

UNITED NATIONS
ECONOMIC
AND
SOCIAL COUNCIL



GENERAL
E/CEPAL/G.1098/Rev.1
October 1979

ENGLISH*
ORIGINAL: SPANISH

CEPAL

Economic Commission for Latin America



DOMINICAN REPUBLIC: EFFECTS OF HURRICANES
DAVID AND FREDERICK ON THE ECONOMY
AND SOCIAL CONDITIONS

(Note by the Secretariat)

79-10-456-475

* Unofficial translation.

CONTENTS

	<u>Page</u>
Foreword	1
I. The Dominican economy before the disaster	5
II. Characteristics and extent of the disaster	12
1. Hurricanes David and Frederick	12
2. Effects on the population	18
3. Over-all assessment of losses to the economy	20
4. Infrastructure losses	23
(a) Social infrastructure and the creation of additional demands	23
(b) Physical and services infrastructure	29
5. The agricultural sector	37
6. Industry, commerce and tourism	47
(a) Industries	47
(b) Commerce	49
(c) Tourism	50
7. First actions taken by the Government of the Dominican Republic and participation of the international community	52
III. Possible repercussions on the economy in 1970 and 1980	56
1. General considerations	56
2. The external sector	59
3. Productive activities and employment	68
4. Energy supply	72
5. Investment requirements and public finances	75
IV. External co-operation requirements	79
1. Assistance during the emergency stage	80
2. Co-operation for reconstruction and development	86
(a) Financing	86
(b) Technical assistance	88

INDEX OF TABLES

<u>Table</u>	<u>Page</u>
1 Summary of material damages	21
2 Total cost of repairing damaged classrooms	25
3 Costs of repairing damaged primary school classrooms	26
4 Expenditures for rehabilitating the health sector	28
5 Damages to the electrical subsector	32
6 Damages to aqueduct systems	35
7 Damages to physical and services infrastructure	36
8 Assessment of physical and financial damages to agriculture by regions and zones	38
9 Assessment of physical and financial damages to agriculture, by principal products	40
10 Cultivated areas, volumes and value of principal agricultural products	42
11 Value of losses in the livestock subsector	44
12 Losses in the livestock subsector	45
13 Exports of goods and services	61
14 Imports of goods and services	62
15 Balance of payments	64
16 External public debt broken down according to amortization periods and sources	67
17 Gross national product	69
18 Demand for electric power and generation	73
19 Central Government income and expenditures	77
20 Emergency, reconstruction and rehabilitation projects that may require international co-operation	81
21 Estimated food deficit for consumption during the period from September to December 1979	85

FOREWORD

Natural disasters which frequently occur in Latin America notably affect the economic and social development of the countries of the area; their damages are difficult to avoid or mitigate. The earthquake which destroyed the city of Managua in 1972, Hurricane Fifi which devastated Honduras in 1974, and an earthquake in Guatemala in 1976 are but a recent few examples of these disasters.

In addition to causing numerous deaths, these events destroyed a considerable portion of the respective countries' assets, level of production, infrastructure and services. Very few Latin American countries are prepared to deal with emergency situations of such magnitude, and, consequently, the timely co-operation from the international community has facilitated the recovery of the affected parties in such cases.

Recently, the Caribbean subregion was struck succesively by hurricanes David and Frederick, which dealt death and destruction to the Dominican Republic, Dominica, Puerto Rico, and, to a lesser extent, to Cuba, Haiti and other nearby islands. This is a study of the situation in the Dominican Republic.^{1/}

This disaster presents special characteristics. First, because more than 2,000 lives were lost and tens of thousands of victims required attention of one kind or another; and, second, because the phenomenon affected not only a large proportion of the island's area, but also because it caused serious damages to the social, physical and services infrastructure; to the productive system and to inventories.

Furthermore, the disaster occurred at a time when the Dominican economy experienced a certain recovery from the period of desaccelerating growth rates of the early 1970's, although problems involving the balance of payments, foreign indebtedness and certain imbalances in public finances continued to prevail, thus contributing to the continuation of the high unemployment rates which have been present for some time in the country. Further, since 1974 the Dominican economy began to accentuate its vulnerability to the changes taking place in international markets, especially

^{1/} A separate report has been prepared dealing with Dominica. See: CEPAL, Report on the Effects of Hurricane David on the Island of Dominica (E/CEPAL/G.1099), October of 1979.

with regard to its traditional export products, the rising prices of imported oil, and its increasing recourse to short-term foreign loans. In addition, public investment and public works began to decline in early 1979, although the agricultural, industrial and tourist sectors signalled a relative recovery.

At the time of the disaster the Government was preparing a three-year investment plan (1980-1982) which aimed at reactivating the national economy, establishing the bases for attaining sustained economic growth and improving the distribution of income.

Immediately after the hurricanes, the Government took emergency measures to assist the population, assess the damages and formulate a reconstruction programme. In addition, it will soon reformulate the three-year investment plan in order to take the new situation into account. Assistance from the international community arrived rapidly. The first supplies required to attend the victims of the hurricanes were promptly received, and co-operation was offered by Governments and international organizations for the identification of financing and technical assistance needs for reconstruction.

This report, which contains four chapters, is aimed at providing guide-lines in addition to those contained in a report prepared by the Government immediately after the disaster.^{2/} The first chapter, which provides general background material, describes the evolution of the Dominican economy in recent years. The second contains an assessment of losses in terms of human lives, infrastructure, inventories and production; these estimates should be considered merely a rough indication of the actual cost of replacing such losses. In the third chapter, the possible repercussions of the disaster on the economy in 1979 and 1980 are presented.^{3/} Lastly, chapter four

^{2/} Secretariado Técnico de la Presidencia, Oficina Nacional de Planificación, Acciones de emergencia para la recuperación nacional, Santo Domingo, September 1979.

^{3/} It must be borne in mind that the information available to assess the magnitude of the damages as well as the referring to the projections of their effects in the economy was only partial. These estimates might vary once the results of more careful investigations carried out by the Government will be available.

contains some guide-lines for financial and technical assistance co-operation that could be provided by the international community to facilitate the early and effective recovery of the Dominican Republic's economy.

In order to prepare this report, the CEPAL Secretariat sent a team of experts to the Dominican Republic from its offices in Mexico City and Port-of-Spain. During one week these officials collected and analyzed official information and made field trips as a means of appraising the damage. The team received the full co-operation of Dominican Government officials, without which it would not have been possible to prepare the report; support from the United Nations Development Programme (UNDP) as well as the collaboration of certain bodies within the United Nations system and other international organizations was also made available.

I. THE DOMINICAN ECONOMY BEFORE THE DISASTER

The Dominican Republic has a land area of 48,400 square kilometres and a population of 5.4 million. Structurally speaking, its economy is very similar to that of other Latin American countries, wherein agriculture generates a large fraction of the gross national product, and employment, and the tertiary sector has an increasing relative importance as a generator of employment and income (commerce, finance, and diverse services) since it accounts for nearly 50 per cent of the gross national product and provides employment to almost half of the economically-active population. The public sector has also played a relatively important role in establishing and broadening the economic and social infrastructure. The country's moderate degree of industrialization should also be noted (18 per cent), particularly since sugar refining alone accounts for one third of this figure. Traditional industries make up the rest of this sector (food, beverages, clothing and chemicals); installed capacity is concentrated in the country's two main cities, Santo Domingo and Santiago; and with the exception of agro-industrial activities - such as sugar mills and hulling and cold-storage plants - production requires considerably large imported inputs.

The productive structure determines that primary goods and sugar account for a large proportion of the country's exports. In 1978, sugar, coffee, cocoa, tobacco, ferronickel, gold, silver and bauxite accounted for more than 90 per cent of total exports. In view of the high proportion of such goods in exports and the small share of industrial products, the country's income is highly dependent on the cyclical fluctuations of external demand for primary goods, although certain degree of diversification of these products in the Dominican Republic exports has made it possible to attenuate the effect of this phenomenon.

During the last 10 years the evolution of the Dominican economy has shown two dissimilar trends: one of rapid economic expansion, and

/the other

the other, of moderate growth.^{1/} The first trend encompassed the period 1969-1973, in which the gross national product grew at an average rate close to 11 per cent; it was brought about by a strong increase in world demand for primary products - both agricultural and mineral - and by the implementation of important investment projects in the public sector and in the national and foreign private sectors, specifically aimed at developing mining (bauxite and ferronickel), commerce, tourism, industry (oil-refining) and infrastructure in general. A large volume of foreign investment, together with increased utilization of public and private loans from abroad mobilized a high level of external savings, whereas the incentives which resulted from the credit, fiscal, exchange^{2/} and customs policies favoured the accumulation of capital. Finally, the budgetary policy aimed at reducing operating expenses in favour of real investment.

Although this period of intense growth encouraged a significant increase in the urban middle class that made it possible to open the domestic market to certain industries producing consumer goods, it seems, as in so many Latin American countries, to have led to increasing concentration of income in hands of a small social group, particularly due to the economy's inability to provide remunerative employment to an ever-increasing economically-active population.

In 1974 the growth rate began to slow down, reaching in 1978 its lowest level (3.4 per cent) in recent years, bringing about a stagnation of the per capita income. This phenomenon was the result of both domestic and exogenous factors. Among the first the decrease in agricultural production must be attributed partially to the reduction of investment in this sector, initiated in the previous period,^{3/} and to the effect of the 1973, 1975 and 1977 droughts, which mainly affected the crops.

1/ See ONAPLAN, Plan trienal de inversiones públicas 1980-1982, preliminary version, April 1979; and República Dominicana: Notas para el Estudio Económico de América Latina, 1978 (CEPAL/MEX/1004), February 1979.

2/ The Presidential decree No. 1482 of 1967, tried to limit the foreign exchange flight, to attract capital deposited abroad and induce the inflow of capital from the Dominicans residing abroad. Though the Dominican peso has the same parity as the United States dollar, a parallel foreign exchange market has been created, which fluctuates around 20% above the official parity.

3/ ONAPLAN, Estudio Económico 1973-1977, Plandes No. 30.

for domestic consumption and has repercussions on local prices. In the period 1974-1978, the obstacles resulting from structural factors become more evident, such as the small size of the domestic market, partially due to the excessive concentration of income, high vulnerability of the foreign sector and the appearance of inflationary pressures. The progressive exhaustion of large-scale public investment projects for the construction of roads, buildings and dams was compounded by the Government's financial difficulties, and as a result investments centered around such State-owned corporations that had previously initiated large-scale projects continued to invest. Private activity also failed to contribute to expanding installed capacity owing to the structural factors mentioned above, the saturation of the supply of housing for the upper middle class and the financial limitations brought about by the restrictive credit measures imposed by the Government.

Exports also encountered various difficulties: a decline in the price of sugar which started in 1975, and a decrease in the bauxite and ferronickel exports. An increase in the price of coffee, however, partially offset decreases in the prices of other products. Whereas in 1975 and 1978 the current value of exports increased at an annual average rate of only 4.7 per cent,^{4/} imports increased by 7.5 per cent, which lead to a growing deficit in current accounts to be financed by medium and long-term loans. Thus, at the end of 1978 the foreign debt surpassed 1,300 million dollars, of which 44 per cent corresponded to the private sector, in contrast to 5 per cent in 1969. In 1978 total external debt servicing accounted for 18 per cent of the exports of goods and services, one of the highest figures among Latin American countries of similar economic dimensions and characteristics.

As a result of its high dependence on foreign trade (45 per cent of the total), the Government's current income decreased by almost 7 per cent in 1978, showing a net loss of 42 million dollars. Taxes

^{4/} It must be borne in mind that since 1975 international prices of sugar, main country's export product decreased abruptly.

on exports fell from 90 to 40 million dollars as a result of a decline in the price of coffee, cacao, tobacco, sugar and ferronickel. However, the value of import taxes -38 per cent of the current income - increased by 3 percent.

The vicious circle in which the Dominican economy moves as the result of its dependence on foreign trade taxes is quite obvious. Although the increase in foreign purchases has a negative effect on the balance of payments, it is also true that since it is the most important source of governmental revenue its growth is essential to the expansion of governmental activities. The tax system continues to rely on indirect taxes, which account for 77 per cent of all taxes collected; however, since 1975 the tax burden has continued to decrease (estimated as 11 per cent of the gross national product for 1978) it confirms the inelasticity of the present tax system.

The control exercised in recent years over public spending by means of a restrictive policy on operating expenses, has made it possible to finance the Government's capital expenditures from the savings in current account and by using the fiscal reserves deriving from savings obtained over previous budgets. During the last biennium this policy was, nevertheless, to some extent altered. In fact, operating expenses increased by 20 per cent in 1978. This increase which continued in 1979 derives from a deliberated policy of readjusting wages and salaries aimed at reducing the distortions created by the freezing of their levels through many years. Capital expenditures decreased by 4 per cent, influenced by the absolute reduction in real investment, especially in the construction field. Consequently, in 1978 public finances showed a fiscal deficit which exceeded 100 million dollars, and reversed the previous trend towards a balanced budget.

Although from the standpoint of its average per capita income the Dominican Republic (approximately 460 dollars per year at 1970 prices) places itself in 1978 in the medium-to-low development category among Latin American countries, income distribution inequalities have

/been

been accentuated in recent years, owing to inflation, inter alia, which resulted in a 32 per cent loss of the purchasing power of salaries between 1969 and 1976.^{5/}

In consequence, nutrition is deficient for a large part of the population, and serious deficits may be observed in the consumption of proteins. It is estimated that approximately 75 per cent of the population does not meet its nutritional requirements and that 50 per cent barely covers 62 per cent of such needs.^{6/} This situation has become more acute in recent years, since the daily calorie intake between the years 1973 and 1975 decreased by slightly more than 9 per cent and child malnutrition reached very high levels.^{7/}

Nutritional deficiencies and the insufficiency of certain social services, such as water supply, sewerage facilities and medical care, have taken their toll on the health of the population. The child mortality rate is 99 per 1,000 - 94 in urban areas and 103 in rural areas - and life expectancy at birth is 53.2 years for males and 56.1 years for women (1975 statistics).

Most health services - consisting more of curative rather than preventive care - are concentrated in Santo Domingo and Santiago, to the disadvantage of the rural areas.

^{5/} According to the National Survey of Income and Expenditures of Families in the Dominican Republic, carried out by the Central Bank, in 1976 10 per cent of families in the lowest income level (which did not exceed 50 dollars) received 1.3 per cent of the national income, whereas the 10 per cent in the highest level received 38.5 per cent of the national income.

^{6/} Information provided directly by ONAPLAN.

^{7/} According to a survey carried out by CARITAS Dominicana in 1976, a sample of 12,000 children showed 66 per cent to be undernourished, although only 4 per cent were considered to be serious cases or to show chronic malnutrition.

Despite a certain amount of progress, the situation is still deficient in the field of education.^{8/} Of every 1,000 students entering the first grade of elementary education, only 16 conclude the cycle six years later.^{9/} Education has traditionally suffered from an acute limitation of resources, which has resulted in the deterioration of school premises, particularly in rural areas.

The lack of dynamism in the economy - which contrasts with the rapid demographic growth - combined with an increase in the economically-active population deriving from the recent incorporation of female labour and increasing migration from rural to urban areas have contributed to increasing manpower surpluses. It is estimated that in 1978, for an economically-active population of slightly more than 1.5 million people, the rate of open unemployment approached 23 per cent. Surveys made by the National Office of Statistics (ONE) and the International Labour Organization (ILO) show that the unemployment rate increased during the present decade.

At the time the disaster struck, the Dominican economy appeared to be recovering from the slackening it had shown during the preceding two-year period. Certain partial indicators for the first half of 1979, compared with the same period in the preceding year, confirm this prediction.

In the agricultural sector, production volumes of the principal products for domestic consumption, such as rice, kidney beans, bananas and chicken, had increased notably. The cultivated area devoted to the principal crops increased by an average 15 per cent, whereas at the same time credits granted by the Agricultural Bank expanded by almost 16 per cent. These signs made it possible to foresee that

^{8/} The percentage of school-age population covered by the educational system in the primary grades was 52.9 per cent in the 1965-1966 school year, increasing to 62.2 per cent in the 1974-1975 year; in intermediate education these figures were 18.3 and 37.6 per cent respectively.

^{9/} Ernesto Schiefelbein, "Los recursos humanos y el empleo en la República Dominicana", Diagrama de flujo del sistema educativo dominicano en el año 1970. Probably this situation has been modified in a positive sense in recent years.

agricultural production - with the exception of sugar cane - would grow during the year between 7 and 8 per cent in comparison with slightly more than 4 per cent the preceding year, invigorated more by crops for domestic consumption than by export crops.

In addition, the salary increases granted in 1978 and 1979 may have had a positive effect on expanding the market for industrial goods until mid-1979.

Means of payment decreased by 2.5 per cent, between July 1978 and June 1979, principally due to reductions in demand, deposits, and in the gross reserves of the Central Bank (-2.6 per cent). Nevertheless, the inflationary pressures had become more acute, albeit within much more modest magnitudes than in most of the countries of Latin America.^{10/} These pressures were further sharpened by problems regarding the supply of meat.

In summary, during the months of 1979 preceding the disaster, the economy presented contradictory symptoms. On the one hand, the principal productive sectors showed signs of reactivation, which gave the authorities reason to foresee an increase in the gross national product in excess of 5.5 per cent for the entire year. On the other hand, however, some of the imbalances that emerged during the previous two-year period continued to persist or became even more accentuated. Under such circumstances, the hurricanes caused a regression in the above-mentioned positive variables and at the same time aggravated the adverse elements present in the situation.

^{10/} Between April 1978 and April 1979 the price index of foodstuffs showed an increase of 6.2 per cent.

II. CHARACTERISTICS AND EXTENT OF THE DISASTER

The aim of this chapter is to assess the effects on the population and the material damages caused by Hurricanes David and Frederick. This evaluation is based essentially on calculations made by the National Planning Office of the Dominican Republic, complemented by information furnished by various governmental organizations and the assessments of the CEPAL group of experts made during a few brief on-site visits and by means of interviews with the victims themselves.

Consequently, it is felt that the following estimates provide an adequate picture of the extent of the losses in human lives and material damages caused by the meteorological phenomena under discussion. Nevertheless, it was not possible to quantify the ecological damage derived from the loss of trees and vegetation, nor their repercussions on the quality of life of the population. This aspect will therefore require special attention in the future.

1. Hurricanes David and Frederick

The Caribbean subregion is frequently affected by tropical storms and hurricanes that cross the Atlantic Ocean in a westerly direction and occasionally produce catastrophic effects during their passage through the Antilles.

In this particular instance, Hurricane David, which formed in mid-August 1979 near the most westerly portion of the coast of Africa, seriously affected the largest islands of the Caribbean. As a further complication, David was closely followed by tropical storm Frederick, which later turned into a hurricane, thus compounding the damage.

According to photographs taken by meteorological satellites, David crossed the 60° meridian on the morning of 29 August in a west-northwest direction and passed over the island of Dominica at midday, leaving a path of death and destruction.^{1/} One day later, also at midday, it

^{1/} David virtually destroyed the capital of Dominica and caused very serious damages to the island's agriculture. It also brought very heavy rains and flooding to Puerto Rico.

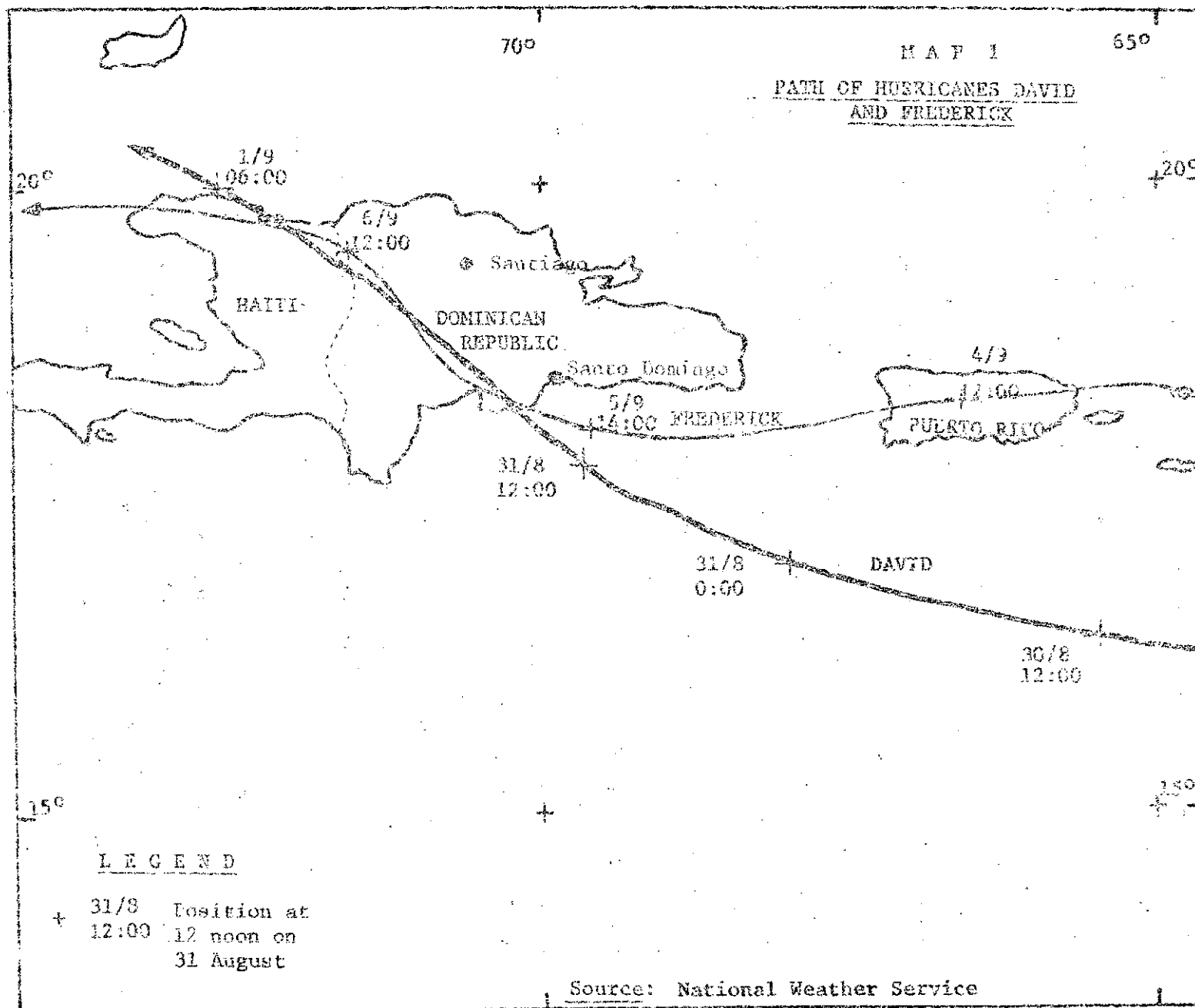
crossed the 65° meridian with maximum wind speeds of 240 kilometres per hour and steady winds of 120 kilometres per hour within a radius of 80 kilometres around its eye. It continued in the same west-northwest direction at a speed of 22.5 kilometres per hour in the direction of the Dominican Republic. (See map 1).

On the afternoon of 31 August, David struck the island on a front 400 kilometres wide. Once over the island, the hurricane lost force upon coming up against the country's central mountain range, and its displacement speed diminished.

David's intense winds toppled trees, buildings and minor infrastructure works and substantially affected dwellings, schools and other buildings, in addition to numerous crops. The heavy surf resulting from the hurricane - with waves more than eight metres high - caused serious damages in some ports. Lastly, the heavy rains - which in some parts of La Vega Province amounted to more than 400 millimetres - caused substantial flooding when many rivers overflowed their banks and directly affected hydroelectric, irrigation and drinking water works, in addition to several highway bridges, extensive cultivated areas in the lowlands, dwellings - particularly those belonging to low-income individuals - and the urban infrastructure as a whole.

By the morning of 1 September, after having crossed the island, David touched the northern coast of Haiti. Its maximum winds had diminished to 145 kilometres per hour and it continued in the direction of Cuba and the United States, where it also caused considerable damage. (See map 1 again.)

Five days later, on the afternoon of 5 September, Hurricane Frederick also struck the Dominican Republic, following a path almost identical to that of David. (See map 1 again.) The winds accompanying this storm were less than 75 kilometres per hour, but the new rainfall - ranged from 250 to 400 millimetres - caused as much or more damage than that inflicted by David. It must be recalled here that as a result of the rainfall left by David, the soil was still saturated with water, so that almost all the new rainfall caused by Hurricane Frederick ran



down to the rivers. This caused general flooding throughout the country that led to the loss or undermining of bridges and sewerage systems, landslides and other damages to roads and water works, in addition to considerable agricultural and human losses.

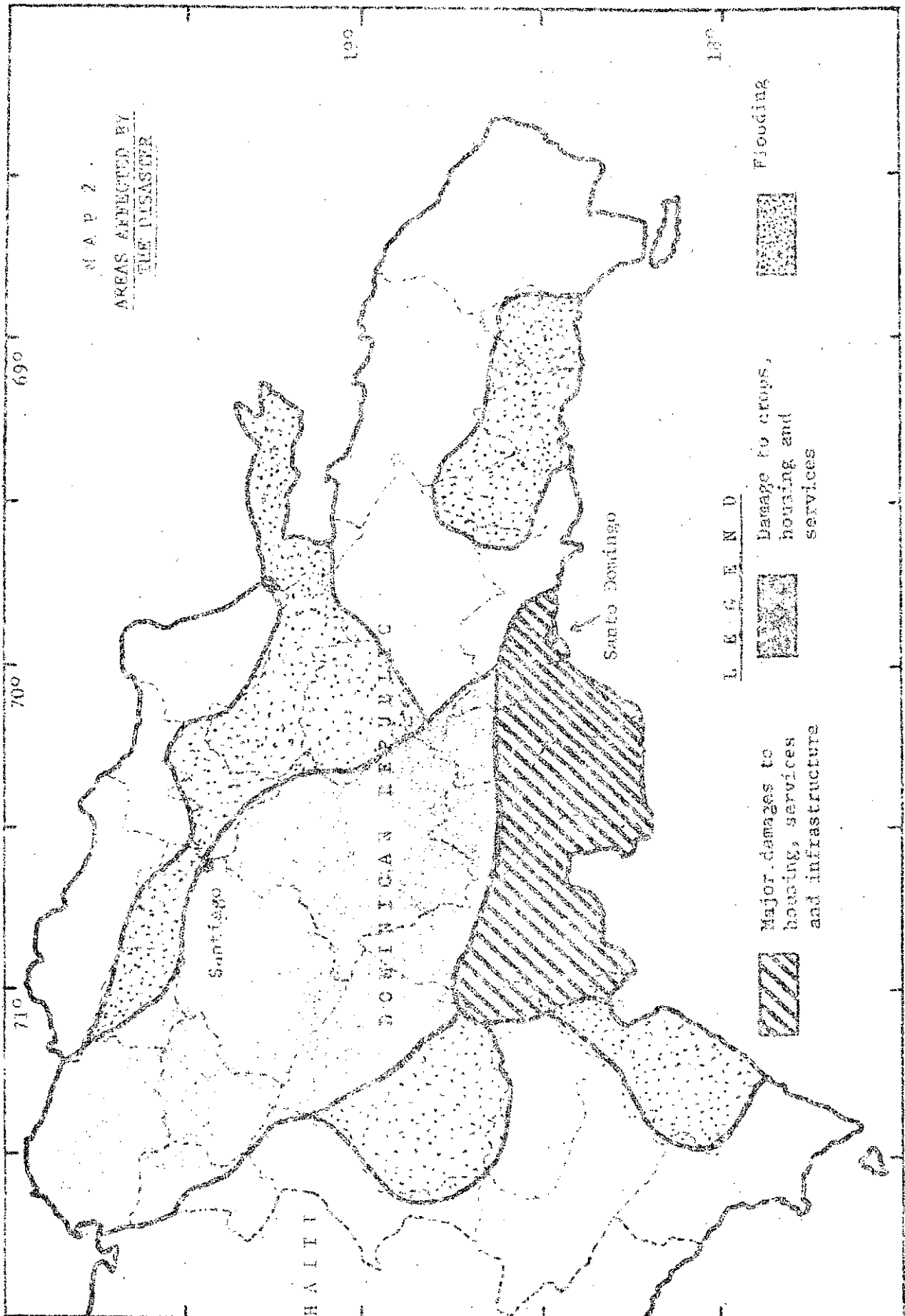
It will be easier to grasp the magnitude of these phenomena if it is noted that during the period between 29 August and 7 September alone almost 700 millimetres of rain fell in some areas, approximately half the normal yearly precipitation. It should also be noted that the maximum volume of flow observed in the Yaque del Norte River, for example, amounted to $6,000 \text{ m}^3$ per second, whereas normal flow for the August-September period is approximately 40 m^3 per second.

The greatest damages to housing, infrastructure, services and communications occurred in the provinces of Azua, Peravia, San Cristóbal, the National District and part of La Vega. Serious damage was done to crops and plantations, housing, municipal services and roadway infrastructure in the provinces of Montecristi, Valverde, Rodríguez, Santiago and La Vega. Severe flooding occurred in the provinces of San Juan, Barahona, Valverde, Salcedo, Duarte, Sánchez Ramírez, María Trinidad Sánchez, El Seibo and San Pedro de Macoris.^{2/} (See map 2.)

Although David was not the most severe hurricane in recent history, it is considered to be one of the most dangerous in view of its compactness.^{3/} Losses in human lives were lower in comparison with others caused by similar occurrences owing to the existence of modern hurricane warning systems and the fact that a relatively efficient system for evacuating the population was able to be put into

^{2/} David and Frederick later affected the northern part of Haiti and the eastern part of Cuba, in addition to causing damages on the east coast of the United States in excess of 1,200 million dollars.

^{3/} The "great hurricane" of 1780, which caused some 28,000 deaths on several Caribbean islands, is considered the most destructive. Destructive hurricanes also occurred in 1899 (3,000 deaths in Puerto Rico), 1932 (2,500 deaths in Cuba), 1935 (2,000 deaths in Haiti), 1951 (150 deaths and 56 million dollars damage in Jamaica) and 1954 (Hazel: 1,200 deaths and 350 million dollars in damages). In October 1973, Hurricane Flora - considered the second most destructive - killed almost 7,000 persons in the Caribbean subregion and caused material damages of an estimated value of 300 million dollars. In the Dominican Republic it caused 400 deaths and damages in the amount of 60 million dollars. In September 1930 another hurricane struck Santo Domingo, causing some 2,000 deaths and close to 40 million dollars in damages.



practice. Despite such considerations, and in view of the possibility of a repetition of similar phenomena in the future, it would be wise to consider the implantation of building codes appropriate to such conditions, the further improvement of hurricane watch and warning systems and of civil defence systems as a whole.

2. Effects on the population

Preliminary estimates made by Civil Defence^{4/} lead to the conclusion that the loss in human lives may amount to as much as 2,000, a figure that may further increase in view of the fact that three weeks after the disaster, corpses were still being uncovered in flooded areas. As of the time of completion of the present report no complete statistics were available on the number of wounded.

According to information furnished by the same source, David and Frederick affected more than 1.2 million people (23 per cent of the country's total population). The regions hardest hit were the southern and central portions (674,000) and the National District (281,000).

It is estimated that some 125,000 families remained homeless with their dwellings affected in some way or another, and that some 150,000 families evacuated to public shelters, set up mainly in school buildings, to protect themselves from the disaster. The principal shelters were built in the capital city and in San Cristóbal, Baní, Azua and San Juan. Most of the victims were inhabitants of rural areas, where the lowest income groups predominate. Many of these victims partially or totally lost their crops - which for many were subsistence crops - in addition to some of their livestock, their homes, and their domestic and work equipment.

During the week following the disasters, some 18,000 people were assisted in 72 shelters in the National District and another 52,500 in San Cristóbal Province. When this report was being drafted, the number of refugees had diminished, since many - mostly males - were returning to their places of origin to reconstruct their homes and resume their normal work.

^{4/} A Government organization that provides assistance to the population in disaster situations.

Some 280,000 hot meals were distributed in assistance centres during the week of 17 to 22 September. The shortage of gasoline occurring subsequent to the disaster and the damages suffered by the road network are impeding the rapid flow of food rations to shelters distant from the most populated areas, and the loss of many of the crops of products for domestic consumption increases the likelihood that malnutrition and infant mortality will become still more acute.

The incidence of certain diseases increased, such as gastroenteritis, measles and acute respiratory infections; however, so far, there are no official reports of outbreaks of epidemics. Approximately 80,000 doses of TAB vaccine were applied in shelters in which it was not possible to implant proper sanitary measures and in which the population was exposed to special risks, particularly in the southern portion of the country.

3. Over-all assessment of losses to the economy

Material losses to the Dominican economy deriving from the disaster have been estimated at approximately 830 million dollars. In order to grasp the extraordinary magnitude of the catastrophe, these figures should be compared with some of the principal macroeconomic aggregates, as they signify approximately 16 per cent of the current gross national product, 6 per cent of the country's stock of capital, 80 per cent of the total investment in a normal year, more than 120 per cent of 1978 exports and more than 140 per cent of the Central Government's current income.

As may be observed in Table 1, the agricultural sector was the most affected, since it suffered damages in the amount of 345 million dollars, a figure representing more than 40 per cent of the total estimated material losses. As has been mentioned previously, the disaster essentially affected rural areas. This is borne out, on the one hand, by a very substantial loss of already-harvested crops and the vast devastation of agricultural and forest plantations - which restricts the potential for future harvests - and, on the other, by losses in irrigation infrastructure and a very high percentage of loss of poultry. The latter had assumed great significance during the past year as a prime source of meat in view of the drop in pig production occurring in the preceding year due to several epidemics that substantially affected livestock production during that period.

Industry followed agriculture in suffering the most damage caused by the two hurricanes. Losses are estimated at slightly less than 160 million dollars, approximately 20 per cent of the country's total

/Table 1

Table 1

DOMINICAN REPUBLIC: SUMMARY OF MATERIAL DAMAGES

(Millions of dollars)

	Total	Inventories	Losses due to production paralysis	Productive apparatus and constructions
<u>Total</u>	<u>829</u>	<u>180</u>	<u>252</u>	<u>397</u>
Agriculture	354 ^{a/}	132	73	{ 136 13
				Agriculture and forestry plants Irrigation infrastructure
Industry	158	35	73	50
Transportation	81	-	-	{ 46 6
				Communication routes Maritime, air and land fleet
Communications		-	} 24	5
Electricity	47	-		47
Water	5	-		5
Commerce, finances, government and other services	110	13	82 ^{b/}	15 ^{c/}
Housing	19	-	-	19
Other service buildings	55	-	-	55

Source: CEPAL, based on estimates provided by the National Planning Office.

^{a/} Includes losses of 22 million dollars in the livestock subsector, of which 11 million were in aviculture and one million in fisheries.^{b/} Includes 9 million dollars in damages to hotel infrastructure.^{c/} Includes an estimate of a 3 million dollar reduction in hotel revenues.

losses. These losses include damages to buildings, machinery and equipment, the destruction of raw materials inventories and other inputs, and an estimation of the effects of paralyzation of production.

The material damages of almost 50 million dollars in the electricity sector were also highly significant and will doubtless have very direct repercussions of the country's productive apparatus. The service sectors (commerce, finances, government, etc.) suffered losses in excess of 100 million dollars. Housing losses - in terms of total value - were less significant, although of enormous repercussions since they most affected - as is always the case in similar occurrences - the lowest income groups of the population, who normally reside in very precarious structures whose replacement cost is difficult to estimate. Losses in other types of buildings amounted to more than 50 million dollars.

If material damages are examined as capital losses - whether in machinery and equipment, agricultural and forest plantations, dams and electricity generating equipment, communications routes, irrigation infrastructure or constructions - it will be seen that fixed capital was reduced by almost 400 million dollars. In addition, inventories were reduced by 180 million dollars, and losses due to production paralyzation amounted to some 250 million dollars.

Such material damages will obviously have serious repercussions on the performance of the country's principal macroeconomic aggregates, as will be analysed in greater detail further on.^{5/} To this direct negative effect must be added the interruption of the normal dynamics of the productive apparatus, which requires urgent readjustment of economic policies within the short term as a consequence of the emergency; the generalized impetus that must be provided to all efforts aimed at reconstruction and attending to the most essential basic needs as swiftly as possible; and the support that general, economic and social reactivation requires through other means.

It has consequently been estimated that the gross national product, which previous to the hurricanes was expected to grow 5.6 per cent in the current year, will actually diminish by 2.6 per cent. In per capita terms, this signifies that the disaster will have caused an approximate decrease of 6 per cent in the product level in 1979.

5/ See Chapter III, section 3.

4. Infrastructure losses

(a) Social infrastructure and the creation of additional demands

(i) Education. In assessing the damages caused by the hurricanes to the educational infrastructure the following considerations were combined: their direct effect on installations; the use of school premises as shelters for the population, both with regard to preventive action and to assistance to victims; and the deficiencies existing before the disaster, particularly in rural areas.^{6/} This last element demanded that the cost of repairing the damages and replacing schools be calculated in accordance with the most appropriate standards.

Primary schools suffered the most damages - 85 per cent of all classrooms damages - whereas secondary schools suffered fewer damages since they were generally of better construction. Of the 15,750 primary school classrooms affected, 70 per cent are located in rural areas. If it is taken into account that the average number of classrooms per school is 5.8 in urban centres and 2.2 in rural areas, the percentage of rural schools damaged amounts to 86 per cent of the total.

In urban areas almost all schools suffered fewer damages, since they were used as shelters. In the rural areas, however, the effects of the hurricanes were felt with greater force, so that 7 per cent of the classrooms were totally destroyed, 37 per cent suffered between 20 and 50 per cent damage, and the remainder suffered only slight damage.

^{6/} In the mid 1970s only 21 per cent of all classrooms used for primary education were solidly constructed and required only maintenance service; 60 per cent were partially deteriorated, needed repairs, and in some cases should have been replaced; and 10 per cent were deficient. See Secretaría de Estado de Educación, Bellas Artes y Cultos, Diagnóstico del sector educativo en la República Dominicana, November 1977.

A preliminary estimate of the investment required to repair schools has produced a figure of almost 24 million dollars. Of this amount, 37 per cent would be allocated to the most affected rural area,^{7/} 27 per cent to the rest of the rural areas, 12 per cent to the cities suffering most damage, 12 per cent to the rest of the country's urban areas, and 12 per cent to secondary schools.^{8/}

Of the total cost of repairing the primary schools (20 million dollars), 27 per cent would be allocated to urban areas and 73 per cent to rural areas; and of the investment to be allocated for repairs in the cities, a significant portion would be assigned to classrooms that had received minor damage. In rural areas more than half the investment would be allocated to constructions that were already deteriorated and consequently suffered the effects of the hurricanes all the more, and 38 per cent would be allocated to installations that were in good condition but suffered deterioration through their use as shelters. (See tables 2 and 3.)

It should also be noted that as long as the housing problem remains unsolved, the delay in evacuating the schools being used as shelters will delay reconstruction and consequently affect the student population by postponing the school year that should have started at the beginning of September.^{9/}

(ii) Health. The material damages to the health infrastructure were of moderate magnitude and, as in the case of education, were more severe in rural than in urban areas. It is estimated that damage was done to 44 rural clinics and 15 hospitals, whose repair costs will amount to approximately 1.6 million dollars.

^{7/} The most affected area includes the provinces of Azua, Peravia, San Cristóbal and the National District.

^{8/} In estimating construction costs of a classroom, the following investments were taken as base figures: 19,900 dollars for secondary schools, 9,100 dollars for urban primary schools, and 7,000 dollars for rural primary schools. Furniture and equipment costs were estimated for all categories at 1,100 dollars each.

^{9/} During the third week of September the Ministry of Education redoubled its efforts to initiate the school year as soon as possible.

Table 2

DOMINICAN REPUBLIC: TOTAL COST OF REPAIRING DAMAGED
CLASSROOMS a/

	Thousands of dollars	Percentage
<u>Total</u>	<u>23,974</u>	<u>100.0</u>
Primary schools	<u>20,992</u>	<u>87.6</u>
Urban portion of the most affected area ^{b/}	2,925	12.2
Remainder of the country's urban areas	2,819	11.8
Rural portion of the most affected area	8,875	37.0
Remainder of the country's rural areas	6,373	26.6
Secondary schools	<u>2,982</u>	<u>12.4</u>

Source: Ministry of Education, Fine Arts and Cults.

a/ Damages caused by Hurricane David and tropical storm Frederick.

b/ Includes the provinces of Azua, Peravia, San Cristóbal and the
National District.

Table 3

DOMINICAN REPUBLIC: COSTS OF REPAIRING DAMAGED
PRIMARY SCHOOL CLASSROOMS a/

	Total		Most affected areas <u>b/</u>		Rest of the country	
	Thousands of dollars	Percentage	Thousands of dollars	Percentage	Thousands of dollars	Percentage
<u>Total</u>	<u>20,992</u>	<u>100.0</u>	<u>11,800</u>	<u>100.0</u>	<u>9,192</u>	<u>100.0</u>
Classrooms in good condition	11,136	53.0	6,064	51.4	5,072	55.2
Repairable classrooms	1,652	7.9	944	8.0	708	7.0
Classrooms in bad condition	8,204	39.1	4,792	40.6	3,412	37.1
Urban areas	<u>5,744</u>	<u>27.4</u>	<u>2,925</u>	<u>24.8</u>	<u>2,819</u>	<u>30.7</u>
Classrooms in good condition	5,294	25.2	2,669	22.6	2,625	28.6
Repairable classrooms	225	1.1	174	1.5	51	0.6
Classrooms in bad condition	225	1.1	82	0.7	143	1.5
Rural areas	<u>15,248</u>	<u>72.6</u>	<u>8,875</u>	<u>75.2</u>	<u>6,373</u>	<u>69.3</u>
Classrooms in good condition	5,842	27.8	3,395	28.8	2,447	26.6
Repairable classrooms	1,427	6.8	770	6.5	657	7.1
Classrooms in bad condition	7,979	38.0	4,710	39.9	3,269	35.6

Source: Ministry of Education, Fine Arts and Cults.

a/ Damages caused by Hurricane David and tropical storm Frederick.

b/ Includes the provinces of Azua, Peravia, San Cristóbal and the National District.

/Nevertheless,

Nevertheless, the emergency situation bore heavily on welfare services owing to the attention demanded by the wounded and other victims of the disaster. Certain deficiencies in environmental sanitation and nutrition became more acute and new demands emerged, especially in the field of epidemiology, as a result of the interruption of drinking water services.

Preliminary estimates indicate that the expenditures required to rehabilitate the health sector will amount to 15.5 million dollars. Of this figure almost 11 per cent would be allocated to reconstruction as such, and the remainder to meet the needs created by the emergency situation. According to time priorities established in accordance with the degree of urgency, pressing demands in the areas of environmental sanitation, epidemiology, nutrition and social welfare services will have to take precedence over the construction of new rural clinics and hospitals (for which an outlay of more than 4.5 million dollars is foreseen), since, although the latter are important as a means of providing for substantial deficiencies, for the time being they must be assigned secondary importance. (See table 4.)

An expenditure of 5.5 million dollars is estimated for environmental sanitation - 36 per cent of the total expenditure - to be allocated almost entirely to the prevention of water-borne diseases transmittable through food and vectors, by strengthening infrastructure for the control of water and excreta. Two important programmes are envisaged: the construction of 60,000 platforms and sheds for latrines, and the drilling of wells to supply drinking water to 500 communities with a population of less than 2,000 persons each. These projects would be financed by the government and by a loan from the United States Agency for International Development (AID). In addition, an attempt would be made to strengthen co-ordination and supervision of the repair work being done on aqueducts that is being carried out by the National Drinking Water and Sewerage Facilities Institute (INAPA) in conjunction with the Ministry of Health.

Table 4

DOMINICAN REPUBLIC: EXPENDITURES FOR REHABILITATING
THE HEALTH SECTOR

	Thousands of dollars	Percentage
<u>Total</u>	<u>15,354</u>	
Health services	<u>7,598</u>	<u>49.5</u>
Reconstruction	1,633	10.6
Rural clinics	1,045	
Health institutions	588	
Construction	4,679	30.5
Rural clinics	378	
Health institutions	4,301	
Emergency medication	900	5.9
Acquisition of electric plants	386	2.5
Environmental sanitation	<u>5,513</u>	<u>35.9</u>
Construction of platforms and sheds for latrines	5,160	33.6
Construction of wells for supplying drinking water	210	1.4
Strengthening of co-ordination and supervision of construction and repair of aqueducts	60	0.4
Acquisition of five diesel-type light trucks	50	0.3
Acquisition of five sprinkling machines	30	0.2
Fuels and lubricants	3	-
Epidemiology	<u>601</u>	<u>3.9</u>
Vaccination on the national level	49	0.3
Acquisition of hypodermic needles (4 million)	480	3.1
Acquisition of cotton (3 000 pounds)	2	-
Acquisition of alcohol (3 000 litres)	5	-
Acquisition of 320 portable refrigerators	5	-
Living expenses for vaccination personnel	60	0.4
Health education	<u>12</u>	<u>0.1</u>
Preparation of posters	12	0.1
Nutrition	<u>176</u>	<u>1.1</u>
Increasing the number of beneficiaries covered by the complementary food programme	176	1.1
Social welfare services	<u>11,455</u>	<u>9.5</u>
Family assistance programme	600	3.9
Small loans programme	540	3.5
Milk distribution programme	300	2.0
Living expenses	12	0.1
Fuels and lubricants	3	-

Source: Ministry of Public Health and Social Welfare, information provided by
the National Planning Office.

/Campaigns

Campaigns would be carried out to eradicate the vectors of malaria and dengue, diseases that frequently appear in such situations.

Disease control is of a priority nature both with regard to epidemiological surveillance and the implementation of an intensive vaccination campaign^{10/} to avoid a massive outbreak of contagious diseases. So far, no epidemic outbreak has occurred despite the existence of conditions favourable to the proliferation of gastroenteritis owing to the previous mentioned interruption of drinking water services.

Ten per cent of the total expenditure would be allocated to social welfare services and nutrition as a means of covering the food shortages prevalent among the affected population, usually consisting of the lowest income groups. These activities would be directed towards increasing the number of beneficiaries included within the complementary food programme and towards carrying out milk distribution programmes for nursing mothers and children, family assistance programmes, and programmes to provide small subsistence loans.

(b) Physical and services infrastructure

(i) Housing. Inasmuch as no inventory of the dwellings destroyed or damaged throughout the country is as yet available, provisional estimates indicate that in the cities of Santo Domingo, San Cristóbal, Haina, Palenque, Yaguate, Eaní, Ocoa, Padre de las Casas and Azua, approximately 21,000 dwellings were affected or destroyed, largely inhabited by low-income families. In rural areas approximately 36,000 dwellings were destroyed or damaged, which would give a total

10/ The immunization campaign comprises the following vaccination programme: coverage of one million persons in the area most affected by the hurricane with TAB vaccine; coverage of all children less than five years of age with antipoliomyelitis vaccine; coverage of 80 per cent of pregnant women, 40 per cent of minors between 5 and 14 years of age, and 30 per cent of those over 15 years of age with tetanus toxoid vaccine; coverage of all children below the age of five with measles vaccine; and coverage of 70 per cent of children from one to four years of age and 50 per cent of those from five to 14 years of age with BCG vaccine.

of 57,000 for the entire country. It is estimated that some 350,000 people were left homeless or that their dwellings suffered considerable damage, whereas the dwellings of several hundred thousands had been subjected to minor damage. The cost of repairing or replacing these dwellings on the part of public institutions providing the materials - estimated on the basis of more adequate and better quality units than those destroyed - would amount to 18.9 million dollars.^{11/}

(ii) Transportation and communications. Winds, rains and river overflows inflicted extremely severe damage on the transportation and communications infrastructure.

Four principal highways - Duarte, Mella, Las Américas and Sánchez (Ocoa-Azua) - and 18 secondary roads suffered cave-ins, landslides and erosion, and almost 2,100 country roads were subjected to severe erosion. In addition, 50 bridges and sewerage systems were destroyed by floods and 32 affected in their approaches. It is estimated that the cost of repair or replacement of this infrastructure will amount to 44 million dollars.

The urban public road system was also affected by the heavy rains and floods. The cost of repairing damages to pavements and structures is estimated at somewhat more than 5 million dollars.

Telecommunications systems were damaged by winds and floods, particularly with respect to open-air equipment and transmission networks. Extensive areas of the capital and other cities have been left without telephone service, and communication with the interior of the country has been interrupted. In the capital city, damages are being repaired efficiently by CODETEL. It is estimated that it will require three months and expenditures in the range of 5 million dollars to re-establish service completely.

The heavy surf and hurricane-force winds affected the ports of Boca Chica, Santo Domingo, Haina and Puerto Viejo, in addition to causing a certain amount of damage to the international airport. Damages to port

^{11/} The National Housing Institute (INVI) plans investing approximately 8 million dollars during the remainder of 1979 to reconstruct some 15,000 dwellings and repair 5,600 others.

infrastructure were of a limited nature and will not impede port operations. Repair costs are estimated at close to 2 million dollars.

The land, air and maritime fleets also suffered losses or damages with respect to vehicles, vessels and small aircraft. Replacement costs are estimated at some 6 million dollars.

Total repair of damages and replacement of transportation and communications assets will require an investment of 62 million dollars.

(iii) Energy. The strong winds and the floods caused by the heavy rains severely affected electrical power generation plants, transmission lines and distribution systems. Damages also occurred in the country's only oil refinery and in some crude oil pumping and transportation installations.

In the electrical subsector some units in the Haina River thermoelectric plants were affected (84 MW), as were the Tavera (80 MW), the Valdesía (54 MW) and the Las Damas (7.5 MW) hydroelectric plants. The Jimenoa hydroelectric plant (7.5 MW) was totally destroyed.^{12/} The country's installed capacity was thus reduced by almost 42 per cent. The cost of repairing buildings and other structures, in addition to that of repairing generating equipment, is estimated at 16.2 million dollars (see table 5), and it will take one to two months before the plants will be able to operate again. Reconstruction of the Jimenoa hydroelectric plant will take at least two and one-half years.

A total of 270 kilometres of 34,500 and 69,000 volt transmission lines were affected, of which 65 per cent correspond to the southern portion of the country. Approximately 1,200 kilometres of distribution systems were affected, 57 per cent of which are in the southern part of the country and 28 per cent in Santo Domingo and the surrounding area. In both systems breakages in cables and insulators, failures or excessive bending of poles and crossarms, and damage to transformers occurred.

^{12/} Before the disaster, four thermoelectric plants with an installed capacity of 106 MW were being repaired and receiving maintenance.

Table 5

DOMINICAN REPUBLIC: DAMAGES TO THE ELECTRICAL SUBSECTOR

(Thousands of dollars)

	Total	Labour and materials	Machinery and equipment	Other expenses
<u>Subsector total</u>	<u>34,515</u>	<u>8,317</u>	<u>24,558</u>	<u>1,640</u>
Power plants	<u>16,215</u>	<u>8,317</u>	<u>6,258</u>	<u>1,640</u>
Tavera hydroelectric plant	2,420	-	2,190	230
Valderia hydroelectric plant	2,740	1,250	1,175	315
Jimenoa hydroelectric plant ^{a/}	10,000	6,900	2,100	1,000
Río Haina thermoelectric plant	885	34	771	80
Santo Domingo thermoelectric plant	128	116	-	12
Constanza thermoelectric plant (diesel)	39	15	21	3
Ocoa thermoelectric plant (diesel)	3	2	1	-
Transmission lines	<u>6,000</u>	-	<u>6,000</u>	-
69 kV lines, 158 km	4,000	-	4,000	-
34.5 kV lines, 110 km	2,000	-	2,000	-
Distribution systems	<u>8,300</u>	-	<u>8,300</u>	-
Three-phase lines, 12 and 4 kV, 256 km	2,000	-	2,000	-
Single-phase lines, 7.2 and 2.4 kV, 473 km	2,800	-	2,800	-
Secondary systems, 110-120 V, 482 km	3,500	-	3,500	-
Services	<u>4,000</u>	-	<u>4,000</u>	-

Source: Dominican Electricity Corporation and CEPAL estimates.

^{a/} Breakdown of these costs is tentative.

/In addition

In addition, many household connections, metres and networks were damaged. It is estimated that repair of these lines and systems will require two to four months' work and an investment of 18.3 million dollars. (See table 5 again.)

Total damages in the electrical subsector thus amount to 34.5 million dollars.^{13/}

Although the oil refinery suffered certain infrastructural damages and received only a portion of its accustomed electrical power, it was nevertheless able to operate until it exhausted its supply of crude oil. Unfortunately, it is not operating at the present time for reasons unrelated to the disaster, since the crude oil intakes were damaged during discharge from a tanker. Gasoline and gas oil consequently had to be imported; however, the small volumes that are being delivered to service stations point to a shortage of these products. Difficulties have also been encountered in transporting fuel to the Barahona thermoelectric plant, which operates on gas, owing to roadblocks along the Azua-Barahona highway.

Since the disaster, then, serious limitations in the production and distribution of energy have extensively paralysed both productive activities - particularly industry - and services, especially with regard to drinking water, as will be seen in the following paragraphs.

(iv) Drinking water supply. The water works in Santo Domingo, Santiago and other provincial cities suffered serious damage to headworks and infiltration galleries; flooding of pumping equipment, pumphouses, control panels, electrical equipment and purification plants; erosion and damage of deep wells and propulsion lines; and the bursting of distribution lines. Furthermore, large portions of the country were unable to be supplied with water, since electric power was unavailable to operate the pumping equipment required in a significant number of the country's water systems.

^{13/} The Dominican Electricity Corporation has budgeted 25.9 million dollars for repairs it will carry out during the rest of the year.

Two weeks after the disaster full service had not yet been re-established, partly because of the extent of the damage, but also because of electric power deficiencies. However, at least in Santo Domingo, an emergency programme was initiated to supply urban areas without water by means of tank truck deliveries.^{14/} It is estimated that full re-establishment of service will require a maximum period of six months - although in some cities two to three months will suffice - and an approximate investment of 4.8 million dollars. (See table 6.)

(v) Summary of the damages. Damages to physical and services infrastructure, including housing, transportation, communications, electric power and drinking water, are estimated at 120 million dollars. (See table 7.)

Telecommunications systems, the supplying of drinking water and a portion of energy requirements will be able to be re-established within a maximum period of from four to six months. However, reconstruction of housing, highways, secondary roads and a hydroelectric power plant will require up to two to three years.

^{14/} The Santo Domingo Aqueduct and Sewerage Corporation (CASSD) budgeted close to 420,000 dollars for this item for the remainder of the year.

Table 6

DOMINICAN REPUBLIC: DAMAGES TO AQUEDUCT SYSTEMS

(Thousands of dollars)

City or area	Total	Labour and material	Machinery and equipment	Other expenses ^{a/}
<u>National total</u>	<u>4,795</u>	<u>2,826</u>	<u>1,340</u>	<u>629</u>
Santo Domingo ^{b/}	944	639	218	87
Santiago	2,100	1,558	404	138
Zone I ^{c/}	183	73	68	42
Zone II ^{d/}	311	118	121	72
Zone III ^{e/}	727	232	327	168
Zone IV ^{f/}	530	206	202	122

Source: Santo Domingo Aqueduct and Sewerage Corporation, Santiago Aqueduct and Sewerage Corporation, National Drinking Water and Sewerage Institute.

a/ Includes general expenses and unforeseen outlays.

b/ In addition, 420 000 dollars are required for supplying emergency water for four months.

c/ Includes aqueducts located in the provinces of Baoruco and Barahona.

d/ Includes aqueducts located in the provinces of Azua and Peravia.

e/ Includes aqueducts located in the provinces of Puerto Plata, Valverde, Espaillat, Salcedo, María Trinidad Sánchez, La Vega, Duarte and Sánchez Ramírez.

f/ Includes aqueducts located in the provinces of San Cristóbal and Peravia.

Table 7

DOMINICAN REPUBLIC: DAMAGES TO PHYSICAL AND SERVICES
INFRASTRUCTURE

(Millions of dollars)

	Total	Labour and materials	Machinery and equipment	Other expenses
<u>Total</u>	<u>120.3</u>	<u>78.2</u>	<u>37.5</u>	<u>4.6</u>
Housing	<u>18.9</u>	<u>17.0</u>	-	<u>1.9</u>
Transportation and communications	<u>62.1</u>	<u>50.1</u>	<u>11.5</u>	<u>0.5</u>
Roads	27.7	27.7	-	-
Secondary roads	10.3	10.3	-	-
Bridges and sewerage systems	6.0	3.0	3.0	-
Urban transit	5.1	4.6	-	0.5
Ports and airports	2.0	2.0	-	-
Telecommunications	5.0	2.5	2.5	-
Land, air and maritime vehicles	6.0	-	6.0	-
Energy	<u>34.5</u>	<u>8.3</u>	<u>24.6</u>	<u>1.6</u>
Generation	16.2	8.3	6.3	1.6
Transmission	6.0	-	6.0	-
Distribution and services	12.3	-	12.3	-
Drinking water	<u>4.8</u>	<u>2.8</u>	<u>1.4</u>	<u>0.6</u>

Source: CEPAL, based on official figures.

5. The agricultural sector

Agriculture suffered the greatest losses among the productive sectors of the economy. Hurricane David felled many trees, especially those producing plantains, coffee and cacao; and later, the heavy rainfall brought on by Hurricane Frederick caused flooding in most of the sugar cane plantations in the southeastern part of the country and in areas devoted to other crops for domestic consumption, such as kidney beans and cassava.

The central northeast and eastern regions were the most damaged. (See Table 8,) These regions constitute the most productive farmlands in which the principal export crops are grown; southern provinces of San Cristóbal and Peravia suffered the greatest losses as a consequence of the hurricanes. With respect to the south-west region, damages are still greater if duly account is taken of the fact that this region was already one of the most backwards of the country.^{15/}

Damages to the sector as a whole are estimated at 357 million dollars. This figure includes those suffered by agriculture as such, the costs of replacing livestock inventories, damages to irrigation infrastructure and losses in fisheries equipment. However, it does not include forest damage, since it has so far not been possible to evaluate such damage completely as it has been necessary to give priority attention to other activities more essential to the sustenance and employment of the population. Nevertheless, technicians from the Forestry Department of the Ministry of Agriculture estimate that over-all damage to timber-yielding species of the woodlands of the central mountain range could amount to 5 million dollars.

Aviculture was the hardest hit among livestock-raising activities. Preliminary reports indicate that more than 1.2 million heads of poultry disappeared in the wake of the hurricanes.

Subsequent to the drought that affected the country in 1977, the Government had been taking steps to promote the production of certain basic foodstuffs within the Dominican diet, such as rice, cassava,

^{15/} See indices contained in ONAPLAN, Regional Development Plan for the Southwest, 1979-1982.

Table 3

DOMINICAN REPUBLIC: ASSESSMENT OF PHYSICAL AND FINANCIAL DAMAGES
TO AGRICULTURE BY REGIONS AND ZONES

	Land area planted before hurricanes (ha)	Land area affected						Financial losses at farm prices a/ (thousands of dollars)	Percentage structure
		General total		Totally		Partially			
		Hectares	Percentage	Hectares	Percentage	Hectares	Percentage		
National total	475,502	202,239	42.5	94,357	17.7	117,882	24.8	257,127	100.0
Central region	61,461	48,075	78.2	30,067	48.9	18,008	29.3	143,706	55.9
Southeastern region	56,621	17,826	31.5	9,355	16.5	8,471	15.0	13,994	5.4
Southern region	46,317	12,253	26.5	5,232	11.3	7,021	15.2	15,918	6.2
Eastern region	34,169	21,325	62.4	6,926	20.3	14,399	42.1	10,334	4.0
Northern region	117,393	37,381	31.8	14,383	12.2	22,998	19.6	43,392	16.9
Northwestern region	30,657	11,087	36.1	4,794	15.6	6,293	20.5	3,422	1.3
Northeastern region	128,884	54,292	42.1	13,600	10.5	40,692	31.6	26,360	10.3

Source: Ministry of Agriculture.

Note: The percentages were calculated with respect to the land area planted before the hurricanes.

a/ Includes capital replacement costs (which in the case of perennial crops will affect various years) but do not include losses in stock or due to reduction of production, thus for this reason these figures do not necessarily coincide with those in table 1.

kidney beans and plantains, with which it was hoped to achieve self-sufficiency in 1979. The production increases observed in 1978 as a result of these programmes made it possible to reduce imports of these products to a considerable extent during the present year, particularly with respect to rice and kidney beans.

Export crops, however, had been faced with a number of problems stemming mainly from the prices of these products on the international market. In 1978 production of these crops had already dropped because, among other reasons, certain official measures together with the drop in the international price of sugar encouraged producers to reduce the areas devoted to sugar cane to plant them with other crops that were more likely to provide greater financial benefits.

The principal reason for the drop in coffee production in that year was unexpected rainfall during the flowering period. It is also true that the plantations are now old and that yield is consequently decreasing. In this respect the Ministry of Agriculture had been promoting a medium-term rehabilitation programme.

Principal damages. Forecasts for 1979 harvests of the most important crops were quite encouraging. When David struck the country's coasts, approximately 475,000 hectares had been planted, of which it is estimated that 200,000 (43 per cent of the total) were damaged in some way or another. Of the damaged areas, 81,250 hectares were totally laid waste, consisting principally of plantains, coffee, cacao and rice. (See Table 9.)

Plantain crops were the most affected, since 70 per cent of the area devoted to this crop was totally or partially destroyed. This denotes a serious problem if it is taken into account that this product constitutes one of the principal staples of the Dominican diet. The value of the losses is estimated at 86 million dollars on the basis of the 34,625 planted hectares that were virtually wiped out by the winds.

Table 9

DOMINICAN REPUBLIC: ASSESSMENT OF PHYSICAL AND FINANCIAL DAMAGES
TO AGRICULTURE, BY PRINCIPAL PRODUCTS

	Land area planted before hurricanes (ha)	Land area affected						Production lost		Financial losses at farm prices a/ (thousands of dollars)	Percentage structure
		General total		Totally		Partially		Quantity	Unit		
		ha	%	ha	%	ha	%				
<u>Total</u>	<u>475,502</u>	<u>202,239</u>	<u>42.5</u>	<u>84,357</u>	<u>17.7</u>	<u>117,882</u>	<u>24.8</u>	-	-	<u>257,127</u>	<u>100.0</u>
Principal export products <u>b/</u>	<u>248,844</u>	<u>93,711</u>	<u>37.7</u>	<u>16,798</u>	<u>6.8</u>	<u>76,813</u>	<u>30.9</u>	-	-	<u>104,544</u>	<u>40.7</u>
Coffee	154,608	59,901	38.7	10,812	7.0	49,089	31.7	108,221	Quintal	85,817	33.4
Cacao	93,750	33,698	35.9	5,904	6.3	27,784	29.6	82,714	Quintal	18,368	7.2
Tobacco	406	122	30.0	82	20.0		10.0	1,223	Quintal	359	0.1
Principal products for domestic consumption	<u>226,658</u>	<u>108,528</u>	<u>47.9</u>	<u>67,559</u>	<u>29.8</u>	<u>40,969</u>	<u>18.1</u>	-	-	<u>152,583</u>	<u>59.3</u>
Plantains	48,369	34,030	70.3	25,155	52.0	8,875	18.3	1,060,724	Mile	87,683	34.1
Rice	54,396	20,453	37.6	10,422	19.2	10,031	18.4	951,898	Quintal	11,927	4.6
Cassava	19,196	8,201	42.7	5,065	26.4	3,136	16.3	729,681	Quintal	5,026	2.0
Kidney beans	13,774	7,303	53.0	6,372	46.3	931	6.7	113,861	Quintal	3,206	1.2
Corn	17,054	6,333	37.1	4,304	25.2	2,029	11.9	189,193	Quintal	1,294	0.5
Others	73,859	32,208	43.6	15,241	22.0	15,967	21.6	-	-	43,447	16.9

Source: Ministry of Agriculture.

Note: The percentages were calculated with respect to the land area planted before the hurricanes.

a/ Includes capital replacement costs (which in the case of perennial crops will affect various years) but do not include losses in stock or due to immobilization of production, thus for this reason these figures do not necessarily coincide with those in table 1.

b/ Excluding sugar.

Because of the high commercial value of coffee and the important position it occupies in the country's foreign trade, the damages to this crop will still have greater repercussions than the damages to the plantain crop, since it will take from three to four years to recover pre-hurricane production levels on the 10,812 hectares of coffee plantations totally destroyed. It is estimated that approximately 120,000 bags of coffee have been lost, equivalent to a value of 86 million dollars at farm prices.^{16/} (See Table 10.)

Twenty-eight per cent (5,800 hectares) of the cacao crop was damaged by the rainfall, that is, a loss of 83,000 quintals with a value of 18.4 million dollars. As in the case of coffee, the damage to the cultivated areas, with the inevitable decline in production that this implies, will affect the country's foreign exchange income over the coming years.

When Hurricane David arrived, the 1978/1979 sugar cane harvest had already terminated, and sugar plantations were in a period of initial growth; consequently David's winds caused minimal damage. However, Frederick brought intense rainfall for long periods of time that flooded sugar cane fields to such an extent that it is feared that irreversible damage may have been caused. At the time of drafting this report, the water level had not yet receded, and it was not possible to evaluate the damages to inventories in the sugar mills or to the plantations themselves.

The hurricanes affected 37.6 per cent of the land area devoted to the growing of rice, which implies financial losses of approximately 12 million dollars. Of the total affected area, 10,500 hectares (19 per cent) were totally lost.

As for the remainder of the crops (bananas, pigeon peas, kidney beans, corn, citrus fruits and so forth), damages are estimated at 43 million dollars. However, since the majority of these are annual

^{16/} Includes the cost of replacing the plantation.

Table 10

DOMINICAN REPUBLIC: CULTIVATED AREAS, VOLUMES AND VALUE OF
PRINCIPAL AGRICULTURAL PRODUCTS

(Values in thousands of 1970 dollars)

	1979									1980		
	1978			Normal estimate			Estimate considering hurricane effects			Estimate considering hurricane effects		
	Land area (ha)	Volume (t)	Value	Land area (ha)	Volume (t)	Value	Land area (ha)	Volume (t)	Value	Land area (ha)	Volume (t)	Value
Total			302 312			322 694			240 123			274 998
Principal export products ^{a/}			156 273			164 960			134 927			147 733
Coffee	154 688	37 582	47 590	155 438	40 204	50 910	143 875	32 614	41 299	144 563	35 098	44 445
Cacao	93 750	33 120	82 002	94 688	34 776	86 102	87 875	29 302	72 549	88 750	31 372	77 674
Tobacco	375	41 630	26 681	380	43 608	27 948	320	32 890	21 079	360	39 965	25 614
Principal products for domestic consumption			146 039			157 734			105 196			127 265
Plantains (millions of units)	49 375	868	43 000	51 000	946	47 300	24 250	434	21 700	25 000	439	21 950
Rice ^{b/}	101 500	231 426	59 060	102 000	245 318	62 605	91 063	187 634	47 884	102 500	233 864	59 682
Cassava ^{b/}	24 313	150 512	17 836	24 500	159 528	18 904	19 250	116 932	13 856	24 688	152 812	19 108
Kinney beans ^{b/}	42 938	31 602	19 897	44 188	34 454	21 692	36 563	26 358	16 595	45 500	33 488	21 084
Corn ^{b/}	47 250	50 048	6 246	47 938	57 960	7 233	42 938	41 354	5 161	48 688	51 612	6 441

Source: Ministry of Agriculture.

Note: 1980 yield corresponds to that of 1973.

^{a/} Excluding sugar.^{b/} Losses for these crops are for the 1979 spring-summer cycle and consequently do not reflect the seriousness of the loss in comparison with full-year production.

crops that may be recovered promptly, except that of citrus fruits, it is hoped that emergency programmes will make it possible to plant in time to ensure production for domestic consumption within a period of four to five months. If this can be accomplished, it will be necessary to import only red beans, a staple element in the Dominican diet, at a cost of approximately 6.5 million dollars.

The principal livestock losses were also recorded in the central region of the country, and are estimated at 8.8 million dollars. This figure does not include losses in poultry raising, an activity which as already mentioned has been virtually eradicated and represents almost 80 per cent of the total losses in this sector. (See Tables 11 and 12.)

According to data from the National Water Resources Institute (INDRHI), irrigation infrastructure suffered damages in excess of 13.4 million dollars. Canals, secondary roads and pumping equipment were destroyed, thereby affecting the productivity of certain crops, such as sugar cane, which is produced in certain areas using techniques, require permanent auxiliary irrigation.

Fishing, a predominantly unmechanized activity, suffered losses in equipment such as launches, motors and nets, in the approximate amount of 645,000 dollars.

In view of the magnitude of the disaster and its special incidence on the agricultural sector, which plays a fundamental role in providing food for the Dominican people and serving as a source of foreign exchange the Ministry of Agriculture is preparing an emergency programme to promote activities to recover available food inventories as rapidly as possible. The Price Stabilization Institute (INESPRE) feels that despite the losses in rice, this grain will not have to be imported during 1979; however, great efforts will have to be made immediately to recover the crop areas lost in order for production to begin before present inventories are depleted. The same is true of other crops, such as kidney beans, pigeon peas and cassava.

As plantains take from seven to nine months to mature, there will undoubtedly be a shortage of this product while the plants are growing.

Table 11

DOMINICAN REPUBLIC: VALUE OF LOSSES IN
THE LIVESTOCK SUBSECTOR

(Thousands of dollars)

	Total	Value				
		Animals	Equipment	Corrals	Construction	Inputs
<u>National total</u>	<u>22,149^{a/}</u>	<u>3,826</u>	<u>795</u>	<u>422</u>	<u>5,292</u>	<u>814</u>
Southwestern region	408	408	-	-	-	-
Northwestern region	685	242	390	20	15	18
Eastern region	300	50	-	250	-	-
Central region	8,812	2,190	405	150	5,272	795
Northern region	171	171	-	-	-	-
Northeastern region	773	765	-	2	5	1
Southern region	-	-	-	-	-	-

Source: Ministry of Agriculture.

a/ Includes 11 million dollars in other aviculture losses that could not be presented disaggregated.

Table 12

DOMINICAN REPUBLIC: LOSSES IN THE LIVESTOCK SUBSECTOR

	Cattle		Head				Beehives (number)	Value of livestock (dollars)
	Meat	Milk	Pigs	Goats	Horses	Poultry		
<u>National total</u>	<u>2,206</u>	<u>2,025</u>	<u>1,692</u>	<u>8,438</u>	<u>517</u>	<u>1,868,636</u>	<u>1,279</u>	<u>3,235,781</u>
Southwestern region	270	270	16	7,710	202	-	7	407,810
Northwestern region	260	267	15	124	7	-	335	242,305
Eastern region	128	36	-	13	12	1,650	223	49,884
Central region	243	553	1,177	355	50	1,817,000	625	2,190,025
Northern region	38	196	20	16	6	7,012	-	170,735
Northeastern region	1,267	698	464	220	240	42,974	89	765,022
Southern region	-	-	-	-	-	-	-	-

Source: Ministry of Agriculture.

Nevertheless, the plantain may be substituted with other products that grow more rapidly, such as the yautia (a kind of taro root) and potatoes.

Chicken and eggs are an important constituent of the Dominican diet. Because of the great damage brought by the hurricanes and its effects on aviculture installations, it will be necessary to import large quantities of poultry products until the domestic market can again be supplied by local production. During the first weeks following the hurricanes, 400,000 pounds of chicken were imported from the United States, thus solving the immediate problem.

Among the irreparable damage that occurred is the ecological damage suffered by the central portion of the country, which was exposed to the hurricane's strongest winds and in which practically all trees were destroyed. There is little doubt that this will have a very close bearing on environmental conditions in the capital city and in the nearby rural areas. Numberless trees were destroyed in Santo Domingo, and the number of coconut palms damaged in rural areas runs into the thousands. In both instances it will take a very long time for the ecological conditions previous to the disaster to be re-established, and the quality of life of the population would consequently be affected.

6. Industry, commerce and tourism

Under a signee heading this chapter assesses the damages to the principal non-agricultural sectors for which quantitative information was available. Generally speaking, three types of damage may be considered: (a) damage to buildings, installations and equipment; (b) damage to stocks, and (c) damage to production. It was not possible to define precisely the effects of damages to the physical and services infrastructure on transportation and communications activities, nor was it possible to estimate damages to the mining sector, in which water shortages occurred for a few days, or to other service activities, such as restaurants.^{17/}

(a) Industries

Available estimates on damages to the industrial sector vary widely depending on their source. It should be recalled that approximately 80 per cent of the installed capacity of this sector is located between the capital city and San Cristóbal, precisely one of the areas hardest hit by the hurricanes, and also the province of Santiago. However, it appears that a substantial part of the biggest companies were covered by insurance against risks of this nature. On the contrary the great majority of medium size and small enterprises were not insured.

In the Dominican Republic there are some 1,200 industrial establishments employing - with the exception of the sugar mills - some 40,000 people. Some 200 of these establishments suffered some kind of damage,^{18/} Destruction was also considerable in San Cristóbal. Damages occurred in various industries, particularly in coffee and rice-processing plants and - to an as yet unknown extent - in the sugar mills.

^{17/} In estimating the behaviour of the gross national product for 1979, which is presented in Chapter III, Section 3, an appraisal is nevertheless included of the damages to the productive capacity of the economic sectors as a whole.

^{18/} In the industrial zone of Herrera in Santo Domingo about 140 industries with a capital of 80 million dollars are located. Among them 32 were damaged at an estimated value of 4 million dollars, half of which were lost in inventories (newspaper El Caribe, September 28, 1979).

Rough estimates made by the CEPAL mission fix the losses in industrial installations, including damages to buildings - particularly roofing - machinery and equipment, at some 50 million dollars. Losses in relatively plentiful stocks of raw materials and finished products were assessed at some 35 million dollars.^{19/}

The most acute problem faced by industry since the disaster is the lack or irregularity of the supply of electric power, fuels and water. The paralyzation of industry would have assumed still greater proportions if some of the companies did not possess their own energy plants.^{20/}

As mentioned previously, at the time of drafting this report the crude oil intake system in Santo Domingo for the refinery had broken down; this has caused very serious problems in distributing raw materials and merchandise and is consequently slowing down recovery of the industrial sector.

Furthermore, it is estimated that the sector will fail to produce goods during the months of September and October at a value of more than 50 million dollars. Consequently, the gross industrial product, which before the disaster was expected to grow by 5.7 per cent, will on the contrary show a decline of a magnitude not possible to determine yet, for the entire year.

Appropriate measures are being taken with the Insurance Supervision Agency and the Chamber of Underwriters, in conjunction with the Central Bank,^{21/} in order for the latter to be able to collect the external

^{19/} As usually occurs in the Dominican Republic, stock levels are high in the months of August and September, since factories accumulate production in preparation for the Christmas season.

^{20/} A 1975 legal provision granted industry facilities and exemptions in importing equipment to generate energy.

^{21/} See the public declaration of the Minister of Finances of 17 September 1979 published in Listin Diario of 18 September 1979.

reinsurance on hurricanes for Dominican entrepreneurs and private parties. The amount of such insurance is estimated at some 100 million dollars, of which approximately half could be paid before the end of the year.

In addition, on 30 September the Monetary Board approved the issue and negotiation of 40,600 "Hurricane David Emergency Bonds, series 1995" in the amount of 50 million dollars under the provisions of Law No. 52 of September 1979. These bonds will be used to set up an Industrial Rehabilitation Fund as a means of speeding up economic recovery.^{22/} This issue will be backed up by one international emergency loan.

Industry is further being stimulated by the Investment Fund for Economic Development (FIDE), which operates within the Central Bank. Law No. 299 on Industrial Incentives is also being amended, since the government estimates that it did not fully comply with the objectives for which it had been formulated owing to its failure to increase employment significantly and to give preference to the use of domestic raw materials, and to a certain extent by encouraging idle capacity and by not favouring the development of export industries.

(b) Commerce

The commercial sector exercises a great influence on the Dominican economy through its contribution of 15 per cent of the gross national product. More than 26,000 establishments exist throughout the country providing employment to more than 140,000 people. Damages to this sector were considerable, caused essentially by the torrential rains, which in some cases caused two meters of flooding in commercial establishments. Damages were less in Santo Domingo but very severe in the cities and towns of Santiago, San Pedro de Macorís, Haina, San Cristóbal, Baní, Azua, Barahona, San Juan, Sánchez, Nagua and San José de Ocoa. According to information provided by the 1978 Commercial Census, these towns account for 7,100 commercial establishments.

^{22/} See Regulation No. 1189 of 19 September 1979.

On the whole it is estimated that damages to this sector could amount to some 20 million dollars, of which three quarters would derive from destruction of inventories and the remainder from damages to buildings and installations.^{23/} It should be mentioned here that no looting took place. Because of the closing of the affected establishments - which has extended to two or three weeks - and, to a lesser degree, because of the new channels of free distribution set up immediately after the disaster, officials from the Federation of Businessmen estimated that sales for the month of September for the entire sector would be 30 per cent lower than sales in the same month the previous year.

(c) Tourism

Tourism has expanded notably with respect to its installed capacity as a result of the Law on Incentives to Tourism promulgated in June 1971, and in the past five years this installed capacity had even surpassed the demands deriving from the gradual increase in tourist activities. Nevertheless, it is anticipated that capacity and demand will soon be equated, and consequently new projects for hotels are being studied.

Tourism demonstrated dynamic growth in 1978, and it is estimated that between January and August 1979 it generated income 24 per cent higher than in the same period the previous year.

The Ministry of Tourism, based on information received from insurance companies and its own investigations, estimated the following losses: of a total of 2,185 hotel rooms in the capital city, 716 were damaged at a value of 3.6 million dollars; damages to public and service areas of hotels, such as restaurants and laundries, were estimated at 5 million dollars.

^{23/} Based on the Commercial Census of 1978, it is estimated that average inventories per establishment amounted to some 30,000 dollars at 1979 prices.

In addition, it is estimated that the drop in hotel income during the two months following the disaster will amount to some 3 million dollars.

The Ministry of Tourism is negotiating - with good chances of success - a special line of credit with the public banking system in the amount of 2.5 million dollars for hotel reconstruction.

Lastly, judging from confirmed reservations from abroad, rapid recovery of these activities is expected in the last quarter of the year, the peak tourist season.

7. First actions taken by the Government of the Dominican Republic and participation of the international community

As Hurricane Frederick arrived in the Dominican Republic before the effects of Hurricane David had terminated, the government was compelled to take a number of emergency measures aimed principally at providing assistance to victims and to the refugees in improvised shelters in Santo Domingo and the principal cities in the country. These measures turned out to be timely and efficacious.

Food distribution was initiated under the auspices of National Defence. Between 13 and 19 September more than 1.2 million people received approximately 7.8 million pounds of food provided by the donations of various countries and international organizations. In addition, in the same period of time 280,000 meals were served in the various shelters in the capital city under the auspices of the Civil Action Corps of the Armed Forces.

Since the southern part of the country was the most affected, distribution of food there amounted to 54 per cent of the total. This was followed by the National District, with 22 per cent, and the northern and eastern areas.

Civil Defence began its organization before the arrival of Hurricane David, since the hurricane watch systems made it possible to know when the storm would hit the coasts of the Dominican Republic. Days before, with the assistance of the armed forces and the national police, a communications network had been set up to cover the entire country as a means of providing information on the progress and characteristics of the hurricane and on the precautionary measures to be taken to avoid greater physical damage to the population. These measures were surely instrumental in reducing losses in human lives, although in any event, according to the most authoritative estimates, such losses still amounted to approximately 2,000.

During this preparatory stage, all those inhabiting precarious dwellings and neighbourhoods exposed to the direct force of the

/hurricane's

hurricane's winds were evacuated to provisional shelters set up in schools, churches and other public buildings, where they remained until the winds had subsided. The same measures were taken in provincial settlements, since most of the rural population lives in wooden shacks covered with zinc roofs and was obviously exposed to great danger.

Once the hurricane was over, rescue activities commenced, and specialized civilian and military brigades were formed that used all public and private transportation available to carry food and medicine to the affected rural areas and previously prepared shelters. At the same time a massive vaccination campaign was undertaken to prevent the outbreak of epidemics.

In the city of Santo Domingo the great number of fallen trees prevented the circulation of vehicles during the first hours after the hurricane until the government of the National District, with the assistance of the armed forces and whatever equipment was available, organized the removal of the trees and other débris. The local citizenry also assisted in clearing the streets by cutting branches and trees with hatchets and other rudimentary tools. In falling, many of the trees tore down electrical and telephone installations, with the corresponding effects.

The Ministry of Public Health and Social Welfare, in conjunction with Civil Defence and Red Cross personnel, took charge of sanitary measures. The city of Santo Domingo was left almost one week without water, and even by 20 September large areas had still not been supplied with this service. Since medicines had been stocked before the hurricane, the population's most urgent needs were able to be satisfied, and efficient and well-organized service prevented the outbreak of any epidemics.

The difficulties in distributing food and medicine to the victims were essentially derived from the rains brought by Hurricane Frederick, which caused flooding throughout the country and interrupted the transit of vehicles on highways because of the destruction of bridges and secondary roads. For the same reasons the fleet of helicopters that

/assisted

assisted in transporting foodstuffs could not complete many of their scheduled flights, particularly to the most affected areas where the assistance was most needed.

Even though highway traffic has not been completely re-established because in some regions the water has still not receded, food distribution is now being carried out regularly by helicopter and is interrupted only when flying conditions are unfavourable.

Immediately after the hurricane, the government, upon the suggestion of the Ministry of Foreign Affairs, set up a Co-ordination Office for International Assistance (OCAI), presided over by an Undersecretary and assisted by the Technical Secretariat of the Office of the President. This office is responsible for distributing the assistance received from various governments and for negotiating for the supplies required to attend to the population's most urgent needs. The office consists of two departments, one responsible for relations with governments, and the other, with international organizations.

Material aid was forthcoming immediately from the international community, and remittances from various countries, principally the Latin American countries, began to arrive daily at the Aeropuerto de las Américas in Santo Domingo.

Countless international organizations specializing in food distribution, such as the World Food Programme, CARE, FAO, WHO, PAHO, and UNICEF, and international civilian organizations, such as the International Red Cross, Catholic Relief Services, Church World Services, Peace Corp and Baptist Relief Services, sent food to the country almost from the beginning of the state of emergency, and personnel from these institutions immediately joined forces with national brigades in the tasks of distribution and assistance. One week after the hurricanes, supply to victimized areas was considered to be operating efficiently, and most of those who had been evacuated to shelters were returning to their places of origin.

/In order

In order to establish control over remittances, the government assigned the armed forces the responsibility of receiving, classifying and supervising the quantities received, a task they have carried out in an efficient and orderly manner. In several cases army brigades have assisted the Ministry of Public Works in provisionally repairing bridges and secondary roads to speed up food distribution.

/III. POSSIBLE

III. POSSIBLE REPERCUSSIONS ON THE ECONOMY IN 1979 AND 1980

It has already been mentioned that certain trends were present in the Dominican Republic economy that pointed towards situations of increasing disequilibria in the balance of payments and in the fiscal sectors, in spite of the measures taken by the present government aimed at mitigating the situation by renegotiating the debt - especially that of a group of decentralized enterprises -, so as to alleviate the balance of payments' situation as well as the public sector's financial position. On the other hand, the economy has been showing symptoms of decreasing rates of growth, with its consequent effects on the situation of unemployment traditionally afflicting the country. This chapter aims at specifying the salient problems that the economy will have to face in the following years, most of which have been aggravated by the effects of the recent hurricanes. This is preceded by a brief introduction.

1. General considerations

In recent years the Dominican economy had shown signs of exhausting the elements upon which it had sustained its economic development until the middle of the 1970's, one of the most dynamic in Latin America. Mainly because of a slump in agricultural investment, the growth and diversification of exports was curbed, since it had not been possible to include non-traditional products to any significant extent. The industrial sector, whose installed capacity had expanded notably from mere incipient levels, began to face the obstacle to its eventual growth represented by the limited domestic market. To this must be added the fact that industry, except to a very modest extent, had not been able to enter the export market and that the country's productive structure is highly dependent on foreign sources, and consequently only limited dynamic intersectoral effects can be expected.

Mobilization of domestic public and private savings, and, increasingly, of external savings, made it possible to increase capital formation appreciably, to such an extent that in recent years it came to represent almost one fourth of the gross national product. As a

/result

result of this process, the national productive apparatus was expanded, which was most concretely reflected in expansion of the economic infrastructure, and in industrial, mining and tourism capacity. Examination of investment composition, however, shows that investment in construction clearly took precedence over investment in machinery and productive equipment. A very significant amount of capital was dedicated to projects of relatively low social returns, including the construction of residences for the upper-income market, shopping centres and urban renewal of the capital city, which at the present time boasts wide avenues and large recreational parks.

On the other hand, investment in economic and social infrastructure - particularly that of housing for the medium and low income strata - has shown a certain lag with respect to the needs of the population and the productive system.

To this situation - which could be considered one of relative prosperity in the modern urban sector, of moderate technification of agriculture and the persistence of deficits in social indicators, particularly with regard to employment - were added the effects of certain international circumstances that had special repercussions on the country: a widening of the balance of trade gap, to a certain extent related to the considerations expressed above; the increase in the level of foreign debt and its structural change in the direction of shorter-term obligations, and the emergence of inflationary pressures.

During the past year the public sector attempted to improve both the debt situation and efficiency levels in contracting for loans. For the first time the government undertook the centralization of the expenditures of the decentralized enterprises, whose liabilities amounted approximately to 90 million dollars at the end of 1978. Furthermore, various financial transfers were made to these enterprises through which they could modernize their equipment and enlarge their productive capacity. To some extent this was achieved by the negotiation of a loan with foreign commercial banks in the amount of 185 million dollars, which made it possible to finance the deficits of many decentralized enterprises, particularly the Dominican Electric Corporation.

The natural phenomena described in this document will have a profound adverse effect on the aforementioned tendencies, at least during the next two or three years. The hurricanes will have a negative effect on the balance of payments affecting the volume of some of the items exported and, on the other hand, a large amount of unusually high imports will be needed to replace the losses of goods and to cover import requirements for reconstruction. The financing of these inputs will be only partially compensated by insurance payments. The need is thus foreseen to acquire new financial foreign commitments to face the requirements necessary to continue with the economic and social development programmes and at the same time with the reconstruction of the considerable damages resulting from hurricanes David and Frederick. These matters are dealt with in more detail in the following pages.

Another problem of immediate concern that is foreseen is that involving the supply of energy. It has already been pointed out that projects for the expansion of electric power and water supply installed capacity and distribution systems have shown a certain lag over the past 10 years. The hydroelectric projects under way to remedy this situation will undoubtedly suffer setbacks, and it is consequently felt that over the next two or three years emergency measures will be required along the lines suggested in Section 4.

In summary, the following sections separately indicate the aspects considered to be most crucial within the evolution of the Dominican economy for 1979 and 1980: prospects concerning the external sector, production and employment trends, the energy situation, the public finances situation and investment requirements, and how these aspects were influenced by the natural disaster dealt with in this report.

2. The external sector

The deficit in the current account of the balance of payments of the Dominican Republic has increased in recent years, both because of the marked tendencies toward a decline in international prices of its principal agricultural exports and because of increases in the products it imports, particularly with regard to oil. Even taking into consideration the increases expected in unit prices of sugar, ferronickel and doré in 1979, a greater deficit in current account than in the preceding year was anticipated even prior to the hurricanes.

The consequences of the disaster point towards an increase in the current deficit and to the aggravation of the balance of payments problems, which could be partially counterbalanced in 1979 by the inflow of foreign capital and other remittances from abroad. In relation to the export of goods, Table 13 reveals, in a very preliminary form, that they may experience a contraction of 55 million dollars based on former predictions for the entire year. This relatively modest decrease is due to the fact, as already stated in Chapter II, that at the moment the natural disaster occurred the cane crop had been completed; had that not been the case, the damages would have been considerably larger. All in all, at the time of drafting of this report no precise information was available on the losses on the pending stocks of sugar for exports, nor whether the prolonged floods would provoke greater losses in the cane plantations. For this reason the estimates on the decrease of the export values could result to be extremely conservative. In balance, it had been foreseen that the exports of goods and services would have had an increase in 1979 of over 22% against the previous year. It is estimated that this percentage will now reach 14.5%, as a consequence of the disaster.

On the other hand, even the revised export projections which account for the damages of the hurricanes, reveal an increase in relation to the 1978 exports, due to inter alia, the increase in the prices for

/certain

certain mining products. It is estimated that as a direct consequence of the hurricanes, foreign sales of green coffee and cacao will be reduced by 30 million dollars,^{1/} and the remaining agricultural exports, mainly fruits, would decrease in 8 million dollars, whereas the industrial exports, already low, will decrease by another 15 million dollars. (See table 13.)

In the long run the consequences will be still more serious, since 7% of coffee plantations were totally destroyed and 32% partially destroyed. The same is true in the case of cacao, wherein 6% were totally destroyed and 43% partially destroyed. More than three years will be required to recuperate full production and rehabilitate crop lands. With respect to sugar, the 1979/1980 harvest may be somewhat delayed, since heavy rainfall causes yields to diminish and delays harvest preparations. However, this will not affect international deliveries and sugar futures.

With regard to imports, the consequences of the natural disaster, together with the historical trends anticipate that their amount will experience an important increase. For instance, the purchase of oil could amount to a value of 270 million dollars. (See Table 14.) In the short term, increases are also foreseen in the purchases of food, raw materials to replace stocks destroyed by flooding, and capital goods in as yet unspecified amounts. Partial estimates for 1979 indicate that imports could increase by more than 17% in comparison with the previous year, reaching a sum of some 1 088 million dollars. Not barring the effect of the hurricanes, imports would have amounted to 1 031 million dollars.^{2/}

In brief, the tendencies observed in recent years with respect to the increase in the trade imbalance caused by the unequal growth of imports and exports will become more acute in the years to come.

^{1/} The IMF has already granted a first loan of "compensatory financing" nature in order to compensate for the losses in foreign exchange equivalent to 30 million dollars.

^{2/} Import coefficient of goods in 1979 measured at current prices, would have increased from 19% to 22% due to effects of the disaster.

Table 13

DOMINICAN REPUBLIC: EXPORTS OF GOODS AND SERVICES

(Millions of dollars)

	1978	1979		1980
		Estimate prior to the hurricane	Estimate including hurricane effects	
<u>Total of goods and services</u>	<u>826</u>	<u>946</u>	<u>1 109</u>	<u>1 275</u>
<u>Total of goods</u>	<u>676</u>	<u>771</u>	<u>903</u>	<u>1 028</u>
Traditional products	<u>607</u>	<u>693</u>	<u>813</u>	<u>921</u>
Sugar and by-products	209	264	297	344
Green and processed coffee	97	76	95	110
Cacao	86	84	93	96
Tobacco	46	40	46	52
Ferronickel	73	35	116	137
Gold and silver (doré)	73	118	137	150
Bauxite	23	26	29	32
Industrial products	<u>51</u>	<u>58</u>	<u>67</u>	<u>81</u>
Other goods	<u>18</u>	<u>20</u>	<u>23</u>	<u>26</u>
Non-financial services	<u>150</u>	<u>175</u>	<u>206</u>	<u>247</u>

Source: CEPAL, based on information provided by the Central Bank of the Dominican Republic.

Table 14

DOMINICAN REPUBLIC: IMPORTS OF GOODS AND SERVICES

(Millions of dollars)

	1970	1979		1980
		Before hurricanes	After hurricanes	
<u>Total of goods and services</u>	<u>1,219</u>	<u>1,349</u>	<u>1,424</u>	<u>1,663</u>
<u>Total of goods</u>	<u>926</u>	<u>1,031</u>	<u>1,088</u>	<u>1,304</u>
Foodstuffs	147	130	146	160
Other consumer goods	105	110	117	128
Hydrocarbons	194	265	269	300
Intermediate goods	200	315	323	354
Capital goods	192	211	233	266
<u>Total of non-financial services</u>	<u>293</u>	<u>310</u>	<u>336</u>	<u>359</u>

Source: CEPAL, based on official information.

The perspectives of obtaining a sustained level of increment of both goods and services exports, and to limit the current import growth at a rate similar to that of the gross internal product would have allowed a reduction in the 1979 commercial balance deficit. However, due to the effects of the catastrophe as well as the structure of the foreign sector, an improvement in the foreign imbalance is not anticipated during the coming years. As far as external sales are concerned, the deficient growth rate will be accentuated because of the unfavourable international market conditions for some of the country's principal export products and because of the reduction in the exportable supply resulting from agricultural damages.

With respect to the exports of non traditional agricultural products, the Dominican Center for the Promotion of Exports (CEDOPEX), has provisionally banned the exports of such products as manioc, avocado, meat, citrus fruits, plantains, tomatoe, etc.

The situation will be very different as far as imports are concerned. To the increasing purchases abroad required by the development process must be added the undeferrable imports necessary to alleviate capital damages, cover the loss of inputs and, to a lesser extent, compensate for the decline in domestic supply of certain consumer goods. This situation will widen the gap between the demand for imports and the purchasing power provided by exports, and consequently will lead to greater use of external financing.

The trade deficit will thus be in the order of 320 million dollars for the entire year, increasing to some 400 million in 1980. With the inclusion of services, the trade deficit in goods and non-financial services will probably amount to 478 million dollars this year and approximately 550 million dollars next year. (See Table 15.)

The net payment of profits and interests on foreign capital will increase more rapidly than net transfers, thereby producing a deficit of 480 million dollars in current account (27% higher than in 1978) and almost 590 million dollars the following year.

Table 15

DOMINICAN REPUBLIC: BALANCE OF PAYMENTS

(Millions of dollars)

	1978	1979		1980
		Before hurricanes	After hurricanes	
A. <u>Current account</u>				
Export of goods and services	826	1 011	946	1 109
Goods	676	825	771	903
Services	150	186	175	206
Imports of goods and services	1 219	1 349	1 424	1 663
Goods	926	1 031	1 088	1 304
Services	293	318	336	359
Trade balance	-393	-338	-478	-554
Net factor payments	-114	-145	-145	-190
Interests	-72	-98	-98	-139
Earnings	-42	-47	-47	-51
Net current transfers	130	143	143	157
Balance in current account	-377	-340	-480	-587
B. <u>Capital account</u>				
Net foreign investment	40	45	45	50
Net loans to public sector	166	160	168	117
Net loans to private sector	28	9	9	56
Short-term capital	48	185	85	90
Loans from International Monetary Fund	-	41	51	-
Financing gap		-	122	274
Net external financing	367	340	480	587
Variations in the reserves	10	-	-	-

Source: CEPAL based on official information.

/As will

As will be recalled, the existence of a parallel foreign exchange market has given the government the possibility of expanding this regime for the financing of non-essential imports and for which the Central Bank's registry for the granting of foreign exchange at the official rate, was closed. At present, these purchases represent approximately one fourth of the total goods imported^{3/} and, in addition, according to official sources, approximately 35 to 40% of international transactions are made through this market. The premium, as has already been stated, is around 20% higher than the official exchange rate.

The growing deficit in the current account foreseen even before the disaster occurred would have been covered - as has been in the past - with an ever increasing foreign capital made up of direct investment and public and private loans. In spite of the above, in 1978 the country suffered a loss in its international monetary reserves of approximately 10 million dollars. A net capital inflow was contemplated for the present year to cover the entire deficit in current account; that is to say, no loss in the reserves was foreseen. More than half of these funds would originate from official loans previously approved but not yet disbursed (168 million dollars); short-term lines of credit (103 million) and direct investment (45 million). (See again Table 15.) The immediate circumstances after the hurricanes - and its repercussions on the balance of payments current account - anticipate a net additional requirement of approximately 140 million dollars, 20 of which could originate from credits already negotiated with international organizations by expediting disbursements, and the balance of approximately 120 million (referred to as the "financing gap" in Table 15) would have to be mobilized separately.

3/ To illustrate, the balance in current accounts in 1978, showed a deficit of 209 million dollars against 377 million in the balance of payments. The balance of the capital account also pointed to a decrease in the reserves of 9.4 million dollars and more recent estimates of the 1979 balance of payments anticipate a negative balance of approximately 50 million dollars.

This additional requirement for foreign financing compels a brief comment on the Dominican Republic's indebtedness capacity. The country was confronted with certain restrictions in connection with its foreseeable foreign debt capacity. These restrictions would have increased in 1979 even in the absence of the natural disaster, regardless of a rescheduling which defers part of the short and medium-term amortizations. In this manner, 18% of the income generated by the export of goods and services in 1979 would be destined to service the foreign debt. The higher debt levels which the country will be forced to reach to cope with this emergency (see Table 16), emphasizes the importance of improving the foreign debt structure in order to ensure an adequate capacity in this respect in future years. Thus, at the end of 1978 the external debt of the public sector amounted to 883 million dollars. Credits available were in the amount of 240 million dollars, constituted largely by two loans from the World Bank for a total of 40 million dollars and six from the Inter-American Development Bank for some 190 million. Although public sector indebtedness has increased in recent years, its structure, as far as the amortization period is concerned (see Table 16 again), shows that almost half is in loans at more than eight years and that only 17% was contracted for at less than one year. Nevertheless, analysis by sources of financing shows that 46% was obtained from international commercial banks,^{4/} the source that State-affiliated corporations prefer in securing credit.

Unfortunately, due to the provisional type of information available, it was impossible to foresee the relation between the public foreign service debt and the exports for the coming years. However, a very first approximation tends to confirm that if the historical rate which took place during the present decade of exports growth and economic activity in general is recuperated, the Dominican Republic will not experience major difficulties in absorbing a larger flow of outside financing, if and when it is obtained under favorable conditions and according to the emergency situation which the country is facing today.

^{4/} About one third of this percentage corresponds to three months term banking acceptances.

Table 16

DOMINICAN REPUBLIC: EXTERNAL PUBLIC DEBT BROKEN DOWN ACCORDING TO
AMORTIZATION PERIODS AND SOURCES a/

(Millions of dollars)

	Total	Central Government			Remainder of public sector		
		Short <u>b/</u>	Medium <u>c/</u>	Long <u>d/</u>	Short <u>b/</u>	Medium <u>c/</u>	Long <u>d/</u>
<u>Total</u>	<u>883.4</u>	-	<u>67.6</u>	<u>268.5</u>	<u>152.9</u>	<u>226.3</u>	<u>168.1</u>
Inter-American Development Bank (IDB)	175.9	-	-	74.8	-	60.0	41.1
International Bank for Reconstruction and Development (IBRD)	12.3	-	-	5.6	-	-	6.7
International Development Association (IDA)	17.1	-	-	12.0	-	-	5.1
Agency for International Development (AID)	148.1	-	-	120.6	-	-	27.5
International Monetary Fund (IMF)	57.2	-	-	-	-	57.9	-
Bilateral governmental agreements	63.2	-	-	52.4	-	3.9	6.9
Commercial banks	403.9	-	67.6	3.1	152.9 <u>e/</u>	104.5	80.8

Source: Central Bank, Boletín de junio de 1979.

a/ As of 31 December 1978.

b/ One year or less.

c/ More than one year; up to eight inclusive.

d/ More than eight years.

e/ Includes 50 million dollars in banking acceptances at three months term.

3. Productive activities and employment

According to estimates provided by the National Planning Office (ONAPLAN) based on information on the first half of 1979, a growth rate of 5.6 per cent in the gross national product was forecast for this year, attributable mainly to improvement in agriculture - except sugar cane -, mining, industry and construction activities. Since the disaster, however, losses in agriculture, construction, transportation and communications, and in the electricity sector could produce a negative rate of 2.6 per cent that would reduce still further the average income of the population, which itself had become stagnated in 1978.^{5/} (See Table 17.)

This negative impact will probably be most notable in the agricultural sector, the most affected by the disaster, since not only will it fail to increase by the 5 per cent previously predicted, but will show a negative rate of 12 per cent. The decline in this sector has decisive effects on the overall behaviour of the economy owing to its important role in the country's productive activities and to the fact it is the principal generator of employment and foreign exchange. In addition, this decline in production, whose effects will be reflected in supply problems to be encountered next year, is all the more negative in view of the growing imbalance in the external market, principally with regard to coffee and cacao.

However, plans for planting crops for domestic consumption will make it possible to recuperate in 1980 some of the expectations for this year, although, it is imagined, at lower levels than those required by domestic demand, except, perhaps, in the case of rice.

The Secretary of Agriculture has just launched the National Emergency Plan for the agricultural recovery. It includes the rehabilitation, reposition and new sowings up to December 1979 in an extension of 220,000 hectares with a cost of 54 million dollars, part of which is covered by foreign financing.

^{5/} An estimate of the evolution of gross domestic product for 1980 was not available, but undoubtedly the consequences of the meteorological phenomenon will still be present.

Table 17

DOMINICAN REPUBLIC: GROSS NATIONAL PRODUCT

	Millions of 1970 dollars						Growth rates					
			1979		1980				1979		1980	
	1977	1978	Normal	Considering effects of hurricanes	Normal	Considering effects of hurricanes	1977	1978	Normal	Considering effects of hurricanes	Normal	Considering effects of hurricanes
Gross national product	2 544	2 635	2 783	2 567	2 938		4.4	3.4	5.6	-2.6	5.6	
Agriculture	434	465	488	410	508		0.6	7.2	5.0	-11.8	4.0	
Secondary subtotal	796	795	844	815	898		5.3	-0.1	6.2	-2.5	6.4	
Mining	143	116	130	130	137	...	-2.3	-19.8	12.4	12.4	5.0	...
Industry	469	491	519	486	554	...	3.2	4.7	5.7	-2.0	6.8	...
(Sugar)	(90)	(93)	(93)	...	(95)	...		(3.1)	(-)	...	(1.5)	...
Construction	184	188	195	199	207	...	18.3	2.2	4.0	5.9	6.0	...
Basic services subtotal	250	267	284	271	304		12.6	6.8	6.4	1.5	7.0	
Transportation	185	195	205	...	219	...	10.7	5.6	5.0	...	7.0	...
Communications	26	28	31	...	33	...	7.5	9.3	8.1	...	6.9	...
Electricity	39	44	48	...	52	...	27.2	12.5	7.9	...	9.0	...
Tertiary subtotal	1 064	1 108	1 167	1 077	1 228		3.5	4.1	5.3	-3.3	5.2	
Commerce	425	441	468	...	498	...	2.7	3.8	6.0	...	6.5	...
Finance	58	62	65	...	67	...	6.6	7.4	4.0	...	4.0	...
Housing	172	175	184	...	193	...	8.4	2.2	5.0	...	5.0	...
Government	187	190	200	...	208	...	1.1	1.4	5.0	...	4.0	...
Other services	222	240	250	...	262	...	3.4	7.3	5.0	...	4.5	...

Source: CEPAL, based on information provided by the National Planning Office (ONAPLAN) and its own estimates.

A drop in the growth rate of the secondary sectors of an absolute value of some 29 million dollars (at 1970 prices) will be brought on primarily by the partial paralyzation of a certain number of industrial plants in Santo Domingo and Santiago and by the destruction of smaller plants in the provinces. In addition, the replacement of imported and agricultural products and inputs damaged by the hurricane, combined with foreseeable decline in domestic demand, with the exception of building materials and foodstuffs, will also have negative effects on the growth of the industrial sector.

Mining was little affected by the flooding, and it is expected that the construction industry will be activated, after a transition period, particularly private construction which had already shown a recovery during the first semester of 1979.

In basic services the most affected was electric power, especially with regard to the hydroelectric plants that supplemented the thermoelectric plants during the hours of peak consumption. Consequently, production will suffer from deficient supplies of energy. The added value of basic services, including transportation and communications, will probably only increase by 1.5 per cent instead of the 6.4 per cent foreseen. Lastly, in the tertiary sector, commerce and housing suffered the greatest losses.

The destruction of the productive basis of some sectors will to some extent aggravate the critical unemployment problem in the country. Although the reconstruction process may possibly produce positive results in this respect.

The agricultural sector, which provides employment to almost 45 per cent of the economically-active population, is characterized by diverse situations. On the one hand, it is predicted that both subsistence agriculture and sugar cane cultivations will soon be reactivated and will employ at least the same number of people who formerly worked such lands. On the other hand, however, even though the first stage in replanting areas dedicated to perennial crops will absorb a greater quantity of manpower, these effects will be offset by the reduction in the number of harvesters required.

The damages suffered by the manufacturing sector have led to practically no dismissals. In most companies workers are presently engaged in reconstruction work, but it is expected that within a short time production will be reactivated. As idle installed capacity usually exists in the production of non-durable consumer goods, which are preponderant in the Dominican productive structure, no significant investments are predicted in the short term, and therefore the generation of new sources of employment will be minimal.

It is expected that the construction industry will increase its work volume as a result of rehabilitation efforts, which, by their very nature, will demand a considerable amount of manpower. The multiplying effects of this industry will also reactivate the production of construction materials and transportation services.

Lastly, the social and community service sectors will initially create employment by undertaking massive vaccination and social welfare campaigns.

In summary, during 1979 and probably to some extent also in 1980, the Dominican Republic economy will experience a slump as a consequence principally of the damages caused by the hurricanes in the productive capacity of the agricultural, industrial and that of some of the basic services. The reconstruction process will bring up a certain degree of reactivation particularly in the construction activity and might have also a positive balance on the employment situation especially the one linked to the rehabilitation and repairing tasks.

4. Energy supply

Although an in-depth and detailed analysis of the energy situation in the Dominican Republic is not yet available, existing partial information makes it possible to estimate not only the economy's vulnerability and dependence in this area, but also to foresee a negative and even critical situation in the near future.

In this respect it is appropriate to refer to the recent past. First, it should be noted that the previously referred to oil refinery was inaugurated barely at the beginning of the decade of the 1970s and that prior to this the country imported already-refined products. Furthermore, until 1975 electric power was insufficient and imposed serious limitations on industrial development, with the result that some industries had to acquire their own generators. Nevertheless, initiation of the operation of the Haina thermoelectric plants in late 1976 overcame these limitations. (See Table 18.)

In order to satisfy overall commercial energy demands, the Dominican Republic must depend on foreign sources for 95 per cent of its needs. In 1978, the country produced only 9 per cent of the demand for electric power from its own hydroelectric plants. Oil imports have increased from approximately 40 million dollars in 1973 to 190 million dollars in 1978, and it is estimated that these imports will reach 270 million dollars during the current year. This signifies 9 per cent of the total value of merchandise exports in 1973, 27 per cent in 1978 and the possibility of reaching 35 per cent in 1979. Furthermore, the situation will become even worse in accordance with the rises foreseen in the price of oil.

To this situation must be added the effects of the disaster. Although the repair of damages to the thermoelectric plants, the transmission networks and distribution systems will be able to be completed within a relatively short period of time, which will make it possible to recover virtually the entire installed capacity damaged,^{6/}

^{6/} The relative proportion contributed by the Jimenoa hydroelectric plant is actually very low (between one and two per cent) in proportion to total generation.

Table 18

DOMINICAN REPUBLIC: DEMAND FOR ELECTRIC POWER AND GENERATION

	Real			Estimated ^{a/}		
	1975	1977	1978	1979	1980	1981
Power (MW)	241	396	411	451	500	555
Generation (millions of kWh)	<u>1 435</u>	<u>1 859</u>	<u>2 007</u>	<u>2 201</u>	<u>2 441</u>	<u>2 710</u>
Residential	408	481	499	548	601	660
Commerce and small industry	132	172	177	196	217	241
Industry	444	574	627	706	794	893
Government	120	155	146	157	170	183
Rural	120	166	171	190	211	235
Losses	211	311	387	404	448	498

Source: CEPAL, estimates based on official figures.

^{a/} Estimates made without taking the effects of the disaster into account.

production will decline substantially, particularly industrial production. The losses deriving from transportation problems owing to the shortage of fuel caused by the breakdown in the refinery should also be taken into account in this respect.

Thus, not only are production problems and losses foreseen for the remainder of 1979, but also possible limitations on budget allocations for national reconstruction and development plans in the short and medium term as a result of the need to expend large sums of money for imports of oil.

5. Investment requirements and public finances

Losses in public and private fixed assets amounted to 580 million dollars, representing almost five per cent of the total capital stock. This value practically coincides with the investment made in the first eight months of the year (600 million dollars). These losses, which will produce stagnation in the accumulation of capital, will also have important repercussions on the overall context of the economy.

The repair and replacement of destroyed or damaged assets will require greater amounts of investment than in the past if the economic diversification process under way is not to be sacrificed. Even if the 1978 investment level were to be maintained, which was a relatively high 25 per cent of the gross national product in view of the recession foreseen in internal activity levels and consequently in savings levels, an increasing supplement of external financing will be required. This supplement will be added to that derived from the widening gap foreseen in the negative balance of the current account of the balance of payments.

Replacement of a substantial part of the country's property will consequently be the responsibility of the Government, which will increase its expenditures and in turn increase the budgetary imbalance of the preceding year.

It should be stressed, therefore, that if the above-mentioned investment efforts are not carried out, the economic growth of the coming years will be jeopardized. Furthermore, a substantial portion of such investment - namely the investment in reconstruction of basic infrastructure - should be made soon so as not to obstruct the process of economic recovery.

Improvement was foreseen in the public sector's financial situation for 1979 - the deficit should have been reduced by 44 million without considering extraordinary receipts - owing to an increase of 12.5 per cent in total receipts derived principally from foreign trade as a result of the increase in international prices for sugar, ferronickel and doré and the increase of imports subject to the payment of duties.

/Expenditures

Expenditures would have increased by only 3.8 per cent, mainly because of the reduction in capital outlays - (-8.8 per cent), especially in real investment, as may be seen in Table 19. However, in late August of this year, according to preliminary official estimates, it became obvious that these predictions were over-optimistic, since the fiscal apparent deficit of the Central Government amounted to 220 million dollars.^{7/} For the entire year the deficit will increase still more because of the new responsibilities assumed by the public sector deriving from the natural disaster and from its repercussions on Government receipts. In effect, it is estimated that the reduced economic activity and the financial difficulties being faced by numerous private enterprises and individuals will cause tax revenues to decrease by 39 million dollars. Taxes collected from foreign trade will also be less than estimated, both because of reductions in exports and because of the slower growth rate of imports subject to custom duties during the last four months of 1979. This, in turn, will be brought about by the replacement of certain goods by others of a more essential nature destined for the emergency (foodstuffs, machinery and spare parts), the taxes on which are much lower or even non-existent.

State corporations and agencies have requested the principal users of their services to make advance payment on a large part of their bills for their estimated consumption for the rest of the year as a means of financing rehabilitation expenses, as, for example, with regard to electric power and telephone service. For other corporations, the irregularity of the public services they are able to supply will also imply reduced income.

Operating expenses and capital expenditures will have to increase in order to make it possible to replace the productive capacity in several sectors, a situation that may be alleviated in accordance with the nature of external donations received. In addition, the emergency

^{7/} This deficit was compensated, nevertheless by 190 million dollars of foreign capital and by 38 million transfers for the Central Bank.

Table 19

DOMINICAN REPUBLIC: CENTRAL GOVERNMENT INCOME AND EXPENDITURES

(Millions of dollars)

	1977	1978	1979		1980	
			Initially budgeted	Revised after hurricanes	Initially budgeted	Revised after hurricanes
1. Current income	<u>620</u>	<u>578</u>	<u>663</u>	<u>632</u>	<u>780</u>	<u>670</u>
Tax revenues	589	552	621	595	738	631
Direct	126	129	143	149	185	151
Indirect consumer	140	144	160	170	182	173
On foreign trade	296	251	288	245	334	269
Others	26	28	30	30	42	39
Non-tax revenues	31	26	42	37	42	38
2. Operating expenses	<u>367</u>	<u>442</u>	<u>439</u>	<u>617</u>	<u>567</u>	...
Remunerations	180	229	264	313	311	...
Others	187	213	225	304	256	...
3. Current savings (1-2)	<u>137</u>	<u>213</u>	<u>225</u>	15	<u>256</u>	...
4. Capital expenditures	<u>250</u>	<u>239</u>	<u>218</u>	<u>402</u>	<u>224</u>	...
Real investment	170	148	103	165	118	...
Amortization of the debt	16	17	21	21		
Others	64	74	94	216	99	...
5. Total expenditures (2+4)	<u>617</u>	<u>681</u>	<u>707</u>	<u>1 019</u>	<u>791</u>	...
6. Fiscal result (1-5)	<u>3</u>	<u>-103</u>	<u>-44</u>	<u>-387</u>	<u>-11</u>	...

Source: CEPAL, based on information provided by the National Planning Office (ONAPLAN) and the National Budget Office.

actions that will have to be carried out during the last four months of 1979 will result in extra-budgetary spending in the neighbourhood of 114 million dollars. In this respect it should be mentioned that the Government has reduced new expenditures to a minimum by limiting non-essentials and has given greater attention to operating expenses and to replacing assets through the intensive use of manpower in reconstruction than to capital expenditures that would essentially depend on international foreign cooperation.^{8/}

In summary, it is estimated that in 1979 current income will diminish by 31 million dollars, in relation to the projected figures, and in 1980, by almost 110 million dollars, due to direct and indirect effects of the natural disaster. At the same time, total expenditures will increase by almost 312 million dollars during the present year and by an as yet unknown quantity next year, which leads to the estimate that the fiscal deficit will reach some 390 million dollars in 1979, instead of 44 million originally envisaged.

It is, thus, beyond any doubt that the natural disaster had, and will continue to have, very severe effects on the public finance equilibrium. At the same time, it has posed the Government a wide range of responsibilities in the emergency and the reconstruction stages.

^{8/} As a means of speeding up rehabilitation and reconstruction projects, the President of the Dominican Republic has been granted powers through Law No. 53 of 9 September 1979 to provide by Decree for transfers of budgetary allocations within the law on public expenditures or to allocate those funds required for special public administration expenditures. In doing so, he is bound only to inform the National Congress of such actions. This provision will be in force until 31 December 1979.

IV. EXTERNAL CO-OPERATION REQUIREMENTS

The Government has already taken efficient steps to provide for the immediate needs of the population for reconstruction of the damaged infrastructure and for recovery of the economy. Nevertheless, in view of the magnitude of the disaster, those actions require the support of the international community, whose co-operation should respond to certain basic criteria.

Firstly, although the emergency situation will obviously alter the priorities placed on public expenditures for some time, if possible, this additional and unforeseen demand against the public finances should not delay the government's investment priority programmes and projects planned beforehand. In other words, the rehabilitation and reconstruction expenditures should be conceived as additional and not substitutive to those contemplated in the current budget. This would have obvious implications on the magnitude of the financial external co-operation which the Dominican Republic will have to mobilize in the immediate future. Secondly, this co-operation will have to respond, of course, to the priorities set by the government itself, both in its 1980-1982 Public Investments Triennial Plan and in its emergency and reconstruction programmes. Thirdly, the fact that the country would be forced to mobilize a larger volume of foreign financing than that foreseen in its financial programming, implies that measures will have to be adopted to prevent a larger burden on the already high yearly financial commitments which are required to service the foreign public debt. Consequently, new loans must be granted at the maximum possible level of concession, and would justify, in addition, the transfers of funds as official donations. Finally, the possibility of avoiding the significant delay caused by the disaster in the programmes and projects included in the original above mentioned Plan, would depend to a great extent on the celerity of the actions taken to reactivate industry, to rehabilitate the damaged plantations, and to reconstruct housing and other

installations. In this respect, the international community should instill a great sense of urgency to their activities in the Dominican Republic during the coming months.

In the following paragraphs an outline is presented which describes the main requirements for international co-operation to cope with the emergency, including donations in cash and in kind; financing for reconstruction and for balance of payments support and, to a lesser degree, technical assistance for certain specialized tasks.

Table 20 summarizes and quantifies some of these requirements so that the international community may more easily identify the areas where its support should have priority.

1. Assistance during the emergency stage

Officials of the Civil Defence Office responsible for attending to the population's needs during the emergency period - which may extend to the end of 1979 - have formulated a list of immediate needs and availabilities and thus defined the priorities regarding the nature of the external co-operation they consider to be essential.

These priorities include food for the hurricane victims, especially the basic products making up the Dominican diet (see Table 21); zinc or similar metal sheets for reconstructing roofs of dwellings; seeds to plant the principal affected food crops (rice, red beans, potatoes, cassava and the like); and gasoline and diesel fuels and lubricants required to transport assistance to the more distant areas of the country.

Equipment would also be required for attending to different situations, such as bailing pumps to drain flooded areas thoroughly before new heavy rains arrive; tractors and other machinery to repair secondary roads, canals and irrigation works; electricity-generating plants to run coffee-processing plants that are presently without power and must initiate their operations in mid-October;^{1/} and Bailey-type bridges to facilitate the crossing of rivers on highways of vital importance.

Obviously, cash contributions could also be used so that the Dominican authorities could allocate funds to cover the priority needs of the moment.

^{1/} Unless electric power is available opportunely, part of the coffee harvest may be lost due to shut-downs in the coffee-processing plants.

Table 20

DOMINICAN REPUBLIC: EMERGENCY, RECONSTRUCTION AND REHABILITATION PROJECTS
THAT MAY REQUIRE INTERNATIONAL CO-OPERATION

(Thousands of dollars)

	Financial assistance		Technical assistance	
	Estimated amount	Possible sources	Estimated amount	Possible sources
1. EMERGENCY STAGE				
1. Supply, transportation and distribution of foodstuffs and clothing for the population affected	...	Governments, international organizations, private organizations	...	UN DRO UN HCR
2. Supply, transportation and distribution of construction tools and materials for housing and school buildings	...	Governments, international organizations, private organizations	...	UN IDO
3. Supply, transportation and delivery of tools, materials and minor equipment for re-establishing electrical and drinking water services	...	Governments, private organizations		
4. Supply, transportation and distribution of materials, vaccines and medicines for the health sector	...	PAHO/WHO, Governments, private organizations	...	PAHO/WHO
5. Cash donations for the purchase of food, medicine or other emergency inputs	...	Governments, private organizations, international organizations		
6. Medical assistance by means of brigades and field hospitals	...	Governments, private organizations		
7. Transportation and rescue services to evacuate victims and distribute assistance		Governments		
8. Acquisition, transportation and distribution of seeds and other agricultural inputs	...	Governments, international organizations		

/(continued)

Table 20 (Continued)

	Financial assistance		Technical assistance	
	Estimated amount	Possible sources	Estimated amount	Possible sources
9. Collaboration in emergency work to re-establish basic services			...	Governments, international organizations
10. Collaboration in assessment of damages and their impact on the economy and social welfare			...	International organizations
II. BALANCE OF PAYMENTS FINANCING				
1. Servicing of financing gap, 1979-1980	350,000	IMF, Central Banks, bilateral loans, multilateral loans		
2. Partial renegotiation of external debt	...	Creditors, bilateral sources	...	IMF
III. RECONSTRUCTION AND REHABILITATION STAGE				
1. <u>Agricultural sector</u>				
i) Financing of production	40,000	IDB, IFAD		
ii) Rehabilitation of plantations and infrastructure in sugar mills	55,000	IBRD, International banks		
iii) Rehabilitation of canals and irrigation and drainage works	15,000	IDB, IBRD, IFAD		
iv) Formulation of integral rural development programmes			...	UNDP/FAO
v) Recovery of avicultural activities	20,000	IDB, Governments, private enterprise		
vi) Replacement of agricultural equipment	4,000	RFA		
vii) Ecological recovery	...	Governments	..	UNEP
viii) Rehabilitation of the agricultural area of San Cristóbal			...	UNDP
2. <u>Transportation and communications</u>				
i) Reconstruction of roads, secondary roads, bridges and sewerage systems	30,300	Governments, IDB, IBRD		UNDP, UNIDO
ii) Rehabilitation of telecommunication systems	10,000	IDA		ITU,
iii) Replacement of motor vehicles and fishing and air fleet	...			

/ (continued)

Table 20 (Continued)

	Financial assistance		Technical assistance	
	Estimated amount	Possible sources	Estimated amount	Possible sources
3. <u>Housing and social infrastructure</u>				
i) Reconstruction and repair of dwellings	19,000	IDB, IBRD, Governments		UNIDO
ii) Construction programme of rural and urban popular housing	50,000	IDB, IBRD, IDA		
iii) Reconstruction and repair of school buildings	...			UNDP/UNESCO
iv) Construction, repair and reconstruction of health centres and hospitals	...	IDB, IBRD		UNFPA
v) Programme for equipping small rural communities				UNICEF
4. <u>Water and energy supply</u>				
i) Repair of aqueduct and sewerage systems	3,000	ICB	...	PAHO/WHO
ii) Reconstruction and repair of electrical systems	25,000	IBRD, IDB, RFA, EXIMBANK		
iii) Assessment of energy resources and energy balance, increasing of conventional and non-conventional energy resources			...	UNDP/CEPAL OTCD, UNIDO
iv) Support to CDE	40,000	Venezuela		
5. <u>Assessment of water resources</u>				
i) Strengthening of meteorological and hydrological services and networks			...	UNDP/CEPAL
ii) Assessment of available water resources and planning for their multiple and integrated use			...	UNDP/CEPAL
6. <u>Assistance to the government</u>				
i) Formulation of building codes appropriate to the situation			...	Governments, CHPB
ii) Assessment of the impact of the disaster on the ecology and quality of life and formulation of measures to mitigate its effect			...	UNEP

/(continued)

Table 20 (Conclusion)

	Financial assistance		Technical assistance	
	Estimated amount	Possible sources	Estimated amount	Possible sources
iii) Improvement of civil defence organization and procedures			...	UNDRO
iv) Promotion of non-traditional exports and development of free zones			...	UNCTAD/GATT CIPE, UNIDO
v) Determination of specific priorities on education				UNESCO, Government of Spain
vi) Revision of damages received by the industry				UNDP/UNIDO
7. <u>Financing committed but not yet allocated</u>				
i)	25,000 ^{a/}	IDB ^{b/}		
ii)	17,000	USA		
iii)	9,000	IDB, AID		

^{a/} Out of a total of 50,000.

^{b/} Funds from Venezuela.

2. Co-operation for reconstruction and development

(a) Financing

The Dominican Republic would require external credits and donations under suitable conditions to finance post-disaster reconstruction, to support its balance of payments and to implement the three-year public investment plan for 1980-1982.

Despite the fact that efforts were being made to generate funds internally for reconstruction^{2/} and that some measures have been taken to reorient certain loans already granted or being negotiated, the Government will require substantial external resources under the most concessionary terms possible.

As already indicated, external indebtedness - although high, as its accumulated value amounts to 1,300 million dollars - is still manageable since it represents 10 per cent of the country's exports of goods and services. Nevertheless, as it was already pointed out in the preceeding chapter, in the immediate future this item will present certain problems deriving from the fact that half of the public and private loans have been contracted with international commercial banks with amortization periods of less than eight years. This situation will result in an unusually high annual burden in 1979 and might compromise a significant portion of the foreign exchange required by the country for its economic development.

In view of the above, and although in the past the level of the principal development indicators placed the Dominican Republic out of the favourable concessionary financing clauses granted by the multilateral lending organizations, an exceptional treatment would now be fully justified until the country can overcome the abnormal situation derived from the disaster. On the other hand, although the government has already announced that in spite of the unforeseen events, it will

^{2/} Under the provisions of Law No. 52 of 9 September 1979, 40,600 "Hurricane David Emergency Bonds, series 1995" will be issued in the amount of 50 million dollars.

Table 21

DOMINICAN REPUBLIC: ESTIMATED FOOD DEFICIT FOR CONSUMPTION DURING
THE PERIOD FROM SEPTEMBER TO DECEMBER 1979

Type of food	Volume (t)	cif value (millions of dollars)
<u>Total</u>	<u>214.5</u>	<u>82.1</u>
Legumes	10.9	6.5
Potatoes	17.7	6.5
Plantains and bananas	56.1	20.7 <u>a/</u>
Chicken	18.3	23.8
Fresh milk	4.9	2.7
Wheat	27.4	4.1
Cooking oil	17.8	11.7
Miscellaneous <u>b/</u>	61.4	6.1

Source: Technical Secretariat of the Presidency, National Planning
Office.

a/ Potato values used.

b/ Includes fruits and agro-industrial products.

continue to strictly honor its international financial commitments,^{3/} and that the country will continue to enjoy its credit-worthiness, it might be necessary to partially reschedule the Dominican Republic's public sector debt with the commercial private banks.

In any case, it would be convenient if the Government could obtain greater access to external official financing - bilateral and multilateral - in order to reduce the relative participation of commercial loans in its total debt, since this would alleviate the servicing of such obligations, in view of the longer terms and lower rates of interest that prevail within official sources.

Timely financing under suitable conditions will be required for reconstruction and rehabilitation projects as a means of replacing infrastructure and rehabilitating services and of reinitiating production of export items that have been affected by the disaster. In this connection, offers have been received from several international financial institutions and from various Governments to provide new loans, and reallocate funds from other already-granted loans in order to apply them to what have now become priority activities. It would also be very useful for the Dominican Government if it could receive programme loans rather than loans for specific projects, a measure that would speed up disbursements.

Finally, the country will obviously need balance of payments support during the predictable future. It should have a timely access, under flexible conditions, to International Monetary Fund resources - in addition to the compensatory credit already granted by that institution - and Latin American central banks should consider the possibility of making foreign exchange deposits in the account of the Dominican Republic's Central Bank.

^{3/} With the exception of a Venezuelan loan granted in 1976 that required amortization in September, which the Government requested rolling over until December.

(b) Technical assistance

As occurs with financial co-operation, the natural disaster presents the Dominican Republic with additional needs for international technical co-operation, in addition to those originally foreseen, and which cover other activities which before the disaster were undoubtedly of lesser priority. In this respect, it would be fully justified, for example, if the Governing Council of the United Nations Development Programme assigned extraordinary resources to cover the unforeseen and additional demands for technical co-operation. Following this line of thought, other bilateral and multilateral sources could undertake co-operation programmes and projects connected with the task of reconstruction as well as with those comprised in the 1980-1982 Public Investments Triennial Plan.

A few activities are mentioned below, which, in view of the disaster, might constitute areas appropriate for international assistance. These are additional to those that the international community was supporting before the events of early September.

Firstly, it would be useful to assess the impact of the hurricanes on the ecology and quality of life and the means of mitigating its possible adverse effects, as well as to improve systems, procedures and organization to care for the population when natural disasters occur.

It would also be appropriate to prepare building codes that take into account the frequent occurrence of hurricane winds and torrential rainfall as a means of attenuating the effects of possible similar phenomena in the future.

It would further be particularly important to evaluate the country's conventional and non-conventional energy resources and to formulate a balance sheet of present and foreseeable sources and uses of energy in order to provide for their appropriate development.

It would be no less important to plan integral rural development projects that will assist in resolving the deficiencies of the rural population and take into account the new situation created by the recent disaster.

/In this

In this same vein, new technical co-operation activities connected with the reactivation of the productive sectors will have to emerge, especially in the fields of agriculture and industry. The renewed effort of the Government to generate foreign exchange also suggests the convenience of obtaining external assistance for those activities which the country is carrying out not only in the field of diversification but also to increase its exports.

Lastly, it would be desirable to continue the undergoing evaluation and planning of the development of water resources for multiple uses, especially with regard to irrigation, drinking water and the generation of hydroelectric power, and to improve meteorological and hydrological networks and services.