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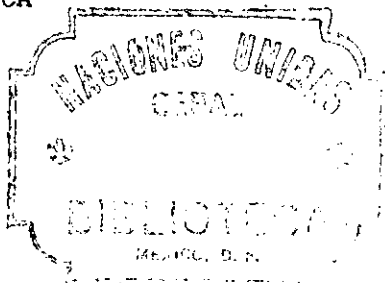
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ENGLISH ONLY

ECONOMIC COMMISSION FOR LATIN AMERICA

COMMITTEE OF THE WHOLE
13th special session
New York, 19 October 1979



REPORT ON THE EFFECT OF HURRICANE
"DAVID" ON THE ISLAND OF DOMINICA

(Note by the Secretariat)

Note: This document was circulated previously with the symbol E/CEPAL/PLEN.13/G.2.



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Background

A two-man Mission comprising the Regional Economic Adviser for the Caribbean (Leader), and the Agricultural Affairs Officer, both from the Caribbean Office of the Economic Commission for Latin America in Port-of-Spain, visited Dominica from 25 to 29 September to conduct an on-the-spot examination of the damage done by hurricane "David", to hold discussion with appropriate personnel, and to prepare a report. The Mission viewed the damage done in Roseau and some other parts of the island, and held discussion or attended meetings with the following persons:

- Mr. Oliver J. Seraphin - Prime Minister
- Mr. Atherton Martin - Minister of Agriculture, Lands and Fisheries
- Mr. Ferdinand Parillon - Minister of Home Affairs and Housing
- Mr. Trevor Gordon-Somers - Resident Representative UNDP, Guyana
- Mr. Belgrave Robinson - Permanent Secretary, Ministry of Education
- Mr. Osborne Symes, - Permanent Secretary, Ministry of Health
- Miss Judith Garraway - Acting Permanent Secretary, Ministry of External Affairs
- Mr. Vernon Shaw - Cabinet Secretary
- Mr. Arlington Riviere - Dominican Ambassador to the U.S.A and Co-ordinator Foreign Aid
- Mr. Wendell Lawrence - Executive Co-ordinator, National Reconstruction Commission
- Mr. Eardley Castor - Permanent Secretary, Ministry of Agriculture, Lands and Fisheries
- Mr. Michael Diese - General Manager, Dominica Housing Corporation
- Mr. Hubert Williams - Agricultural Adviser

- Mr. Colin Bully - Chief Agricultural Officer
- Mr. Patrick Pierre - Executive Secretary, Industrial Development Corporation
- Mr. Wentworth Harris - Acting Secretary Manager, National Planning Organization
- Mr. Cary Harris - Development Economist, National Planning Organization
- Mr. Vernon Martin - Engineer, Ministry of Works
- Mr. Julian Dowe - Mechanical Superintendent, Public Works Department
- Mr. Miodrag Petkovic - Team Leader, U.N Socio-Economic Planning Project
- Mr. Richard Acquaaah-Harrison - U.N. Physical Planning Adviser
- Mr. Jack Carsten - Red Cross League Co-ordinator

and personnel from Dominica Electricity Services. The Government of Dominica provided the Mission with a stenographer, Miss Mona George.

After leaving Dominica, the Team Leader held discussions in Barbados with the following:

- Dr. Lewis Campbell - CDB Co-ordinator of the Dominica Aid Programme
- Mr. Terrence Liercke - Programme Officer, U.S. Embassy
- Mr. Robert Delleré - Agricultural Adviser, Delegation of the Commission of the European Communities

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REPORT OF HURRICANE DISASTER IN DOMINICA

INTRODUCTION

The island of Dominica with a land area of approximately 300 square miles and situated between $15^{\circ} 10$ minutes and $15^{\circ} 40$ minutes north latitude and between $61^{\circ} 15$ minutes to $61^{\circ} 30$ minutes west longitude is at the northern end of the Windward Island group in the Lesser Antilles.^{1/} During the period from May to December, it is in the direct path of moist North East Trade Winds and experiences its highest rainfall with precipitation varying from 120" to 160" on the Windward coast and 70" and 120" on the Leeward.^{2/} The island's topography is marked by a central mountain massif which rises in the north to a peak of 4,747' at Morne Diablotin and in the south to a peak of 4,672' at Morne Trois Pitons.^{3/} This central massif is heavily wooded and the annual heavy rainfall results in numerous rivers flowing from the mountains towards all coastal areas. Due to the topography and steep slopes, most rivers are fast flowing, but their erosive potential is effectively contained at high altitudes by thickly forested mountain slopes. At lower levels, however, indiscriminate human habitation and land use practices have, over the years, caused much soil erosion. The main watershed areas are concentrated in the central portion of the island on the Windward and Leeward sides.^{4/} The combination of tropical temperatures and heavy rainfall result in vegetation whose main characteristic is a dense primary forest which covers the central mountain range and is surrounded at lower slopes by secondary forest. Most cultivation occurs in low lying areas around the coast particularly in the north and south-west of the island.^{5/}

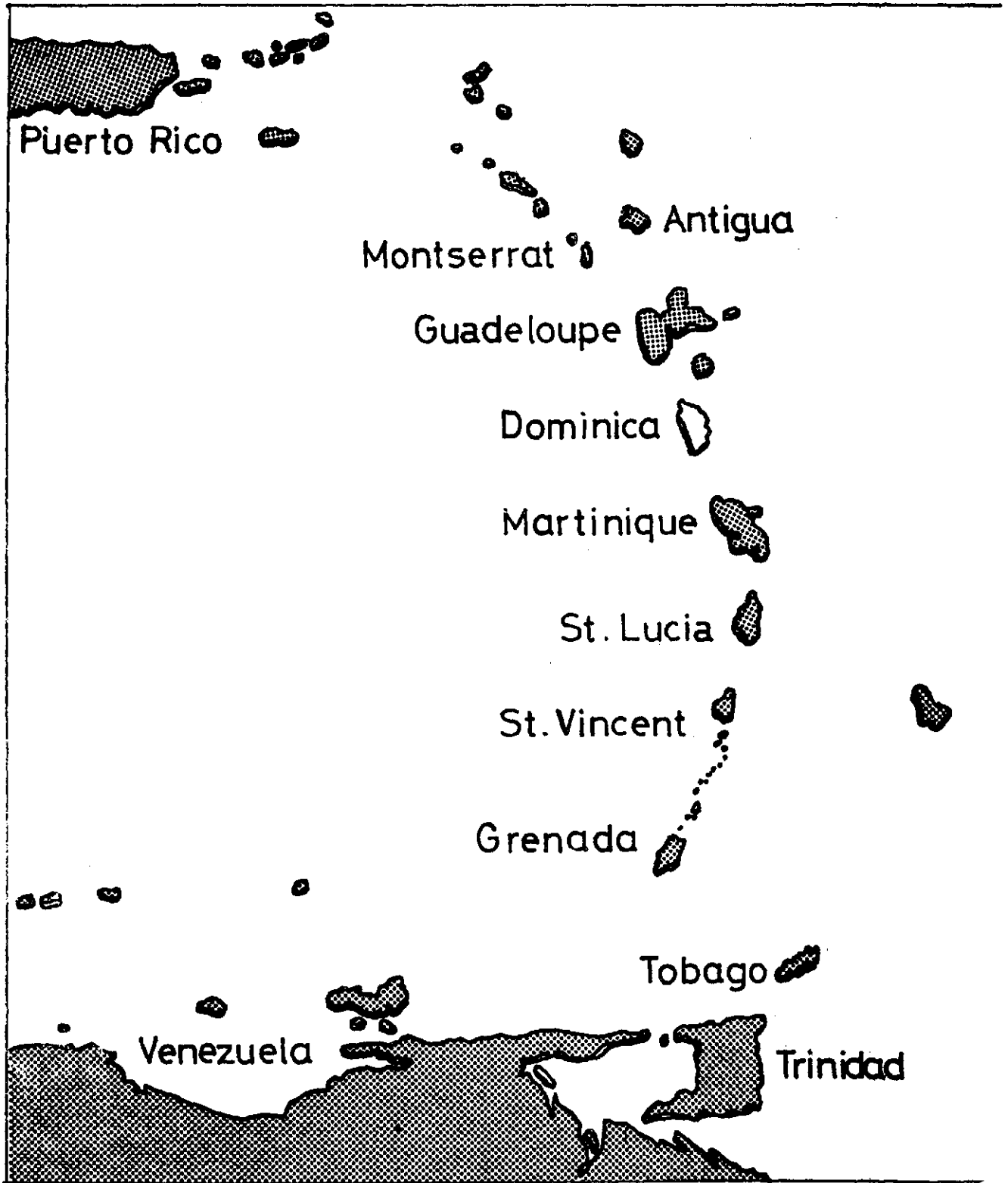
1/ See figure 1

2/ See figure 2

3/ See figure 3

4/ See figure 4

5/ See figure 5



DOMINICA IN EASTERN CARIBBEAN SETTING

DOMINICA RAINFALL

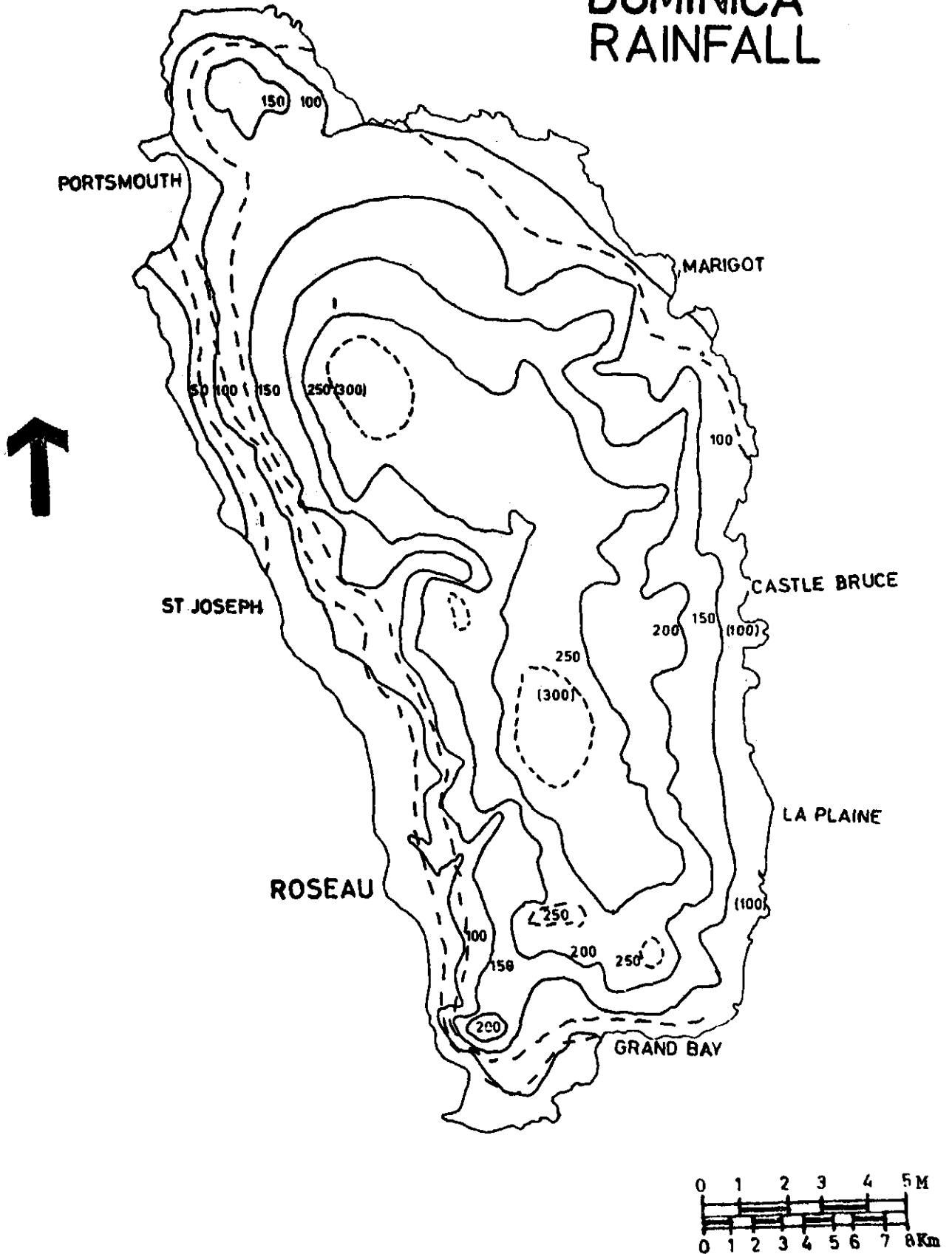


FIG. NO: 2

DOMINICA ELEVATIONS

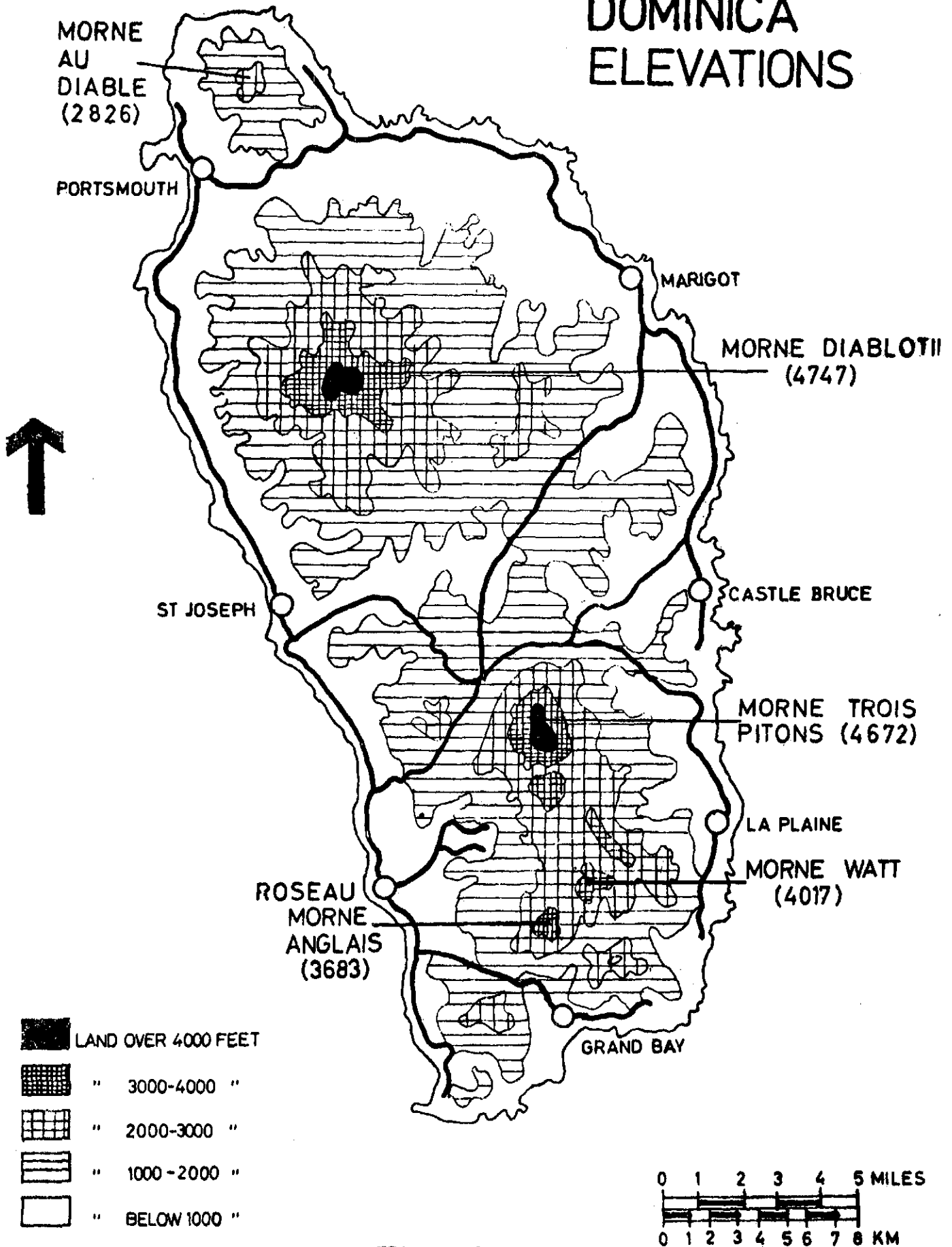
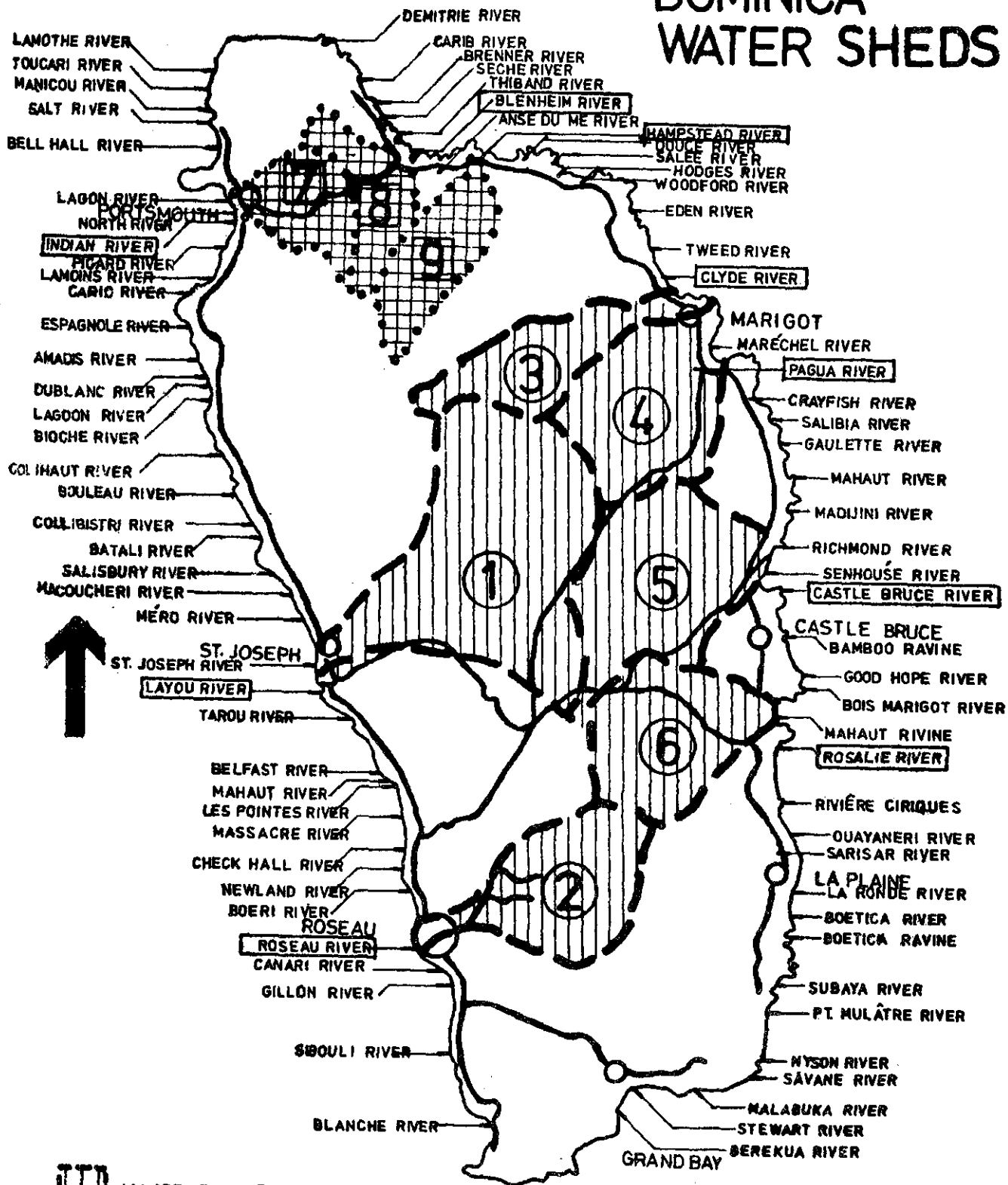





FIG. NO: 3

DOMINICA WATER SHEDS



-  MAJOR BASINS
-  MINOR BASINS
-  RIVER MOUTHS

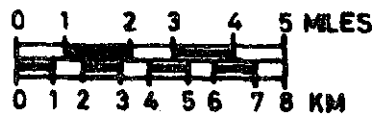
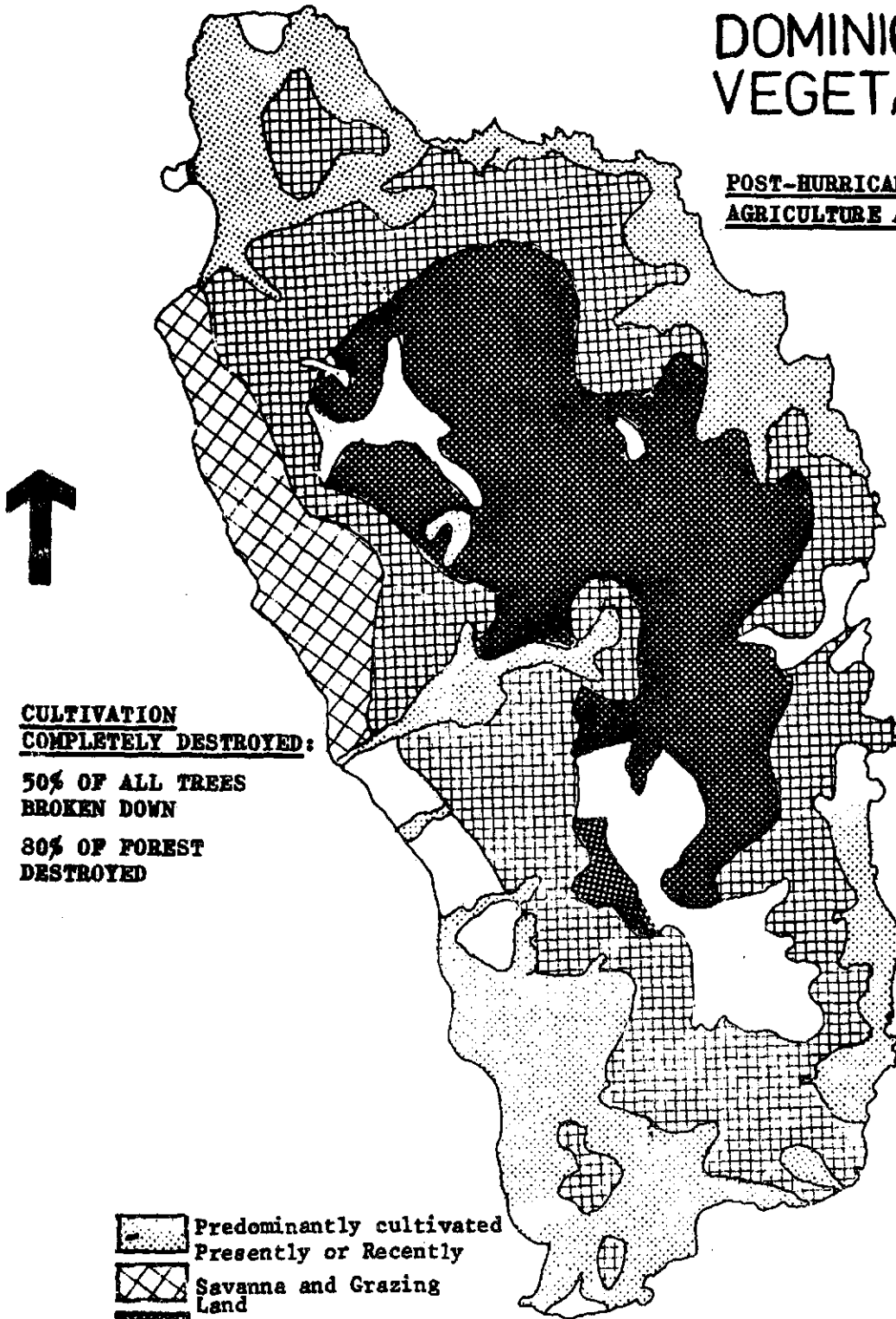


FIG. NO: 4

DOMINICA VEGETATION






POST-HURRICANE DAMAGE
AGRICULTURE AND FORESTRY



CULTIVATION
COMPLETELY DESTROYED:

50% OF ALL TREES
BROKEN DOWN

80% OF FOREST
DESTROYED

-  Predominantly cultivated Presently or Recently
-  Savanna and Grazing Land
-  Rain Forest
-  Secondary Forest
-  Mountain and Woodland

SOURCE: MINISTRY OF AGRICULTURE

PREPARED BY
THE NATIONAL PLANNING ORGANISATION

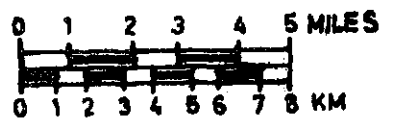


FIG. NO. 5
September 28th, 1979

Population distribution

2. Because of its mountainous features, the island's population resides mainly in clusters around the coasts. The largest concentration is at Roseau, the capital, and its environs, with a total population of 20,000 persons. Portsmouth at the north-western section of the island is the second largest town with a population of 3,000. The remainder of the island's 77,000 inhabitants is distributed in small population clusters, most of which are to be found along the eastern and western coast.^{6/}

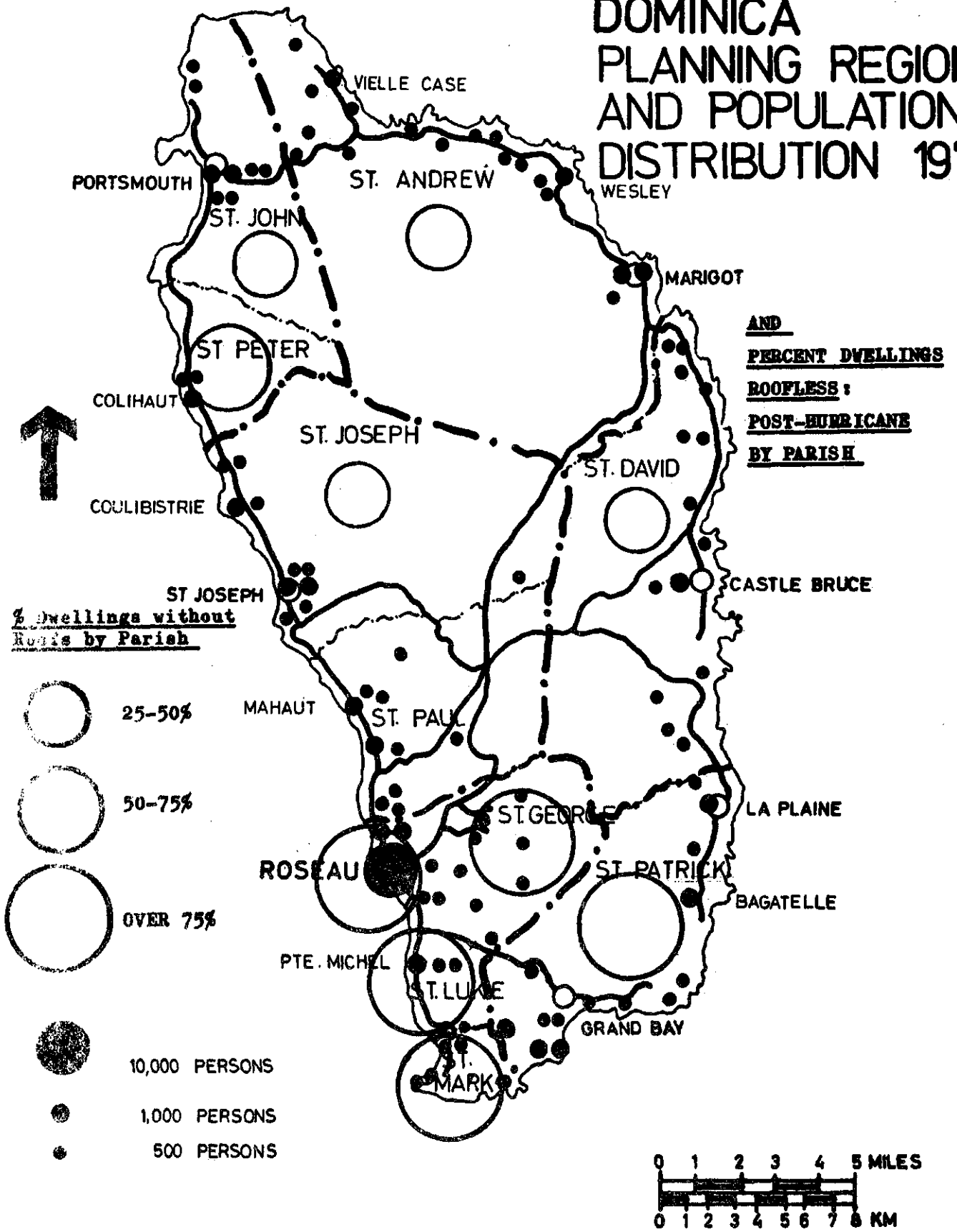
The island's economy

3. Gross domestic product at 1977 market prices declined between 1972 from EC\$107.5 to \$90.4 (US\$33m.) in 1977. The most important and sensitive component of the GDP is the agricultural sector. Its real share in the GDP showed only a modest rise from 35% to 37% between 1975 and 1977, occasioned mainly by volume and not price increases in agricultural exports. This sector also employs 36% of the island's labour force.

4. The island's balance of payments position is not a healthy one. In 1977 its imports and exports of goods were respectively 66% and 42% of GDP. A negative trade balance has been a feature of the economy since the beginning of the current decade, so that the country has been heavily dependent on external sources of supply while at the same time relying almost wholly on earnings from its major export crop - bananas. The deficit in the country's current account has been financed mainly by inflows of public capital and occasional trickles of private capital, thus the country's international reserves are usually very low.

^{6/} See figure 6

DOMINICA PLANNING REGIONS AND POPULATION DISTRIBUTION 1970



September 28, 1979

FIG. NO: 6

5. The preceding macro-economic description of the economy does not accurately reflect the high degree of dependence of the population on agriculture and other biological resources for their livelihood, because there is a large subsistence sector for which only very inadequate guesstimates can be made. The mass of the population in Dominica depends on agriculture, hunting and fishing activities for their livelihood, and the quality of life they can attain from these activities is largely dependent on maintenance of nature's ecosystem resulting from the country's topography, rainfall and geophysical characteristics. Any disturbance of these basic natural features of the island must result in severe interruption of the normal way of life of the population.

Economic infrastructure

6. Heavy dependence on exports of agricultural produce makes an efficient road system a factor of great importance for transport of produce to coastal ports. Because of the island's topography, main roads are coastal with connections between the east and west coasts crossing the central mountain range. There are numerous feeder roads which facilitate movement of agricultural produce to main roads for transport into urban areas and for shipment overseas. Due to heavy rainfall and natural forest characteristics of the island, most of these roads are bordered by large forests, and heavy erosion during the wet season often makes them impassable.

THE NATURAL DISASTER

7. On Wednesday 29 August, 1979, the island was struck by a hurricane, code name "David", which attained wind speeds well in excess of 150 miles per hour, with accompanying tornadoes which circulated in and around the island from 11 a.m. to 5 p.m. The whole island suffered severe damage and was declared a disaster area by the Government.

Loss of life and injury

8. Twenty-five (25) lives were lost on the day of the disaster and by mid-September an additional 17 deaths had occurred as a result of injuries and exposure. The total number of deaths resulting from the hurricane was therefore 42. Seven persons have not been accounted for. In addition, over 2,000 persons were treated by medical personnel for injuries sustained.

Infrastructural material losses

Housing

9. A survey of houses by parish conducted within one week of the hurricane revealed that the proportion of houses which were either roofless or completely destroyed ranged from 20% in St. Peter to 80% in each of the four parishes of St. George, St. Luke, St. Mark and St. Patrick. Included in the destruction of dwellings is over 90% of low cost housing which had been erected over the past five years.^{7/} In Roseau, the capital, 75% of all dwellings were damaged, most of them beyond repair. In the island as a whole, 78% of the population was rendered homeless by destruction of housing accommodation.

Education

10. Nineteen (19) primary school buildings with an enrolment of 3,746 pupils were completely destroyed. Minor damage was done to twenty-one (21) buildings which served 6,121 pupils, and an additional twenty-one (21) buildings used by 9,720 pupils suffered major damage.^{8/} The furniture in all these schools has been destroyed.

^{7/} See Appendix I for details

^{8/} See figure 7 and Appendix II

11. All secondary and technical school buildings suffered severe damage and science laboratories were destroyed. Text books, libraries and furniture used by teachers were all destroyed. In short, the country now has no educational infrastructure and there are very limited facilities for providing formal education to the school-age population.

Health

12. The island has five hospitals located at Roseau, Portsmouth, Marigot, Grand Bay and Stock Farm. All these buildings suffered extensive damage and are now either roofless or completely destroyed. Medical stores and facilities were damaged and most drugs were lost. In addition to the destruction of hospital buildings, forty-four (44) health centres and clinics distributed all over the island suffered severe damage and there was heavy loss of medicine and equipment stocked at these centres.^{9/} Ambulances were destroyed and the mobile dental unit was also damaged. In sum, the island's 21 doctors, 1 dentist and 239 nurses and nursing assistants have lost the medical infrastructure and drugs needed to attend to persons in need of medical attention.

Government offices

13. The main administration building in Roseau suffered severe damage, and is in need of immediate repair for the country's administration to function efficiently. All government offices located throughout the island suffered severe damage.

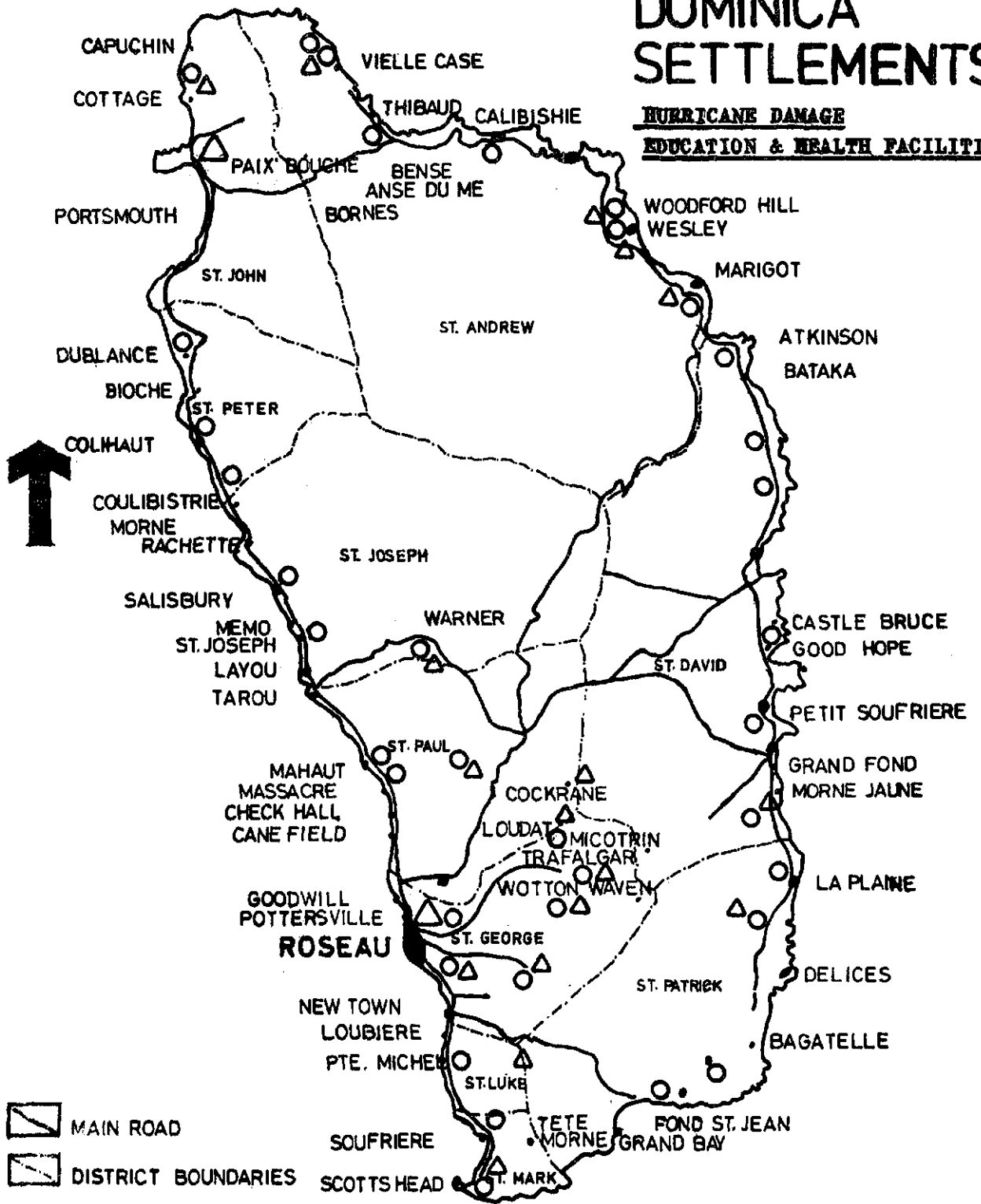
Port facilities






14. A deep water port at Woodbridge Bay near Roseau which was completed with CDB and CIDA finance in 1978 suffered substantial damage

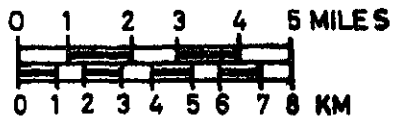
^{9/} See figure 7

DOMINICA SETTLEMENTS

HURRICANE DAMAGE
EDUCATION & HEALTH FACILITIES



-  MAIN ROAD
-  DISTRICT BOUNDARIES
-  HOSPITALS DAMAGED
-  HEALTH CLINICS/CENTRES EXTENSIVELY DAMAGED
-  SCHOOLS DESTROYED



SOURCE: MINISTRY OF EDUCATION & HEALTH

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FIG. NO: 7

September 28th, 1979

to the reclamation area containing port buildings and facilities. Wharf facilities in Roseau were destroyed including adjacent sheds and buildings.

15. At Portsmouth, the only other port in the island, jetties have been destroyed.

Roads and bridges

16. All roads and most bridges in the country were damaged by the hurricane. Steel structures of bridges have been twisted and bridge foundations have been undermined by flood waters and boulders brought down from mountain slopes. Many roads were blocked by landslides and fallen trees and road communication between the single airport on the North-east of the island and the capital was cut off. The main road connecting Roseau and Portsmouth was washed away in parts and communication is only now possible by a hazardous sea passage. In the north-east and southern sections of the island parts of main roads have also been washed away.

17. Of the 230 miles of asphalted road in the island, 200 miles are now in poor condition as a direct result of hurricane damage. The remaining 240 miles of road, which either have laterite cover or are unsurfaced, are more or less unusable because of landslides, gullies and tree blockages.^{10/}

Electricity^{11/}

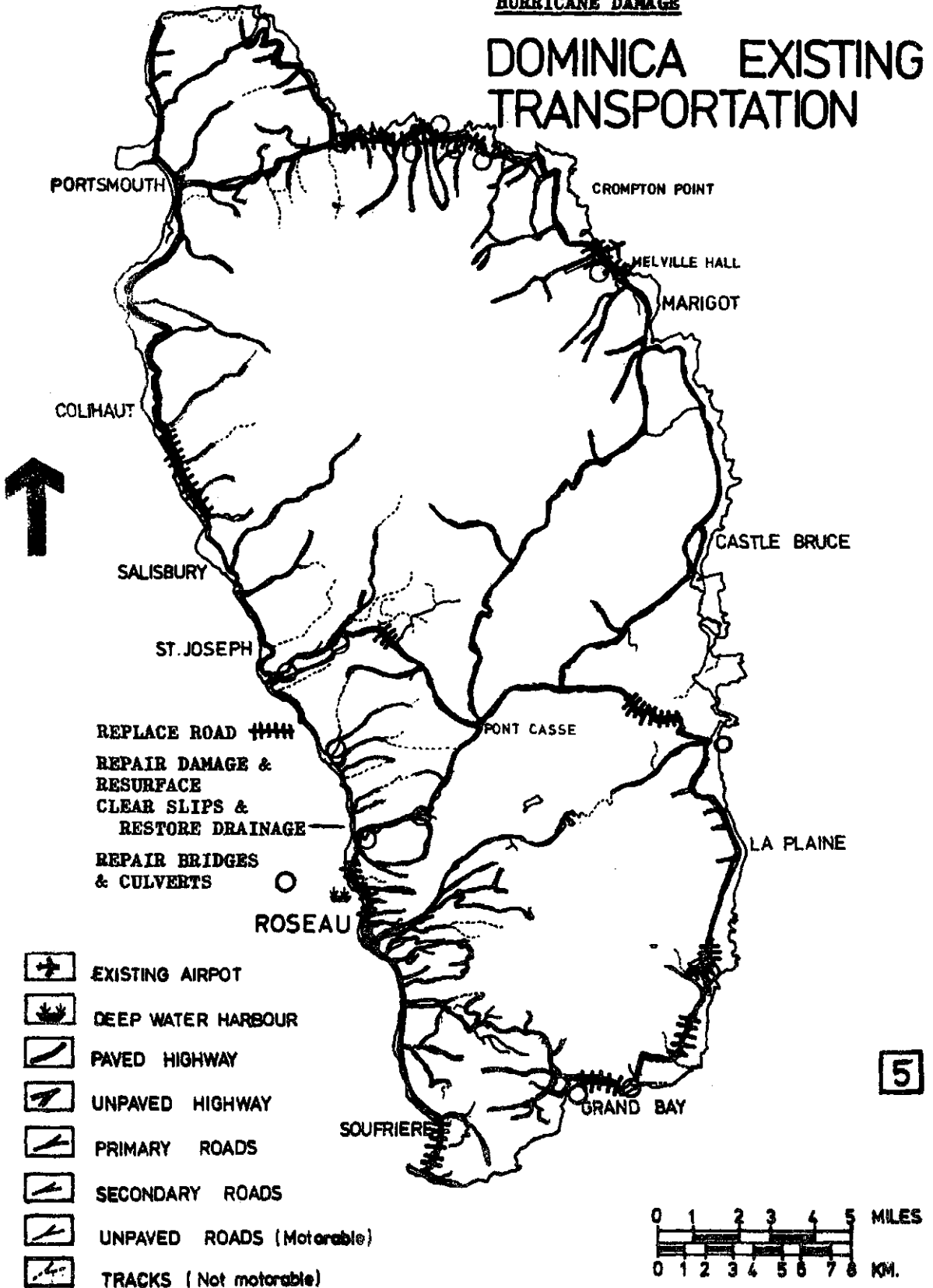
18. The installed capacity at the time of the hurricane was 6,700 kws of which 43% was hydro. This hydro capacity supplied 78% of power generated in 1978. The installed diesel capacity was used primarily for peak local generation. The hurricane did extensive damage to the key

^{10/} See figure 8

^{11/} See figure 9

HURRICANE DAMAGE

DOMINICA EXISTING TRANSPORTATION

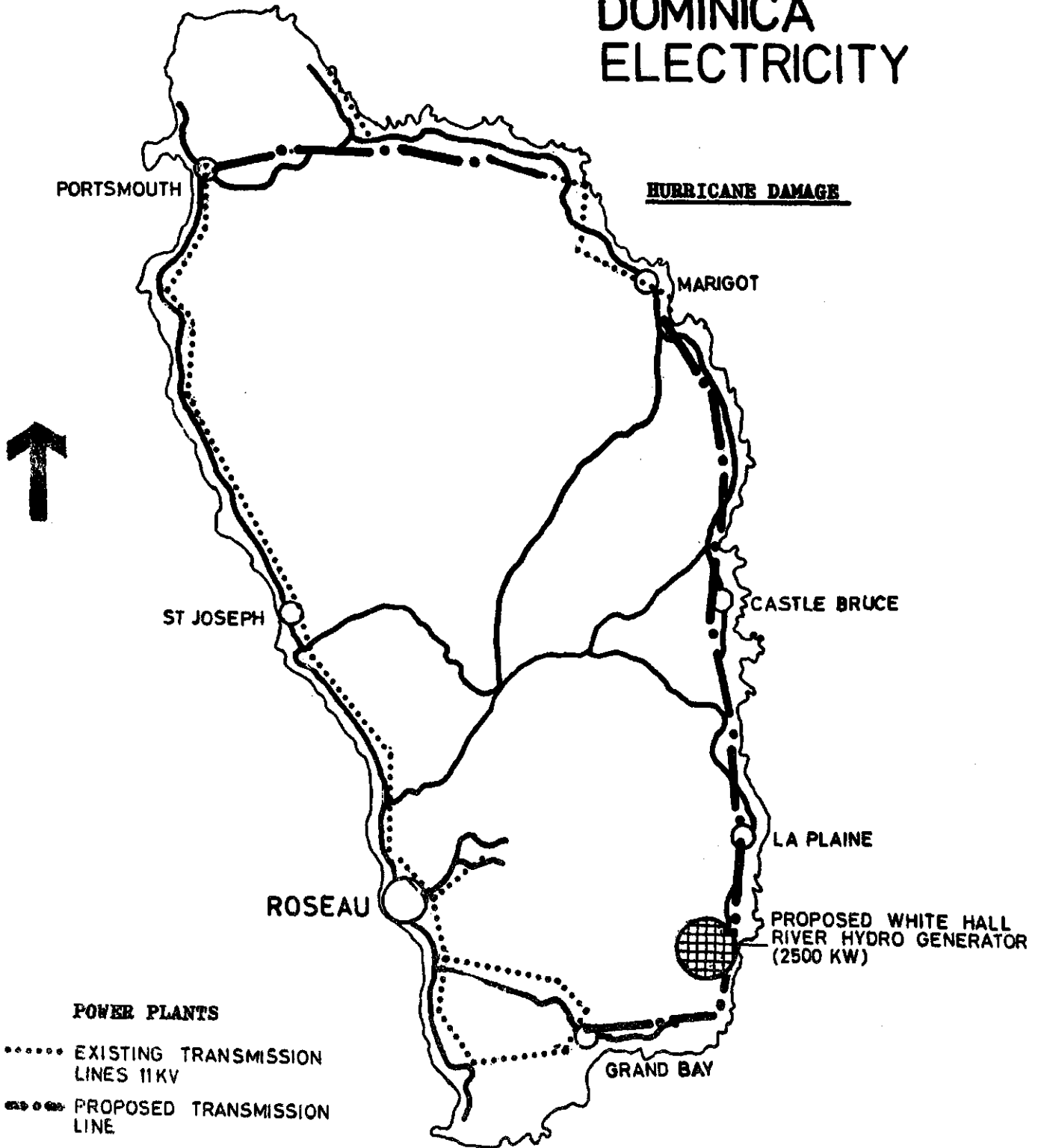


SOURCE: ISLAND ENGINEERING GROUP LTD

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FIG. NO. 8
September 28th, 1979

DOMINICA ELECTRICITY



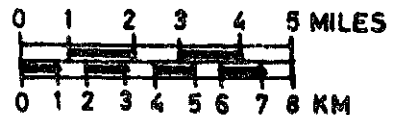
POWER PLANTS

- EXISTING TRANSMISSION LINES 11KV
- -- PROPOSED TRANSMISSION LINE

NOTE

NEARLY ALL LINES AND TERMINAL FACILITIES BROKEN DOWN

September 28, 1979



generating stations at Trafalgar and Padu and sub-stations and consumer connections were severely impaired. Extensive damage was also done to high and low tension lines, particularly in the south of the island. The island is without electrical service following the hurricane devastation and in some areas this has affected the water supply.

Water

19. The island's water supply which is provided mainly by gravity flows, was contaminated by pollution of rivers and streams.

Telephone, radio and external communications

20. All these communication services broke down and there has been extensive damage to overhead wires and some damage to underground cables. The island was, for a period, completely cut off from communication with the outside world.

Agricultural and other biological damage

Crops^{12/}

21. The hurricane did severe damage to the island's economy by the havoc wreaked to agricultural production. Some crops in Northern Coastal districts survived, but in the south destruction was total. The banana crop has been totally destroyed and there will be no exports before the second quarter of 1980. Average weekly payments to growers for the first 8 months of 1979 were EC\$155,000. This provides a rough estimate of the loss of purchasing power to farm families for the next 8 to 9 months.

^{12/} See Appendix III

22. Coconut production was severely damaged. There are now only approximately 40% of bearing coconut trees standing in the 8,500 acres that were under crop cultivation. Future yields of standing trees are however uncertain. The estimated loss from the hurricane is 8.2 million mature nuts, valued at EC\$1.3 million. Estimated farmer earnings for 1979 were over EC\$4.0 million, and projected foreign earnings were in excess of EC\$5.0 million. Since coconut rehabilitation is a long-term exercise the island may earn little foreign exchange from exports of this commodity over the next decade.

23. Citrus fruit (limes, oranges and grapefruit) acreage under cultivation was approximately 5,000 acres at the time of the hurricane. Over 50% of production has been completely destroyed and the remaining acreage was severely damaged. The estimated loss of fruit is in the region of 17,000 tons valued at EC\$11.0 million. Cocoa, a minor but important exporting crop, had 1,100 of its 1,200 acres destroyed by the hurricane. The estimated loss in terms of tonnage is 450 tons at an estimated value of EC\$2.3 million. The rehabilitation programme to bring these crops back to levels of production attained before the disaster will take at least ten years and during this time the country's foreign earnings capacity will be seriously affected.

24. Other crops such as bay leaf, cinnamon and other spices suffered severe damage. Export of these products will be considerably reduced.

25. Domestic food supplies have been very hard hit. It is estimated that ground provisions, food trees, fruit and vegetable production covered approximately 6,000 acres of cultivation. All food and fruit trees have suffered substantial damage, and 50% of ground provision and vegetable provision has been lost.

26. This will result in a shortfall of 10,000 tons of food which, under normal conditions, would have been available over the next eight months. The full effect of these food losses are just beginning to be felt and it is expected that the situation will worsen over the next six months unless immediate steps are taken to increase domestic food supplies.

Fertilizer loss

27. A recent application of fertilizer to banana plantations has been washed away by heavy rains and stocks held by farmers have been destroyed.

Agricultural infrastructure

28. Support systems for the banana export industry have been severely damaged. Of 27 boxing plants 17 have been completely destroyed, 10 have suffered damage, and only 5 are now serviceable.

29. Commercial vehicles which transported contract bananas to export points have been severely damaged, and so too have been banana loading facilities. Feeder and on-farm road damage has been extensive all over the island, and it will now be impossible to get much agricultural produce to market. The Marketing Board which handled most agricultural exports has been destroyed. Many transport vehicles belonging to the Ministry of Agriculture were destroyed and so too were the garages. Many agricultural tools and equipment were also lost.

30. The destruction of farm housing has been very severe and this will affect the capacity of large farmers to accommodate farm labour thus slowing down the pace of farm rehabilitation.

31. The propagation station and plant nurseries have also been destroyed, and the agro-industrial laboratory where there was an on-going programme for developing the island's agro-processing capabilities has suffered severe damage and product losses. The island's Botanic Gardens, where many rare tropical plants were nurtured has also experienced severe loss.

Horticulture

32. The island had developed a thriving horticultural industry exporting anthurium lilies and other household ornamental plants to the United States and Europe. This industry has also been destroyed.

Fisheries

33. The fishing industry usually provides a high percentage of protein requirements of the population, particularly among the rural population. There has been a 75% loss of boats in addition to boat building installations, and this will affect domestic protein supplies for some time to come. The high winds and rough seas also caused severe damage to coral reefs, thereby affecting the marine environment. Special steps will have to be taken to improve fish supplies in the immediate offshore waters.

34. The Fish Breeding Programme which was based on the development of Tilapia, and multiplication of private fish farms has been completely destroyed by flood waters and all fish ponds both public and private will have to be rebuilt and restocked.

Livestock

35. The island's livestock industry is small, but comprises over 20,000 head of cattle and small stock excluding poultry. About 10,000 animals are slaughtered annually. Many cattle and small stock were lost by flood waters and it is expected that this will seriously affect the supply of animal protein over the next 5 years. There was also substantial

loss of yard poultry which will further deplete protein supplies of both meat and eggs for most of the rural population. Additional shortages will occur due to loss of milk from cows and goats. It is expected, therefore, that hurricane damage will affect supply of animal protein severely and special steps will have to be taken to correct these deficiencies.

36. The single Government Stud Farm was severely damaged and 30% of animals were lost. Some of these were breeding animals and therefore this will interrupt the Government animal production programme.

37. There has been extensive damage of the poultry industry, the three largest farms having suffered severe damage and most animal housing facilities have been destroyed.

Forestry

38. One of the most severe blows struck to the island's economy by the hurricane is the destruction of the country's forest, and consequent loss of top-soil and cover of hydrographic basins. The 150 m.p.h. winds uprooted large trees in the central massif, debarked, decapitated and defoliated most of the trees and destroyed animal and bird wild life. The estimated 75,000 acres under forest cover has lost most of its standing commercial trees. There is an immediate need to extract timber which is now lying on the ground. Since most of these trees destroyed, particularly Gommier and Carapite, were long standing and regeneration will take many decades, it is likely that a re-forestation programme will have to be designed with new forest species

Industrial sector

39. This sector consisted of over 50 manufacturing establishments producing agro-industrial, construction, and light consumer goods. They provided direct employment to over 1,000 persons, 5% of the working population. All these plants were damaged by the hurricane, some of them are beyond repair.

Commercial sector

40. Most of the island's commercial facilities are located in Roseau. The damage done by the hurricane was severe. Most of the buildings had their roofs blown off and many steel structures were twisted by high winds. There was extensive damage to merchandise, followed by looting. This sector employed more than 3,000 persons, most of whom will be unemployed for some time to come.

Transport

41. Many motor vehicles - both public and private - were damaged by the hurricane and some of them are beyond repair. The motor firms which supplied parts were looted and therefore repairs and maintenance will be difficult to effect.

42. It is not possible at this stage to quantify the effect which hurricane "David" will have on labour supply for agriculture and reconstruction or to indicate its effect on the morale and general work attitudes of the working population. The hurricane's damage has been not only physical but also moral; for the island had not experienced such damage within living memory, and it was generally believed that its location at the northern end of the Windward chain placed it outside of the path of severe winds. Quite apart from the task of patching up houses which were never, in the first instance, constructed to withstand high winds, the population has also to turn its attention to the immediate requirement of ploughing and sowing agricultural stock in order to provide foodstuff in the shortest possible time. Moreover, long-term crops such as coconuts, cocoa and citrus will call for greater moral strength than the cultivation of such relatively short-term produce like bananas, plantains, and ground provisions. The population may well take a few months to overcome the trauma resulting from the hurricane devastation, because the society had never before experienced such a severe shock.

THE EFFECTS ON THE ECONOMY

43. In 1978, 37,181 tons of banana exports yielded EC\$25 million of foreign earnings, \$13.4 million of which were paid out to farmers. During the period 1 January to 24 August, 1979, exports of 14,900 tons of bananas earned EC\$11 million of which \$4.6 million were paid to farmers. The estimated loss for the remainder of 1979 from the banana trade is EC\$13.0 million, and the purchasing power of farmers will be between \$6 and 7 million less than it was in 1978. Heavy losses in domestic food supply will result in increased dependence on imported foods. This, together with losses in foreign earnings from commodity exports and tourism will worsen the country's balance of payments position.

44. Furthermore, together with financing increased imbalances in current account, there will be need for inflows of substantial public capital in order to activate rehabilitation and regeneration programmes.

45. The government's revenue position has been in deficit for most of the past decade, and there has been heavy dependence on budgetary grants from overseas to meet current central government expenditure. This heavy dependence on grants has continued despite increases in local revenue from \$12.5 million in calendar year 1972 to \$27.6 in the fiscal period July 1978 to April 1979. Increased revenues in the latter period were in part due to increases in indirect tax rates and the introduction of new taxes, but there were corresponding increases in expenditure resulting in a deficit of EC\$17.9 in the July 1979 - April 1979 account. Under existing circumstances government tax receipts, both direct and indirect, will be severely reduced during rehabilitation of the economy.

46. The expenditure side of the equation does not leave much room for manoeuvre. Wages, salaries, pensions and other transfers were 63% of current expenditure in July 1978 - April 1979.

47. The country's need for external financing both for balance of payments requirements and for central government management cannot be established at this juncture, but it will be heavy and the period of dependence will most likely be not less than ten years.

Immediate rehabilitation requirements

Housing

48. The extensive damage done to the housing sector has left thousands of families homeless or living under conditions exposed to the elements. In order to overcome this immediate problem half a million sheets of 7' galvanized sheeting are required for domestic housing. In addition, in order to repair other damages, estimated lumber requirements are 5,115,200 bf. (2x4x20) and 415,800 bf. (2x4x14). Additional material will be required for non-residential and public buildings.

Health

49. Immediate repairs need to be carried out to all hospitals and health centres. This will require both roofing material and lumber. New beds and mattresses are required as well as immediate supplies of drugs and instruments.

Roads

50. Feeder roads to agricultural farms need to be cleared immediately so that farmers can reap existing produce and sow new seeds and cuttings before termination of the current rainy season in a few weeks time. Main roads which have been washed away need urgent attention to facilitate movement of building material and agricultural inputs to areas where these are needed for rehabilitation. See Appendix IV for estimated cost of rehabilitation and reconstruction.

Schools

51. There is a need for immediate action to provide schooling facilities both for primary and secondary school children.

Agriculture

52. Immediate action needs to be taken to provide seed, planting material and other inputs in the short-term so that domestic supplies of food will be available in the shortest possible time.

Public buildings

53. Government offices suffered severe damage from the hurricane and immediate steps need to be taken so that the administration can manage the affairs of the country efficiently.

Medium and long-term requirements

54. Most of the infrastructural damage done to housing and urban centres call for massive reconstruction of roads, urban re-development with consideration of construction of houses which will be better able to withstand severe winds. Sea defences need to be re-examined so that roads will be better protected from occasional swells. With respect to agriculture, the main exports crops - bananas, coconuts, citrus, cocoa and spices will need massive inputs of capital to raise production to pre-hurricane levels. Many government buildings and schools will need to be completely re-built, taking into consideration the country's exposure to natural disasters.

Administrative support systems

55. The tasks of rehabilitation and reconstruction will place severe strain on the existing administrative structure, and therefore special consideration has to be given to ensure that the country gets maximum returns from aid and technical assistance. The Government fully

appreciates the need for administrative support personnel, and the Mission was informed by the Chairman of the National Committee for Reconstruction that arrangements are being made for recruiting co-ordinators with the assistance of the Commonwealth Fund for Technical Cooperation and the UNDP Resident Representative for Guyana.

EXTERNAL RELIEF AND REHABILITATION

56. One of the first actions taken by the Government was to set up a Relief Committee under the Chairmanship of the Minister of Home Affairs and Housing. This Committee was responsible for coordinating, where necessary, the activities of external aid donors, and ensuring efficient distribution of food and other supplies. Personnel from the United Nations Relief Organization gave valuable assistance to this Committee.

57. There was immediate response from other member countries of the United Nations following appeals from the Government for help. Immediate assistance came from the United Kingdom, the United States, France, Holland, Venezuela, Jamaica, Barbados and Trinidad. The types of relief provided were: rescue work, road clearance, emergency hospital repairs, restoration of water storage facilities, provision of emergency medical supplies and services, provision of shelter and bed supplies, installation of water purification units, air-lifting services, establishment of external and internal telecommunication facilities, provision of heavy earth-moving equipment, garbage clearance, establishing coastal sea linkages and provision of stand-by generators and chain saws.

58. Short-term emergency food supplies were provided by the EEC. These consist of 200 tons of milk to be delivered as follows: 100 tons in September and 50 tons each in the months of October and November. The EEC has also approved EC\$1 million for other supplies. Short-term food supplies have been consigned by the U.S. Department of Agriculture through Catholic relief services for distribution by the Dominican Food Task Force. In the initial phase, 160 tons will be airlifted in early October and then sea supplies will be provided at the rate of approximately 500 tons per month, phasing out between the sixth and ninth month. These will be basic supplies such as rice, flour, fortified dried milk and vegetable oil. It is expected that as U.S. food aid phases out, supplies from the World Food Programme will be made available. The Canadian Government has also promised to provide food supplies to the value of approximately Can. \$ 1 million before the end of the year.

Agriculture

59. In its rehabilitation programme, Government sought immediate aid in seed and planting material for short-term crops in order to improve the domestic food supply situation at the earliest possible time. 2,700 acres of land have already been earmarked for cultivation of these crops and it is expected that harvesting will begin by March 1980. U.S. AID has undertaken to supply over 30,000 lbs. of seed for peas, beans, corn and vegetables. The programme for rehabilitation of the main export crops is as follows:

Banana - approximately EC\$ 10 million which the Government expects to receive under the STABEX programme, will be utilized as follows: EC\$ 7 million for inputs, EC\$ 3 million for labour. Funds to the tune of approximately EC\$ 8 million have been requested from the British Development Division (BDD) through WINBAN. The purpose of this assistance is to improve acreage yields. At present, these are in the region of 4 - 5 tons per acre as compared to 14 tons per acre in neighbouring Guadeloupe. The International Monetary Fund (IMF) has offered assistance similar to that under STABEX to the tune of approximately US\$ 3 million of which \$.6 million is to be a grant and the remainder a loan.

Coconut - the Canadian International Development Aid (CIDA) had approved assistance to this industry prior to the hurricane. It provided assistance in plant material, fertilizer, labour and infrastructural provisions for copra processing. The Canadian programme is now under review. The whole rehabilitation programme for this industry calls for development of 5,000 acres under production in a 10-year period. The estimated fertilizer requirement for this programme is 2,000 tons and it is anticipated that coconut production will return to pre-hurricane levels in the tenth year.

Citrus - this rehabilitation programme which applies mainly to grapefruit, oranges and limes, will call for re-establishment of 2,500 acres over a 5-year period. The estimated fertilizer requirement is 2,000 tons. The Canadian Government has approved a diversion of a

fertilizer which it had previously given to Dominica for immediate use in rehabilitating citrus crop production. However, further assistance will be required to achieve government goals.

Cocoa and other tree crops - the estimated acreage to be rehabilitated is 2,000 acres and fertilizer over a 5-year period will be approximately 1,200 tons.

Veterinary supplies - the Canadian Government has undertaken to provide equipment, drugs, chemicals, etc., to the value of approximately Can. \$15,000.

Forestry - the Canadian Government has agreed to provide 4 foresters and USAID is fielding a forestry team in cooperation with the Caribbean Agricultural Research and Development Institute (CARDI).

Electricity

60. The preliminary survey conducted by the Dominica Electricity Service estimated that the sum of EC\$13 million will be required to re-establish the country's electricity system. The immediate needs for Phase I of the rehabilitation programme which, it is expected can be done in 6 months, will cost EC\$2 million. This will, among other things, provide Roseau with electricity. Prior to the disaster there were plans for supplying the eastern half of the island with electricity, but these plans are now in abeyance. There is no indication at present of how re-electrification will be financed.

61. The USAID has entered into agreement with CDB in relation to its Basic Need Fund. This is an employment-oriented fund and through this medium, the U.S. hopes to stimulate employment in the rehabilitation programme.

Other infrastructural rehabilitation

62. Preliminary estimates for rehabilitation of primary schools is in excess of EC\$15 million and for roads over EC\$82 million. Both preliminary estimates have been prepared by the Government of Dominica. They are reproduced here to give some indication of the high cost of putting essential services back into usable conditions. The Caribbean Development Bank (CDB) has enlisted a team of experts with the aid of international agencies and individual donor countries. Representatives from the following organizations will be on the team: USAID, CIDA, FAO, BDD and CDB and it is expected that this team will present its report towards the end of October.

63. The only indication at present with respect to funds to meet the long-term needs of the rehabilitation programme stem from U.S. Congress supplemental legislation which it is expected will make some provision for Dominica.

SUMMARY AND CONCLUSIONS

64. This report attempts to convey to the reader some indication of the nature and extent of the physical damage done to Dominica by hurricane "David". Only persons who were familiar with the densely forested nature of the island's vegetation prior to the hurricane can grasp fully the severity of the destructive force to which the island has been exposed. The mere change in the environment caused by the destruction would by itself have had traumatic effects on the island's population. One can, therefore, imagine the additional blow to the morale of the people by loss of life and property. It would seem, however, as though at both government and public levels, the people have already overcome the preliminary shock and are getting around to doing things to put the country back on its feet.

65. Financial and administrative assistance will be required for quite some time and it will be many years before the country attains an economic position equivalent to the one it had prior to the hurricane. The government which has for some time been dependent on budgetary grants will also be in need of financial assistance for some time to come.

APPENDIX I

ESTIMATES OF DAMAGES TO DWELLINGS* AND OF
BUILDING MATERIAL REQUIREMENTS

September 1979

DOMINICA

AREA	Number of Dwellings Total	Estimated Roofless on 30-31 Aug. 1979		Estimated Galvanized Requirement (7') ('000 sheets)	Estimated Lumber Requirement ('000 boards of)	
			% of Total		2x4x20	2x4x14
ROSEAU	2,300	1,725	75	138	1,017.75	138
ST. GEORGE	2,000	1,600	80	64	944	64
ST. JOHN	1,200	480	40	19.2	283.2	19.2
ST. PETER	500	250	50	10	147.5	10
ST. JOSEPH	1,500	450	30	18	265.5	18
ST. PAUL	1,100	825	75	33	486.75	33
ST. LUKE	500	400	80	16	236	16
ST. MARK	500	400	80	16	236	16
ST. PATRICK	1,900	1,520	80	60.8	896.8	60.8
ST. DAVID	1,200	300	25	12	177	12
ST. ANDREW	2,400	720	30	28.8	424.8	28
TOTAL	15,100	8,670	57.4	415.8	5,115.3	415.8

* Not included: total disintegration and damage to governmental, commercial and industrial buildings.

Source: HURRICANE RELIEF AND HOUSING TASK FORCE.

APPENDIX II

PRELIMINARY ESTIMATED COST OF REHABILITATION
OF PRIMARY SCHOOLS

DOMINICA

GROUP A* (Destroyed)	Number of Pupils	GROUP B (Minor Damage)	Number of Pupils	GROUP C (Major Damage)	Number of Pupils	GROUP D	Number of Pupils
Bellevee Chopin	135	Belles	99	Bagatelle	333	St. Luke's	436
Boetice	157	Calibishie	320	Grand Bay	1,064	Atkinson	246
Campbell	172	Bense	225	Grand Fond	302	(New school under construction)	
Cockrane	100	Castle Bruce	601	La Plaine	502		
Des d'Ane	120	Clifton	219	Mahaut	668		
Eggleston/Giraudel	70	Colihaut	277	Marigot-Weirs	684		
Laudat	93	Concord	59	Massaore	431		
Marigot Junior	242	Coulibistrie	262	Petite Savanne	244		
Morne Jaune	100	Dublanc	202	Portsmouth	460		
Morne Prosper	174	Giraudel (Main school)	124	Roseau Boys	1,053		
Newton Infants	313	Goodwill	1,022	Roseau Girls	267		
Penville	396	Morne Jaune (Main school)	172	Roseau Infants	268		
Savanne Paille	147	Paix Bouche	317	Salybia	270		
Scotts Head	284	Pichelin	190	San Saviour	366		
Trafalgar	179	St. Joseph (Junior Secondary)	300	Snake Coe	148		
Warner	139	St. Joseph (Infant & Primary)	472	Soufriere	264		
Wesley	589	Salisbury	485	Tete Morne	426		
Woodford Hill	303	Good Hope	70	St. John's	740		
Wotton Waven (Principal's offices)	33	Petite Soufriere	70	St. Martins	1,230		
		Thibaud	226				
		Vieille Case	409				
TOTAL PUPILS	3,746		6,121		9,720		682
To build and equip at EC\$1,000 per pupil TOTAL EC\$3,746,000		To repair at EC\$43,750 per building TOTAL EC\$918,750		To repair at EC\$125,000 per building TOTAL EC\$2,375,000		To repair at EC\$80,000 per building TOTAL EC\$160,000	
E - Furniture for 16,000 pupils at EC\$50 per pupil = EC\$ 8,000,000							
F - Furniture for 400 teachers at EC\$350 each = EC\$ 140,000							
GRAND TOTAL A+B+C+D+E+F						= EC\$15,339,750	

* Add to this group Delices School Roll 358 comprising: 10 classrooms, 1 Home Economics room, 1 Industrial Arts room, 1 Science room, 1 Principal's Office, 1 Staff room and 1 Library.

Source: Dominica Ministry of Education, Office of the Permanent Secretary

APPENDIX III

ESTIMATED VOLUME AND VALUE OF
CROP DAMAGES

(September 1979)

DOMINICA

CROP	Acreage Prior to Hurricane (Acres)	Extent of Damage After Hurricane		Estimate of Production Loss	
		(ACRES)		VOLUME Tons (Unless Indicated Otherwise)	VALUE EC\$
		Partially Destroyed	Completely Destroyed		
BANANA	13,000	-	13,000	17,000	13,000,000
GRAPEFRUIT	2,500	1,500	1,000	500,000 (HB)	7,350,000
ORANGES	900	360	540	60,000 (FC)	1,800,000
LIMES	1,300	400	900	2,400	640,000
COCONUTS ^{1/}	8,500	3,400	5,100	8,200,000 nuts	1,312,000
COCOA	1,200	100	1,100	450	2,349,000
BAY	500	150	150		
PLANTAIN	400	-	400	1,100	400,000
MANGOES ^{2/}	...	Substantial Damage			
AVOCADO ^{2/}	...	Substantial Damage			
DASHEEN	2,200	-	900	4,500	2,250,000
TANNIA	1,600	-	640	2,560	2,048,000
YAM	600	-	360	1,800	1,440,000
SWEET POTATOES	500	-	100	300	120,000
CASSAVA	150	60	90	450	180,000
BREADFRUIT ^{2/}	39,000 trees	Substantial Damage			
CORN	20	-	20	120	9,600
LEGUMES	10	-	10	3	6,000
PINEAPPLES	40	-	10	6	3,000
CABBAGE	20	-	15	90	180,000
WATERMELON	25	-	5	40	16,000

1/ Production of nuts: 20 million per annum - Average annual export: 500 tons of copra

2/ No estimate available

Source: DOMINICA MINISTRY OF AGRICULTURE

BIBLIOTECA NACIONES UNIDAS MEXICO

APPENDIX IV

SUMMARY OF PRELIMINARY COST ESTIMATES FOR
ROAD REHABILITATION AND RECONSTRUCTION

September 1979

DOMINICA

CODE ^{1/}	DESCRIPTION OF ACTION REQUIRED	ESTIMATED COST EC \$ Million	
	<u>MAIN ROADS</u>		
	Further tree clearance202	
001 to	Clear slips/restore drainage601	
	Minor repair/resurfacing	13.475	
006	Road reconstruction	3.600	
	Road replacement	2.988	
	Bridge/culvert repair	1.625	
007	<u>CODE 007 AND FEEDER ROADS</u>		37.891
	Add for inflation at 12% per annum over 3 years'	15.217	
	Plant, equipment and supplies	6.000	
	Management and technical services	3.800	25.017
	<u>OTHER ROADS</u>		
	(from later survey on main and feeder roads damage)	19.320	19.320
	<u>GRAND TOTAL</u>		<u>82.228</u>

1/ Code used in report indicated below

Source: "Survey of infrastructural damage and cost estimates for reconstruction' Commonwealth of Dominica, by Islands Engineering Group Ltd. September 11-16, 1979

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