5
<u>Infrastructure</u>	<u>179.5</u>	<u>150.8</u>	<u>28.7</u>	
Road Transport	119.3	117.5	1.8	48.5
Railway Transport	9.4	7.7	1.7	4.5
Ports and Airports	12.9	4.9	8.0	5.7
Urban Infrastructure	16.0	16.0	-	10.4
Electricity	15.0	2.1	12.9	3.8
Water Supply and Waste Disposal	4.8	0.6	4.2	0.3
Other Services and Sectors	2.1	2.0	0.1	0.2
<u>Agriculture and Livestock</u>	<u>109.7</u>	<u>78.1</u>	<u>31.6</u>	
Land and Capital Goods Losses	68.2	68.2	-	(4.2)
Agricultural Production Losses	34.9	3.3	31.6	(33.0)
Agricultural Input Losses	1.7	1.7	-	1.0
Commodities Ready for Consumption Losses	3.6	3.6	-	(3.0)
Livestock Production Losses	0.9	0.9	-	(0.3)
Fishing Production Losses	0.4	0.4	-	(0.4)
<u>Industrial and Mining Sectors</u>	<u>19.1</u>	<u>4.8</u>	<u>14.3</u>	
Industrial Facility Losses	2.5	2.5	-	1.0
Stock Losses	2.3	2.3	-	(2.3)
Industrial Production Losses	13.8	-	13.8	-
Mining Production Losses	0.5	-	0.5	0.5
<u>Commerce Sector</u>	<u>3.4</u>	<u>1.7</u>	<u>1.7</u>	
Fixed Asset Losses	0.5	0.5	-	0.1
Stock Losses	1.2	1.2	-	1.0
Sales Losses	1.7	-	1.7	-

Source: Estimates made by CEPAL on the basis of official information.

a/ Figures in parenthesis indicate losses in exports. In summary, 91 million US Dollars refer to imported materials and 43 million to exports.

/III. EFFECTS

III. EFFECTS ON ECONOMIC DEVELOPMENT

1. Evolution of the Nicaraguan Economy as of 1979

a) Main Features of the Economy and of the Problems Inherited

Nicaragua has the typical characteristics of a small agri-exporting economy, based on a small number of commodities which make it highly vulnerable to the international economic situation. In the 1960s its traditional export platform was considerably expanded and diversified. In addition to coffee, cotton, sugar and meat were incorporated as "motor" products, and at the same time some progress in industrialization was made within the context of the Central American Common Market integration scheme. The dynamic stimulus of the traditional export sector and of import substitution industrialization allowed for a rapid expansion of the economy as of 1960, but with a highly uneven distribution of its benefits among the different population strata. Thus, among the present main features of the Nicaraguan economy are its extreme dependence on phenomena associated with the international economy -and among these the shortage of foreign exchange which is the principal factor limiting development- and the many lacks and backwardness suffered by the bulk of the population.

The devastating effects of the 1972 earthquake aggravated those inequalities, punishing to a great extent the low-income groups living in the margined areas of the city and adding thus to their aforementioned backwardness.^{5/} The aftermath of the still unfinished reconstruction was superimposed on an increasingly intense civil upheaval which in turn led to a situation of progressive economic recession, characterized by a contraction of private investment, the flight of foreign exchange, growing external public indebtedness and, finally, considerable damage caused by the armed conflict which culminated in mid 1979 at a cost of not less than 50 000 human lives and material damage amounting to some 500 million Dollars.^{6/}

When the new authorities assumed power, a large extension of cotton and basic grains remained unsown; the country was immersed in an acute internal decapitalization process and an unprecedented external financial insolvency -the total external debt amounted to 1 500 million Dollars, with service payments that in 1979 would have absorbed 100% of the foreign exchange earned by exports of goods and services- open unemployment of more than 30% of the economically-active population and a fiscal deficit of over 1 200 million Córdobas,^{7/} equivalent to 70% of the Government current income. As a direct result of the war and because of the transfer of capitals abroad, there was heavy decapitalization in both production and economic infrastructure.

b) Principal Aspects of the Economic Policy as of 1979 and Main Achievements

In the face of this profound economic depression and the paralyzation of most production activities, combined with the longstanding problems of Nicaragua's economy, the National Reconstruction Government Junta established a number of objectives which at the beginning of 1980 were incorporated into an annual plan,^{8/} and which were reinforced in a second plan adopted early in 1981.^{9/} These measures were designed to reactivate production and were at the same time consistent with the objectives for social justice outlined in the Government's original programme.

This reactivation was sought by imbuing the State's operational structure with dynamic force, in an endeavour to combine, in a system of mixed economy the interests of the workers, the Government and private enterprise. Incentives were offered to production and exports, both through credit and fiscal concessions and by fixing remunerative sales prices for the main export commodities. At the same time, an attempt was made to raise the level of well-being of the masses, not so much through a wage policy -although minimum wages were adjusted nominally during the period 1980-1981, real wages fell- but rather through the provision of services and other indirect benefits and the creation of

new employment opportunities. For example, ceiling prices were fixed for a basket of basic commodities and for rents; distribution channels were organized for essential articles on the basis of popular markets; and there was improvement in the provision of health and education services, most notably the literacy campaign launched in 1980. At the same time, the year-end rates of open unemployment dropped from 23% in 1979 to 17.8% in 1980 and to 13.4% in 1981.

During this period an important change was also introduced in the structure of property, with the State confiscating all the assets of the overthrown political group.^{10/} In addition, an agrarian reform was initiated on the basis of expropriated land, and subsequently of the unused areas in properties larger than 350 hectares on the Pacific coast and 700 hectares in the rest of the country. This land is administered as State enterprises or as co-operatives.

In order to alleviate the external constraints, the new authorities initiated concerted actions with a view toward obtaining additional credit from abroad under favourable terms -the official loans contracted between July 1979 and December 1981 amounted to about 1 200 million Dollars^{11/} and renegotiations of the previously existing external public debt with private creditors were carried out successfully.

Finally, important efforts were made to improve the efficiency of the enterprises which came under State control -the so-called Popular Ownership Area- and to improve the public sector's capacity to stimulate economic growth and promote the changes postulated in the Government programme and development plans previously referred to, although problems such as the organization and shortage of executive and intermediate staff hindered the attainment of these goals.

Unfortunately, all these efforts were made within the context of a gradual decline in the world economy; this deterioration was particularly severe in 1981, and the main obstacle to economic recovery -the acute scarcity of foreign exchange- was seriously aggravated. Furthermore, the changes proposed by the National Reconstruction Government Junta were questioned both internally and externally and thus not free from

/pressures:

pressures: private enterprise was reluctant to reactivate its investments in spite of the fiscal incentives offered, due to the uncertainty of a great many entrepreneurs concerning the medium-term future of the country. These pressures turned at times into acts of violence, which, among other effects, increased the concern of the authorities for national security and defence. Moreover, Nicaragua has -as the rest of the Central American countries- recently experienced difficulties in obtaining resources to finance its development, particularly when taking into account that, for different reasons, some important international agents have placed obstacles to the flow of new resources into the country. Nevertheless, since 1979 the Government Junta has accomplished important achievements. In 1981 the gross domestic product increased at a rate of approximately 9% for its second consecutive year. Although real per capita income in the past year was 25% lower than that recorded five years before, its growth was considerable, if it is considered against a background of the adverse trends described above, and reflects reactivation from an extremely depressed internal situation.

The production of goods recovered in 1981, basically stimulated by agriculture, with a 14% increase in that sector's added value, despite the fact that cattle production continued to fall during that same year. The rise in production was both in export and domestic consumption goods. The construction sector -the most severely affected by the 1979 recession- had shown a distinct trend towards recovery during the 1980-1981 two-year period -although it only reached 75% of the 1978 level- basically influenced by public investment and the support and financing of low-cost housing. Notable developments in this sector are the virtual conclusion of the highway to the Atlantic (Puerto Cabezas), the great stimulus given to the construction of rural roads, the works connected with the energy sector, and the building of hospitals, health centres and schools. In general, public expenditure -both capital and current- became one of the main dynamic factors of the economy. For example, the added value of the public administration represented one-quarter of economic growth in 1981. This, of course, also gave rise

to the financial disequilibrium which will be referred to later on. Finally, mining, electricity generation, transport and trade also showed a fairly vigorous growth in the recent two-year period.

In contrast, the manufacturing sector has had to face the most serious problems in its reactivation, although it experienced a moderate growth during 1980 and 1981; some of the contributing factors were the destruction of its installations and equipment, the depletion of its inventories and the breaking down of the chain of financing-imports of inputs-productive process-distribution-exports. This sector continues to be affected by the lack of skilled personnel and by the private industrial sector's attitude, described above, which, in the face of the new economic policy guidelines, has discouraged investment and even led to decapitalization.

As regards the external sector, exports growth has been severely limited by the instability and decrease in prices of the main commodities and in their purchasing power, and further limited by the rise in the average price of imports. The high interest payments for the external debt, despite its recent renegotiation, combined with the negative trade balance, raised the deficit on the current account to approximately 490 million Dollars in 1981 -a figure which, for the first time, comes fairly close to the current value of exports- and the shortage of foreign exchange constituted a crucial limitation for the general operation of economic activities. This shortage contributed to the formation of a parallel market used mainly for non-essential imports and the movement of unrecorded capital, whereby the exchange rate almost tripled the official one, which introduced additional distortions in the financial area and in the general price system.

On the domestic economy front, notwithstanding the efforts exhorted for austerity and rationality, the disequilibria and pressures of the most important economic and financial variables still exist, although inflationary pressures have diminished. In this respect, a source of concern was the growing deficit of the central Government, which increased from 1 840 to over 2 900 million Córdobas between 1980 and 1981 -8.5% and 11%, respectively, of the GDP- despite the increase in income

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which almost tripled between 1979 and 1981. The rapid expansion of expenditure -in 1980 both on investment and current; in 1981, only on current expenditure- is consistent with the Government's effort to achieve its many and sometimes conflicting economic, social and security policy goals.

To sum up, in the past two-year period Nicaragua faced two long-standing development obstacles -disequilibria in the balance of payments current account and in public sector finances- added to new obstacles linked with the effort to introduce changes in conducting the economic policy, within the context of increasing political polarization.^{12/} What is more, the country had not yet recovered from the damage caused by the 1972 earthquake, and still less from the considerable destruction and indirect consequences of the armed conflict in 1979. Now, in addition to this entire constellation of adverse phenomena, there are the effects of a new natural disaster.

2. Possible Effects on the Economy in 1982

a) General

The natural disaster will have clear effects on the evolution of the economy not only in what remains of 1982 but also and to some extent in 1983. As regards the damage to certain natural resources linked to agriculture, its impact will be felt over a still longer period.

In the first place, the growth rate of nearly all the production sectors will slow down, which, in turn, will affect the high unemployment levels recorded in the country, i.e., about 13% of the work force at the time of the disaster. Perhaps the only exception will be construction, where the urgent need for repairs to highways, bridges, buildings and housing will demand a high level of activity, which, in view of the high demand for manpower in this sector will probably offset, in part, the situation of increasing unemployment.

In the second place, there will be an impact on the balance of payments due to the decrease in exports of agricultural commodities, either destroyed or damaged, and the increase in external purchases of consumer goods,

/raw materials

raw materials for agriculture and industry designed to replace lost stocks and capital goods, particularly spare parts, and to put rapidly into operation machinery and equipment which came to a standstill in the productive sectors. In addition, despite the magnitude of the disaster, the flow of donations thus far received (mid-June 1982) continued to be insignificant in terms of the existing requirements. Hence an even greater current account deficit on the balance of payments is expected than the already high figure (520 million Dollars) estimated before the disaster.

A third type of negative effects will be recorded in the public sector's operation. On the one hand, the reduction in the product's rate of growth will affect the collection of taxes, both direct and those deriving from consumption; as regards expenditure, there is no doubt that the austerity policy in current expenditure and investment envisaged before the disaster will have to be modified in the face of the urgent need to undertake activities such as the reconstruction of roads, the transport system, housing, hospitals, schools, etc. Possibly, there should also be increases in the subsidies to State agencies responsible for the distribution of food so as to allow them to revert to the operation levels required by the population.

It is still too early to assess the full effects of the recent disaster on the general economy of Nicaragua. There is no doubt, for example, that the supply problems which it has brought about will affect the rate of inflation, as borne out by the efforts made by the authorities -with varying results- to exert a more strict control on basic commodities prices which shot up during the first few weeks after the disaster; also, connected to this is the great increase in the demand for certain materials that will arise as a result of the reconstruction process.

In short, the disaster is having negative effects on three areas of key importance for the economic situation prevailing in the country: it is reducing the production of goods, with the corresponding impact on the rate of growth and employment which are posed as crucial matters in order to face the unemployment problems and the existing plans to raise the populations's level of consumption in the short term; it is aggravating

/the problem

the problem of the shortage of foreign exchange, which has already constituted a basic factor hindering the economic reactivation plans which have been put into effect since the new authorities assumed power in 1979, and at the same time it raises new requirements in terms of foreign capital, despite the high levels reached by debt service payments; and, finally, it is accentuating the disequilibrium in public finance with the reduction in public income and the rise in the expenditure required to repair the damages. It should be noted that the Government has been making praiseworthy efforts in this connection which seemed to indicate that a considerable reduction in the absolute amount of the deficit might have been expected.

Within the still preliminary nature of the figures, an attempt is made below to define somewhat more precisely the foreseeable effects in each of these fields.

b) Prospects for the Economic Situation in 1982 before the Disaster

The two main financial constraints which had characterized the economic situation in 1981 with different intensity,^{13/} -extreme shortage of foreign exchange and serious fiscal imbalance- were accentuated after the first quarter of 1982, causing a drastic fall in economic activity -with negative effects on employment- and an increase in inflationary pressures.

In the first place, the rigidities which were previously evident in economic relations with other countries, in general, became more acute. On the one hand, with a volume of exports which would apparently exceed the previous year's level, the further decline in world prices of the main commodities, would increase the loss in foreign trade, which the efforts to continue the reduction of imports would not compensate. Hence the current account balance would almost maintain, in general terms, the critical 1981 levels. On the other hand, the high level of cumulative indebtedness -which, in addition to the level of the inherited debt, is explained by the execution of projects mainly benefiting the production sectors and economic and social infrastructure-

/and

and the difficulty to execute investment projects, determined that the utilization of foreign capital would not be high, so that an even sharper drop in international reserves was expected at the end of 1982. As already stated in the preceding pages, among the causes underlying these predictions, both the international situation and the short-term trends played an important part in Central America.

Secondly, as regards public finance, the aforementioned difficulties which increasingly encouraged a less expansive expenditure policy, gave grounds for assuming that in 1982 the high fiscal deficit would be reduced basically due to a rise in tax revenues (improvements in the collection of taxes on personal income and property and new charges on beverages and tobacco). The fiscal situation, however, would in any case maintain its critical levels since, for example, the Government's coefficient fiscal deficit/total expenditure would only have fallen from 34% to 30%. It should also be noted that the above-mentioned efforts to moderate the vigorous growth of public expenditure with the aim of reducing the financial disequilibrium conflicted with various pressures deriving from the international situation which, for reasons unrelated to economics, required the orientation of more resources for defence in the present year than in the past.

These disequilibria -balance of payments and fiscal- owing both to internal and external factors had determined, as noted earlier, that at the beginning of the year the goals considered in the Government's economic plan had already contemplated a decrease of the growth rate from nearly 9% in 1981 to less than 5% in 1982. Subsequently, the more serious situation with respect to the shortage of foreign exchange, over and above what was expected, had already determined an additional decrease in this rate as a result of more pessimistic prospects in the case of the manufacturing industry, one of the sectors which in Nicaragua is most dependent on supplies of imported raw materials ^{14/} (see Table 17). In order to understand the persistence of the low levels of real economic activity, it should be taken into account that the growth that had been predicted for 1982 meant that even the total added value at constant prices would be lower than that recorded in the mid 1970s, and would represent approximately 80% of the 1977 total.

Table 17

NICARAGUA: GROSS DOMESTIC PRODUCT BY ECONOMIC ACTIVITY IN 1981
AND PROJECTIONS FOR 1982 a/

(Growth rates)

Item	1980	1981	1982	
			Expected before the Disaster	Probable Results after the Disaster
<u>Gross domestic product</u>	<u>10.0</u>	<u>8.9</u>	<u>4.2^{b/}</u>	<u>0.7</u>
Goods	0.7	10.3	6.4	2.1
Agriculture	-10.0	14.3	7.4	3.1 ^{c/}
Mining	49.2	6.6	14.4	0.0
Manufacturing	11.8	2.8	4.9 ^{d/}	-0.4
Construction	117.3	34.8	7.0	10.0
Services	115.8	9.2	2.9	-0.8
Electricity, gas and water	11.8	16.0	15.0	-2.5
Transport, storage and communications	18.5	6.1	...	-5.0
Trade and finance	16.3	6.9	3.0	0.0
Ownership of dwellings	-	4.9	...	...
Public administration and defence, and other services	26.2	11.8	0.0	0.0

Source: Estimates made by CEPAL on the basis of information provided by the Ministry of Planning.

a/ Preliminary, subject to subsequent revision.

b/ Already adjusted to take into account a decrease in the industrial growth rate.

c/ On the basis of Table 10, an increase of 15.7% was expected in the agricultural quantum, which was reduced to 8.8% because of the disaster. This proportion was maintained in calculating the new growth rate of the agricultural product. The estimated losses in livestock production and in stocks of products ready for sale were deducted (see Table 13).

d/ Owing to foreign exchange problems, the reduction of this rate to 2.2% had been proposed even before the disaster.

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At the sectoral level, with the exception of the large increase in mining -of relatively little significance in Nicaragua's production structure- and a levelling in Government services in real terms- which was expected to be achieved without decreasing the volume of services rendered on the basis of greater efficiency and without filling any vacancies- it was expected that the rest of the activities would lose dynamism. In the case of agriculture, a slightly smaller increase than in the previous year was envisaged, on the basis of an extension of the area sown for production of domestic consumption goods (precisely by stimulating the production of basic grains, the consolidation of associative forms of production continues to be encouraged). As regards fishing, through the direct action of the State, the catch of fish and shrimp had increased significantly. At the same time, in the case of manufactures, action was being taken to promote the production of basic articles, of widespread use, such a foodstuffs, textiles and clothing, as also construction materials, especially wood.

These results of economic activity, envisaged in general since the beginning of 1982, were already occurring in the early months of the year simultaneously with the changes in some of the trends which it had been possible to achieve in 1981, particularly at two levels. On the one hand, in the preceding two-year period intensive efforts had been made to partially overcome the serious problem of open unemployment,^{15/} which succeeded in consolidating a trend in this direction, which apparently in 1982 was losing some of its momentum despite the policy to stimulate the production of basic grains. On the other hand, relatively satisfactory results had been obtained up to 1981 in substantially attenuating the inflationary process.^{16/} The continued scarcity of some staples, however, -although the possibilities for speculating on the market had been largely eliminated- in the early months of 1982 was determining a certain acceleration of the rate of increase in prices. This was even predicted in the goals of the Government's economic plan.^{17/}

Finally, economic trends in 1982 would have lead to a further deterioration in the real wages of the workers as the result of increased inflationary pressures vis-a-vis a somewhat austere wage policy, given

/the

the generalized financial difficulties. It was also expected that, if new increases in employment levels were not achieved -taking into account that the total volume of wages would diminish in real terms- the levels of personal consumption would decrease. Of course, if these predictions are confirmed, they would interfere with one of the main objectives of economic policy which the administration has kept in force since it assumed power in 1979: the progressive redistribution of income.

c) Prospects for the Economic Situation in 1982 after the Disaster

As noted earlier, the natural phenomenon described throughout this study significantly alters the country's 1982 economic development prospects, thus adding to the list of obstacles described earlier. The following is a summarized review of the implications of this phenomenon for the main macro-economic variables.

i) Rate of Global and Sectoral Growth. The external and internal difficulties which Nicaragua's economy had been confronting in order to maintain a growth rate in accordance with its rehabilitation needs -result of the civil war commented on above- which had led to a reduction in the growth rate predicted for 1982 to half that recorded in 1981, will undoubtedly be aggravated for the rest of the year (see Table 17).

Taking into account the production losses observed in the various economic sectors, an attempt has been made to revise the projections prepared by the Government before the disaster. The estimated decrease in the growth rate, however, probably fails to reflect the full magnitude of the effect of the damage, because of the difficulties in assessing some indirect effects on levels of activity such as, for example, obstruction, slowness and higher cost of transport, or the greater relative shortage expected of certain inputs and other supplies whose use should be given priority in the more immediate rehabilitation work. Moreover, some of the effects of the floods -particularly on cotton, coffee and bananas- will be felt in the 1982/1983 agricultural year and, therefore, on the balance of payments for the next financial year.

/The estimates

The estimates made for the 1982 calendar year indicate a substantial reduction in the growth rate of the gross domestic product, which altogether would decrease from 4.2% to less than 1%, which represent a setback of a least 1.5% in per capita income levels. The contraction which can be attributable to the disaster is fairly serious as far as the production of goods is concerned (the expected rate would fall from 6.4% to 2.1%), caused in its turn by drastic reductions in the dynamism originally predicted for agriculture -the growth rate of its gross domestic product would fall from 7.4% to 3.1%- and for manufacturing in which the rate would become negative. In the mining sector, the losses -partly attributable to the reduction in gold production- would virtually nullify the expected growth although non-metallic mining would probably have a recovery in the rest of the year, in view of the additional demand for construction materials which is bound to be generated. In this respect, it is expected that the growth rate of the construction sector will necessarily be accelerated; the only case within the whole economy for the same reasons noted above. Naturally, the reactivation of this activity will not be sufficient to counteract the foreseeable negative evolution of the other productive sectors, so that the above-mentioned rate would fall.

In the services sector, for which the Government had already predicted a very moderate growth of 2.9% -basically because of the austerity and rationalization programme undertaken by the public administration, including the State distribution apparatus- a contraction of about 1% is estimated as a result both of the effects on trade activities and transport, owing to interruptions in the road and railway systems and the loss of impetus of each, as a more direct aftermath to the disaster.

ii) The Balance of Payments. The natural disaster will have an adverse effect on the various items which make up the 1982 balance of payments, although its adverse effects on exports of traditional commodities are estimated as being even greater in 1983. The estimates presented in this respect, which are of a very preliminary nature, may be found in Table 18.

/Table 18

Table 18
NICARAGUA: BALANCE OF PAYMENTS

(Millions of Dollars)

Item	1980	1981	1982 Projections	
			Before the Disaster	After the Disaster
Exports, <u>fob</u>	451	501	549	521
Cotton	30	122	122	96
Coffee	166	136	179	189
Sugar	20	49	49	49
Bananas	8	6	7	7
Others	...	158	192	180
Imports, <u>fob</u>	803	919	886	940
<u>Services Balance</u>	<u>-135</u>	<u>-155</u>	<u>-200</u>	<u>-195</u>
Income	78	80	61	66
Expenditure	214	235	261	261
Donations	81	57	48	60
<u>Current Account Balance</u>	<u>-407</u>	<u>-516</u>	<u>-489</u>	<u>-554</u>
Movements of Capital (net)	206	569	374	...
Official Capital (net)	343	588 ^{a/}	374	...
Withdrawals	366	654	467	...
Normal	280	411	467	...
Renegotiated	85	243	-	-
Amortization Payments	-22	-66	-93	...
Undetermined Capital	137	-19	...	...
Special Drawing Rights	5	5	...	...
Change in Net Reserves	196	-58	115	...
Balance of External Debt (due in more than one year's time)	1 571	2 141	...	...

Source: Estimates made by CEPAL on the basis of information provided by the Central Bank of Nicaragua and other official sources.

a/ Does not include 71 million due to the renegotiation of the external debt.

/It shows,

It shows, in the first place, an increase in the current account balance-of-payments deficit of 65 million Dollars over that envisaged before the disaster, or around 40 million Dollars with respect to the 1981 figure, so that at year's end the deficit will exceed 550 million Dollars.

The increase in the deficit is due both to the predicted decrease in foreign sales because of the effects of the floods and to the bigger imports required owing to the loss of stocks and additional requirements for rehabilitation and reconstruction activities.

The projections made prior to the natural disaster on the volume of exports were relatively encouraging and altogether amounted to 550 million Dollars thanks to bigger sales of coffee, cotton and cane, and notwithstanding a certain stagnation in the sale of non-traditional products, particularly those destined for the rest of Central America.

As a result of the floods, external sales of ginned cotton -estimated at 122 million Dollars- will probably only reach 96 million, while those of bananas will practically remain at around 7 million Dollars. Of lesser importance were estimated the decreases that will be experienced by the cane exports (see Table 18). External sales of meat, shellfish and, in general, the commodities purchased by Central America will probably also decrease, among other factors, because of the obstruction of the transport system. In short, total exports of goods would decrease from 550 to 520 million Dollars. The donations, which had normally entered the country and been assigned to the reconstruction process, suffered a drastic contraction in the early months of 1982, so that taking into account those which Nicaragua expects to receive in view of the new natural disaster, the figure for the entire year will probably amount to some 60 million Dollars, which -in the light of what has occurred after the floods- will be insufficient.

In general, the losses of goods in customs warehouses, which were either for export or were entering the country for subsequent use, were largely protected by local insurance, which in turn was to a large extent reinsured abroad, so that the income envisaged under this heading in the services account can be expected to increase in the course of the year.

/Imports,

Imports, estimated by the Central Bank for the whole year at 886 million Dollars, will rise due on the one hand to donations in kind of 10 million Dollars which had not originally been considered -their counterpart being the income recorded in the capital account- plus 45 million representing 50% of the total requirements of imported goods calculated in this report in terms of stock losses and/or urgent needs arising in the various sectors.^{18/}

Logically enough, the capital account will also be affected, although the magnitude and characteristics of its evolution will depend on the volume of additional resources which may be mobilized, and on the country's capacity to implement new projects. In this respect, some sluggishness is noted in the utilization of earmarked foreign loans due to problems in executing different projects which have been started on the basis of this capital (utilization of net official capital which amounted to 654 million Dollars in 1981 should be reduced to some 450 million according to estimates prior to the disaster). This situation entailed the need to utilize international reserves of over 115 million Dollars. In the face of the deterioration in the balance-of-payments current account which has resulted from the meteorological phenomenon and the resulting needs in terms of imports and replacement of assets, in the next few months additional capital on very favourable maturity and interest terms will be required, particularly keeping in mind that the country's total external debt was already 2 150 million Dollars in 1981 during which year its servicing absorbed over 35% of total exports.

iii) The Public Sector. Due to the important stimulating role played by the public sector and its efforts to overcome the considerable deficiencies in the provision of social services, since the present administration assumed power in the country, the fiscal deficit is one of the greatest disequilibria facing the economy.

In 1982 efforts were being made to alleviate this problem by means of a sustained increase in the collection of taxes -both direct and indirect- and by slowing down the expenditure expansion in relation to

/previous

previous years. Had it not been for the disaster, the fiscal deficit would have been reduced from nearly 3 000 million Córdobas (54% of current income and 11% of GDP) in 1981, to 2 600 million in 1982 (37% of projected income and 7.6% of GDP) (see Table 19). This would have been an important achievement, considering that it was to be attained without reducing the magnitude of the services for the population, and even though it meant a decrease in the real implementation of investment projects of approximately 400 million Córdobas.

The natural disaster modified the situation envisaged in several respects. The reduction in the levels of activity described above was bound to affect the levels of tax collection for the rest of 1982 by a sum roughly estimated at a little over 300 million Córdobas (a decrease of 100 million in taxes on income and net worth, and a decrease of 200 million in consumer taxes). Despite this contraction, the income under this heading exceeded the one received in 1981 due to changes and improvements in the tax collection system (see Table 19). Taxes on foreign trade would not be substantially modified, since although there could be a reduction on export taxes, these are of little importance; in contrast, it is probable that import taxes will be maintained, notwithstanding their expected increase owing to the fact that most of the additional imports foreseen would be tax free.

As regards the evolution of current expenditure, it was assumed that the principle of austerity in connection with wages and salaries will have to be maintained, in spite of the increase in working hours of many of the Government personnel connected with the emergency and rehabilitation activities, since to a great extent it will have to resort to voluntary work. On the other hand, there should be an increase in expenditure on the purchase of goods and services related to the above-mentioned process, and very probably, too, in transfers to some official institutions, particularly those responsible for the distribution of foodstuffs and other basic items.

In accordance with the above observations, the negative current saving would increase by about 940 million Córdobas. Moreover, a moderate increase of 420 million Córdobas has been estimated for the

Table 19

NICARAGUA: CENTRAL GOVERNMENT INCOME AND EXPENDITURE

(Millions of Córdobas)

Item	1980	1981 ^{a/}	1982 ^{b/}	
			Before the Disaster ^{c/}	After the Disaster
1. Current Income	4 526	5 523	6 923	6 570
Tax Revenue	3 991	4 531	5 509	5 160
Direct	934	966	1 161	1 060
Indirect	1 840	2 684	3 113	2 900
From Foreign Trade	1 217	881	1 236	1 200
2. Current Expenditure	5 008	6 880	7 000	7 500
Wages and Salaries	1 562	1 954	2 343	2 340
Other current expenditure ^{d/}	3 446	4 926	4 657	5 160
3. Current Savings (1-2)	-482	-1 357	-77	-930
4. Capital Expenditure	1 356	1 610	2 518	2 940
Real Investment	972	992	...	...
Debt Amortization	170	381	...	...
Other Capital Expenditure	214	237	...	...
5. Total Expenditure (2+4)	6 364	8 490	9 518	10 440
6. Fiscal Deficit (1-5)	1 838	2 967	2 595	3 870
7. Deficit Financing				
Internal Financing	450	2 018	745	1 020
External Financing	1 388	949	1 850	2 850

Source: Estimates made by CEPAL on the basis of information provided by the Ministry of Planning.

a/ Preliminary figures.

b/ On the basis of figures provided by the Fiscal Economic Studies Division of the Ministry of Finance.

c/ Updated budget (on the basis of January-April collection; in the case of expenditure: January-May), the source being the Ministry of Finance.

d/ Including transfers (except those made to ENABAS, CORADEP, ENABUS, Ferrocarril and INPESCA).

/capital

capital expenditure required for reconstruction in 1982, so that the fiscal deficit would increase considerably -from 2 600 to 3 870 million- amounting to as much as 59% of current income and 11.3% of the estimated GDP. The increases in expenditure are fairly modest if account is taken of the substantial requirements for the reconstruction of the infrastructure destroyed, and the fact that much of it will have to be redesigned so that it can withstand similar future phenomena. It has been assumed, however, that part of the new expenditure involved in the rehabilitation and reconstruction works will be based on the postponement or elimination of projects which were originally meant to be executed in 1982 but which are less pressing.

In any case, the expected notable increase in the deficit imposes additional external financing requirements on the Government, of approximately 100 million Dollars over and above the figure anticipated before the disaster, which means that the level of the 1981 disbursement will be tripled.

IV. NEW INTERNATIONAL COOPERATION REQUIREMENTS

1. General

As noted earlier, the floods inflicted severe material damage to physical and social infrastructure and considerably undermined Nicaragua's production capacity, affecting more intensively those areas in which the main country's economic activities are concentrated and, particularly, those which generate most of the foreign exchange and fiscal income.

In addition to the prevailing situation which the Nicaraguan Government was facing -that is, the recovery from the 1972 earthquake damages which had not been completed by the previous regime, and from the 1978-1979 civil war- there is now the need for repairing damages brought about by this natural disaster. Furthermore, the Government had imposed itself the task of improving the standards of living of the population and bringing about a more equitable distribution of income, both of which required a very large scale economic effort and the mobilization of the people. The fact that the enormous debt inherited -in spite of having been recently renegotiated under more favourable terms- imposed high expenditure of the country's foreign exchange, must also be recognized.

It is undeniable that the international financial community has made a substantial contribution towards the reconstruction efforts of the Nicaraguan Government by lending and donating a sum of about 1 300 million Dollars as of July 1979. That contribution, however, is not sufficient for the country to recover from the damage caused by the two disasters that affected it in the 1970s, in addition to confronting the many obstacles to its development.

The May 1982 disaster has aggravated the situation already prevailing before that date and will bring many and more serious adverse effects. On the one hand, it will be necessary to incur unforeseen expenditures for rehabilitation or repair instead of increasing the existing stock of capital, at much higher replacement costs than the

/original

original value of the existing resources. On the other hand, the capacity of the national economy to finance that expenditure -in terms of both saving and the external sector- will undoubtedly be affected for a period of two or three years.

Also there is a sense of urgency in undertaking some of the rehabilitation and reconstruction works, especially in connection with the reconstruction of access roads and the rehabilitation of agricultural infrastructure, since these tasks must be done in time to ensure the sowing of some crops such as cotton and basic grains, which cannot be prolonged beyond the middle of August.

Notable in the first place, therefore, is the urgent need to provide Nicaragua, apart from emergency aid, with significant support for its balance of payments and public sector financing. This is the only way to avoid a considerable deterioration in the living conditions of the population and a shortage of liquidity which could prevent Nicaragua from meeting its international commitments.

In the second place, it is considered necessary that, with the assistance of the international community, Nicaragua should face this new disaster in such a manner as to reduce or eliminate to its utmost any negative effect on the economic and social development efforts made so far. In other words, it is imperative to combine its rehabilitation and reconstruction efforts with the development plans being implemented before the disaster, endeavouring, in essence, not to alter the goals and objectives set by the National Reconstruction Government. In other words, international aid to cope with the damages caused by the disaster should be of an additional and not of a substitutive nature to that originally contemplated in support of its development plans. As a result of the disaster, the Government will not only have the difficult task of obtaining the external resources required in its financial programming due to the growing shortage of resources, but it will now require additional financing for unforeseen needs.

In the third place, the assistance required for the three phases which follow a process of this nature -emergency, rehabilitation and reconstruction- should be determined. This does not mean that a strict

/chronological

chronological order must be observed, since in some cases they could even be dealt with simultaneously or on a complementary basis. By way of example, it should be noted that the aid in terms of foodstuffs will be required until the new harvests are brought in, while rehabilitation and reconstruction works -already initiated- may well require a longer period, probably not less than 18 months.

Finally, there is no doubt that the efficiency, speed and earnestness with which the Nicaraguan authorities and the popular organizations -at both national and provincial levels- have responded to the emergency imposed by the disaster, are a guarantee that the proper organizational capacity is available to mobilize and channel a considerable flow of international assistance aimed at undertaking the reconstruction and development projects. This capacity could be strengthened through external technical co-operation, for which a number of guidelines are suggested later in this study.

2. Characteristics of the International Assistance Required

Although it is still too early to estimate the full extent of the international assistance required to repair the damage caused by the floods, the estimates presented earlier in this study indicate a figure of approximately 220 million Dollars in direct losses of physical assets alone. On the other hand, it is feasible to indicate some of the characteristics of this assistance.

Because of the type of damage caused, which largely affected the country's export capacity, and the balance-of-payments position, in the next 18 months Nicaragua will obviously require additional international financing -both public and private- to prevent the complete breakdown of its external sector. In view of the considerable burden which the country must bear in covering the servicing of the already renegotiated external debt, that additional amount of net capital inflows would undoubtedly raise very serious problems with respect to Nicaragua's indebtedness capacity, unless very favourable terms as regards maturity, grace period and interest, and donations could be granted.

/It seems

It seems justifiable, moreover, that -taking into account the difficulties which the Government will have to face as a result of the disaster- a system of direct support, flexible as far as local counterpart contributions are concerned, should be designed and put into practice. In other words, it is essential that the new loans, in addition to being granted on highly favourable terms, cover almost the entire cost of the programmes and projects.

In view of the extreme urgency with which Nicaragua needs increased foreign financial assistance to deal with the emergency, rehabilitation and reconstruction, in order to prevent the external sector from reaching a critical position in the immediate future, it seems in order to put forward some suggestions to the international financing agencies.

In the first place unutilized resources of some of the loans already granted could be immediately reoriented and those which are "frozen" could be renewed. In the second, it would be desirable to grant preferential treatment consistent with the magnitude of the disaster and the conditions which prevailed before by making more flexible the procedures, mechanisms and conditions which are normally applicable in the evaluation and approval of loan requests, following the same procedure utilized for some projects initiated after the war. Finally, it would be highly desirable that financing should be provided for programmes -not for projects- in order to avoid the delays involved in the formulation and approval of specific projects.

Fortunately, as a result of the reconstruction work initiated after the war, Nicaragua established an ad hoc agency responsible for analysing and directing the mobilization and absorption of its external resources; the International Reconstruction Fund (FIR).

As regards balance of payments support, the country has already made full use of the procedures available in the Central American Integration process (especially the Central American Monetary Stabilization Fund) and it would not seem practical to reach agreements, within a short time period, with the International Monetary Fund. This support therefore should come from credit lines, inter-bank deposits from the central banks of friendly nations, and official loans from bilateral sources.

/Finally,

Finally, the United Nations Special Programme to provide emergency aid and development assistance, established by the General Assembly in resolution 3202 (S-VI) could be approached, since the disaster at the end of May 1982 clearly fulfils the requirements established for the purpose.

3. Specific Fields Requiring Priority International Assistance

It does not seem necessary to await the completion of a detailed reconstruction plan in order to point out the projects, programmes, sectors or geographical areas requiring urgent attention from the Government and the international community. On the basis of the analysis of the damages presented in this document it is possible to identify the areas or sectors which should undoubtedly be given priority. These activities, which are summarized below and are presented in detail in Table 20, refer to the three aforementioned post-disaster phases; that is, emergency, rehabilitation and reconstruction. It is once again stressed, however, that this classification or subdivision does not necessarily mean a chronological order of execution, or that they should be programmed in the future as part of the Government's economic and social development plans.

Without underrating the damage in other sectors and activities, those which demand preferential attention are agricultural infrastructure and production, the road transport system, housing, food and health.

a) Emergency Phase

The floods affected the crops of basic grains ready for harvest and the soil ready for sowing, which brought about a shortage of the former and has imposed a considerable delay in the sowing and possible harvest of cereals, especially maize. As a result, food contributions will have to be extended to at least August or September.

Furthermore, it is urgent that more permanent and safe housing be provided for about 12 000 families who lost their homes and household effects, by strengthening and supporting the programme which the Government has initiated in this respect.

Table 20

POSSIBLE INTERNATIONAL ASSISTANCE REQUIREMENTS AS A RESULT OF THE MAY 1982 FLOODS IN NICARAGUA

Stage and sector	Financial Cooperation		Technical Cooperation	
	Programme or Project Description	Possible Sources of Cooperation	Programme or Project Description	Possible Sources of Cooperation
<u>(a) Emergency Phase</u>				
Social Sectors	31 550 tons of maize to meet food requirements through September	Governments PIA/FAO UNICEF		
	Construction material and tools for building 12 000 dwellings	Governments IDB CABEI OAS Private Organizations	Assistance in urban planning for small-size towns	Governments United Nations
	Emergency health assistance, including personnel, medical supplies and field hospitals	Governments Red Cross PAHO/WHO		
	Repair of drinking water and waste disposal systems	Governments IBRD	Assistance for the reorientation of existing loans	PAHO/WHO IBRD
Agricultural Sector	400 tons of maize seed, 20 tons of sesame seed and 20 tons of fertilizer	Governments PIA/FAO		
Public Sector	Refinancing of loans to farmers who lost crops or land prepared for sowing	CABEI IDB IBRD Governments		

/(Continuation)

Table 20 (Continued)

Stage and sector	Financial Cooperation		Technical Cooperation	
	Programme or Project Description	Possible Sources of Cooperation	Programme or Project Description	Possible Source of Cooperation
(b) Rehabilitation Phase				
Infrastructure	Acquisition of heavy equipment for the removal of sediments and the reconstruction of roads and drainage canals	Governments CABEI IDB IBRD		
	Acquisition of "Bailey" - bridges for rehabilitation of the road system	Governments CABEI IDB IBRD		
	Temporary repair of highways, roads, bridges and airstrips, to restore access through the affected area	Governments CABEI	Hydrological studies to determine design floods for bridges and culverts	Governments IMO UNDP
	Establishing of a factory of pre-stressed concrete components for the construction of bridges	Governments	Techni-economical study to determine the best way of reconstructing the railway system; analysis of the tariffs structure	CABEI Governments United Nations UNDP
Agriculture	Acquisition of agricultural machinery and implements for the repair of terraces and preparation of land for sowing	Governments CABEI		
Public Sector	Loans to Central Bank of Nicaragua to support the balance of payments	Central Banks CAIIC Governments		
	Channelling of special resources to the public sector through lines of credit and budgetary support	Governments	Assistance in the formulation of development programmes and projects	FAO UNIDO United Nations UNDP

/(Continuation)

Table 20 (Continued)

Stage and sector	Financial Cooperation		Technical Cooperation	
	Programme or Project Description	Possible Sources of Cooperation	Programme or Project Description	Possible Source of Cooperation
Public Sector (Concluded)			Inclusion of programmes of damage rehabilitation and reconstruction in the economic development plans	CEPAL/ILPES UNDP TCD
Health Sector	Campaign for the prevention of malaria, dengue, yellow fever, etc.	Governments PAHO/WHO	Assistance in the formulation of prevention campaigns	Governments PAHO/WHO
Housing Sector	Financing for housing construction programme	CABEI IDB IBRD Governments		
(c) <u>Reconstruction Phase</u>				
Infrastructure Sector	Permanent repairs to the road and railway systems, including bridges, culverts and storm drainage systems in urban areas	CABEI IDB IBRD Governments		
	Repair and protection of river banks which were eroded or obstructed	CABEI IDB IBRD IFAD		
	Repair and extension of breakwaters in Corinto	CABEI IDB IBRD Governments		
	Establishment of meteorological and hydrological system for flood and hurricane forecasting	Governments WMO UNDP		

/(Continuation)

Table 20 (Concluded)

Stage and sector	Financial Cooperation		Technical Cooperation	
	Programme or Project Description	Possible Sources of Cooperation	Programme or Project Description	Possible Source of Cooperation
Agricultural Sector	Increase and improvement of the national stock of cattle	IDB IBRD FAO		
	Erosion and reforestation control programme in the uplands	IFAD	Design of the programme	FAO Governments
	Rehabilitations of land covered by deposit in low-lying areas	IDB		
			Research of the effects of sedimentation in estuaries and coastal lakes for the protection of marine fauna, and the ecological modifications which occurred in Lake Managua	FAO UNDP UNEP
			Study on changes in the general environment as a result of the disaster	UNDP UNEP Governments
Public Sector	Creation of a special fund to attend immediate needs and a minimum stock of emergency materials in case of future disasters, preferably at the regional level	CABEI Red Cross Governments	Inclusion of disaster vulnerability analysis in all development projects	UNDP UNDRO CEPAL/ILPES
			Identification of areas prone to difficult types of disasters, and establishment of disaster-resistant construction standards	UNDP UNDRO OAS WHO UNESCO CEPAL/ILPES
			Inclusion of projects and programmes for natural disaster prevention and forecasting in the national development plans	UNDP UNDRO CEPAL/ILPES

/ In order

In order to prevent an outbreak of epidemics among the flood victims owing to the crowded conditions of the provisional shelters, it is urgent that these be provided with preventive and curative medical services and the necessary medical supplies, and to continue the use of campaign hospitals which recently arrived. Another urgent matter is to repair and re-establish the drinking water and sanitary disposal systems in some towns of the interior.

In order to ensure that sowing is completed in time, it is of the utmost priority to have the necessary fertilizers, seeds and other inputs, and to be able to refinance the farmers who lost their crops and land ready for sowing.

b) Rehabilitation Phase

While recognizing the need for some overlap between the emergency and rehabilitation phases, and between these two and the reconstruction phases, it is important to point out the most urgently needed rehabilitation activities.

In view of the urgency imposed by the climatic conditions, it is pressing to repair the production roads providing access for inputs and machinery in the agricultural areas; to rebuild the terraces on the land used for cotton-growing; to sow all the basic grains and cotton, and to rehabilitate and repair the air fields required for agricultural pest control. These activities should be completed within a very short period in order to ensure a timely summer harvest.

It is also necessary to continue the temporary repair of the damage to the road transport system, filling in the approaches to the bridges, repairing culverts and constructing fords with minimum safety conditions or using Bailey structures in the case of bridges which were completely destroyed or their structure seriously affected. This work has already been initiated by the Government with the cooperation of friendly countries. The same action must be taken in the case of the secondary roads network. For these activities it is necessary to acquire heavy earth-moving machinery to supplement the units available in the country.

/Finally

Finally, another necessary step is to start the aforementioned campaigns for the prevention of malaria, dengue and yellow fever, before the effects of the propagating vectors start.

c) Reconstruction Phase

Taking into account the above-mentioned overlap with the rehabilitation activities, it would be necessary to undertake the final reconstruction of the road and agricultural infrastructure, the renewal of banana plantations, the final rehabilitation of land eroded and silted, and of river channels which overflowed their banks, and the reconstruction of urban, port and airfield infrastructure.

The reconstruction of bridges and culverts which were damaged or destroyed should only be undertaken after a review of the hydrometeorological design criteria in the area has been completed. The same may be said of rain drainage canals and structures in the cities, and of the correction, removal of obstructions and definite protection of river courses in the coastal areas.

The road transport system will also have to be definitely repaired, adequately replacing the surfaces; the railroad track will have to be reconstructed along the lines most compatible to the needs of the country.

Work designed to protect uplands against progressive erosion should be started, by reforestation, constructing soil retention and conservation works and establishing tree or bush wind breakers. Permanent rehabilitation tasks would also be necessary on land upon which large volumes of sediment were deposited, by removing debris, stones and tree trunks. Fences and other minor agricultural and stock-breeding structures should also be rebuilt.

Moreover, it will be essential to strengthen and extend the coastal protection works (breakwaters) in the port of Corinto, so as to prevent the sea from advancing further inland.

The health and education infrastructure, together with educational materials and the stock of medical supplies should also be replaced on a permanent basis, taking into account the location of the new settlements.

/Lastly,

Lastly, and equally important, would be the establishment of a system of surface and altitude meteorological stations -including radar and radiosonde-, the reconstruction of hydrometric stations carried away by the currents, and the undertaking of specialized training in forecasting for Nicaraguan personnel. This would enable the availability of an efficient forecasting system to lessen the damage of future disasters.

4. International Technical Cooperation

The financial cooperation projects and programmes which have just been outlined should be supplemented by technical assistance additional to that which international organizations and friendly Governments are currently providing. This assistance should be basically oriented towards supporting the Government for National Reconstruction in dealing with economic areas and sectors defined as of priority importance, and particularly in the formulation of specific rehabilitation, reconstruction and development programmes and projects in order to facilitate and accelerate the granting of external financing. This cooperation could also be oriented towards the inclusion of the disaster requirements in national development plans.

Technical assistance could also be required in the formulation of plans for the reconstruction of road, railroad and drainage infrastructure and in a thorough study of the hydrological regime of rivers and in the establishment of an efficient flood forecasting system.

There is also the need to provide assistance in formulating plans for the recovery of debris-strewn land, the protection of eroded land, erosion control on the highlands and reforestation; in short, for control of the soil and forests so seriously affected. Cooperation in analysis and counteraction of the effects on marine fauna caused by the sediment deposited in estuaries might also be required.

Finally, there might be a need for advisory assistance in the planning of human settlements, with the aim of relocating the flood victims by applying the best criteria possible.

/To sum up,

To sum up, after the emergency phase -in which the cooperation of Governments, UNDRO, WFP, the International Red Cross and PAHO is crucial for the subsequent stages of rehabilitation and reconstruction- the Government of Nicaragua should urgently devote itself to the task of defining, as precisely as possible, the priorities and periods to undertake and complete the various fields of activities envisaged. Obviously, the sounder the basis and rationality with which action priorities converted into projects and preliminary projects can be submitted, the greater will be the possibilities that international, regional and sub-regional financing institutions, as well as friendly Governments, will make available the resources in the amount and on the conditions required. Perhaps one of the immediate steps would be to create technical ad-hoc groups, with the collaboration of international assistance, in order to prepare the required draft projects for at least the following fields: road transport infrastructure, bridges, railways, land management and protection, housing and human settlements. Once the Government has stated its needs in terms of technical assistance for this phase, the United Nations Development Programme (UNDP) could be entrusted with the task of finding and mobilizing the required expertise.

NOTES

1/ Some newspaper accounts initially attributed the occurrence of the persistent rains to tropical storm Aletta. However, reliable information obtained by means of meteorological satellite photographs and from radiosonde stations, indicate that Aletta was already far away from Central America at the time of the disaster.

2/ See General Secretariat of the National Reconstruction Government Junta, Informe preliminar de la cuantificación de los daños ocasionados por el desastre, Managua, 27 May, 1982.

3/ The increase in transport costs does not affect Nicaragua only. Preliminary estimates show that the other Central American countries will have to pay an additional 1.4 million Dollars in transport costs during the next 18 months, as a result of the damages on the Nicaraguan road network.

4/ The same meteorological phenomenon also imposed heavy damage in neighboring Costa Rica and Honduras. Even though the CEPAL mission did not visit these countries, because their respective governments did not request it, the United Nations Disaster Relief Office (UNDRO) has estimated that in Honduras alone 200 people died and material losses amounted to about 100 million Dollars, of which 60 million refer to the agricultural sector, 30 million to roads and bridges, and the rest to education, health and housing facilities. In addition, water-supply systems are reported to be severely affected, thereby imposing danger of epidemics.

5/ See CEPAL, Informe sobre los daños y repercusiones del terremoto de la ciudad de Managua en la economía nicaragüense (E/CN.12/AC.64/2/Rev.1), January 1973.

6/ See CEPAL, Nicaragua: Repercusiones económicas de los acontecimientos políticos recientes (E/CEPAL/G.1091/Rev.1), December 1979.

7/ The Córdoba is Nicaragua's national currency whose official value is equal to 10 US cents.

8/ See Planning Ministry of Nicaragua, Programa de emergencia y reactivación en beneficio del pueblo, January 1980.

9/ Ministry of Economic Planning of Nicaragua, Programa económico de austeridad y eficiencia, 1981, January 1981.

10/ At the end of 1981, approximately 55% of the total assets of the economy were in private hands, and 45% in the public sector. The State controlled 24% of the agricultural sector, 22% of manufacturing, 100% of mining and finance, and 40% of trade.

11/ Official loans were obtained from the following sources:

<u>Multilateral</u>	<u>470.1</u>
BCIE	80.8
IBRD	90.7
IDB	189.1
Others	109.5
<u>Bilateral</u>	<u>348.8</u>
United States	72.6
Western Europe	68.7
Socialist countries	56.5
Latin America	51.0
Libya	100.0
<u>Credit lines</u>	<u>353.2</u>
<u>Suppliers</u>	<u>24.6</u>

Of the above figure, during the period analysed, 840 million Dollars were utilized and debt servicing absorbed 370 million (90 million in amortization payments and 280 million in interest payments).

12/ For a more detailed analysis of the situations described above, see CEPAL, Nicaragua: Notas para el Estudio Económico de América Latina, 1980 y 1981 (CEPAL/MEX/1042 and E/CEPAL/MEX/1982/L.23).

13/ See Nicaragua: Notas para el Estudio Económico, 1981, op. cit.

14/ It is considered that in May manufacturing operated at 60% of its installed capacity.

15/ Open unemployment had stood at 25%, 18% and 13% in 1979, 1980 and 1981, respectively.

16/ The average annual rate of increase in consumer prices had been 48%, 35% and 24% in 1979, 1980 and 1981, respectively.

17/ The cost-of-living index was expected to increase from 24% to 30% in 1982.

18/ The other 50% would have to be imported in 1983.