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SPECIAL ECONOMIC AND DISASTER RELIEF ASSISTANCE:
SPECIAL PROGRAMMES OF ECONOMIC ASSISTANCEAssistance to MadagascarReport of the Secretary-General

1. In its resolution 1984/3 of 11 May 1984, the Economic and Social Council requested the Secretary-General, inter alia, to send an inter-agency mission to Madagascar with a view to evaluating the damage, the priority needs of the country following the cyclones and floods and the medium-term and long-term impact of those disasters on the national economy, and to compiling the data relevant to the promotion of concerted international assistance. The Council also requested the Secretary-General to transmit the mission's report to the international community and to take the necessary action to help the Government prepare a reconstruction and recovery programme for the regions and sectors affected. The Council further requested the Secretary-General to apprise it at its second regular session of 1984 and to report to the General Assembly at its thirty-ninth session on the implementation of the resolution.
2. Pursuant to the resolution, the Secretary-General arranged for an inter-agency mission to visit Madagascar during the period 24 May to 5 June 1984. The mission's report, annexed hereto, provides information on the damage caused by the cyclones and floods, the priority needs of the country following the cyclones and floods and the medium- and long-term impact of those disasters on the national economy. The report also provides details of individual projects recommended for international assistance together with estimated costs.
3. An oral report was made to the Economic and Social Council at its second regular session of 1984 outlining the results of the mission.

* A/39/150.

ANNEX

Report of the inter-agency mission to Madagascar

(24 May-5 June 1984)

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I. INTRODUCTION

1. The inter-agency mission visited Madagascar from 24 May to 5 June 1984. Pursuant to sectoral areas of interest indicated by the Malagasy authorities, the mission included experts in the fields of transportation from the Department of Technical Co-operation for Development of the United Nations Secretariat, (DTCD), in ports from the United Nations Conference on Trade and Development (UNCTAD), in agriculture from the Food and Agriculture Organization of the United Nations (FAO), in industrialization from the United Nations Industrial Development Organization (UNIDO) and in housing from the United Nations Centre for Human Settlements (UNCHS).
2. During its visit, the mission met with the Ministers for Foreign Affairs, Interior, Agricultural Production and Agrarian Reform, Public Works, Industry, Energy and Mines, and Transport, Supply and Tourism. It also had discussions with key officials of those Ministries and the Directorate of Planning. The mission visited the ports of Mahajanga and Antsiranana, which suffered extensive damage as a result of the recent cyclones and floods and consulted with senior officials of the provincial governments of those areas. The mission also met with resident members of the diplomatic corps as well as local representatives of intergovernmental organizations.
3. The mission wishes to record its great appreciation for the co-operation and assistance received from the Government of Madagascar. The mission also wishes to acknowledge the valuable contribution of the Resident Representative of the United Nations Development Programme (UNDP) and other representatives of the United Nations system in Madagascar.

II. COUNTRY PROFILE

4. Madagascar comprises the large island of Madagascar and five small islands in the Indian ocean off the south-east coast of Africa, separated from the mainland by the Mozambique channel (see appendix). The country has an area of 581,041 sq km. The island of Madagascar extends 1,600 km, north to south, ranging in width from 450 to 570 km, and with a topography which divides the island into six fairly distinct regions.
5. The northernmost region of the island contains fertile valleys where tropical crops can be raised and possesses the excellent natural harbour of Antsiranana. The island's highest peak, Mount Tsaratanana, rising upward 2,800 metres, isolates this region from the rest of the island. Further south and westward lies a rich agricultural region in a series of valleys converging on the port of Mahajanga. This is the principal rice growing area in the country. Further south, still, on the western side of the island along the coastal plain lies a well-watered region with large animal herds and crops of rice, cotton, tobacco and manioc. The southernmost region of the island contains most of Madagascar's known mineral deposits as well as extensive cattle herds, despite the almost total lack of rainfall. Northward, along the east coast, the hot and humid climate favours the cultivation of the island's most valuable tropical crops: coffee, vanilla, cloves

and sugar cane. Toamasina, Madagascar's most important commercial port, is located on the east coast. The island's mountain hinterland is difficult of access. Nevertheless, it is a relatively densely populated region of extensive rice culture and stock raising and is the country's administrative and cultural centre, the focal point being the capital city of Antananarivo.

6. Climatic conditions on the island vary considerably, ranging from tropical conditions in the east and northwest coasts to the dry heat of the west coast, the extreme aridity of the south and the temperateness of the central highlands. Most of the island is savannah-steppe, and much of the interior is covered with laterite. Except in the arid south, rivers are numerous and generally flow westward. Rapids and waterfalls, however, limit their navigability.

7. Madagascar's location between the latitudes of 12 and 25 degrees south makes it especially vulnerable to tropical cyclones, whose season extends from November to April. Similarly, the country is prone to "intertropical convergence zones", a phenomenon which gives rise to heavy and sustained rainfall often resulting in high water levels and floods.

III. GENERAL ECONOMIC SURVEY

A. Overview

8. As a result of historical developments including exogenous factors beyond the control of the Government, Madagascar faces serious economic constraints arising from its external debts and balance-of-payments position. Since 1982, the Government, in co-operation with the International Monetary Fund, has sought to implement a programme of stabilization and rehabilitation, including a restrained public expenditure policy, which both reflects the realities of the short-term position and seeks to establish a basis for a more dynamic and sustainable development. In spite of these efforts, however, the country is faced with an over-riding foreign exchange scarcity and consequent need for continuing budgetary restraint which affords little room for manoeuvre and minimal capacity to cope with unexpected set-backs such as the recent cyclones and floods.

9. While much of the discussions which follows focuses on domestic developments, it must be emphasized that external factors have played a significant role. Madagascar, as many other developing countries, has suffered and continues to suffer the effects of the international economic recession, whether in terms of decreased demand for its exports, fluctuations in the prices of raw materials, deteriorating terms of trade, exchange rate fluctuations or increases in interest rates. These external developments, coming as they did during a period of great vulnerability of the country, continue to frustrate the efforts of the Government. The impact of natural disasters has only aggravated the situation.

10. In the period 1970-1978, there was on average virtually no growth in real gross domestic product (GDP), while population growth averaged 2.8 per cent annually, resulting in a 20 per cent deterioration in real per capita income. During this period, the Government pursued cautious policies with regard to balance of payments, public finances and external debt.

11. In 1979, the Government undertook a large expansion in public sector investment relying much more than previously on external financing. While this contributed to an increase in GDP in 1979, external payments began to run into difficulties in 1980, and by 1981, the balance of payments had entered into a crisis situation. Consequent reductions in imports of non-food consumer goods, raw materials and spare parts arrested economic growth in 1980 and led to over a 9 per cent decline in real GDP in 1981 and around a 2 per cent decline in 1982 (table 1). It is estimated that GDP grew at a rate of 0.8 per cent in 1983.

Table 1. Gross domestic product by industrial origin
 (Billions of FMG, a/ constant 1970 prices)

Sector	1977	1978	1979	1980	1981	1982
Agriculture, forestry and fishing	76.3	71.3	76.4	78.3	77.1	79.0
Industry	48.1	50.1	56.5	55.0	41.9	39.4
Services	85.6	80.7	90.1	90.7	81.6	77.5
Public administration	35.5	37.3	40.0	41.7	42.0	43.7
Import duties	<u>9.9</u>	<u>9.3</u>	<u>10.1</u>	<u>9.6</u>	<u>7.4</u>	<u>5.9</u>
Total	255.4	248.7	273.1	275.3	250.0	245.5
Percentage of change	2.4	-2.6	9.8	0.8	-9.2	-1.8

Source: Planning Directorate, Madagascar.

a/ Rate of exchange (1984): 550 FMG = \$US 1.

12. The investment boom and the subsequent efforts to stabilize government finances are reflected in the budget figures for 1978-1982 (table 2). Total expenditures more than doubled between 1978 and 1980 and declined slightly in 1981 and 1982 in spite of a higher rate of inflation. Capital budget expenditures accounted for much of this variation; however, other government expenditures increased throughout the period. Even though revenues expanded, the overall deficit was 4 per cent of GDP in 1978, 18 per cent in 1981 and 9 per cent in 1982. It is estimated that this basic pattern of overall improvement continued in 1983 when, in spite of an increase in capital expenditures, the overall deficit declined to FMG 81.5 million, approximately 7 per cent of GDP.

Table 2. Central Government revenues and expenditures

(Billions of FMG)

	1978	1979	1980	1981	1982 (provisional)
Total revenue	<u>99.0</u>	<u>110.0</u>	<u>116.0</u>	<u>119.5</u>	<u>147.8</u>
Recurrent	80.9	90.7	100.4	104.3	121.9
FNUP receipts a/	18.1	19.3	15.6	15.2	25.9
Total expenditures	<u>119.6</u>	<u>189.9</u>	<u>242.8</u>	<u>233.6</u>	<u>239.0</u>
Recurrent	89.5	97.7	112.9	111.0	130.3
Capital	20.7	62.1	92.5	69.1	39.4
Other	9.4	30.1	37.4	53.5	69.3
Recurrent budgetary deficit	<u>-8.6</u>	<u>-7.0</u>	<u>12.5</u>	<u>-6.7</u>	<u>-8.4</u>
Overall deficit	<u>-20.6</u>	<u>-79.9</u>	<u>-126.8</u>	<u>-114.1</u>	<u>-91.2</u>
Financing					
Foreign (net)	8.2	35.3	47.9	56.0	54.7
Domestic (net)	12.4	44.6	28.9	58.1	36.5
Central Bank	18.5	42.1	85.6	45.0	
State Bank	-0.3	-0.2	-7.4	11.5	
Other (net)	5.8	2.7	0.7	1.6	2.5
(Deficit as percentage of GDP)	4.0	13.0	18.0	15.0	9.0

Source: Government of Madagascar.

a/ Fonds National Unifié de Perquation (Stabilization Funds) for main export crops.

13. The balance-of-payments position deteriorated dramatically from 1978 to 1980 and has continued to be under considerable strain ever since (table 3). There has been a general deterioration in the terms of trade. The value of export receipts remained virtually unchanged from 1978 to 1981 (table 4) and increased somewhat in 1982; however, the volume of exports decreased or remained stagnant. The value of merchandise imports increased sharply from 1978 to 1980, was cut back in 1981 and increased again in 1982 (table 5). Again, this reflects significant reductions in volume and a continuing increase in average import prices. It is estimated that in 1983, exports increased to FMG 125.9 million (fob), while imports totalled to 193.7 billion FMG (cif). In 1982, the balance-of-payments current account deficit represented approximately 12 per cent of GDP, a significant improvement over the 18.5 per cent in 1980. It is estimated that this ratio decreased further in 1983.

Table 3. Balance of payments

(Billions of FMG)

	1978	1979	1980	1981	1982
Exports (fob)	91.4	88.0	92.3	91.4	114.0
Imports (fob)	87.2	-149.1	-170.6	-145.9	-170.6
Trade balance	4.2	-61.1	-78.3	-54.5	-56.6
Service receipt	8.9	11.6	12.0	12.8	12.0
Service payments	-40.6	-54.8	-61.4	-78.3	-82.0
of which interest payments	-3.0	-5.3	-8.2	-22.0	-32.7
Service (net)	-31.7	-43.2	-49.4	-65.5	-70.0
Public transfers (net)	11.8	13.4	13.2	16.0	22.0
Non-monetary capital:					
Direct investment (net)	-1.4	-1.4	-0.2	-0.2	-0.1
Medium- and long-term loans					
Disbursements	15.1	57.0	64.4	79.9	67.4
Repayments	-2.1	-3.5	-6.4	-18.4	-40.3
Net	13.0	53.5	58.0	61.5	27.1
Debt relief	-	-	-	19.9	40.1
Allocation of SDRs	-	1.0	1.0	1.1	-
Other	2.1	-7.6	2.5	-2.1	2.5
Errors and omissions	1.8	1.5	0.2	7.3	3.6
Overall balance	-0.2	-43.9	-53.0	-16.5	-31.4

Source: Government of Madagascar.

Table 4. Major merchandise exports

(Millions of FMG)

	1978	1979	1980	1981
Coffee	36 583	38 074	45 110	30 353
Cloves	17 222	15 007	6 583	17 721
Vanilla	8 645	3 114	3 945	7 491
Rice	171	157	732	82.6
Sisal	1 292	1 853	1 796	1 708
Lima beans	1 156	781	589	60.3
Cocoa	757	1 116	677	692
Fish	3 116	3 685	3 914	4 565
Meat and meat products	1 544	2 942	3 760	1 258
Sugar	1 434	1 365	2 471	413
Clove oil	1 157	1 004	668	763
Chromite	3 146	1 834	1 982	1 532
Graphite	1 277	1 283	1 430	2 451
Petroleum products	1 365	2 235	1 373	4 072

Source: Government of Madagascar.

Table 5. Structure of merchandise imports (c.i.f.)

(Billions of FMG)

	1979	1980	1981	1982
Non-food consumer goods	22.9	22.0	16.0	15.5
Food imports, of	17.7	18.7	27.7	40.1
which: rice	(8.9)	(11.7)	(18.0)	(38.0)
Energy	20.7	33.6	35.6	44.8
Raw materials	36.0	43.6	31.9	35.1
Capital goods	71.5	70.3	62.7	53.0
Other	10.5	17.8	4.0	4.3
Total (c.i.f.)	179.3	206.0	177.9	198.8

Source: Government of Madagascar.

14. From 1978 to 1980, the balance-of-payments deficit was financed primarily through increased foreign borrowing and running down foreign exchange reserves. External debt service obligations increased dramatically from about \$19 million in 1978 (approximately 4 per cent of receipts from exports of goods and services) to about \$265 million in 1982 (approximately 72 per cent of exports of goods and services). Faced with this situation the Government has sought and obtained a rescheduling of a part of the debt service obligations due. The relief provided by the Paris Club in 1981 and 1982 was for a relatively short period of time (about 12 months) and carried a moratorium interest which averaged about 10 per cent (table 6). Additional debt rescheduling was arranged with the Paris Club and the London Club in 1984.

Table 6. Debt service and impact of debt relief

(Millions of US dollars)

	1980	1981	1982
Debt service due	59.4	187.9	265.0
Relief: Paris Club (1981)		105.7	63.8
Relief: Paris Club (1982)			70.6
Debt service after debt relief	59.4	82.2	130.6

Source: Government of Madagascar.

B. Agriculture

15. Agriculture constitutes the backbone of the economy, contributing close to 40 per cent of GNP and over 80 per cent of export earnings. More than 85 per cent of the Malagasy population live in the rural areas and around 65 per cent are involved in subsistence agriculture. Paddy is the main staple crop, engaging about 70 per cent of the population and 1.5 million hectares or about half the land under cultivation. Annual production averages about 2 million tons, all of which is consumed in the country and supplemented by imports. Cassava is the second most important food. The most important agricultural export product is coffee (53 per cent of all exports). The other important export crops are cloves and vanilla. Cotton is the second cash crop and is used mainly for local industries. Other important cash crops include sugar cane and tobacco. Livestock is also a very significant component of agriculture, with the cattle herd estimated at around 10 million head and sizeable stocks of pigs, sheep and poultry. Fishing is another important sub-sector with an average annual catch of around 55,000 tons, 80 per cent of which comes from inland fishing and 20 per cent from ocean fishing.

16. For the period 1980-1982, agricultural production, both food and cash crops, has been stagnant (see table 7). Several factors have interacted to affect agricultural production, the most important being an inadequate road network and a lack of means of transportation to move output from surplus regions to commercial outlets. Other factors affecting agricultural production include inadequate price incentives, inefficient collection and marketing systems and shortages of inputs (due both to import restrictions and the high cost of transportation).

Table 7. Production, area cultivated and producer price of principal crops, 1978-83

	1978	1979	1980	1981	1982	1983
<u>Food crops</u>						
<u>Paddy</u>						
Production						
(thousand tons)	1 922	2 045	2 109	2 011	1 967	2 147
Area (thousand ha)	1 133	1 163	1 199	1 185	1 139	1 219
Yield (ton/ha)	1.70	1.76	1.76	1.70	1.72	1.76
Producer price (FMG/kg)	35	38	43	47	60	65
<u>Manioc</u>						
Production						
(thousand tons)	1 594	1 569	1 684	1 670	1 742	1 726
Area (thousand ha)	273	266	277	287	287	292
Yield (ton/ha)	5.83	5.89	6.08	5.82	6.07	5.91
Producer price (FMG/kg)	-	-	-	-	-	-
<u>Maize</u>						
Production						
(thousand tons)	115	116	128	120	113	115
Area (thousand ha)	122	116	128	127	116	144
Yield (ton/ha)	0.94	1.00	1.00	0.95	0.97	0.80
Producer price (FMG/kg)	-	-	-	-	-	-
<u>Cash crops</u>						
<u>Coffee</u>						
Production (green)						
(thousand tons)	78.2	81.6	79.9	83.5	79.7	81.1
Area (thousand ha)	226	215	217	217	218	220
Yield (ton/ha)	0.35	0.38	0.37	0.38	0.36	0.37
Producer price (FMG/kg)	180	185	215	250	260	280

Table 7 (continued)

	1978	1979	1980	1981	1982	1983
Cloves						
Production						
(thousand tons)	12.8	4.2	12.3	10.8	15.8	6.0
Area (thousand ha)	69.0	69.9	72.0	72.5	72.4	73.0
Yield (ton/ha)	0.19	0.06	0.17	0.15	0.22	0.08
Producer price						
(FMG/kg)	340	385	395	430	435	435
Vanilla						
Production						
(thousand tons)	4.8	2.3	3.0	4.3	4.0	4.1
Area (thousand ha)	22.6	23.1	25.7	25.0	26.2	27.0
Yield (ton/ha)	0.21	0.10	0.12	0.17	0.15	0.15
Producer price						
(FMG/kg)	305	500	600	700	700	1.000
Sugarcane						
Production						
(thousand tons)	1 375	1 444	1 395	1 420	1 459	1 464
Area (thousand ha)	33.6	36.4	40.2	41.5	43.7	43.9
Yield (ton/ha)	40.9	39.7	34.7	34.6	33.2	33.3
Producer price						
(FMG/kg)	4.6	5.3	6.4	7.7	9.4	9.5
Sisal						
Production						
(thousand tons)	15.9	14.8	16.0	15.4	15.1	12.5
Area (thousand ha)	-	-	-	-	-	-
Yield (ton/ha)	-	-	-	-	-	-
Producer price						
(FMG/kg)	74	63.5	85.7	140	1500	150
Pepper						
Production						
(thousand tons)	2.5	2.5	2.8	2.9	2.5	2.5
Area (thousand ha)	5.3	5.4	5.9	5.9	6.0	6.1
Yield (ton/ha)	0.47	0.46	0.47	0.49	0.41	0.41
Producer price						
(FMG/kg)	190	200	225	225	230	230
Cotton						
Production						
(thousand tons)	33.1	30.5	23.2	28.0	25.6	24.3
Area (thousand ha)	22.2	17.9	17.0	18.7	16.7	17.9
Yield (ton/ha)	1.49	1.70	1.37	1.50	1.53	1.36
Producer price						
(FMG/kg)	77	81.8	90	100	126	155

Table 7 (continued)

	1978	1979	1980	1981	1982	1983
Groundnuts						
Production						
(thousand tons)	34.0	40.2	39.1	32.9	33.9	34.2
Area (thousand ha)	38.3	40.2	41.9	35.5	37.2	38.0
Yield (ton/ha)	0.89	1.00	0.93	0.93	0.91	0.9
Producer price	-	-	-	-	-	-

17. The net result is a lag of the growth of agricultural production behind that of the population.

C. Transportation

18. Shipping is essential for Madagascar's foreign trade. In addition, the island's mountainous topography has been a perennial handicap to adequate internal transportation and communications either by road or rail.

1. Roads

19. The road network comprises about 49,650 km (1982) of road. National roads (4,350 km paved and 4,260 km unpaved) link provincial capitals and major towns, while gravel roads link smaller towns and villages within and between provinces. The road network is generally in poor condition. Most of the paved roads show signs of deterioration: 50 per cent require full rehabilitation, while 30 per cent require resurfacing to avoid further deterioration and costly repairs. Unpaved and gravel roads are in equally poor condition.

2. Railways

20. The railways consist of two single track systems:

(a) About 700 km from Antananarivo to the port city of Toamasina on the east coast, from Antananarivo to the industrial city of Antsirabe in the south, and from Moramanga to the agricultural area of Lake Alaotra;

(b) 163 km connecting the provincial center of Fianarantsoa and the agricultural areas in the southern plateau to the port of Manakara.

21. The Antananarivo-Toamasina line is the most important link, since it is the only reliable means of surface transport between the country's main seaport and the capital city.

22. The rolling stock and locomotive fleet are generally adequate to carry present traffic, although their condition is poor due to maintenance and operational problems. The track is also in very poor condition. The railway's transport capacity declined during the past few years to the point where it has been unable to meet transport demand and has become a major bottleneck in Madagascar's economy. The deterioration is reflected in the decrease in total freight traffic from 861,000 tons in 1976 to 650,000 tons in 1981.

23. Since 1982, the Government has taken major steps to arrest the deterioration by addressing the most urgent operational problems and resuming a normal flow of spare parts.

3. Ports, shipping and aviation

24. Coastal freight shipping plays an important part in the transport network. The country's 18 classified ports serve approximately 5000 km of sea-coast. The three major ports handle nearly all of Madagascar's foreign trade (table 8).

Table 8. General cargo a/ (excluding bulk and hydrocarbons)
(tons)

	1981	1982	1983
Toamasina	570 000	627 000	514 000
Mahajanga	162 000	179 000	90 000
Antsiranana	<u>128 000</u>	<u>131 000</u>	<u>102 000</u>
Total	860 000	937 000	706 000

Source: Government of Madagascar.

a/ Imports and exports and national coastal trans-shipment.

25. Air transport constitutes an essential mode of transport for domestic and international passengers. The national airline regularly serves the country's internal network of airports distributed throughout the country. Foreign passenger travel is exclusively served by air transport, principally through the capital, Antananarivo.

D. Industry

26. It is estimated from government statistics that the contribution of the industrial sector to GDP in 1983 was 18 per cent. Since approximately 60 per cent

of production is based on agricultural outputs, i.e. textile and food processing industries, any decrease in the agricultural sector has a direct impact on industrial production as a whole. The other industrial branches such as metallurgy, engineering, chemicals and building materials are not well developed. Industry relies heavily on imports, especially for intermediate industrial products which are not locally manufactured at present.

27. Industrial output, including mining, reached its peak in 1979, declined slightly in 1980 (-3 per cent) and then precipitously in 1981 (-24 per cent). The decline apparently continued in 1982 (-6 per cent) and at the end of that year production equalled approximately 70 per cent of the 1979 target.

28. A major cause of this disappointing performance has been the acute shortage of foreign exchange which has forced the Government to restrict imports of raw materials and spare parts needed for industry. The recent devaluation of the Malagasy currency increased import costs, which in turn accelerated the decrease of production. Additional adverse factors include the deterioration of the transportation infrastructure, mainly the road network, the paucity of accurate statistics and precise information on enterprises, the shortage of qualified personnel, and problems in the maintenance of production equipment.

E. Energy

29. To meet its energy requirements, Madagascar relies on wood and wood products (including charcoal), primarily for domestic consumption, imported oil and hydropower. Imports of petroleum and petroleum products average approximately 400,000 tons per year and represent a major foreign exchange expenditure. Electricity production depends heavily on the eight hydroelectric stations which supply over two thirds of demand, with the remainder being provided by thermal stations. Total installed capacity is estimated at approximately 400 million KWH per annum.

F. Social

30. The Malagasy population is well over 9 million, with an average annual growth of 2.75 per cent. Approximately 45 per cent of the population is under 15 years of age. Over 88 per cent of the active population work in agriculture and forestry, around 8 per cent in the service sector and 4 per cent in the industrial and other sectors. About 18 per cent of the population currently lives in the urban areas which is growing at an average annual rate of 5 per cent.

31. A sizeable portion of the government recurrent budget for central administration is devoted to education (30 per cent) and health (7 per cent). About 8 per cent of the capital budget is devoted to these social services.

32. The national school system provides for higher education as well as for secondary and primary levels. The Government pursues a policy of achieving universal primary education and maintains both primary and secondary schools in areas of population density. In 1983, there were 71 high secondary schools with

approximately 43,000 students and 619 junior secondary schools with 701,600 students. The system also includes a major university centre in each province. The adult literacy rate was 50 per cent in 1983. In 1983 there were also 26 institutions providing technical and vocational education and training, but that number is far from adequate to meet the needs of the country.

33. The Government is also pursuing a policy of improving the social welfare of women and children and of increasing the role of women in the development process.

34. All the public institutions providing social services are affected by the current restraint on public expenditures and cannot keep pace with the increasing demands resulting from the growth of the population. The scarcity of foreign exchange makes it increasingly difficult to order new equipment, to obtain spare parts or to assure a regular supply of essential medical and educational materials. Under these conditions, the policy of the Government is to maintain an optimal level of services, concentrating upon the rehabilitation of existing infrastructures.

G. Disaster preparedness

35. Madagascar's location between the latitude of 12 and 25 degrees south places it in the tropical cyclone zone, and it can expect to be struck during the cyclone season (November through April) by winds of high intensity capable of inflicting loss of life and severe property damage. Central to the country's ability to cope with cyclones and to mitigate the effects of future cyclones is the Meteorological Service, an organizational component of the Ministry of Transport, Supply and Tourism. This Service, possessing a small but experienced and well-qualified professional staff has the responsibility of anticipating and evaluating climatic phenomena and of disseminating relevant information as a timely warning of impending natural disaster. This responsibility is discharged in a three phase operation:

(a) Acquisition of data on approaching climatic phenomena, particularly cyclones, by the use of observation stations equipped with the necessary scientific instruments;

(b) Collection, collation, analysis and evaluation of this data at a central point (the Meteorology Service's office in Antananarivo);

(c) Dissemination, on a timely basis, to the concerned institutions and the general public, of its judgements on the implications of the approaching climatic phenomena, i.e. where they will occur, with what severity, and the likely effect on the affected area.

36. The Service also actively participates in a regional association on weather observation, exchanging information with its neighbours in the Comoros Islands, Reunion and Mauritius. In addition, it maintains professional linkages on an interregional level.

IV. GOVERNMENT POLICY

A. National policy

37. The Second National Development Plan, 1982 to 1987, has the following main targets: to achieve self-sufficiency in foodstuffs and increase production for export, to promote selected industrial development, to achieve self-sufficiency in energy and to promote social development essentially through the improvement of training and health systems.

38. In the light of recent economic difficulties, the Government issued a white paper in 1983 which included measures for short-term economic recovery, as well as a long-term development strategy.

39. As regards the agricultural sector, the white paper provided for action to ensure adequate price incentives - including regular price reviews and increases. It also called for the improvement of the irrigation system and rural access and feeder roads, the diversification of crops, support to private enterprise, and the rehabilitation of agro-industrial companies. As a first step, the Government liberalized price controls by allowing free movement between minimum producer price and maximum consumer price and permitted the private sector to trade rice. Price increases for paddy and rice went into effect in May 1982.

40. The white paper also stated the Government's intention to divest itself of unsuccessful and unprofitable parastatal ventures, reduce state marketing ventures, provide incentives to smallholders and privately owned production systems, improve agricultural extension services and research and focus on the rehabilitation of road networks which had clear economic importance. Measures were also defined by the white paper for activating industrial development and for improving the transport system. For the immediate, the Government is emphasizing the rehabilitation and maximum utilization of existing industrial facilities rather than the construction of new facilities.

41. Currently, the Government is preparing a new investment code which is designed to facilitate the growth of the private sector and thus permit the elimination of unproductive and unprofitable government business ventures.

42. In general, the Government is moving in the direction of reducing public expenditures, eliminating administrative bottlenecks which hinder economic development, and encouraging the private sector to play a larger role in economic development.

B. Foreign assistance

43. Foreign assistance remains a critical element to the successful implementation of the national development programme of Madagascar. In recent years, technical assistance has been declining: from \$113 million in 1981 to \$95 million in 1982 to an estimated \$50 million in 1983. In 1982, the United Nations system accounted for approximately 47 per cent of commitments with 43 per cent coming from bilateral donors and 10 per cent from non-governmental organizations.

44. In 1982, financial assistance to Madagascar totalled \$222 million (\$128 million in loans and \$94 million in grants), a significant increase over the 1981 level of \$112 million. The major sources of these funds included the Caisse Centrale de Coopération Economique of France (CCCE), World Bank-International Development Agency (IDA), the African Development Bank (ADB) and the European Development Fund (EDF).

45. In terms of bilateral co-operation, France is the most important source of assistance. Other important contributors include Switzerland, the Federal Republic of Germany, Japan and China.

V. ASSESSMENT OF DAMAGES

A. Introduction

46. The present assessment focuses on the damages following the cyclones and floods of December 1983 to April 1984, and particularly the most recent and most destructive cyclone, "Kamisy" which hit the northern areas (Antsiranana, Mahajanga, and Toamasina provinces) in early April 1984. It should be recalled, however, that Madagascar suffers each year from cyclones* and that the 1981/82 cyclone season, in particular, caused extensive damages. Reconstruction from these earlier cyclones and floods was still going on when "Kamisy" occurred. An assessment of the needs for reconstruction and rehabilitation must take into account the cumulative effect of the cyclones and floods as well as the state of maintenance which, in many instances, was relatively poor.

* Record of major cyclones in Madagascar:

"Benedicte"	December 1981
"Frida"	January 1982
"Electra"	January 1982
"Gabrielle"	February 1982
"Justine"	March 1982
"André"	December 1983
"Caboto"	January 1984
"Domoina"	January 1984
"Galy"	February 1984
"Haja"	February 1984
"Imboa"	March 1984
"Kamisy"	April 1984

47. In a preliminary provisional report on the damages caused by the 1983/1984 cyclones prior to "Kamisy", the Government provided the following estimates of damage:

	<u>Millions of FMG</u>
Factories	38.6
Workshops	7.1
Infrastructure	285.3
Administrative buildings	0.5
Government housing	21.3
Equipment damage	35.7
Agricultural	17.3
Electricity	51.3

48. To these indicative figures must be added the loss of agricultural production (estimated at 1,000 tons of sugar and 200 tons of paddy rice) and, most important, the loss and injury of people (estimated at 102 dead, 47 missing and 37 seriously wounded).

49. Cyclone "Kamisy" and the subsequent floods caused significant damage in the provinces of Mahajanga and Antsiranana and to a lesser extent in Toamasina. In assessing the damages following "Kamisy", the mission has drawn heavily on information provided by the Government as well as from an inspection of Mahajanga and Antsiranana. The mission was greatly impressed by the efforts already made by the central and provincial governments and by the people themselves to effect necessary reconstruction so that economic activity could be resumed. The assessment below thus focuses on the outstanding damages calling for repair and reconstruction. At the request of the Government, the United Nations Educational, Scientific and Cultural Organization sent a mission of experts to Madagascar in early June 1984 to evaluate the damages in the educational sector and to recommend a programme of rehabilitation. Accordingly, the present report does not address that sector.

B. Agriculture

50. Agricultural damage caused by the cyclones of late 1983 and early 1984 culminating in "Kamisy" and by the floods coincident to these cyclones is essentially of two types: loss of crops and seedlings and infrastructural damages. The Government estimates that this series of cyclones and floods resulted in overall crop losses of approximately \$36.12 million, detailed in table 9.

51. Infrastructural damages totalled an estimated \$4.9 million, as itemized in table 10.

Table 9. Crop losses due to cyclones and floods, December 1983 to April 1984

(Millions of dollars)

Paddy	18.5
Paddy seedlings	0.8
Cotton	12.7
Tobacco	1.1
Other staple crops	2.0
Oil palm	0.07
Coconut	0.25
Fruits and vegetables	<u>0.7</u>
Total	36.12

Table 10. Damage to agricultural infrastructure due to cyclones and floods, December 1983 to April 1984

(Millions of dollars)

Agro-industrial buildings and plants	0.5
Access roads	0.9
Irrigation systems	3.1
Agricultural barges and lighters, silting	<u>0.4</u>
Total	4.9

52. In addition, livestock losses are estimated at 1,275 head or \$170,000.

53. The destruction of rice paddy has been particularly severe, as shown in table 11.

Table 11. Estimated loss of paddy production,
 December 1983 to April 1984

Province	Tons	Value ^{a/} (Thousands of FMG)
Antananarivo	20 580	1 543
Toamasina	29 950	2 249
Mahajanga	67 070	5 030
Toliary	5 650	424
Fianarantsoa	17 730	1 330
Antsiranana	6 800	510
Total	147 780	11 086 000

^{a/} Value calculated on the basis of a "floor" price to producer of FMG 75 per kg.

54. Since rice is a staple food in Madagascar, shortfalls in domestic production must be covered by imports. It is estimated that the December 1983 to March 1984 cyclones (excluding "Kamisy") led to supplementary import requirements of around 64,000 tons of rice. Preliminary estimates show that "Kamisy" will result in a further import requirement of 25,500 tons.

55. In early June 1984, FAO/Office for Special Relief Operations (OSRO) dispatched an agriculture expert mission to Madagascar to assist the Government in undertaking a thorough assessment of damages in the agriculture sector and to recommend a programme of rehabilitation. The report of the FAO mission will provide more comprehensive information on the extent and nature of the agricultural damage caused by the cyclones and floods.

C. Transportation

1. Road infrastructure

56. It is estimated that the damage to vital main roads as well as rural access roads totalled approximately \$9.6 million. This includes damages to road segments which became hollowed out, washed away in some cases and cut off in others. With the rising of river levels, breaches were made to embanked roads and to embankments leading to bridges, and the abutments of several bridges were washed away. Further information on damage and consequent rehabilitation requirements are reflected in the projects outlined in section VII below.

57. The rehabilitation of the road infrastructure requires urgent attention not only because of its basic importance to economic activity in the country but also because it is critical to reconstruction and rehabilitation efforts. Delay in undertaking the necessary repairs could lead to further deterioration during the rainy season which begins in November.

2. Shipping and ports

58. Although no loss of capacity in deep-sea or coastal shipping was recorded, the mission was able to ascertain extensive damage to the port infrastructure, superstructure and cargo handling and service equipment in both Antsiranana and Mahajanga, respectively the second and third major ports of the country. The two ports have an important share of the country's external trade flows and the coastal distribution system of food and materials. Both ports were built before independence. Their age and the consequent lack of both infrastructure and superstructure maintenance constitute a serious handicap to efficient cargo handling.

59. The already degraded port facilities, including floating and mobile equipment, were further damaged by the series of cyclones to an amount of approximately \$3.3 million. It is estimated that damage has reduced the operating capacity of both ports by approximately 60 per cent compared with 1983 levels. Present contingency measures to deal with traffic entail higher cargo transit costs and accrued ship-time in port costs.

60. This situation constitutes a serious disruption of the national transport network which relies heavily on both ports for coastal distribution, foreign trade and logistical services for development projects. The port of Antsiranana not only serves the whole of the northern province but also operates the island's only drydock and ship repair yards, essential to maintaining the country's shipping and fishing fleets as well as port floating equipment. The port of Mahajanga serves the north-west coastline, the capital, Antananarivo, and several areas along the main road linking the two cities.

61. The loss of capacity in both ports due to cyclone damage will hinder the urgent rehabilitation efforts in the hinterland, in particular in regard to the transportation of needed construction and building materials.

3. Airport installations and navigational aids

62. Cyclone damage to airports was extensive in Antsiranana and to a lesser degree in Mahajanga. Total damage is estimated at approximately \$607,000. Airport buildings and hangars suffered as well as navigational aids and communications networks. At Antsiranana the airport building and main hangar have no roof, and all major navigational aids (very high frequency omnidirectional radio range system (VORS), radio beacons (Locator), abbreviated visual approach slope indicator system (AVASIS), radio VHK/HF etc.), communications systems and services such as VHF telephone and telex and electricity are out of order owing to cyclone damage. Passenger safety is thus seriously jeopardized.

4. Meteorological installations

63. The meteorological centres in both airports were badly hit. Radio communications equipment and meteorological devices were either destroyed beyond repair or badly damaged. Although some of the meteorological aids have been provisionally re-established, such makeshift arrangements are highly insufficient. The consequences of this damage are not only immediately evident in reduced air-control capability but, in the longer run, by an inability to provide adequate early warning of inevitable future cyclones.

5. Total damage assessment

64. On the basis of the foregoing assessments, reconstruction costs for the transport sector can be estimated as follows:

Roads	\$ 9 620 000
Ports	3 325 000
Airports	607 000
Meteorology	<u>135 000</u>
Total	\$13 687 000

65. Government sources indicated that the loss due to cyclone damage of port-service-craft was estimated at \$3,525,000, namely, 3 tugs (300 HP) and 15 lights in the upstream river port of Marovoay (Mahajanga Province). Government sources also indicated damage to provincial airports (Nosy-Be, Sambava and Vohemar) estimated at \$325,000 for civil works and \$80,000, for equipment, totalling \$405,000. The mission was unable to visit these three airports or the port of Marovoay to ascertain these damages.

D. Industry

66. The damage in this sector relates mainly to industrial buildings. It was also reported that there had been serious damage to production equipment as well as a loss of raw materials and products. Some industrial plants have had to reduce production drastically, others have had to stop production altogether.

67. Listed below are the main companies suffering from losses attributable to "Kamisy" with estimates of damages as provided by the Government:

(a) SOTEMA (textile mill): 2,000 m² roofing blown off, six looms and some engines damaged; evaluation of damage to buildings and equipment = FMG 100,000,000 (\$182,000); to raw material and products = FMG 126,999,999 (\$230,000);

(b) FITIM (agro-industry): evaluation of damage to roofing, windows, brick work and electrical equipment: FMG 125,000,000 (\$227,000); loss of material: \$50,000;

(c) SOPEBO (fish-processing plant): evaluation of damage to roofing and to factory building: FMG 100,000,000 (\$190,000); wharf belonging to Government: FMG 14,000,000 (\$25,400);

(d) SOMAPECHE (fish-processing plant): breaking of wharf and consequent breaking of refrigeration plant and destruction of four compressors = FMG 400,000,000 (\$727,000); destruction of ice producing equipment = FMG 60,000,000 (\$110,000); additional cement and concrete requirements = FMG 20,000,000 (\$36,000). The company also experienced a loss of shrimp estimated at \$200,000;

(e) Amboanio cement plant: 50 per cent roofing destroyed: FMG 36,000,000 (\$65,000); laboratory destroyed: FMG 15,000,000 (\$27,000); electrical power plant damaged: FMG 15,000,000 (\$27,000); mechanical shovel destroyed: FMG 30,000,000 (\$54,000);

(f) SECREN (Société d'Etude, de Construction et de Réparation Navale) (naval construction): total damages evaluated at FMG 1.834 billion (\$3.3 million). In addition, three speedboats used for high sea repairs were lost. The cost of replacing these boats is FMG 1 billion (\$1.8 million) each.

68. In addition to the above-mentioned companies, several other industrial enterprises, mainly small- and medium-scale companies in Mahajanga and Antsiranana, suffered damages, especially to their roofs.

69. Table 12 contains a recapitulation of the cost of damages to industrial plants in Mahajanga and Antsiranana.

Table 12. Industrial plant damage - December 1983 to April 1984 a/

Mahajanga

SOTEMA (textiles)	\$412 000
FITIM (jute mill)	277 000
SOPEBO (fish processing)	215 000
SOMAPECHE (fish processing)	873 000
Amboanio cement plant	174 000
Agro-industries: SIB, SIEB, sugar plants, etc.)	350 000
Garages and repair shops	<u>\$100 000</u>

Subtotal

\$2 401 000

Table 12 (continued)

Antsiranana

SECREN (shipyard)	\$3 300 000	
Replacement of 3 speedboats	5 400 000	
CONSAZLIMAS (salt plant)	100 000	
SCIM (vegetable oil)	120 000	
HODIMA (tannery)	50 000	
Mavico (canning factory)	50 000	
Brewery	120 000	
Sugar plants (including Nosy-Be)	100 000	
Garage and repair shops	<u>\$ 150 000</u>	
	Subtotal	<u>\$ 9 390 000</u>
	Total	<u><u>\$11 791 000</u></u>

Source: Government of Madagascar.

a/ Does not include agro-industrial plants noted in table 10.

E. Housing and public buildings

70. The cyclones and floods of December 1983-April 1984 caused severe damage to public buildings, with complete destruction in some cases and loss of roofing in others. With regard to private housing, damage to good or medium standard houses was mostly loss of roofing with consequent water damage. In low-income areas, the houses generally made of corrugated iron were largely destroyed.

71. The assessment of damage shown in table 13 focuses on public buildings in view of the importance attached by the Government to returning public administration and services to normal as quickly as possible. The mission was able to obtain detailed data on damage to public buildings in the towns of Antsiranana and Antsiranana I, both in Antsiranana Province and in the town of Mahajanga, Province of Mahajanga. As regards other towns and areas in these provinces, damage estimates are based on indirectly obtained information.

Table 13. Damage to public buildings, December 1983 to April 1984
 (Millions of dollars)

	Province of Antsiranana			Province of Mahajanga		Total
	Town of Antsiranana I	Town of Antsiranana	Other <u>a/</u> areas	Town of Mahajanga	Other <u>b/</u> areas	
Public						
Administration	2.17	0.69	1.22	0.63	0.19	4.90
Education <u>c/</u>	1.23	0.25	0.64	0.74	0.22	3.08
Health services <u>d/</u>	0.09	0.05	0.06	0.12	0.04	0.36
Community facilities <u>e/</u>	0.18	0.01	0.08	0.51	0.15	0.93
Total	3.67	1.00	2.00	2.00	.60	9.27

Source: Government of Madagascar.

a/ Ambanja, Nosy-Be, Ambilobe and Voahemmar.

b/ Mitsinjo, Ambato-Boeine, Tsaratanava and Marovoay.

c/ Primary, secondary and university-level school buildings.

d/ Principal and subsidiary hospitals, dispensaries and Red Cross buildings.

e/ Cultural buildings, churches, community centres and day care centre.

72. In Antsiranana, clear evidence of the violence of the cyclone could be seen: the entire roof of strong buildings blown away, concrete electricity poles broken, iron trusses and beams bent. It is estimated that about 4,000 private houses were damaged or destroyed, of which 60 per cent involved corrugated iron low-cost housing.

73. The assessment understates the extent of real damage since significant rehabilitation efforts have been made by the local authorities and the population itself: roads were cleared of all debris and entire zones of low-cost houses made of corrugated iron sheets were rebuilt. Although no comprehensive investigation of damage to private housing could be undertaken by the mission, it was repeatedly observed in Antsiranana and Mahajanga that the restoration of private dwelling was proceeding apace through the initiative of individuals and with the use of salvaged building materials or procurements from the markets.

74. In the Province of Mahajanga several public buildings and private houses were damaged by the cyclones. However, it is generally estimated that the damages are more extensive than intensive. As in Antsiranana, the private housing which was completely destroyed were mostly of the low-cost corrugated iron sheet type.

F. Energy

75. Cyclone "Kamisy" destroyed practically the entire electricity distribution network in all of the towns of the Provinces of Antsiranana and Mahajanga. Damage in Toamasina was significantly less. The following estimates of damages to power lines and electricity plants were prepared by the national electricity company (JIRAMA):

<u>Town</u>	<u>Power lines</u>	<u>Buildings</u>
Mahajanga	\$180 000	\$130 000
Marovoay	35 000	4 000
Ambato-Boeni	8 000	
Maevatanana	2 000	
Antsiranana	130 000	8 000
Nosy-Be	1 000	
Toamasina	<u>18 000</u>	<u> </u>
	<u>\$374 000</u>	<u>\$142 000</u>

The total damages in the energy sector are set at \$516,000.

VI. EMERGENCY ASSISTANCE

76. In the aftermath of the earlier cyclones and again after "Kamisy", the Government of Madagascar appealed to the international community for emergency assistance. The Office of the United Nations Disaster Relief Co-ordinator (UNDRO) played the leading role in co-ordinating the responses. A summary table of emergency assistance provided as at 21 May 1984 (preliminary estimate) is given below:

International Red Cross	\$601 851
Red Cross of the People's Republic of China	FMG 12 000 000
Gulf Group of Companies (Switzerland)	FMG 27 500 000
European Economic Community	ECU 1 261 890
UNDP	\$30 000
Federation of Protestant Churches of Mozambique	\$20 000
United States of America	\$6 015 000
Federal Republic of Germany	\$19 230
Italy	\$41 500
Netherlands	\$65 000
United Kingdom of Great Britain and Northern Ireland	\$74 000
Union of Soviet Socialist Republics	\$3 000 000
Japan	FMG 42 000 000
Algeria	\$1 200 000
UNDRO	\$30 000

VII. SPECIAL ECONOMIC ASSISTANCE PROGRAMME

A. Introduction

77. A special economic assistance programme has been formulated to assist the country to recover from the destruction wrought by the recent cyclones and floods, particularly cyclone "Kamisy". The specific projects are the results of consultations which the inter-agency mission had with the authorities concerned of the Government, both at the central and provincial levels.

78. Although the main goal of the programme is reconstruction and rehabilitation, the projects are fully consistent with the objectives and strategy of the current National Development Plan. It should also be emphasized that the projects are closely interrelated. For example, the rehabilitation of the transportation infrastructure, particularly the road system, is essential to the successful implementation of projects relating to agricultural productivity. Similarly, the early restoration of the country's industrial plant can facilitate reconstruction in the housing and public building sector. Finally, the projects contained in the programme call for urgent implementation so that the country can resume normal economic activity.

79. The project descriptions have not, in most instances, attempted a clear distinction between their foreign exchange costs and their local costs. As a result of the major reconstruction efforts already undertaken, government resources are extremely limited. Additional reconstruction and rehabilitation costs, whether requiring foreign or local currency, can only be covered, for the most part, by assistance from external sources. Full details of the project are available from the Government of Madagascar.

B. Agriculture

80. External assistance is required to enable the country to cope with its projected shortfall of rice production in 1984. In addition, assistance is required to rehabilitate the hydro-agricultural infrastructure and to provide agricultural inputs where necessary so that 1985 production can be brought up to normal or even to a positive growth level.

81. With the assistance of the Caisse Centrale de Co-opération Economique (CCCE), the African Development Bank (ADB) and the European Development Fund (EDF), the heavy damages caused by cyclones in 1982 were repaired in time to meet the next agricultural calendar. Similar prompt external assistance is required under the present circumstances.

82. The report of the expert mission from FAO/OSRO, (see para. 55) will provide additional information on the requirements and measures to be taken, including specific projects, to rehabilitate agricultural production in the areas concerned. This will be complemented by the work of other agencies such as the World Bank and ADB in rural infrastructure rehabilitation projects in the context of ongoing assistance programmes.

83. In terms of food production, the earning of foreign exchange and the provision of inputs to agro-industry, it is a matter of urgency to Madagascar to restore its agricultural production capacities. An essential measure towards this end is the rehabilitation of the country's irrigation systems and related facilities which were damaged or destroyed by the natural disasters of December 1983-April 1984. In order to accomplish this, the Government requires, in the immediate future, assistance for the following eight projects estimated at \$4,470,000. Approximately 70 per cent of the cost of all these projects is for imported materials, with the remaining 30 per cent for labour.

A-1. Rehabilitation of agricultural infrastructure, Antsiranana

84. The purpose of this project is to engage in rehabilitation work in the areas of Ambohivohibe, Ambilobe, Mahavanona, Anamakia, Andapa, Andrianakonko and other locations in Antsiranana Province. The work consists of the dredging and repairing of canals of the irrigation systems in these locations and the reconstruction of buildings and storage facilities. The estimated cost of this project is \$220,000.

A-2. Rehabilitation of agricultural infrastructure, Mahajanga

85. While the major work would be at Bekarara, the project includes other parts of the network located in Ankijabe, Ambodimany, Ambalabe/Bekobay, Mangetsa, Bealanana and Antongomena/Betsina. The estimated cost is \$800,000 which includes the dredging and repair of the irrigation canals and the reconstruction of office buildings and storage facilities.

A-3. Rehabilitation of agricultural infrastructure, Maintirano

86. The most important irrigation rehabilitation effort under this project would be at Veromanga, followed by Behirijy, Betantanana, Tambohorano and Ankisoka. Six other subsidiary areas also need rehabilitation. The work consists of dredging and realignment of canals, repair of gaps, repair of dikes, and building reconstruction. The estimated cost is \$700,000.

A-4. Rehabilitation of agricultural infrastructure, FIFABE

87. This rehabilitation project includes restoring the hydro-agricultural system to normal operation and the reconstruction of a pumping station and of dikes, canals and dams. The total estimated cost is \$1.3 million.

A-5. Rehabilitation of agricultural infrastructure, Antananarivo and Antsirabe

88. This project provides for repair of dikes, improvement of drainage systems and desilting of rice fields, essentially in the areas of Laniera and Sahalombo (Manandona) as well as Antananarivo and seven other areas. The total estimated cost is \$500,000.

A-6. Rehabilitation of agricultural infrastructure, Toamasina

89. The most important area requiring restoration of its irrigation system is Ambatondrazaka. Two other areas need some minor rehabilitation work, namely Antetezatona/Sahararo/Kotobona in Toamasina and Ankofa/Sahatany in Fénérive-Est. The project provides for the reconstruction of canals and dikes and the dredging of canals at a total estimated cost of \$600,000.

A-7. Rehabilitation of agricultural infrastructure, Mananjary and Fianarantsoa

90. The work involves the repair of damage caused by heavy rains, essentially the reconstruction of canals and repairing breaks. The estimated cost is \$150,000 (\$100,000 for Mananjary and \$50,000 for Fianarantsoa).

A-8. Repair work, Morondava

91. Following successive cyclones and consequential heavy rains, there has been an erosion of levees on the right bank of the Morondava, endangering its stability and jeopardizing the adjacent areas. The most important purpose of this project is the protection of the levee at Dabara by repairing and strengthening it. The estimated cost of this project is \$200,000.

C. Transportation

1. Roads

92. Madagascar's road network is a vital element in its national and local transportation systems. It is essential to the country's economic activity and development, linking production areas, market places, principal cities, railways, ports and airline terminals. The degradation of the road system because of cyclones and floods has an immediate adverse impact on many economic and social sectors. The prompt repair of the damaged road sections is therefore imperative. In order to avoid harmful consequences to the economy of the country, it is necessary to activate an emergency programme for the rehabilitation of critical roads, particularly those with economic importance. The mission, in consultation with the Government, has identified those road segments most urgently requiring rehabilitation with external assistance.

TR-1. Reconstruction of the Anivorano-Ambilobe Road (RN6)

93. The Anivorano-Ambilobe Road is a vital intra-provincial transportation link in Antsiranana Province, comprising approximately 25 per cent of the paved roads in Antsiranana Province. This road, which was experiencing maintenance problems, deteriorated considerably as a result of "Kamisy". In order to restore its stability, a project of reconstruction is envisaged. The reconstruction cost is estimated at \$4 million. Technical assistance is also required in the amount of \$320,000. The total cost of this project is estimated at \$4,320,000.

TR-2. Rehabilitation of the Ambilobe-Vohemar Road (RN5)

94. As a result of the damage inflicted by the cyclones and floods, this road is cut off at various river crossings. In addition, several wooden bridges have been destroyed, the embankment of one bridge has been washed away and a culverted passageway has been destroyed. Pending the construction of permanent bridges, it is proposed to use "Bailey" bridges for river crossings and to construct or repair the necessary culverts, gabions and embankments. The estimated cost of this project is \$400,000.

TR-3. Rehabilitation of the Sambava-Antalaha and Antalaha-Antsirabato Roads (RN5)

95. These all-weather roads are located close to the north-east coast and have suffered damage to their pavements and to several bridges. The following rehabilitation work is urgently required: repair to pavement, installation of new culverts, replacement of bridge planks and construction of a provisional bridge. The estimated cost of this project is \$300,000.

TR-4. Rehabilitation of the Sambava-Andapa Road (RN3)

96. The heavy rains have caused significant damage: several bridge abutments washed away, embankments broken, and landfills washed away. Landslides have also occurred on several parts of that road. The proposed rehabilitation project provides for installation of gabions, filling up of breaches, reconstruction of culverts, clearing up of the landslides, repair to embankments, strengthening of piers and resurfacing of several parts of the road. The estimated cost of this project is \$750,000.

TR-5. Rehabilitation of access roads of economic importance

97. These access roads, totalling some 250 km, are crucial for the transportation of agricultural outputs such as coffee, cloves and rice. The repair of these roads should be sufficient to enable trucks to reach various agricultural areas. This rehabilitation cost is estimated at \$1,750,000. In addition, there is a need for "Bailey" bridges at several points. The estimated cost of the needed bridges is \$370,000. The total cost of this project is thus \$2,120,000.

TR-6. Reconstruction of Port-Berge-Ambondromamy Road (RN6)

98. This road segment requires urgent rehabilitation. While waiting for the necessary financing for complete reconstruction, it is necessary that the critical parts be repaired urgently before the next rainy season. The work will involve mainly filling of breaches and resurfacing of the road at an estimated cost of \$220,000.

TR-7. Rehabilitation of the PK 227 to 532 Road (RN4)

99. In order to assure traffic on this important segment of National Road No. 4 during the next rainy season, it is necessary to repair critical parts of the road segment. The main work will involve filling of low sections, repair of the Amboromalandy embankment and reconstruction of culverted passageways. The total estimated cost of this project is \$1,400,000.

TR-8. Rehabilitation of the Befandriana-Mandritsara Road (RN32)

100. The urgent rehabilitation work will involve filling the eroded parts of the road at an estimated cost of \$110,000.

2. Ports

101. The World Bank is currently studying a long-term port development project for Madagascar. For this reason, the four port rehabilitation projects presented in this report concern only immediate short-term measures designed to re-establish former port capacities in Antsiranana and Mahajanga following the cyclone damage.

102. Although most of the civil works reconstruction and some of the rehabilitation of the technical facilities can be undertaken respectively by local contractors and by the local dock-yard SECREN, it is estimated that almost all building materials and certain technical equipment will have to be imported. Hence, the civil works programmes can be considered as having an 80 per cent foreign exchange component (cement and building materials, specialized expertise) and a 20 per cent local currency component (local labour, sand, stone etc.). This proportion also applies to projects concerning technical facilities undertaken by the Antsiranana dock-yard of SECREN, as all materials (engines, steel sheet, welding rods etc.) will have to be imported. Other projects relating to the rehabilitation of technical facilities can be assumed to require 100 per cent foreign exchange financing.

103. Wherever applicable, each project should incorporate technical assistance and training to avoid subsequent degradation of both infrastructure, superstructure and technical facilities due to inadequate maintenance and management.

104. The following are the projects proposed in this sub-sector.

TP-1. Reconstruction work, Antsiranana port

105. Antsiranana is one of the three major ports of Madagascar handling imports, exports and national coastal transshipments. Of its 300 metres of concrete quays serving as deep sea berths for commercial shipping, only 100 metres are barely operational as a result of the damage inflicted by the cyclones and floods of December 1983-April 1984. In addition, various other facilities of the port require extensive repair or reconstruction to recover from the damages wrought by the cyclones. All the commercial quays and support facilities should be brought to a fully functional condition as soon as possible if the port of Antsiranana is to fulfil its necessary role as part of the transportation system of the country. The purposes of this project, therefore, are several.

106. The projects include the following:

(a) Reconstruction of 300 metres of commercial quay involving land filling and paving as well as major underwater caisson repair, at an estimated cost of \$750,000;

(b) Reconstruction of a breakwater, at an estimated cost of \$150,000;

(c) Repair and reconstruction of port service craft quays at an estimated cost of \$50,000;

(d) Repair of quay apron surfacing at an estimated cost of \$80,000;

(e) repair or reconstruction of the harbour master's building, technical repair sheds and administrative buildings at an estimated cost of \$40,000.

The total cost of this project is estimated at \$1,070,000.

TP-2. Rehabilitation of technical facilities at Antsiranana port

107. The purpose of this project is to replace or repair technical facilities, such as port service craft, which were sunk or suffered serious damage because of the cyclone. The work includes replacing three port service craft (harbour master and pilot vessels) and spare parts, replacing a lighter (for midstream cargo-handling operations), rehabilitating two lighters, rehabilitating the port tug, including spare parts, and repairing navigational aids and beacons. The total estimated cost is \$540,000.

108. Except for naval and craft engine repairing, the local dock-yard, SECREN, can undertake the implementation of this project on the condition that it is fully supplied with the appropriate imported material.

TP-3. Reconstruction work, Mahajanga port

109. Mahajanga has a series of lighterage berths for the discharge and loading of lighters, serving vessels lying at anchor. Small coastal vessels can be accommodated alongside the berth at high-water. All of the existing quays were damaged. The World Bank is considering a long-term rehabilitation project. However, the following reconstruction needs to be done immediately: minor temporary repair to the quay COSTE (to avoid further washing away of the fill behind the sheet-piled wall); reconstruction of quay VUILLEMAN; the extension of the quay BARRIQUAND (the driving of 210 m of steel sheet-piling immediately behind the concrete deck structure and refilling and resurfacing the apron); and repairs to the masonry-walled quay ORSINI simply to avoid further erosion of the fill behind it. The estimated cost for this reconstruction is \$800,000.

110. The project will also involve (a) replacement of the stone dike to the south of the port by a gabion structure to prevent land erosion at an estimated cost of \$250,000, (b) roof and masonry repair to sheds, technical and administrative buildings, the nautical college, officials' houses and the harbour master's building at an estimated cost of \$150,000 and (c) rehabilitation of the electricity distribution system, light-houses and beacons at a cost of \$80,000. This project has a total estimated cost of \$1,280,000.

TP-4. Rehabilitation of technical facilities at Mahajanga port

111. The object of this project is to replace or repair technical facilities which were sunk, destroyed or damaged during the cyclone. The work includes replacement

of two lighters (100 t) (estimated cost, \$120,000), rehabilitation of two damaged tugs for midstream operations (estimated cost, \$120,000), rehabilitation of two port service craft (harbour master/pilot vessels) (estimated cost, \$145,000) and rehabilitation of navigation aids (estimated cost, \$50,000). The total cost of this project is estimated to be \$435,000. All above replacement and repairs, excepting for navigation aids, can be undertaken in the SECREN Antsiranana ship-yard providing adequate imported materials are available.

3. Airports

112. Because of the important role of air traffic in the country's economy, especially in view of further damage to the northern road network, it is essential to re-establish airport technical and passenger facilities as soon as possible. The airports at Antsiranana and Mahajanga are in urgent need of the reconstruction of their physical plant and the rehabilitation of their technical facilities if an adequate level of air traffic safety is to be maintained. The reconstruction work can be undertaken by local contractors; some sophisticated navigational equipment will need to be imported. Spare parts, technical assistance and training should be essential components of the two projects concerning rehabilitation of technical facilities to assure proper maintenance.

TA-1. Reconstruction work at Antsiranana airport

113. The purpose of this project is to undertake the reconstruction or repair of the following buildings in the airport: passenger and freight terminal, technical communications and control tower, main aircraft hangar, and various technical and administrative buildings. The estimated cost of this work is \$240,000.

TA-2. Rehabilitation of technical facilities at Antsiranana airport

114. The purpose of this project is to replace or repair technical facilities damaged by the cyclone, the disfunctioning of which is a serious hazard to air traffic safety in the region. The rehabilitation will involve replacement or repair of navigational aids (very high frequency omni-directional radio range (VOR) system, locator radio beacon, antennae and pylons for VHF and HF, visual landing aids), procurement of a fire engine and reconnection of telex and telephone circuits and electricity distribution systems. The estimated cost of this project is \$151,000.

TA-3. Reconstruction work at Mahajanga airport

115. This project is designed to reconstruct or repair the roofs and fittings of airport buildings damaged by the cyclone: passenger and freight terminal, technical buildings and control tower, staff offices and aircraft sheds. The estimated cost of this project is \$85,000.

TA-4. Rehabilitation of technical facilities at Mahajanga airport

116. The purpose of this project is to replace or repair technical facilities, the disfunctioning of which is a serious hazard to air traffic safety in the region.

The equipment and facilities requiring rehabilitation include several radio beacons and transmitters with auxiliary equipment (radio beacon transmitter MF 1 KW, radio beacon two transmitters 300 W, AFTN (aeronautical fixed telecommunication network) (5 freq.) 10 transmitters 1 KW, 39 m high mast for 5SJ beacon, 15 m high mast for MA beacon, 5 HF antennas for AFTN, 10 HF receivers for AFTN, one VOR/DME (distance measuring equipment) station, radio beacon cabling) and installation of two standby generators (50 kVA and 70 kVA) for the control and terminal buildings. The total estimated cost of this project is \$853,000.

D. Industry

117. Madagascar has a number of industrial plants which can contribute significantly to recovery and rehabilitation efforts, as well as to the economic development of the country. Many of these plants, however, have suffered damages from the cyclones and floods and are in need of assistance in order to play their role effectively in the reconstruction. The proposed assistance should serve to help each factory become operational as soon as possible and to improve the capacity of each factory both to participate in the reconstruction programme of the region and to produce import substitutes.

118. In this connection, the provision of equipment and raw materials will be combined with training and technical assistance, especially in the management field.

119. In Mahajanga Province, the most severe damages were suffered by a fish-processing plant and two textile plants. The first can rely on its foreign partners to partly rebuild the factory. The two textile plants suffered losses mainly to their stocks of raw material and finished products; the replacement of those is not within the scope of the proposed programme. On the other hand, those industrial plants, as well as the agro-industries in the Province, are in need of assistance to reorganize their production, implement simple repair and maintenance systems and to return to a useful level of productivity.

120. Antsiranana Province contains only a few important industrial establishments. The most important one, SECREN, suffered the most. The other large factories and the 25 to 35 small industries, in particular the agro-industries, need assistance to restore adequate levels of productivity.

I-1. Production of corrugated iron sheets, MACOMA plant, Tamatave

121. The main damage caused by "Kamisy" was the destruction of building roofs. Although much of the damaged iron sheets have been put back as provisional cover, it is obvious that a major programme is needed to give industrial and private buildings permanent roofing. The purpose of this project is the procurement of spools of sheet metal to be provided to the MACOMA plant so that it can produce corrugated iron sheets. It is estimated that the industrial establishments will need 40,000 m² to 50,000 m² of corrugated sheets. The MACOMA plant is currently working at 50 per cent capacity because of the lack of this material. It is estimated that 300 tons of zinc covered sheet metal, in spools, are needed at a

cost of \$180,000. This should be accompanied by 30 tons of nails and other fixtures at an estimated cost of \$20,000. The total cost of the project is approximately \$200,000.

122. The corrugated sheets produced by MACOMA would be sold to the industrial enterprises at a price which would cover only transport and local manufacturing costs.

I-2. Production of roofing material at SECREN, Antsiranana

123. In addition to corrugated iron sheet roofing, special roofing materials are required, such as for drainage. The workshops of SECREN could be utilized for the production of these roofing materials. This project would provide SECREN with a small rolling mill and auxiliary equipment. Short-term technical assistance will also be provided. The estimated cost of this project is \$80,000.

I-3. Production of roofing tiles

124. Roofing requirements generated by the cyclones for public buildings, private houses and industrial plants call for tiles, as well as corrugated iron sheets. This project has the purpose of establishing two mobile tile-making units. Such units can conveniently produce roofing tiles near the buildings where they are needed. The necessary production equipment is carried on a trailer and will have a capacity to produce 1,000 to 1,500 tiles per hour. The tiles can be fired in a local oven. The same equipment can also be used to prepare the tiles for firing in a Hoffman kiln. Each of the two units requires a tile press, conveyors, knives and a 40 KW motor as well as a trailer, at an estimated cost for both units of \$260,000. Technical assistance at a further cost of \$50,000 is needed to phase in the equipment, locate clay deposits and train local technicians. The total cost of this project is estimated at \$310,000.

I-4. Establishment of a Hoffman oven for bricks and tiles

125. The town of Antsiranana and environs have a concentrated requirement for bricks and tiles. Practical assistance in helping to meet this requirement would be the provision of a kiln which could be operated at low cost. Such a facility would be a Hoffman kiln which could be installed near Antsiranana and could use local wood or coconut fibre to fire bricks and tiles, including those produced by the above-mentioned mobile units. The estimated cost of the Hoffman kiln with drying racks and some short-term technical assistance is \$170,000.

I-5. Establishment of an asbestos-cement roofing-plate production unit

126. The possibility of setting up an asbestos-cement roofing-plate production unit with the cement factory of Amboanio is under consideration. Asbestos can be mined in central Madagascar and locally produced, weather-resistant asbestos-cement plates could be a major import substitute, effectively replacing imports of corrugated iron roofing. A feasibility study should be undertaken (for the establishment of an asbestos-cement roofing-plate production unit to standard profile). Such a feasibility study has an estimated cost of \$24,000. Eventually the establishment of a unit with a production capacity of 12,500 tons a year would call for an investment of approximately \$2 million.

I-6. Assistance to the Amboanio cement plant

127. The current national deficit of cement is estimated at 360,000 tons, much of it imposed by the need to repair the damage caused by the cyclones. The Amboanio cement plant with a nominal annual capacity of 60,000 tons could contribute significantly to meeting this deficit. However, its production rate fell to less than 30,000 tons per year because of the damages it suffered from the December 1983-April 1984 cyclones. This project is proposed to improve the operational capacity of the plant so that it can make a greater contribution towards meeting the urgent cement requirements of the country. The cyclones damaged the power plant of the factory and destroyed a large power shovel and transport belts, laboratory equipment and workshop equipment. The repair and replacement of these items should be accompanied by technical assistance in the fields of maintenance and repair and general management. The overall estimated cost of this project is \$320,000.

128. The project aims at the rehabilitation of the plant, with the provision of a new power unit and spare parts for an "Allen" motor (\$125,000), provision of a hydraulic shovel and parts for transport belts (\$25,000), replacement of laboratory equipment (control instruments, pyrometer, reactives) (\$35,000) and equipment and spare parts for workshops (lathes, cutting tools, equipment of electrical repair) (\$50,000). Technical assistance is required especially to strengthen the capacity for repair and maintenance (\$85,000). The estimated cost of the project is \$320,000.

I-7a. Immediate rehabilitation of SECREN

129. SECREN, employing approximately 1,250 people, is the largest industrial company in Antsiranana Province and is a major component of the nation's industrial plant. Its ship repair, foundry and machine shop capabilities are urgently needed for the recovery effort. As an urgent first step in restoring its infrastructure to operational condition, this rehabilitation project is proposed. The project also provides for the replenishment of its inventory of raw materials and supplies which were partly damaged by the cyclones and partly used for emergency repairs to ships damaged by the cyclones.

130. The objectives of the project are the reconstruction of 50 metres of quays near the dry dock, the replacement of roofing of the industrial halls and administration buildings, the replacement of electrical cables, telephone cables and lights, the reconstruction of the slipway and the replacement of pumps and compressors for the dry dock, the replacement of the damaged power plant by two new electric power units, and the replacement of office equipment and measuring equipment which had been destroyed. The cost of this component of the project is estimated at \$1,295,000. Furthermore, SECREN urgently needs a minimum supply of raw materials and supplies which are not available locally, including sheet metal, steel beams and rods, welding wires and supplies, nuts and bolts, fixtures, electrical cables, copper wire, cutting tools, paint and dilutants and steel tubes, at a total estimated cost of \$145,000. The total estimated cost of this project is \$1,440,000.

I-7b. Medium-term rehabilitation of SECREN

131. Beyond the preceding project to put SECREN on a minimally operational basis, a medium-term rehabilitation programme is also required to restore SECREN to its pre-cyclone condition and to increase its capacity for production, repair and maintenance and industrial development work, thereby allowing it to play its assigned role as industrial centre for the north-west coast of Madagascar and to serve once again as the major naval repair centre servicing the Indian Ocean. Pursuant thereto, this project has the objectives of assisting SECREN to the full restoration of its industrial repair and foundry capabilities. In connection with the repair capabilities, the project will replace SECREN's workshop equipment which was destroyed by cyclone and floods, including gear grinding equipment, lathes, portable welding equipment, cutting tools, fixtures for machine tools, hand tools, electrical repair tools, basic parts for an electrical workshop and gauges for a total estimated cost of \$372,000.

132. With regard to the renovation of the foundry, the project provides for replacement of the tilting oven and linings and accessories, a small oven for non-ferrous metals, melting equipment, the sand mixers and metallurgical microscopes and other equipment for the control laboratory. The renovation of the foundry would cost an estimated \$95,000.

133. The improved naval repair and industrial repair capability would be maximized by a reorganization of the shipyard and the upgrading of industrial and naval repair and maintenance skills of staff and management at all levels. To accomplish this, technical assistance over a period of time is required in various fields including shipyards, organizational management, ship repair work, organization and operation of an industrial repair and maintenance facility, organization and conduct of training programmes and general management. This major technical assistance activity would cost an estimated \$768,000. The estimated total cost of this project is thus \$1,235,000.

I-8. Strengthening of the capacity of SECREN for naval repairs

134. The three speedboats used by SECREN for urgent repairs on the high seas and for maintaining vessels in other ports of Madagascar were sunk by the cyclone. Each had four engines of 1,100 hp. In addition, SECREN also suffered the destruction of several tugs in the harbour of Antsiranana. In order to assist SECREN to recover its capability to make repairs on the high seas, this project provides SECREN with two repair vessels of appropriate design and with fully equipped workshops and spare parts. Two units are required in order to meet adequately the need for repair requirements for trawlers and barges in all ports of the island. A sea-going tug will also be procured. The estimated cost of this project is \$2.9 million.

I-9. Management assistance and extension services to industries

135. In view of the damage done by the cyclones, a special programme is required to help the industrial plants of the north-west region to regain their productivity. The major activities of this programme would be the conduct of a study mission to

identify the principal production management problems in the factories affected by the cyclone and a sustained follow-up with production management advisory services. Special attention will be given to agro-industries (producing items for local consumption and export), particularly in connection with repair and maintenance functions in collaboration with the industrial repair workshop at SECREN. The Ministry of Industry and the Société d'étude et de recherches pour le développement industriel (industrial development centre) lack the financial and technical means to establish this assistance programme. They require technical assistance and training support in production management, diagnostic techniques, time and method studies and related subjects. The total estimated cost of this project is \$600,000 for a period of three years.

I-10. Modular wooden bridges for rural roads

136. In order to repair or replace as speedily as possible the estimated 100 small bridges lost because of the cyclone and floods, the Government would like to undertake the construction of a standard modular bridge composed of both steel and wood parts. The steel fixtures would be obtained from SECREN and the wood parts would be produced by a small workshop located for convenience and economy near a sawmill and dedicated to the fabrication of wooden beams and trusses. The standardization of these steel and wood parts and their easy transport would permit on-site construction of small bridges where needed. The purpose of this project is to provide equipment for the wood prefabrication shop (special saws, drills), equipment for the wood-treatment unit (tanks and pumps) and technical assistance and training. The estimated cost of this project is \$87,000.

E. Public buildings

137. The rehabilitation of public buildings requires substantial amounts of building material - corrugated iron roofing sheets, nails and accessories for the fixation of roofing sheets, masticon (tar) for water-proofing roofing sheets and cement. The commodities are in short supply in the country. Furthermore, the public requirements should not compete for these items with individual housing needs. The purpose of this project is to procure from external sources the necessary building materials for the repair of public buildings in the Provinces of Antsiranana and Mahajanga. The actual reconstruction work will be undertaken by local technicians and skilled workers. The type, quantity and estimated cost of the materials required are given below.

P-1. Assistance for the rehabilitation of public buildings in the Province of Antsiranana

<u>Type of construction material</u>	<u>Approximate quantities needed</u>	<u>Cost</u> (Millions of dollars)
Corrugated iron roofing sheets	990,000 m ² of roofing sheets (330,000 roofing sheets of 3 m length)	5.34
Nails and accessories for fixing roofing sheets	335,000 kg of nails and accessories	0.67
Masticon	23,570 kg of masticon (4,700 boxes of 5 kg)	0.33
Cement	3,300 t	0.33
	Total	<u>6.67</u>

P-2. Assistance for the rehabilitation of public buildings in the Province of Mahajanga

<u>Type of construction material</u>	<u>Approximate quantities needed</u>	<u>Cost</u> (Millions of dollars)
Corrugated iron roofing sheets	385,000 m ² of roofing sheets (128,000 roofing sheets of 3 m length)	2.08
Nails and accessories for fixing roofing sheets	130,000 kg of nails and accessories	0.26
Masticon	9,300 kg of masticon (1,850 boxes of 5 kg)	0.13
Cement	1,300 t	0.13
	Total	<u>2.60</u>

F. Energy

E-1. Rehabilitation of electricity network

138. The electricity networks, including power plants and distribution systems in Antsiranana and Mahajanga, suffered substantial damage from "Kamisy" and this debilitation is inhibiting the economic and social recovery of the provinces from the effects of the cyclones. This project will assist in the rehabilitation of those networks by providing for the replacement of power lines by the procurement of electricity poles, iron bars, fixtures, high tension cables, low tension cables and roofing materials for the power plants. The estimated cost of these commodities is \$400,000. The actual repair and reconstruction work will be carried out by qualified local personnel.

G. Disaster preparedness

D-1. Strengthening of disaster early warning system

139. Because of the destruction and damage by cyclones to its buildings and equipment, the Meteorological Service can neither make satisfactory observations nor transmit weather information in many cyclone-prone areas. In order to provide sufficient early warning and give time for taking measures to mitigate the effects of inevitable future cyclones and to provide for routine air traffic safety, it is necessary to replace the damaged equipment and, when doing so, to improve the previous early warning system, including taking advantage of the availability of new technology, e.g. the use of satellites to obtain weather information. This project, accordingly, proposes the following activities:

- (a) Renovation of meteorological data transmission network (estimated cost, \$620,000);
- (b) Acquisition of equipment for reception of weather satellite transmission (estimated cost, \$60,000);
- (c) Acquisition of wind direction and speed measuring equipment (estimated cost, \$180,000);
- (d) Replacement parts for damaged or destroyed meteorological equipment (estimated cost, \$440,000);
- (e) Provision of out-of-country and in-country training of staff (estimated cost, \$25,000);
- (f) Reparation of building (estimated cost, \$100,000).

The total cost of the project is approximately \$1,425,000.

140. The Ministry of Interior of Madagascar pointed out the need for a project to strengthen the central and provincial public services in the handling of relief and

assistance following cyclones, as well as in disaster preparedness generally. This matter has been brought to the attention of UNDR0 which has agreed to provide appropriate technical assistance to the Government of Madagascar.

Table 14. Summary listing of projects
 (Estimated cost in thousands of dollars)

1. <u>Agricultural sector</u>		
A-1.	Rehabilitation of agricultural infrastructure, Antsiranana	220
A-2.	Rehabilitation of agricultural infrastructure, Mahajanga	800
A-3.	Rehabilitation of agricultural infrastructure, Maintirano	700
A-4.	Rehabilitation of agricultural infrastructure, FIFABE	1 300
A-5.	Rehabilitation of agricultural infrastructure, Antananarivo and Antsirabe	500
A-6.	Rehabilitation of agricultural infrastructure, Toamasina	600
A-7.	Rehabilitation of agricultural infrastructure, Mananjary and Fianarantsoa	150
A-8.	Repair work, Morondava	<u>200</u>
	Sub-total	<u>4 470</u>
2. <u>Transport</u>		
(a) <u>Roads</u>		
TR-1.	Reconstruction of the Anivorano-Ambilobe Road (RN6)	4 320
TR-2.	Rehabilitation of the Ambilobe-Vohemar Road (RN5)	400
TR-3.	Rehabilitation of the Sambava-Antalaha and Antalaha-Antsirabato Roads (RN5)	300
TR-4.	Rehabilitation of the Sambava-Andapa Road (RN3)	750

Table 14 (continued)

TR-5.	Rehabilitation of access roads of economic importance	2 120
TR-6.	Reconstruction of Port-Berge-Ambondromamy Road (RN6)	220
TR-7.	Rehabilitation of the PK 227 to 532 Road (RN4)	1 400
TR-8.	Rehabilitation of the Befandriana-Mandritsara Road (RN32)	<u>110</u>
	Sub-total	<u>9 620</u>
(b) <u>Ports</u>		
TP-1.	Reconstruction work, Antsiranana port	1 070
TP-2.	Rehabilitation of technical facilities at Antsiranana port	540
TP-3.	Reconstruction work, Mahajanga port	1 280
TP-4.	Rehabilitation of technical facilities at Mahajanga port	<u>435</u>
	Sub-total	<u>3 325</u>
(c) <u>Airports</u>		
TA-1.	Reconstruction work at Antsiranana airport	240
TA-2.	Rehabilitation of technical facilities at Antsiranana airport	151
TA-3.	Reconstruction work at Mahajanga airport	85
TA-4.	Rehabilitation of technical facilities at Mahajanga airport	<u>853</u>
	Sub-total	<u>1 329</u>
3. <u>Industry</u>		
I-1.	Production of corrugated iron sheets, MACOMA plant, Tamatave	200

Table 14 (continued)

I-2.	Production of roofing material at SECREN, Antsiranana	80
I-3.	Production of roofing tiles	310
I-4.	Establishment of a Hoffman oven for bricks and tiles	170
I-5.	Establishment of an asbestos-cement roofing-plate production unit	2 000
I-6.	Assistance to the Amboanio cement plant	320
I-7a.	Immediate rehabilitation of SECREN	1 440
I-7b.	Medium-term rehabilitation of SECREN	1 235
I-8.	Strengthening of the capacity of SECREN for naval repairs	2 900
I-9.	Management assistance and extension services to industries	600
I-10.	Modular wooden bridges for rural roads	<u>87</u>
	Sub-total	<u>9 342</u>
4.	<u>Public buildings</u>	
P-1.	Assistance for the rehabilitation of public buildings in the Province of Antsiranana	6 670
P-2.	Assistance for the rehabilitation of public buildings in the province of Mahajanga	<u>2 600</u>
	Sub-total	<u>9 270</u>
5.	<u>Energy</u>	
E-1.	Rehabilitation of electricity network	<u>400</u>
6.	<u>Disaster preparedness</u>	
D-1.	Strengthening of disaster early warning system	<u>1 425</u>
	Total	<u><u>39 181</u></u>

APPENDIX
Map of Madagascar

