1.5.3 Trade

(1) Trade balance

Evolution of trade balance is shown in Table 1-5-5 and Figure 1-5-3. In 1992, exports were valued at 500 billion FMG, while imports were about 845 billion FMG representing a trade deficit of 345 billion FMG. This trend has continued for over 20 years.

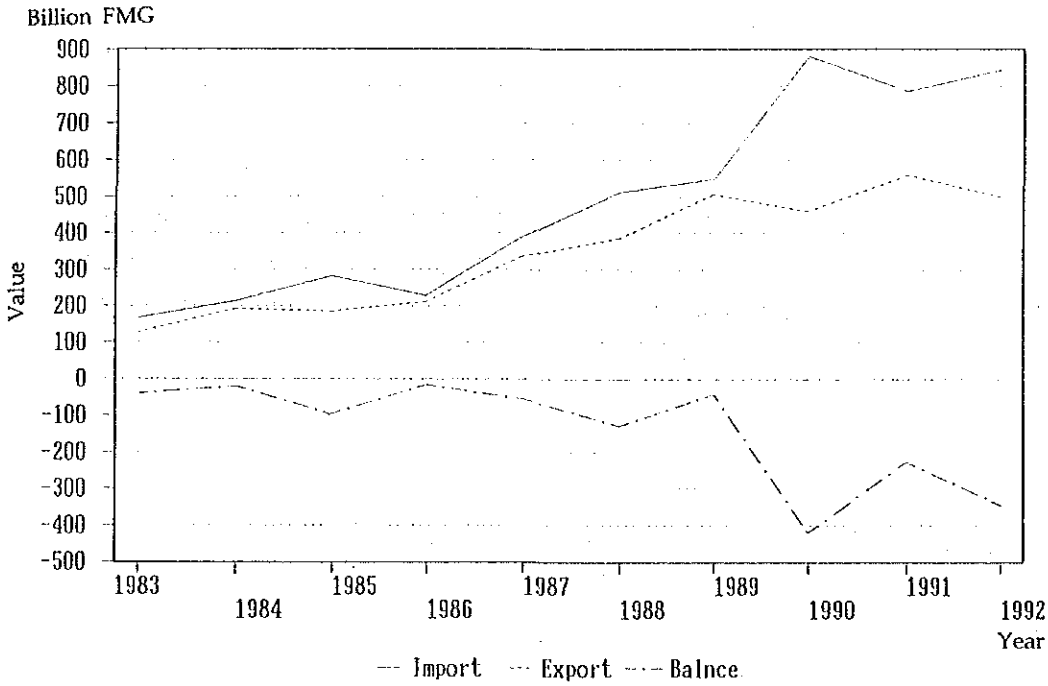


Figure 1-5-3 Trend of Trade Balance of Madagascar

Table 1-5-5 Trend of Trade Balance of Madagascar

YEAR	Quantity (Net ton)		Value(Million FMG)		Result of exchange	
	Import	Export	Import (CIF)	Export (FOB)	Trade Balance (Million FMG)	%
1983	1,075,281	317,539	166,750.3	127,257.5	-39,492.8	76.3
1984	759,730	299,292	213,531.1	192,266.8	-21,264.3	90.0
1985	933,536	312,643	282,299.6	185,616.4	-96,683.2	65.8
1986	759,428	313,633	229,660.4	212,546.3	-17,114.1	92.5
1987	817,905	277,755	390,183.8	336,245.2	-53,938.6	86.2
1988	794,004	416,143	512,063.1	385,080.2	-126,982.9	75.2
1989	615,254	484,254	548,685.6	506,193.4	-42,492.2	92.3
1990	917,111	477,525	881,328.0	460,343.2	-420,984.8	52.2
1991	728,183	482,846	785,689.5	559,073.3	-226,616.2	71.2
1992	869,124	415,766	844,935.6	499,805.9	-345,129.7	59.2

Source: Banque des Donnees de l'Ltat

(2) Export

The value of exports is shown in Table 1-5-6. The average growth rate of total export value is -1.1 %. Vanilla has the highest share among export commodities in 1992, representing 19.1 %. Shrimp and coffee follow, with respective shares of 14.1 % and 11.8 %. But the share of crops and vegetables have decreased, particularly, noteworthy is the decline in coffee exports. On the other hand, the growth rates of animal products, forestry products and mineral chromium are particularly high. Major trade commodities of Madagascar are limited to primary products, mineral products and light industries.

The volume of exports is shown in Table 1-5-7, Table 1-5-8 and Figure 1-5-4. The average growth rate of total export volume is 3.0 %. Mineral chromium had the highest share in 1992, representing 26.1 %. Petroleum products and coffee follow, with respective shares of 24.5 % and 11.9 %. The growth rate of other commodities is very high. This fact indicates that export commodities are being diversified. On the other hand, the light industries are showing a tendency to decrease.

Table 1-5-6 Trend of Export Value

(Unit:Million US$)

	1983	%	1987	%	1992	%	Ave. growth rates(%)
Crops and vegetables	206.04	69.3	206.56	65.4	123.81	45.9	-5.5
Vanilla	63.53	21.4	83.88	26.5	51.52	19.1	-2.3
Green coffee	114.28	38.5	91.20	28.9	31.73	11.8	-13.3
Clove	16.26	5.5	8.38	2.6	9.01	3.3	-6.3
Litchis		—		—	5.16	1.9	-
Animal products	25.80	8.7	45.59	14.4	52.53	19.5	8.2
Shrimp	23.43	7.9	32.24	10.2	38.06	14.1	5.5
Forestry products	0.22	0.1	1.00	0.3	3.61	1.3	36.5
Mineral products	21.60	7.3	18.03	5.7	26.43	9.8	2.3
Petroleum products	9.62	3.2	4.80	1.5	9.39	3.5	0.3
Mineral chromium	2.82	0.9	3.96	1.3	7.75	2.9	11.9
Graphite	5.93	2.0	7.63	2.4	7.44	2.8	2.6
Foodstuff industry products	17.27	5.8	11.70	3.7	11.23	4.2	-4.7
Sugar	12.12	4.1	6.50	2.1	9.20	3.4	-3.0
Fiber materials and textile prod.	18.60	6.3	16.74	5.3	26.68	9.9	4.1
Cotton textures		—		—	9.50	3.5	-
Chemical and pharmaceutical prod.	3.40	1.1	5.70	1.8	3.73	1.4	1.0
Subtotal	292.93	98.6	305.32	96.6	248.01	92.0	-1.8
Others	4.19	1.4	10.73	3.4	21.48	8.0	19.9
Total	297.12	100.0	316.05	100.0	269.50	100.0	-1.1

Source: Banque des Donnees de l'Etat
Notes: Original data are indicated by million FMG.

Table 1-5-7 Trend of Export Volume

(Unit: ton)

	1983(A)	%	1987	%	1992(B)	%	Ave. growth rates(%)
Crops and vegetables	72,311	22.8	75,398	27.2	98,690	23.7	3.5
Green coffee	50,034	15.8	46,663	16.8	49,448	11.9	-0.1
Clove	1,973	0.6	3,005	1.1	10,585	2.5	20.5
Pea of cap	5,668	1.8	2,604	0.9	6,763	1.6	2.0
Maize	—	—	7,439	2.7	1,465	0.4	—
Animal products	4,427	1.4	9,782	3.5	11,011	2.6	10.7
Shrimp	3,455	1.1	5,143	1.9	5,891	1.4	6.1
Forestory products	405	0.1	2,039	0.7	12,118	2.9	45.9
Mineral products	171,956	54.2	145,582	52.4	232,677	56.0	3.4
Mineral chromium	59,406	18.7	83,842	30.2	108,450	26.1	6.9
Petroleum products	57,066	18.0	41,125	14.8	101,899	24.5	6.7
Graphite	11,685	3.7	11,141	4.0	10,671	2.6	-1.0
Salts	2,181	0.7	8,289	3.0	7,768	1.9	15.2
Foodstuff industry prod.	48,372	15.2	26,232	9.4	31,385	7.6	-4.7
Sugar	32,300	10.2	18,612	6.7	17,238	4.1	-6.7
Molasses	10,000	3.1	—	—	7,000	1.7	-3.9
Fiber materials & textile prod.	17,705	5.6	15,463	5.6	13,001	3.1	-3.4
Sisal fibers	10,571	3.3	7,175	2.6	7,078	1.7	-4.4
Cotton textures	—	—	—	—	2,634	0.6	—
Subtotal	315,176	99.3	274,496	98.8	398,882	95.9	2.7
Others	2,363	0.7	3,259	1.2	16,884	4.1	24.4
Total	317,539	100.0	277,755	100.0	415,766	100.0	3.0

Source: Banque des Donnees de l'Etat

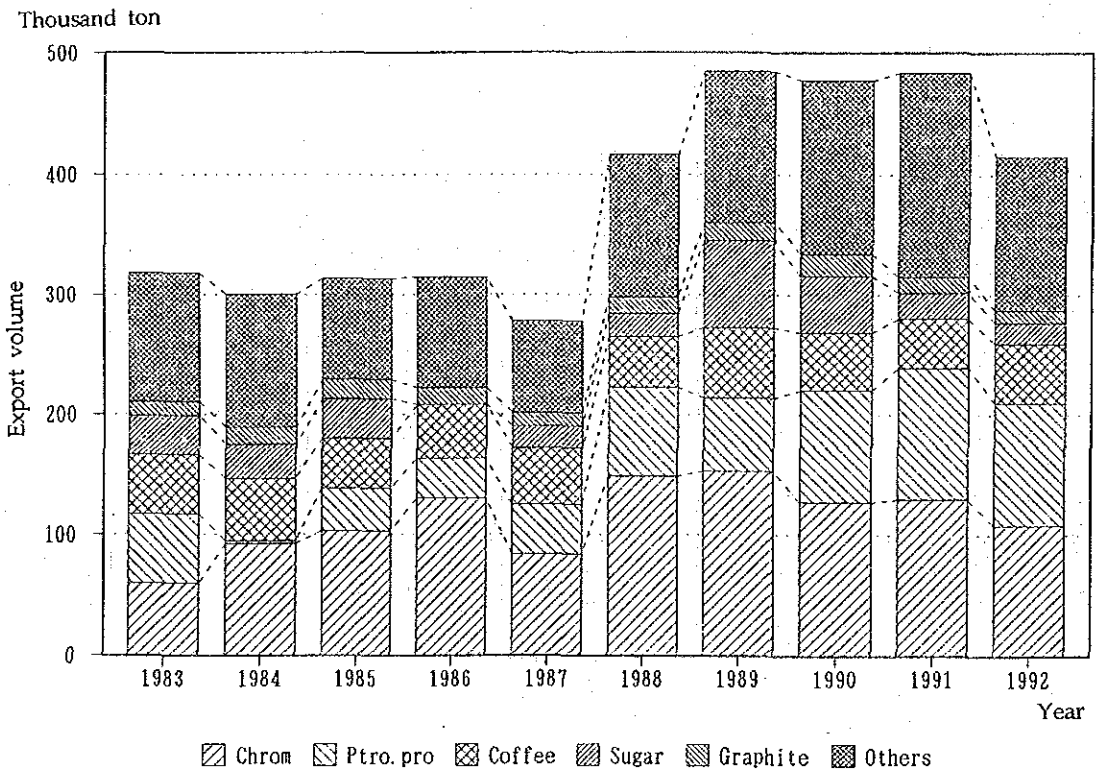


Figure 1-5-4 Trend of Export Volume

Table 1-5-8 Trend of Export Volume in Principal Products

(Unit: ton

Major products	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Shrimp	3,455	3,797	4,257	4,272	5,143	5,091	5,309	5,085	6,589	5,891
Pea of cap	5,668	5,172	4,881	2,298	2,604	4,265	3,386	4,556	7,630	6,763
Green coffee	50,034	51,337	41,662	44,937	46,663	42,101	58,524	47,824	40,878	49,448
Clove	1,973	6,268	12,031	10,183	3,005	5,374	16,449	10,222	13,079	10,585
Maize	0	7,649	1,082	0	7,439	19,774	21,665	28,817	14,460	1,465
Sugar	32,300	28,082	32,802	0	18,612	18,990	72,128	46,910	21,129	17,238
Molasses	10,000	20,500	14,350	13,000	0	26,003	2	9,855	13,770	7,000
Salts	2,181	7,827	11,150	9,116	8,289	7,552	12,548	8,141	10,387	7,768
Graphite	11,685	14,527	16,125	13,707	11,141	13,839	15,049	18,503	13,555	10,671
Mineral chromium	59,406	92,423	103,180	130,244	83,842	148,500	152,591	127,558	129,342	108,450
Petroleum products	57,066	2,294	35,128	32,868	41,125	73,943	61,228	92,954	109,091	101,899
Cotton textures	0	0	0	0	0	4,861	4,553	2,418	4,048	2,634
Sisal fibers	10,571	12,047	7,435	8,758	7,175	8,507	7,462	12,187	9,656	7,078
Sub -total	244,339	251,923	284,083	269,383	235,038	378,800	430,894	415,030	393,614	336,890
Others	73,200	47,369	28,560	44,250	42,717	37,343	53,360	62,495	89,232	78,876
Total	317,539	299,292	312,643	313,633	277,755	416,143	484,254	477,525	482,846	415,766

Source: Banque des Donnees de l'Etat

(3) Import

The value of imports is shown in Table 1-5-9 and the volume of imports is shown in Table 1-5-10, Table 1-5-11, Figure 1-5-5. The average growth rate of total import value is 1.8 %. Crude petroleum has the highest share among import commodities in 1992, representing 11.3 %. Transport equipment and machine & apparatus follow, with respective shares of 11.1 % and 10.4 %. The average growth rate of animal products, paper products and trucks & cars are particularly high. On the other hand, the decrease in crops and vegetables has been remarkable. As the growth of manufacturing industries is very slow in Madagascar, most of its imports are petroleum & its products and manufacturing products.

Regarding the volume of imports, total volume has varied roughly between 700 and 900 thousand tons in the last decade. It is mainly in the field of petroleum and its products where volume variation has been observed. Petroleum and its products have the biggest share, about 50 % in 1992, while cement and rice follow, with respective shares of 11.4 % and 6.0 %.The increase of wheat flour and animal products is particularly remarkable while plastic materials, electric instruments & equipment and transport equipment also show sharp increases. On the other hand, the decrease of rice is particularly remarkable, followed by cooking oils and coals.

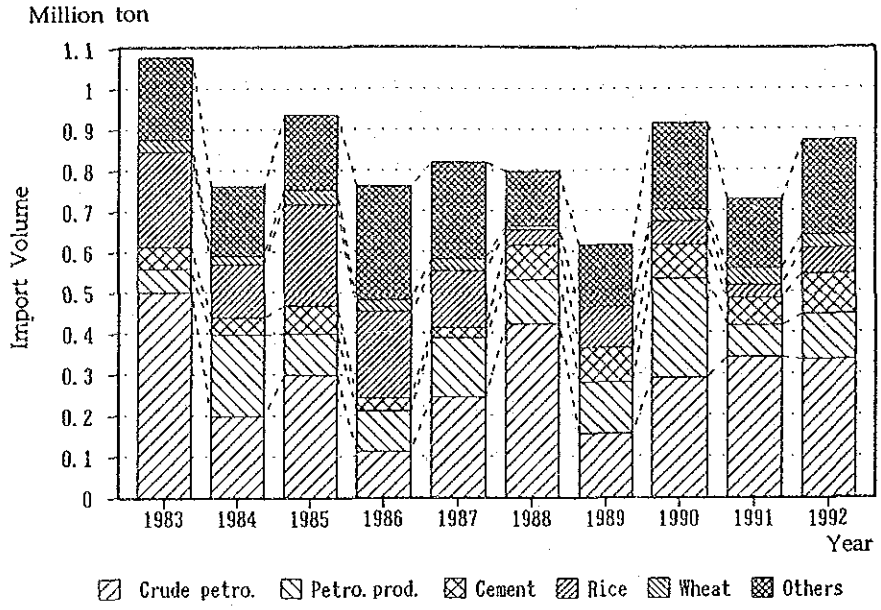


Figure 1-5-5 Trend of Import Volume

Table 1-5-9 Trend of Import Value

(Unit: Million US$)

	1983	%	1987	%	1992	%	Ave. growth rates(%)
Crops and vegetables	61.04	15.8	45.39	12.5	36.05	8.0	-5.7
Rice	53.21	13.8	14.97	4.1	14.50	3.2	-13.5
Animal products	4.23	1.1	8.64	2.4	15.32	3.4	15.4
Mineral products	85.56	22.2	62.48	17.2	90.18	20.0	0.6
Crude Petroleum	49.73	12.9	38.12	10.5	50.76	11.3	0.2
Petroleum products	18.26	4.7	9.99	2.8	23.15	5.1	2.7
Cement	5.26	1.4	9.26	2.6	9.05	2.0	6.2
Chemical & pharmaceutical prod.	42.59	11.1	57.50	15.8	61.95	13.7	4.3
Pharmaceutical products	9.01	2.3	13.19	3.6	13.67	3.0	4.7
Plastic materials	6.37	1.7	14.60	4.0	14.55	3.2	9.6
Rubber products	9.23	2.4	9.84	2.7	12.09	2.7	3.0
Tire	5.83	1.5	6.07	1.7	7.92	1.8	3.5
Paper products	7.85	2.0	10.03	2.8	22.10	4.9	12.2
Fiber materials & textile prod.	13.87	3.6	8.63	2.4	8.89	2.0	-4.8
Metal products	36.60	9.5	28.12	7.8	31.80	7.1	-1.5
Steel products	16.46	4.3	15.42	4.3	12.67	2.8	-2.9
Machine and apparatus	40.99	10.6	54.62	15.0	47.12	10.4	1.6
Electric instruments & equipments	15.72	4.1	15.98	4.4	34.88	7.7	9.3
Transport equipment	30.32	7.9	33.46	9.2	50.27	11.1	5.8
Truck	5.41	1.4	19.84	5.5	17.81	4.0	14.2
Car	4.36	1.1	12.89	3.5	16.00	3.5	15.5
Sub Total	347.99	90.3	334.69	92.2	410.66	91.0	1.9
Others	37.47	9.7	28.44	7.8	40.38	9.0	0.8
Total	385.46	100.0	363.13	100.0	451.04	100.0	1.8

Source: Banque des Donnees de l'Etat
Notes: Original data are indicated by million FMG.

Table 1-5-10 Trend of Import Volume

(Unit:ton)

	1983	%	1987	%	1992	%	Ave. growth rates (%)
Crops and vegetables	267,624	24.9	216,559	26.5	134,229	15.4	-7.4
Rice	232,709	21.6	138,991	17.0	52,413	6.0	-15.3
Wheat	30,207	2.8	29,187	3.6	32,561	3.7	0.8
Wheat flour	1,683	0.2	2,449	0.3	18,414	2.1	30.5
Animal products	2,974	0.3	6,056	0.7	19,370	2.2	23.1
Animal oils and vegetable oils	20,544	1.9	12,467	1.5	20,416	2.3	-0.1
Cooking oil	20,544	1.9	12,467	1.5	11,672	1.3	-6.1
Foodstuff industry products	17,982	1.7	8,149	1.0	13,974	1.6	-2.8
Mineral products	658,702	61.3	443,666	54.2	568,974	65.5	-1.6
Crude petroleum	500,153	46.5	244,099	29.8	332,791	38.3	-4.4
Petroleum products	57,295	5.3	143,470	17.5	111,433	12.8	7.7
Cement	53,343	5.0	24,591	3.0	99,354	11.4	7.2
Coal	27,918	2.6	13,570	1.7	12,010	1.4	-8.9
Chemical & pharmaceutical products	36,637	3.4	71,753	8.8	35,483	4.1	-0.4
Fertilizer	20,004	1.9	51,383	6.3	11,740	1.4	-5.7
Plastic materials	3,656	0.3	5,056	0.6	7,426	0.9	8.2
Paper products	5,832	0.5	5,645	0.7	10,363	1.2	6.6
Metal products	39,795	3.7	28,278	3.5	27,407	3.2	-4.1
Steel materials	31,837	3.0	22,624	2.8	20,770	2.4	-4.6
Machine & apparatus	4,833	0.4	6,333	0.8	5,597	0.6	1.6
Electric instruments & equipment	2,027	0.2	1,785	0.2	4,142	0.5	8.3
Transport equipment	5,178	0.5	6,792	0.8	10,879	1.3	8.6
Sub Total	1,062,128	98.8	807,483	98.7	850,834	97.9	-2.4
Others	13,153	1.2	10,422	1.3	18,290	2.1	3.7
Total	1,075,281	100.0	817,905	100.0	869,124	100.0	-2.3

Source: Banque des Donnees de l'Etat

Table 1-5-11 Trend of Import Volume in Principal Products

(Unit:ton

Major products	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Wheat	30,207	21,077	34,545	29,879	29,187	10,081	0	30,049	42,047	32,561
Rice	232,709	130,759	249,659	209,738	138,991	37,251	99,026	58,969	31,300	62,413
Wheat flour	1,683	703	28	1,750	2,449	85	103	1,085	7,543	18,414
Cooking oil	20,544	11,972	14,513	12,668	12,467	6,602	8,639	7,181	4,450	11,671
Cement	53,343	41,822	68,940	30,347	24,591	86,433	83,951	82,650	66,003	99,354
Coal	27,918	7,387	4,374	14,265	13,570	13,895	14,443	12,053	11,902	12,010
Crude petroleum	500,153	197,104	297,457	113,179	244,099	420,229	154,186	290,209	339,807	332,791
Petroleum products	57,295	198,424	100,179	97,450	143,470	107,690	125,470	242,472	78,028	111,433
Fertilizer	20,004	33,310	30,430	23,460	51,383	8,562	12,101	35,132	12,320	11,740
Plastic materials	3,656	5,085	6,691	4,707	5,056	5,351	4,871	7,677	5,611	7,426
Steel materials	31,837	22,327	16,558	15,223	22,624	18,360	17,918	23,074	13,951	20,770
Sub total	979,349	669,970	823,374	552,666	687,887	714,539	520,708	790,551	612,962	710,584
Others	95,932	89,760	110,162	206,762	130,018	79,465	94,546	126,560	115,221	158,540
Total	1,075,281	759,730	933,536	759,428	817,905	794,004	615,254	917,111	728,183	869,124

Source: Banque des Donnees de l'Etat

1.6 Transport

1.6.1 Road

Since the geographical feature of the country is such that mountainous and torrential areas separate communities from one another, land transportation is not very practical. Total length of road is about 50,000 km, however, 90 % of them are unpaved. According to "PREPARATION DU PLAN DE TRANSPORT", the main road network is 6,824 km long, 4,265 km(63 %) of which are asphalted. But the length of paved road in good condition is only 1,468 km.

Figure 1-6-1 and Table 1-6-1 show the present characteristics of each route. It can be seen that Antsiranana does not have good connections with other cities and that it is isolated during the rainy season.

The Seventh Road Project targets an improvement of the existing road network, but even after its completion, the road to/from Antsiranana will remain more or less in poor condition. Although road development is one of the key factors for progress of the country, the Seventh Road Project has not been initiated yet.

The number of vehicles is increasing year by year, rising to 72,890 in 1990 from 46,862 in 1985. However, 14 % of these vehicles are over 20 years old, according to the investigation.

The investigation also shows that road traffic around Antananarivo and between Antananarivo and Toamasina is far greater than road traffic between other districts.

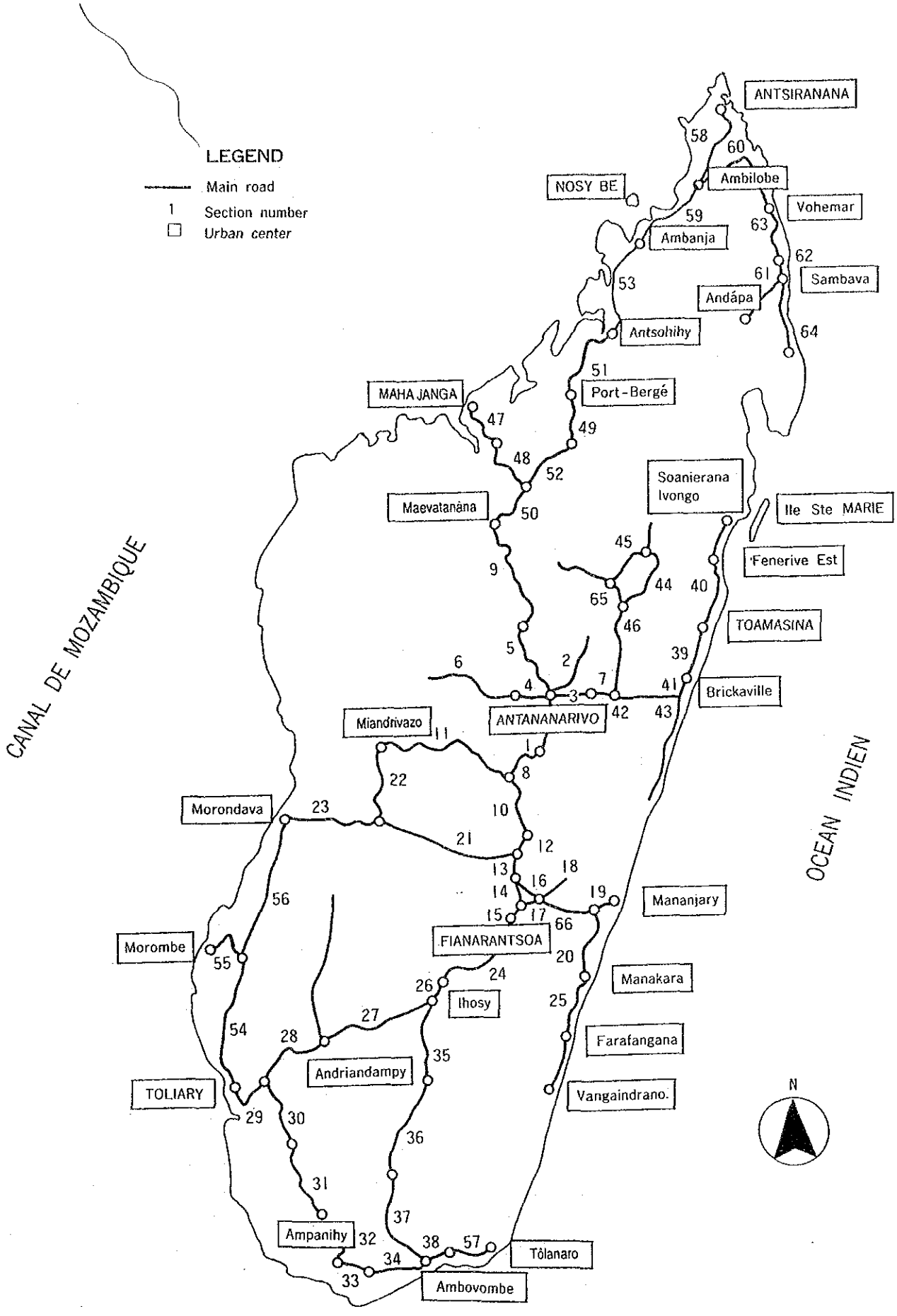


Figure 1-6-1 Actual Situation of the Road Network

Table 1-6-1 Present Condition of the Road Network

(Unit:Km)

ROUTE No.	SECTION	(1)	(2)	(3)	(4)	(5)	(6)
1	ANTANANARIVO-AMBATOLAMPY	15	22	31	0	0	0
2	ANTANANARIVO-	0	30	61	0	0	0
3	ANTANANARIVO-AMBATOLAMPY	0	0	48	0	0	0
4	ANTANANARIVO-AMBATOLAMPY	0	0	45	0	0	0
5	ANTANANARIVO-AMBATOLAMPY	54	40	0	0	0	0
6	ARIVONIMAMO-TSIROANOMANDIDY	0	134	39	0	0	0
7	MANJAKANDRIANA-MORAMANGA	18	0	49	0	0	0
8	AMBATOLAMPY-ANTSIRABE	64	25	12	0	0	0
9	ANKAZOBE-MAEVATANANA	200	0	35	0	0	0
10	ANTSIRABE-AMBOSITRA	58	0	32	0	0	0
11	ANTSIRABE-MIANDRIVAZO	22	224	0	0	0	0
12	AMBOSITRA-CF RN7xRN35	15	0	0	0	0	0
13	CF RN7xRN35-CF RN7xRN25	85	0	0	0	0	0
14	CF RN7xRN25-CF RN7xRN45	0	0	23	0	0	0
15	CF RN7xRN45-FIANARANTSOA	0	0	28	0	0	0
16	CF RN7xRN25-CF RN25xRN45	0	0	0	0	0	29
17	CF RN7xRN45- RN25xRN45	0	0	0	0	0	24
18	CF RN25xRN45-IFANADIANA	0	0	35	0	0	0
19	CF RN25xRN12-MANANJARY	0	59	0	0	0	0
20	CF RN25xRN12-MANAKARA	50	68	0	0	0	0
21	CF RN7xRN35-CF RN35xRN34	0	67	0	0	0	214
22	CF RN35xRN34- MIANDRIVAZO	0	0	122	0	0	0
23	CF RN35xRN34-MORONDAVA	122	42	0	0	0	0
24	FIANARANTSOA-IHOSY	98	0	28	0	0	80
25	MANAKARA-FARAFANGANA	0	60	87	0	0	0
26	IHOSY-CF RN7xRN13	14	0	0	0	0	0
27	CF RN7xRN13-SAKARAHA	187	0	0	0	0	0
28	SAKARAHA-CF RN7xRN10	0	0	63	0	0	0
29	CF RN7xRN10-TOLIARY	0	0	70	0	0	0
30	CF RN7xRN10-BETIOKY	0	0	0	0	0	88
31	BETIOKY-AMPANIHY	0	0	0	0	0	134
32	AMPANIHY-BELOHA	0	0	0	0	0	102
33	BELOHA-TSIHOMBE	0	0	0	0	0	53
34	TSIOMBE-AMBOVOMBE	0	0	0	0	0	67
35	CF RN7xRN13-BETROKA	0	0	0	0	0	118
36	BETROKA-BEKILY	0	0	0	0	0	125
37	BEKILY-AMBOVOMBE	0	0	0	0	0	139
38	CF RN10xRN13-AMBOASARY	0	0	35	0	0	0
39	TOAMASINA-BRICKAVILLE	88	10	0	0	0	0
40	TOAMASINA-FENOARIVO	0	60	39	0	0	0
41	BRICKAVILLE-CF RN2xRN11a	30	0	0	0	0	0
42	MORAMANGA-CF RN2xRN11a	106	0	0	0	0	0
43	CF RN2xRN11a-MAHANORO;VATOMANDRY	18	0	0	0	0	72
44	AMBATONDRAZAKA-CF RN44xRN3a	0	24	0	0	0	0
45	AMPARAFARAVOLA-ANDILAMENA	0	35	0	0	0	23
46	MORAMANGA-CF RN44xRN3a	0	0	0	0	0	133
47	MAHAJANGA-MAROVOAY	82	0	0	0	0	0
48	MAROVOAY-CF RN4xRN6	30	0	41	0	0	0
49	MAMPIKONY-PORT BERGE	0	0	82	0	0	0
50	MAEVATANANA-CF RN4xRN6	42	0	54	0	0	0
51	ANTSOHIHY-PORT BERGE	0	83	50	0	0	0
52	MAMPIKONY-CF RN4xRN6	0	0	84	0	0	0
53	ANTSOHIHY-AMBANJA	0	0	0	0	100	117
54	TOLIARY-CF RN9xRN55	0	0	0	0	0	204
55	MOROMBE-CF RN9xRN55	0	0	61	0	0	16
56	MORONDAVA-CF RN9xRN55	0	0	0	0	0	305
57	AMBOASARY-TAOLAGNARO	0	0	75	0	0	0
58	ANTSIRANANA-AMBILOBE	0	68	63	0	0	0
59	AMBANJA-AMBILOBE	0	102	0	0	0	0
60	VOHEMAR-AMBILOBE	0	0	0	0	0	164
61	ANDAPA-CF RN3bxRN5a	0	111	0	0	0	0
62	SAMBAVA-CF RN3bxRN5a	0	8	0	0	0	0
63	VOHEMAR-CF RN3bxRN5a	0	61	69	0	0	15
64	SAMBAVA-ANTALAHA	0	0	0	0	0	89
65	VOHIDIALA-AMPARAFARAVOLA	50	0	0	0	0	0
66	IFANADIANA-CF RN25xRN12	20	38	0	0	0	0
	TOTAL	1468	1371	1461	0	100	2311

Note: (1)-Asphalted road in good state (4)-Unpaved road in good state
(2)-Asphalted road in average state (5)-Unpaved road in average st
(3)-Asphalted road in bad state (6)-Unpaved road in bad state
Source: PREPARATION DU PLAN DE TRANSPORTS, RAPPORT FINAL, Avril 1992

1.6.2 Railway

The railway in Madagascar consists of two lines, the northern and the southern system, operated by Reseau National des Chemins de Fer Malagasy (RNCFM). The former, 693 km in length, connects Antananarivo and Toamasina, Lac Alaotra via Moramanga and Antsirabe. The latter, 163 km in length, connects Fianarantsoa and Manakara.

The railway is playing an important role both in terms of goods and passenger transport. In particular, the Antananarivo - Toamasina line carries a considerable amount of hydrocarbons, chromite, miscellaneous etc. and it is expected to continue this function (Table 1-6-2).

Table 1-6-2 Estimated Railway Traffic by RNCFM

GOODS (Unit:ton)

	1992	1996
NORTHERN NETWORK	597,400	700,000
- Chromite	160,000	155,000
- Hydrocarbons	170,000	190,000
- Wheat and Rice	74,800	84,000
- Granite	21,600	8,000
- Miscellaneous	171,000	263,000
SOUTHERN NETWORK	39,500	30,000
TOTAL	636,900	730,000

Note: The column of commodity shows the breakdown of traffic carried by Northern Network.

PASSENGERS

	1992	1996
NORTHERN NETWORK	600,000	287,000
SOUTHERN NETWORK	388,000	208,000
TOTAL	988,000	495,000

(Source: PREPARATION DU PLAN DE TRANSPORTS, RAPPORT FINAL, Avril 1992)

1.6.3 Maritime Transport

Maritime transport is relatively active not only in terms of domestic transport but also in terms of overseas trade because land transportation system is relatively undeveloped and its service level will remain lower for the time being .

Maritime transport in Madagascar is mainly run by the Societe Malgache des Transports Maritime (SMTM), Compagnie Malgache de Navigation (CMN), Societe Malgache de Cabotage (SMC) and other foreign shipping companies. SMTM is a state-owned company in charge of international maritime transport. However, SMTM does not possess its own vessel, and organizes a consortium named Capricorne to operate the shipping line. CMN is also state-owned and in charge of coastal maritime transport almost all around Madagascar. CMN owns four vessels, three of which are 5,300 GRT and the other is 1,100 GRT. SMC is a private company, founded in June, 1992. It charters and regularly operates two vessels, one 2,000 DWT vessel between Toamasina and Fort Dauphin and another 1,000 DWT vessel between Toamasina and Antsiranana via Vohemar. When timber or corn etc. is transported to Toliara or Morombe, these vessels are operated as a tramper. CMN and SMC also try to serve regularly, about two rotations a month, but these attempts are often unsuccessful. Table 1-6-3 shows the list of vessels which are registered and operated in Madagascar as quoted from "PREPARATION DU PLAN DE TRANSPORTS, RAPPORT FINAL ANNEXES, Avril 1992".

Other foreign shipping companies provide international shipping service between many countries in the Indian Ocean, Europe or South East Asia. The international regular container shipping service based on the survey is shown in Table 1-6-4.

SOLITANY MALAGASY (SOLIMA), the government-owned oil company, has oil refineries in Toamasina. They distribute their products all over Madagascar by cars, trains and vessels. They own and operate three tankers.

In addition, on the west coast, many sailing ships and schooners are operated in a traditional way. It is said that their total capacity of transport is only about 10,000 tons.

Table 1-6-3 Registered Ships in Madagascar

Ship name	Year	GRT	NRT	DWT	Shipping company
SAMBRINE	1969	1,986.00	1,286.00	3,326.00	Malagasy shipping line
ANAIS	1966	499.40	323.03	1,198.00	Peter Wessels
VATSY 2	1978/1979	487.00	222.00	250.00	C.M.N
VATSY 3	1979	2,516.00	1,216.00	1,822.00	C.M.N
VATSY 4	1979	2,516.00	1,216.00	1,014.00	C.M.N
ONILAHY	1979	3,297.00	1,726.00	5,327.00	C.M.N
KINGA	1977	429.00	416.00	500.00	STARR DEPT CORP(COLAS c/o C.M.N)
BEMOLANGA	1981	2,764.00	927.00	4,284.00	SOLIMA
TSIMIROFO	1978	4,233.00	2,247.00	6,847.00	SOLIMA
TSIMISARAKA	1967	1,599.00	718.00	2,300.00	SOLIMA
MAHAJANGA	1978	11,530.00	6,521.00	16,000.00	DELMAS (S.M.T.M)
TOAMASINA	1979/1988	11,530.00	6,521.00	16,000.00	DELMAS (S.M.T.M)
CANARD I	1972	35.75	28.90	—	P.N.B
CANARD II	1972	35.70	20.90	—	P.N.B
NOSY BE III	1969	130.80	63.10	50.00	P.N.B
NOSY BE No 5	1984	250.00	193.00	60.00	P.N.B
NOSY VORONA	1974	58.50	28.30	14.00	P.N.B
NOSY VALIHA	1984	348.00	186.00	—	P.N.B
ARANTA	1986	222.50	127.40	185.00	Hassanaly Mamodaly Hasly
SOFIA	1972	99.60	43.30	98.00	Hassanaly Mamodaly Hasly
LEON BESSON	1958	148.70	76.30	—	SIRAMA
MAROCAIN	1949	33.00	16.00	—	SIRAMA
CAP EST	1962	293.00	149.00	610.00	SITRACOM
CAP D'AMBRE	1966	371.00	166.00	150.00	SITRACOM
HERCULE II	1970	43.10	30.60	<20 M.T.>	TAVAKAL
HADHI	1962	44.20	27.50	60.10	TAVAKAL
DJAFFAR I	1990	190.93	94.79	3.00	TAVAKAL
VUBPINA---	1930	163.00	82.00	225.00	Armement Maritime Levis
LE MAJUNGAIS	1937	235.05	99.93	250.00	Armement Maritime Levis
SAFINA	1955	246.00	12.00	238.00	Aly Mamade Houssein
SOALALA	1988	317.49	127.90	130.00	Aly Mamade Houssein
ISLE BOURBON	1969	99.00	44.00	—	Societe Bourbonnaise de Navigation
ASGARI	1969	147.00	77.00	150.00	S.A.M Asgari
NAFISA	1928	325.30	13.40	100.30	Issouf Namad
TANTERAKA	1986	26.50	14.20	25.00	Foulbay
SAINT LOUIS	1930	142.00	65.80	130.00	Vallimamad Nehbouhaly
AMBOABOAKA	1955	93.67	44.50	2.75	S.C.A.C Toamasina
TANJONA	1987	215.40	54.52	155.00	SAMBO
JACQUES ORSINI	1950	171.00	86.00	100.00	C.M.O
PREMIER	1973	65.72	25.79	70.00	SOTRAMA
KARTALA	1954	1,452.00	763.00	1,550.00	Kaid Freres
PAMALA	1971	1,579.00	977.00	2,704.00	SMC
RAVINALA	1961	399.00	214.00	1,046.00	SMC

Note: Year: construction year

Source: Service de la Marine Marchande.
PREPARATION DU PLAN DE TRANSPORTS, RAPPORT FINAL
ANNEXES, Avril 1992.

Table 1-6-4 Outline of Regular Container Service in Madagascar

< Port of Toamasina >

Shipping company	Frequency	Calling ports	Remarks
Capricorne SMTM MDB CGM NCHP	Every 10 days	Toamasina Re Union Port Louis Dar es Salaam (Seychelles)	Semicontainer service 20,000 DTW (600～1,100TEU)
MSC(Mediterranean Shipping Co.)	Every 2 weeks	Toamasina Re Union	24,000 DTW (1,200TEU)
MOL(Mitsui OSK Lines)	Weekly	Singapore Port Louis Toamasina Mombasa Dar es Salaam (Tanga) Singapore	Fullcontainer service Singapore Transship started in June,1993
Nedllyod	Every 2 weeks	Singapore Port Louis Re Union Toamasina Dar es Salaam Mombasa Singapore	Fullcontainer service Singapore Transship
SMN	Monthly	Singapore Port Louis Toamasina	Semicontainer service

< Port of Antsiranana >

Shipping company	Frequency	Calling ports	Remarks
Capricorne	Every 20 days	Re Union Dzaoudzi Mutsamudu Mahajanga Nosy be Antsiranana Toamasina Port Louis Re Union	Multipurpose ship service 400 TEU Re Union Transship
MSC	Monthly (Twice per month at high season)	Durban Port Louis Re Union Antsiranana Dzaoudzi Mahajanga Durban	Semicontainer service 8,000 DTW (400 TEU) as regular 1,000 DTW (50 TEU) Durban Transship

According to the survey and interviews with shipping companies or agencies, almost all export goods such as coffee, vanilla, clove etc. are transported to the port of Toamasina for transshipment, Toamasina has an overwhelming share of exports. Various goods imported to Toamasina are distributed to various regions. Except for goods transported by road and railway to the Central Highlands, almost all goods are transshipped and transported by coastal vessels to all the ports in Madagascar. Therefore, main maritime networks include the port of Toamasina.

Consequently, the main features of maritime transport are as follows:

- Toamasina is the most important and biggest port.
- Almost all maritime networks are connected to Toamasina.
- Coastal shipping is playing an important role in tems of distribution of local products and transhipment of export/import cargoes.
- There is little competition between maritime transport and other modes.
- Most shipping companies in Madagascar face difficulties in management because of lack of funds, and many vessels are old and poorly maintained.

1.6.4 Airline Transport

Because of the undeveloped land transportation network, air transport network is relatively developed. There are 52 airports in use.

Antananarivo Ivato Airport is an international airport, where Boeing 747s land. The total number of arriving and departing passengers through three international airports(Ivato, Tamatave and Majunga) is 371,778 in 1991.

As to the domestic airline, the biggest plane is a Boeing 737-200. A Boeing 737 can be used in normal conditions at only seven airports. Antsiranana Airport can not accommodate a Boeing 737 at full weight because of the limited length of its runway.

Table 1-6-5 shows domestic airline traffic from 1990 to 1992.

Table 1-6-5 Domestic Airline Traffic

	1990	1991	1992
PASSENGERS	353,486 (63,406)	254,168 (43,978)	271,853 (44,384)
GOODS (UNIT:TON)	3,625 (502)	2,301 (579)	1,933 (389)

Note: Passengers: total arrivals and departures
Parenthesis: Antsiranana Airport
Source: Direction de l' Aviation Civil, MTM

1.7 Industrial Activity

1.7.1 General

The composition of the GDP by sector in 1989 was as follows;

Agriculture	: 31.4 %
Industry	: 14.5 %
(Manufacturing industry	: 12.7 %)
Service	: 54.2 %

The above composition is typical of newly developing countries. The share of the service sector seems inordinately large. The GDP by industrial origin at constant 1984 factor cost is shown in Table 1-7-1.

This table shows that the average growth rate of the primary sector increases slightly. However, the average growth rate of most of the secondary sector decreases except mining, energy, edible oils and fats, wood industries and so on. The average growth of the tertiary sector increases from 1984 to 1990. In brief, this table shows that the GDP of Madagascar has increased slightly in the last decade.

Table 1-7-1 GDP by Industrial Origin at Constant 1984 Factor Cost

(Unit:billion FMG)

	1984	1985	1986	1987	1988	1989	1990	1991	1990/1984 AVERAGE (%)	1991/1984 AVERAGE (%)
PRIMARY SECTOR	531.0	536.9	554.3	568.2	580.7	610.9	623.6	626.8	2.7	2.4
Agriculture	277.7	273.7	277.5	282.8	280.0	300.0	302.7	300.0	1.4	1.1
Livestock	200.7	211.0	223.3	232.0	244.5	257.1	265.3	268.0	4.8	4.2
Forestry	52.5	52.2	53.5	53.4	54.2	53.8	55.6	58.8	1.0	1.6
SECONDARY SECTOR	195.0	197.6	206.1	214.8	218.6	221.3	219.1	216.8	2.0	1.5
Agro-Indus	14.8	15.0	14.8	16.3	18.4	19.3	17.8	14.6	3.1	-0.2
Mining	2.8	3.8	3.5	3.3	4.4	4.3	4.0	4.0	6.1	3.2
Energy	19.2	24.7	25.2	26.4	28.8	26.4	38.1	41.5	12.6	11.6
Food	41.4	40.9	41.4	42.2	42.1	44.8	34.5	35.9	-3.0	-2.0
Beverage	10.9	12.0	12.2	17.4	22.4	22.4	26.8	25.9	16.2	13.2
Tobacco	12.9	12.7	13.6	13.2	13.1	12.9	11.0	11.9	-2.6	-1.1
Edble oils and fats	8.1	7.2	8.2	14.4	12.5	12.6	12.4	11.9	7.4	5.6
Pharmaceutical	8.4	9.1	6.6	10.8	11.2	10.5	9.9	9.6	2.8	1.9
Textiles	25.8	24.2	25.2	24.0	22.3	22.7	19.8	13.3	-4.3	-9.0
Leather	5.5	5.9	8.0	4.6	2.7	4.4	4.2	2.6	-4.4	-10.2
Wood industries	3.8	3.3	4.1	3.3	4.1	4.8	5.0	5.4	4.7	5.1
Construction materials	4.8	3.7	6.7	5.8	4.3	3.4	4.1	4.4	-2.6	-1.2
Metal industries	5.2	3.8	3.9	4.3	3.9	4.0	2.9	2.2	-9.3	-11.6
Transport materials	4.3	4.3	2.4	4.0	4.1	4.3	4.0	2.6	-1.2	-6.9
Elect. industries	12.0	11.0	12.9	11.1	10.2	9.5	9.5	19.9	-3.8	7.5
Paper and Printing ind.	10.6	11.3	11.5	8.7	9.5	10.8	9.6	6.4	-1.6	-7.0
Others	4.6	4.7	4.9	4.9	4.7	4.4	4.6	4.5	0.0	-0.3
TERTIARY SECTOR+ CONSTRUCTION	808.1	815.1	820.7	819.3	855.6	890.7	925.8	854.3	2.3	0.8
Construction	14.4	15.9	19.6	17.4	19.1	20.1	24.0	18.3	8.9	3.5
Transports	186.8	186.3	190.0	194.2	208.3	220.5	238.4	196.8	4.9	0.7
Transport-related services	43.3	45.4	46.9	47.4	50.4	52.9	56.8	42.2	4.6	-0.4
Telecommunications	7.3	8.3	8.7	9.4	10.0	10.7	8.3	8.7	2.2	2.5
Trade	194.0	193.5	192.6	195.7	201.6	216.4	221.2	230.9	2.2	2.5
Banking	28.9	27.1	27.7	31.4	30.6	32.5	33.1	24.6	2.3	-2.3
Insurance	0.7	0.9	0.9	0.6	0.6	0.7	0.8	0.7	2.3	0.0
Services (Business, Community, Others)	225.0	229.1	225.0	213.7	225.3	227.3	234.3	221.4	0.7	-0.2
Public administration	107.8	108.7	109.4	109.6	109.6	109.6	110.9	110.6	0.5	0.4
Imputed bank service Charges(less)	-29.5	-27.7	-28.2	-32.0	-31.3	-33.2	-33.8	-25.1		
GDP at factor cost	1,504.6	1,521.9	1,551.9	1,570.2	1,623.6	1,689.8	1,734.7	1,672.7		
Net indirect taxes	190.4	192.7	196.3	198.6	205.4	213.8	227.6	164.2		
GDP at market prices	1,695.0	1,714.6	1,748.2	1,768.8	1,829.0	1,903.6	1,962.3	1,837.0		

<Source: Date Bank of the State>

1.7.2 Agriculture

(1) Agriculture

Because of its growth potential given its vast area of arable land, and the resulting effects on the national economy, agricultural sector is destined to play an important role in the national strategy of development which aims at accelerating economic growth to struggle against poverty and food shortage.

Considering Madagascar's geography, distribution of its population and the difficulty in promoting migration and development of less populated areas, the best perspective of agricultural sector growth is based on short and medium term intensification in densely populated areas with strong agricultural potential.

That intensification process could take place mainly by an improvement of production, as well as diversification at the operational level towards a market agriculture rather than subsistence farming and an increased regional specialization not only towards export markets but also towards domestic markets.

That development process would rely on expansion of agricultural markets both foreign and domestic, on the development of the private sector and a decentralization of agricultural support services.

Growth potential of all sub-sectors constituting the agricultural sector is high. Concerning supply of food products, financial and economic analysis of agriculture suggests that Madagascar should be able to almost totally satisfy its food needs.

As a matter of fact, however, agricultural production is unvaryingly low and has practically not progressed since independence. This applies to Malagasy agricultural benefits which remain low in spite of an important productive capital materialized by very dense irrigation systems (40 percent of surface suitable for cultivation) which are largely underused: production is low, agriculture is scant or not diversified and essentially aimed at food autonomy—paddy (40 % in total agricultural production value), commercialized at the rate of less than 15 percent, does not enjoy full irrigation.

The agricultural production and yields of selected crops, fertilizer consumption and irrigation of Madagascar are shown in Table 1-7-2. The production of cereals which include paddy, maize and bean etc. yielded 2,542,000 tons in 1989 with an average growth rate from 1965 to 1989 of only 1.2 percent. This is smaller than the population growth rate of 2.6%.

Table 1-7-2 Agriculture of Madagascar: Production and Yields of Selected Crops, Fertilizer Consumption and Irrigation

Items	Year	Unit	Cereals	Roots & tubers	Fertilizer consumption	Irrigation
Production	<1989>	1000 ton	2,542	3,128		
(growth rate)	<1965-89>	(%)	1.2	3.3		
Yields	<1989>	ton/ha	2.0	6.4	4.0	
(growth rate)	<1965-89>	(%)	0.2	-0.1	-0.8	
Share of	<1989>	(%)				2.4
arable land	<1965-89>	(%)				5.3

<Source:World Development Report 1992>

On the other hand, the production of roots and tubers including manioc, sweet potato, potato, etc. reached 3,128,000 tons in 1989 with an average growth rate from 1965 to 1989 of 3.3 percent.

Fertilizer consumption is 4.0 tons per hectare but its unitary consumption rate in 1989 was less than that in 1965.

The values of the arable lands and the agricultural productions in each province of Madagascar are shown in Table 1-7-3. Paddy is produced in all provinces but production in the provinces of Antsiranana and Toliara is less than that of other provinces.

Following the production of paddy, there is a large production of manioc, particularly in the province of Fianarantsoa. The manioc production in the province of Antsiranana is comparatively great, but that of the province of Mahajanga is less than other provinces.

The production of sugar cane comes next after the above two products. The sugar cane production in the province of Antsiranana is particularly great and accounts for one third of the total production in Madagascar. There is some production of sweet potato, potato and maize but it is not significant.

Coffee is not produced in great quantity but it is an important product for export. The production of vanilla is relatively small but it is a very important product for export because Madagascar is the world's greatest exporting country of Vanilla. Madagascar is also the world's greatest supplier of sisal.

Table 1-7-3 Agricultural Production and Area of the Arable Land

PROVINCE	1 Antananarivo		2 Fianarantsoa		3 Toamasina		4 Mahajanga		5 Toliara		6 Antsiranana		TOTAL	
	Area (Km^2)	Product (1000 T)	Area (Km^2)	Product (1000 T)	Area (Km^2)	Product (1000 T)	Area (Km^2)	Product (1000 T)	Area (Km^2)	Product (1000 T)	Area (Km^2)	Product (1000 T)	Area (Km^2)	Product (1000 T)
A Paddy	2,435.8	602.90	2,393.2	464.73	2,411.3	405.86	2,293.0	503.42	908.6	189.83	1,208.3	233.28	11,650.0	2,420.00
B Manioc	527.6	390.28	1,608.7	1,102.51	302.2	254.10	217.0	117.05	685.4	359.78	83.4	532.85	3,424.0	2,277.00
C Sweet potato	285.4	183.22	253.5	142.60	47.4	22.30	24.1	12.21	285.2	116.83	16.6	6.05	912.0	483.20
D Potato	338.8	244.04	44.5	25.66	2.9	0.74	1.2	0.28	0.7	0.07	1.1	0.23	389.0	271.00
E Groundnut	102.1	9.81	76.8	7.68	22.8	1.76	53.0	6.47	68.8	5.68	10.3	0.91	333.7	32.30
F Maize	770.2	88.68	177.6	18.61	122.9	13.56	153.7	13.13	244.4	22.78	45.3	3.73	1,513.9	160.48
G Bean	205.8	17.27	181.9	14.63	25.1	2.31	12.6	1.00	32.8	2.39	3.9	0.30	462.0	37.89
H Pea	—	—	—	—	—	—	0.5	0.05	63.5	7.15	—	—	64.0	7.20
I Sugar cane	30.3	53.12	103.9	228.71	103.9	333.30	122.7	524.75	99.8	274.30	153.5	575.83	614.0	1,990.00
J Pepper	—	—	27.0	1.30	7.5	0.44	5.5	0.25	—	—	24.8		64.7	3.30
K Sisal	—	—	—	—	—	—	—	—	184.7	21.50	—	—	184.7	21.50
L Cacao	—	—	—	—	—	—	—	—	—	—	78.0	2.80	78.0	2.80
M Coffee	10.5	0.38	1,066.2	38.90	737.2	28.83	53.3	1.83	30.1	0.93	483.8	17.33	2,381.0	88.20
N Vanilla	—	—	—	—	46.0	1.25	2.0	0.10	—	—	238.1	6.45	286.0	7.80
O Cotton	0.1	0.01	4.3	0.35	—		103.9	24.55	170.2	15.17	11.7	1.37	290.1	41.43
P Clove	—	—	9.7	0.17	787.4	6.83	1.3	0.02	—	—	6.8	0.09	805.2	7.10
Sub-total	4,706.3	1,589.68	5,947.0	2,045.83	4,616.3	1,071.25	3,043.6	1,205.09	2,773.9	1,016.40	2,365.3	1,381.21	23,452.3	7,851.20
Share(%)	20.1	20.2	25.4	26.1	19.7	13.6	13.0	15.3	11.8	12.9	10.1	17.6	100.0	100.0

Note:The Value of the area of the arable land is in 1989. (Source:Ministry of Agriculture)

(2) Stockbreeding

In Madagascar, more than half of the territory (340,490 square kilometers) is covered by permanent pasture (see Table 1-4-1). There are many heads of cattle (bovines), pigs (porcines), sheep/goats, and poultry in the vast area of permanent pasture. Estimated livestock is shown in Table 1-7-4.

Table 1-7-4 Estimated Livestock of Madagascar

(Unit: Head)

Year	Bovines	Porcines	Sheep/ Goats	Poultry
1982	10,281,000	1,240,000	2,525,000	17,750,000
1983	10,322,000	622,000	1,979,650	14,587,000
1984	10,363,000	1,379,000	1,979,450	14,486,000
1985	10,420,000	1,339,000	1,804,600	18,683,000
1986	10,485,000	1,412,000	1,951,860	20,026,000
1987	10,220,500	1,315,000	1,351,319	18,066,609
1988	10,232,000	1,476,000	1,951,660	20,072,000
1989	10,243,000	1,400,000	1,950,000	22,208,000
1990	10,254,000	1,430,000	1,993,000	19,105,707
1991	10,265,000	1,461,000	2,036,000	19,545,138
1992	10,276,000	1,493,000	2,081,000	19,994,676

<Source: Direction de l'Elevage>

The heads of livestock have not increased in the last decade. There were 10,276,000 heads of bovines as of 1992 while the largest number of bovines was observed in 1986. The growth rate of the bovines from 1987 to 1992 is almost nil. There were 1.493 million heads of porcines as of 1992 and the growth rate from 1987 to 1992 is also almost nil. The heads of the porcine are about one seventh of those of the bovines.

There were 2,081,000 heads of sheep/goats as of 1992, which is about 80 % of those observed in 1982. The growth rate in the last decade is almost zero percent but the heads increased slightly in the last decade. There are 19.995 million heads of poultry (chicken, duck, etc.) as of 1992. The heads of poultry have not varied greatly in the last decade.

Generally speaking, the total heads of livestock have remained stable in the last decade. It may create some problems in the near future if the heads of livestock do not increase in line with the increase in population.

Population and the number of livestock (bovines, porcines and sheep/goats) are shown in Table 1-7-5.

Table 1-7-5 Population/Heads of Livestock in Antsiranana Province

Year:1989

Fivondronana	Population		Bovines		Porcines		Sheep/Goats	
	Numbers	rate (%)	Heads	rate (%)	Heads	rate (%)	Heads	rate (%)
Diego I	73,607	6.8	57,500	9.0	500	1.3	700	1.8
Diego II	69,489	6.4	58,600	9.2	2,000	5.2	27,700	71.6
Ambilobe	138,409	12.8	152,250	23.8	4,575	11.9	3,080	8.0
Ambanja	96,871	8.9	38,500	6.0	3,500	9.1	5,010	12.9
Nosy-Be	28,032	2.6	4,800	0.8	1,540	4.0	1,540	4.0
Sub-Total	406,408	37.5	311,500	48.7	11,255	29.2	38,030	98.3
Vohemar	149,423	13.8	260,000	40.6	300	0.8	470	1.2
Samvaba	215,739	19.9	30,000	4.7	16,000	41.5	60	0.2
Antalaha	176,210	16.3	21,500	3.4	4,000	10.4	105	0.3
Andapa	136,191	12.6	16,600	2.6	7,000	18.2	30	0.1
Sub-Total	677,563	62.5	328,100	51.3	27,300	70.8	665	1.7
TOTAL	1,083,971	100.0	639,650	100.0	38,555	100.0	38,695	100.0
(Share of Ma.)	(9.9%)		(8.9%)		(5.7%)		(2.2%)	

Source: Elevage

The heads of bovines in the districts of Ambilobe and Vohémar exceed the human population in each district. In particular, the district of Vohémar has 1.74 times more bovines (260,000) than people (approx. 149,000). It is notable, however, that the number of bovines in the district of Vohémar accounts for about 41 % of the entire province.

Sambava has the largest number of porcines, 16,000 or 41.5 % of the entire province. In the district of Sambava, moreover, porcines account for only 7.4 % of the total population.

The district of Antsiranana II has the largest number of sheep and goats, 27,700 or 71 % of the entire province.

Table 1-7-6 shows the evolution of livestock in Madagascar. There are 4,192 heads of live cattle for export in 1992 while there were more than ten thousand heads in 1987. There is a vast area of permanent pasture in this country. If cattle breeding is widely commercialized, the heads of live cattle for export will rapidly increase.

Table 1-7-6 Trend of Exportation of Livestock

	Unit	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Live cattle	Heads	—	—	—	—	249	11,727	3,307	6,359	7,445	7,850	4,192
	1000 FMG	—	—	—	—	47,581	2,545,872	1,148,032	1,888,449	2,551,798	2,895,992	1,602,590
Live goat	Heads	—	—	—	—	—	106	—	1,120	5,344	3,990	—
	1000 FMG	—	—	—	—	—	889	—	29,730	200,279	228,093	—
Cattle meat	ton	934.23	152.80	2,133.65	411.48	—	373.59	213.92	19.07	55.28	345.21	1,289.09
	1000 FMG	743,313	132,287	1,685,068	417,117	—	907,849	614,843	56,628	157,757	157,757	5,731,332
Cattle entrails	ton	—	—	—	15.95	—	140.30	0.05	4.33	2.84	1.08	0.04
	1000 FMG	—	—	—	3,100	—	217,027	53	10,667	7,440	3,622	42
Canned meat	ton	233.58	87.11	373.55	243.17	—	7.46	2.69	—	0.02	—	—
	1000 FMG	244,217	99,043	546,723	444,696	—	16,978	7,392	—	674	—	—
Dried cattle meat	ton	—	—	—	—	3.10	1.15	4.51	5.10	23.98	—	—
	1000 FMG	—	—	—	—	3,725	4,887	14,096	12,939	57,175	—	—
Pig meat	ton	—	—	—	—	—	0.70	2.06	0.78	0.01	0.03	0.09
	1000 FMG	—	—	—	—	—	2,973	3,371	4,406	50	84	561
Goat meat	ton	—	—	—	—	—	—	0.50	—	0.18	—	0.16
	1000 FMG	—	—	—	—	—	—	2,110	—	447	—	480
Mutton meat	ton	—	—	—	—	—	0.71	0.21	2.17	1.42	—	0.02
	1000 FMG	—	—	—	—	—	3,711	828	12,804	7,046	—	46
Rabbit meat	ton	—	—	—	—	—	0.08	—	0.24	0.11	—	—
	1000 FMG	—	—	—	—	—	386	—	715	440	—	—
Poultry meat	ton	—	—	0.06	—	—	22.95	3.22	4.07	2.42	20.65	25.73
	1000 FMG	—	—	656	—	—	100,405	17,213	17,081	22,632	169,193	221,532
Foies gras	ton	—	—	0.06	—	—	0.59	0.45	0.69	0.93	6.28	9.38
	1000 FMG	—	—	145	—	—	16,310	14,328	6,843	56,806	246,628	428,241
Terrine de foie gras	*Barquettes*	—	—	—	—	—	—	—	*30,00*	—	—	—
	1000 FMG	—	—	—	—	—	—	—	587	—	—	—
Delicatessen	ton	—	—	—	—	—	0.07	0.02	0.05	0.01	—	0.14
	1000 FMG	—	—	—	—	—	1,078	110	308	70	—	1,660
Milk	Litter	—	—	—	—	—	—	—	988	902	55	—
	1000 FMG	—	—	—	—	—	—	—	614	729	105	—
Cheese	ton	—	—	—	—	—	0.07	0.10	0.60	0.37	0.23	0.03
	1000 FMG	—	—	—	—	—	592	884	5,537	259	2,200	69
Butter	ton		—	—	—	—	0.01	—	0.28	0.20	0.05	—
	1000 FMG		—	—	—	—	67	—	2,180	1,670	570	—
Honey	ton	0.25	—	—		—	—	0.59	0.97	3.29	4.41	2.85
	1000 FMG	63	—	—		—	—	3,975	1,150	4,062	4,732	3,171
Beeswax	ton	70.80	47.60	69.31	36.91	22.31	53.03	72.15	61.58	49.32	41.70	71.54
	1000 FMG	72,859	56,736	91,965	58,894	39,302	140,409	199,789	211,289	184,654	198,078	352,622
Corns and their product	ton	—	—	—	—	—	11.38	69.37	234.72	130.45	77.05	41.26
	1000 FMG	—	—	—	—	—	37,698	346,047	592,824	360,064	443,167	303,564
Processed leather	ton	28.87	—	32.32	59.01	142.12	523.53	348.35	95.77	505.89	350.92	424.51
	1000 FMG	5,218	—	65,911	22,407	304,437	2,085,343	2,038,790	145,872	1,324,401	545,911	800,136
Processed skin	ton	—	—	198.13	—	—	—	170.38	—	—	208.18	185.94
	1000 FMG	—	—	126,278	—	—	—	125,758	—	—	611,356	258,612
Raw skin	ton	—	—	—	—	—	—	—	—	—	9.60	43.62
	1000 FMG	—	—	—	—	—	—	—	—	—	9,448	50,353
Eggs	Unit	—	—	—	—	—	—	3,600.00	—	—	—	200.00
	1000 FMG					—	—	885	—	—	—	40
Porc sausage	ton	—	—	—	—	—	—		0.00	—	—	—
	1000 FMG	—	—	—	—	—	—	—	3,750	—	—	—
Canned poultry	ton	—	—	—	—	—	—	—	—	—	0.74	0.70
	1000 FMG	—	—	—	—	—	—	—	—	—	9,191	37,629
Grease of poultry	ton	—	—	—	—	—	—	—	—	—	0.04	0.01
	1000 FMG	—	—	—	—	—	—	—	—	—	142	140
Giblets	ton	—	—	—	—	—	—	—	—	—	0.10	0.95
	1000 FMG	—	—	—	—	—	—	—	—	—	315	8,675
TOTAL	ton	—	—	—	—	—	—	—	—	—	—	—
	1000 FMG	1,065,670	288,066	2,516,746	946,213	395,046	6,082,471	4,538,504	3,004,372	4,938,452	5,526,584	9,801,498

Note: 1982; Cattle meat of 469.945 t is not declared and its quantity is not included in the explotation of 1982. <Source: Direction de l'Elevage>
1983; Cattle meat of 542.775 t is not declared and its quantity is not included.
1984; Cattle meat of 1.474 t and raw cattle skin of 218.704 t are not declared.
1985; 184.455 t of meat is not declared.
The exportation of live cattle is suspended sice July 1992.

The various export products which can be made from livestock, such as beeswax, corns and their products, processed leather processed skin, etc. should be examined.

There are now six projects in the Direction of Livestock (Direction de l'Elevage). Five of them are financed by foreign funds and the other one is a private project. The six projects are as follows;

Projects financed by foreign funds

1) Sectorial Breeding Project<Projet Sectoriel Elevage>
   * Institutional improvement of breeding industry
   * Promotion of dairy
   * Privatization of veterinary medicine(sanitary aspect in particular)
2) Dairy Production in the periphery of 10 regional urban centers
   <Production laitiere dans la peripherie de 10 centres urbains regionaux de Madagascar>
   * Dairy promotion project focusing upon 10 regional urban centers
3) Breeding development in the South west
   <Developpement de l'Elevage dans le Sud Ouest>
   * Institutional improvement
   * Improvement of animals sanitary condition
4) Project of supporting animal production in respect of short cycle species
   <Projet d'appui a la production animal pour les especes a cycle court>
5) Program of slaughterhouse facilities in secondary cities
   <Programme d'equipement des abattoirs des villes secondaires>

Private project

1) Ostrich breeding
   * Planning at Morondava

1.7.3 Fishery

The quantity of fishery products reached 104 thousand tons in 1990 (this includes catches from both freshwater and saltwater sources). The fishery production is increasing every year.

Moreover, a prawn/shrimp industry in the north-west coast of Madagascar is now being developed with the cooperation of Japan. The tuna fishery in the Indian Ocean was so active that a canning factory at the port of Antsiranana began its operation in March 1991. The quantity of tuna used in the canning industry (PFOI: Peche et Froid Ocean Indien) reached about 15 thousand tons in 1992.

The improvement of the means of fishery and the creation of make-up structure of the fishery products distribution system was realized by the fourth grant in the field of fishery offered by the Japanese Government. The production growth rate in this field is remarkable. The amount of foreign currency acquired by the export of fishery products is actually the second greatest and possibly the greatest in the future, in the field of exports.

The fishery production in Madagascar is shown in Table 1-7-7. The number of fishing villages, fishermen and the distribution of small fishing boats are shown in Table 1-7-8. The facilities of the main fishing ports in Madagascar are shown in Table 1-7-9.

Table 1-7-7 Fishery Production in Madagascar

N°	Productions	1960	1970	1980	1990
I	**Production maritime**	3.500	9.376	13.618	73.470
1.1	Pêche industrielle, dont :	-	3.010	5.119	19.274
	– crevettes	-	*2.910*	*4.913*	*6.967*
	– langoustes	-	-	-	*30*
	– poissons	-	*100*	*206*	*12.277* [1]
1.2	Pêches traditionnelle/ artisanale	3.500	6.366	8.500	54.196
II	**Production d'eaux douces**	22.500	35.090	38.700	30.230
2.1	Pêche continentale	21.621	34.510	38.350	30.000 [2]
2.2	Pisciculture en étangs	864	508	250	70
2.3	Rizipisciculture	15	72	100	160
III	PRODUCTION TOTALE	26.000	44.466	52.319	103.700

[1] *dont 10.000 tonnes de thons pêchés par les bateaux sous pavillon étranger.*
[2] *à partir de 1989 la production estuarine, classée auparavant dans la pêche continentale, a été inclue dans la pêche maritime.*

Sources : Anonyme (1962), M. Vincke (1972), A. Collart, M. Vincke (1989), Rapport N°10, Statistiques de la Direction de la Pêche et de l'Aquaculture, Rapport d'activités de la DPA en 1990.

Table 1-7-8 Fishing Village, Fishermen and Distribution of Small Fishing Boat

Faritany	Nombre de villages de pêcheurs	Nombre de pêcheurs			Nombre d'embarcations			
		Piroguiers	A pied	Total	Pirogue simple	Pirogue à balancier	Embarcation en planches	Total
Antsiranana	370	5.818	1.426	7.244	849	3.234	21	4.104
Fianarantsoa	71	2.112	1.348	3.460	1.133	6	139	1.278
Mahajanga	346	6.690	4.903	11.593	1.243	3.477	64	4.784
Toamasina	200	3.499	1.491	4.990	2.596	331	5	2.932
Toliara	263	12.601	2.668	15.269	1.883	6.474	0	8.357
TOTAL	1.250	30.720	11.836	42.556	7.704	13.522	229	21.455

***Source :** Rapport de terrain N°4.*

Table 1-7-9 Facility of Main Fishing Port in Madagascar

Ports	Quais		Observations
	Longueur (m)	Tirant d'eau à basse-mer (m)	
Antsiranana	300,0	8,5	excellent état, long-courrier
	62,0	4,5	excellent état, caboteurs
	51,0	2,0	vedettes
Mahajanga			
Quai Orsini	154,0	asséché	très mauvais état, convenant à 7 navires dont 4 à fort tonnage.
Quai Coste	98,0	2,0	très mauvais état
Quai Willemin	154,0	1,0	bon état
Quai Barriquand	180,0	2,0	bon état ; 120 m sont utilisés par des chalutiers de la SOMAPECHE et de SOPEBO
Toamasina			
Mole A	259,0	5,5	caboteur
	100,0	8,5	bananier
Mole B	180,0	9,0	long-courrier
	41,0	10,0	pétrolier
Mole C	171,5	12,0	paquebot
	192,0	3,0	caboteur
	354,5	10,0	céréales et chromite
Nosy-Be			
Nord	142,0	3,5	les PNB, installées à Nosy-Be, exploitent leurs propres installations
Est	148,0	2,0	(jetées...)
Morondava	50,0	2,0	chenal impraticable à marée basse
	57,0	asséché	
	50,0	asséché	
Tolagnaro	71,0	2,5	seuls 45 m linéaire sont utilisables
	73,0	0,5	pour les barges ; appontement
	22,0	0,5	supportant une digue de 30 tonnes
Toliara	140,0	7,5 (8,5 initialement)	état médiocre pour la partie en planches
	90,0	2,0 (*asséché en partie à basse-mer*)	état satisfaisant
Vohemar	50,0	5,2	relié à la terre par une passerelle de 37 x 8 m

Sources : Direction des Transports et de la Météorologie. Etude pour le développement de la pêche au thon dans l'Océan Indien. Rapport N°1, 1984.

1.7.4 Industry

Industrial sector in Madagascar is relatively undeveloped. Principal main industries are textile, clothing canning stuffs, beverages, shoes and pharmaceutical products. The clothing and shoe sectors are the most suited to orientate themselves towards export. The regime of free zone or investment code has been established to further export.

Dependency of industries on local raw materials such as cotton, hides, fruit and vegetables should be reduced in so far as the advantage of efficient and very competitive manpower permits to import materials to be processed before export.

South East Asia countries which have experienced rapid growth have known a still more rapid growth in the industrial sector. Malaysia experienced a growth of 7 % between 1973 and 1981, including one sector which grew at a rate of 9.5 %. During that time, industrial sector weight increased from 15 % to 20 % of GDP. Thailand experienced a growth rate of 7 % between 1963 and 1987, and an industrial growth rate of 9.5 %. During that period, industrial sector increased its share of GDP from 14 % to 25 %.

What lessons can Madagascar take from Asia's experience? First, sector growth seems to pass through the same successive stage:

(1) a first stage of production with intensive non-qualified manpower, based on local raw materials and devoted to substitute import;

(2) rapid replacement by industry development orientated towards export with intensive manpower having a growing proportion of qualified employees; it dealt with activities of assembling imported parts first and;

(3) increase of productivity by intensive utilization of imported technology and by contracting efficient foreign managers. The firms and investors of the most advanced countries (Taiwan, Hong Kong, Japan, USA) were canvassed and actively requested to establish production platforms in association with local private contractors.

Madagascar has the ability to develop its industrial sector. It has indeed at its disposal a major trump in its abundant manpower, which is cheap and suitable to be trained on production techniques. That potential can be realized only if a prescribed and judicial environment of economic activities enables the release of productive forces by facilitating firm creation, intervention of foreign investors and employment creation. It will also depend on the development of human resources and existence of appropriate

physical infrastructures. It is by developing the export industry with intensive manpower that Madagascar can hope at the end to solve its unemployment problem which is already very disastrous and might become a cause of social and political trouble in the country.

Development of the industrial sector will not be easy, however. The world has entered a universalization of markets of manufactured products and financial services assorted with very rapid progress in technology, marketing and firm management. In those markets, product quality and punctuality become prevailing factors. This increases the importance for Madagascar to know how to catch opportunities of investment and exchange with neighboring countries such as Mauritius and South Africa, as well as East Asian industrialized countries.

The enterprize number engaged in one or several activities as of 01/01/92 in each province is shown in Table 1-7-10.

Rice polishing, processing of cotton, manioc, sugar cane, tobacco, groundnut, meat, and leather, etc. have been the main industries of Madagascar up to now. Cement, match and paper factories have been actively operated in recent years, and Madagascar has begun exporting its paper product to African countries. This applies also to the textile and beverage industries which have become actively engaged in their production. In addition to the foregoing industries, a shipbuilding company named SECREN is operating at Antsiranana in the field of ship repairs and maintenance including fishing boats in particular.

Table 1-7-10 Number of Enterprize Engaged in One/Several Activity <January '92>

CITIM	Branche of activities	Tana.	Fianar.	Tama	Majunga	Tuliar	Diego<B>	Total<A>	B/A(%)
0	Agriculture, Livestock, Fishery	550	176	292	146	119	497	1,780	27.9
1	Mining	251	37	54	14	54	14	424	3.3
20-22	Food	1,934	166	545	284	122	296	3,347	8.8
23-24-29	Textiles and leather	6,863	160	114	102	31	95	7,365	1.3
25-26	Wood industry	952	81	65	56	31	92	1,277	7.2
27	Paper industry	210	4	1	0	2	0	217	0.0
28	Printing works-Edition	289	13	11	11	14	16	354	4.5
30-31	Chemical	577	58	123	24	13	52	847	6.1
32	Refining petroleum	2	0	0	0	0	0	2	0.0
33	Fabrication of metal products	204	36	17	12	9	10	288	3.5
34	Metallurgical Industry(Basic)	40	6	10	1	3	6	66	9.1
35-393	Fabrication of metal works	2,647	279	300	194	179	236	3,835	6.2
394-399	Other manufacturing industry	774	26	29	49	26	55	959	5.7
4	Construction	2,279	464	409	231	271	308	3,962	7.8
51-521	Electricity, water and gas	5	1	1	0	3	0	10	0.0
610,611,699	Wholesale trade	6,329	740	1,120	834	498	533	10,054	5.3
612-619	Retail trade	62,716	23,223	23,124	16,057	14,473	16,326	155,919	10.5
62-64	Bank, insurance & estate activity	161	9	15	8	4	12	209	5.7
7	Transport & telecommunication	2,844	322	378	270	324	566	4,704	12.0
810	Public services	54	4	5	9	8	3	83	3.6
821	Education (teaching)	539	85	218	25	324	19	1,210	1.6
822	Health	427	62	67	49	31	61	697	8.8
829,841-843	Recreation & social services	159	26	27	16	16	34	278	12.2
831 - 839	Business services	936	35	76	37	16	51	1,151	4.4
862 - 863	Hotels, restaurant & gargote	5,773	1,291	1,278	1,537	1,217	1,551	12,647	12.3
522,823-827 864-869	Other services	1,043	111	130	71	62	93	1,510	6.2
	T O T A L	98,558	27,415	28,409	20,037	17,850	20,926	213,195	9.8

Source: Data Bank of the State

1.7.5 Mining

In spite of the relatively poor soil of the country, Madagascar has very rich mineral resources. In addition to coal (which is mined primarily in the basin of SAKOA near Toliara), Madagascar has rich mineral resources of chrome, graphite, brown mica, titan (this resource would be three times bigger than that of Australia which is the top-ranked producing country of titan having a 30% share in the world market), gold, etc. These minerals, however, are under exploited.

Gold is produced here and there in Madagascar and the annual production was over 20 tons in the early 1970's, but in recent years, the quantity of gold production has fallen to 3 or 4 tons at the very most.

Mica is mainly produced in southeast and graphite is largely produced in the east. Quartz, beryl, garnet, amethyst, etc. are produced and used for various industries.

The production of chromite, mica, graphite and quartz is shown in Table 1-7-11. The production of chromite was 160 thousand tons in 1992. The majority of chromite is for export, the volume of which has been stable in recent years. Chromite exports are promising because the demand from importing countries is increasing. The income from chromite exportation is the largest in the mining sector. The chromite mines are shown in Figure 1-7-1.

The production and the exportation of graphite has been stable in the last decade and the income from graphite exportation has been increasing at the same rate as that of chromite.

On the other hand, rare metals such as nickel, titan, etc. are produced in various spots in Madagascar. As the demand/supply for these rare metals is increasing all over the world, it is expected that this field of rare metals will develop on the basis of well-programmed investigations.

Table 1-7-11 Statistics of Madagascar

- Production and Exportation -

SUBSTANCE	UNIT	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Graphite	ton	14,523	11,662	13,624	14,948	14,833	10,316	13,428	15,221	14,654	10,741	7,577
	1000 FMG	2,741,100	2,552,140	3,358,262	4,429,208	5,550,025	7,409,129	12,734,953	15,576,540	17,662,725	14,514,575	10,171,293
Chromite	ton	79,371	40,573	107,548	102,282	105,099	96,227	127,832	134,338	75,269	129,340	108,375
	1000 FMG	2,047,630	888,905	3,286,772	3,525,951	4,048,317	5,436,683	12,567,906	28,426,418	11,707,000	19,342,077	1,463,200
Mica	ton	1,409	301	781	878	1,825	392	871	684	1,868	614	832
	1000 FMG	318,328	227,527	261,845	377,870	553,963	373,791	1,181,485	864,911	1,851,187	1,216,232	859,094
Quartz	ton	296	103	829	759	656	594	598	603	236	232	839
	1000 FMG	124,186	279,652	474,159	479,162	658,387	981,726	1,528,415	1,392,332	603,443	635,871	27,040,686

Note:Export price is FOB.

<Source:Ministry of Mining>

District of Antsiranana (Diego-Suarez)

Salt of Madagascar is largely produced in the Diego-Suarez Bay. In view of the development of the salt industry, chemical industry such as chlorine, caustic soda, etc has a bright future.

Limestone is abundantly deposited in the circumference of the Diego-Suarez Bay and at Mount Ansiravo. This limestone has a poor content of magnesium oxide so that it is suitable for the production of good quality cement.

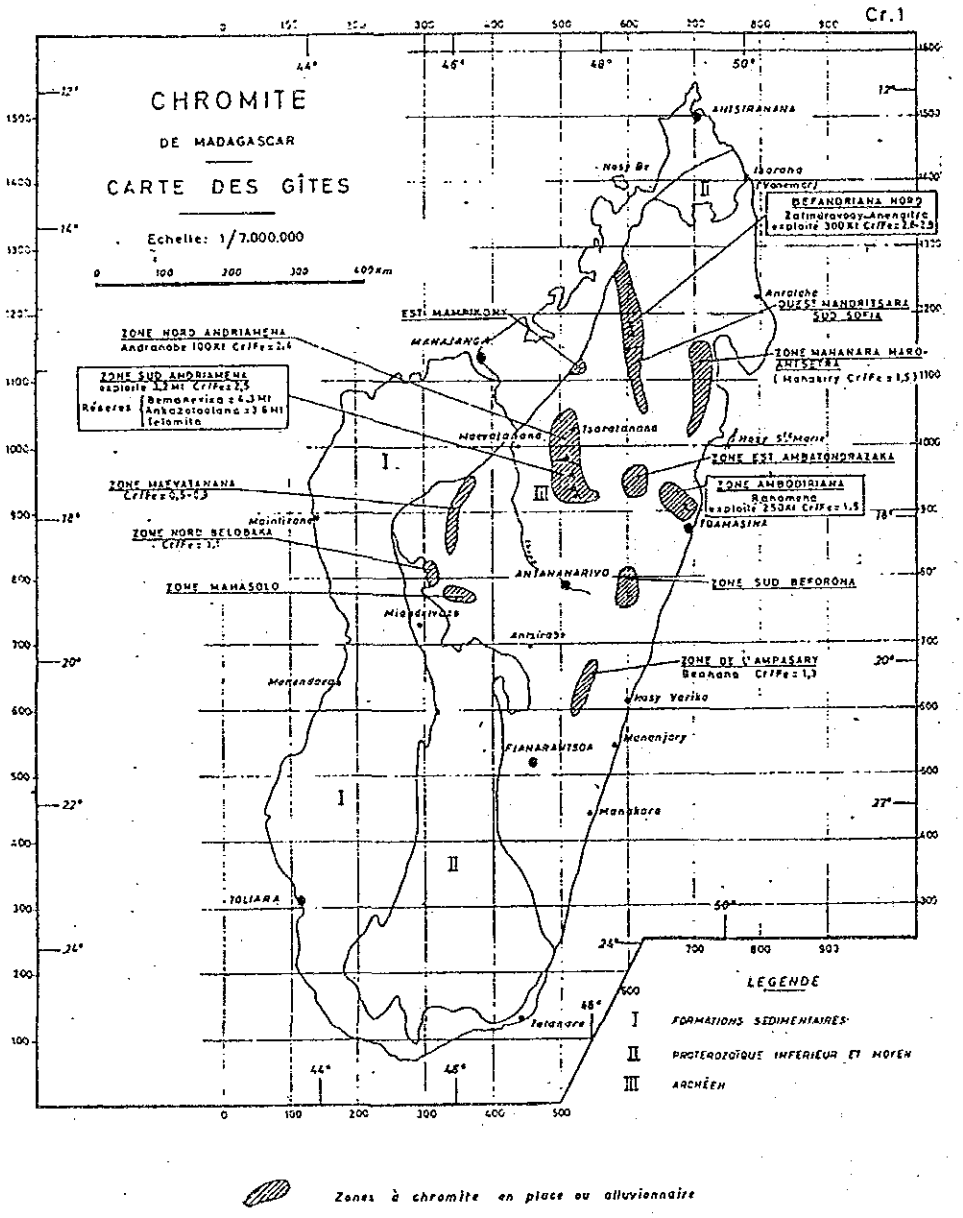


Figure 1-7-1 Production Area of Chromite

1.7.6 Water and Energy

The east coast is abundant in water resources thanks to sufficient rainfalls. The rivers which empty into the sea along the west coast area are comparatively rich water resources because of rain falling from the east coast area to the central mountainous area. Water in the southwest area is scarce; this area is almost a desert. The province of Antsiranana is generally abundant in water expect for the northern part of the province.

In Madagascar, coal and petroleum are not produced at all now and are imported from foreign countries. The evolution of the commercial energy in Madagascar is shown in Table 1-7-12.

Table 1-7-12 Trend of Commercial Energy

Category	Year	(%)	Remarks
Energy prodction	1965-80	3.9	growth rate
	1980-90	7.4	
Energy consumption	1965-80	3.5	growth rate
	1980-90	1.8	
Energy consumption per capita(kg/oil)	1965	34.0	kg/oil equivalent
	1990	40.0	
Energy Import	1965	8.0	%/merchandise export
	1990	2.0	

<Source:World Development Report 1992>

Therefore, many woods are cut and use for fuel. The forests, protected areas and water resources in Madagascar are shown in Table 1-7-13.

Table 1-7-13 Forests, Protected Areas and Water Resources

Category	Items	Detail	Year	Unit	Value	Remarks
Forest area	Area	Total area	1980	1000 km^2	132	
		Closed area		1000 km^2	103	
	Annual deforestation	Total area	1981-85	1000 km^2	1.6	
		Closed area		1000 km^2	1.5	
Nationally protected area	Area	Total area	1991	1000 km^2	11.2	
		Number		Number	37	
		%/total land		%	1.9	
Internal renewable water resources	Quantity	Total quantity	1970-87	cubic km	16.3	
		%/total W. R.		%	41	
	Per capita	Total	1970-87	cubic m	1,675	
		Domestic		cubic m	17	
		Ind. & Agri.		cubic m	1,658	

<Source:World Development Report 1992>

The location of the power plants and the sources of water in the province of Antsiranana (Diego-Suarez) are shown in Table 1-7-14.

Table 1-7-14 Power Plant and Water Source

<1992>

Code	District	Power plant Capacity (MWH)	Water source Capacity (thous. q.m)
200	Antsiranana	15,247	dum/river 630,000
203	Ambanja	1,641	underground 25,207
204	Ambilobe	1,021	— —
205	Andapa	678	river 152,109
206	Antalaha	2,253	river 493,890
207	Nosy be	11,354	lake 98,152
208	Sambava	1,883	river 220,672
209	Iharana	678	well 190,220

<Source:JIRAMA>

All of the power plants in the province of Antsiranana use diesel oil for power generation. The capacity of the power plants in the district of Antsiranana is saturated because of the tuna factory (PFOI). The construction of new power generating facilities is under planning. The capacity of the power plant will increase from 4,200 kw to 6,000 kw in the near future, if this project is realized.

1.7.7 Tourism

Between 1985 and 1990, the number of foreign visitors increased from about 23,500 to nearly 53,000 (though the number fell to 35,000 in 1991). Hotels offered 1,597 rooms in 1985 and 3,040 in 1991. Though income generated from tourism fell from 40 million dollars in 1990 to 29 million dollars in 1991, this was still greater than the income generated from the export of coffee. Table 1-7-15 shows the number of foreign tourists who passed through customs in 1990 and 1991.

Table 1-7-15 Number of Tourists Passing through Customs

NATIONAL OF COUNTRY	1990	1991	91/TOTAL Share	91/90 Change
AFRICA	10,149	7,146	20.5	-29.6
Comores	2,261	1,960	5.6	-13.3
Kenya	672	315	0.9	-53.1
Mauritius	989	603	1.7	-39.0
Reunion	5,628	4,045	11.6	-28.1
Seychelles	279	23	0.1	-91.8
South Africa with Tanzania	320	185	0.5	-42.2
Rest Africa	—	15	0.1	—
AMERICA	3,867	2,547	7.3	-34.1
USA/CANADA	3,815	2,497	7.2	-34.5
Rest America	52	50	0.1	-3.8
ASIA	2,205	1,262	3.6	-42.8
Japon	2,035	935	2.7	-54.1
Other Asia	170	327	0.9	92.4
EUROPE	36,695	23,936	68.6	-34.8
Soviet Union	—	—	—	—
United Kingdom	2,381	1,262	3.6	-47.0
Scandinavia	476	145	0.4	-69.5
Italy	3,962	2,615	7.5	-34.0
France	14,782	9,327	26.8	-36.9
East Germany	10,373	7,182	20.6	-30.8
Switzerland	3,669	2,815	8.1	-23.3
Benelux	623	295	0.8	-52.6
Spain	254	159	0.5	-37.4
Other Europ	182	80	0.2	-56.0
TOTAL	52,923	34,891	100.00	-34.1

Source: Ministry of Tourism

It is obvious that tourism offers large possibilities to Madagascar. Nevertheless, in this field, forecasted demand is always subject to strong uncertainty, though, starting from a low level, tourism should initially develop relatively fast. It is probably with Maldives or Seychelles that we can best compare Madagascar, although its territory is much vaster, its variety larger.

Maldives which had received 33,000 tourists in 1979 had that number increased to 158,000 in 1989. For Seychelles, arrivals which amounted to 55,000 in 1977 increased to more than 104,000 in 1990. This suggests that Madagascar might receive from 100,000 to 150,000 visitors a year during the next decade.

During the last years, two relatively important studies were conducted. The first one, supporting a relatively ambitious project of hotel construction on 3 sites (Nosy-Be and Saint Marie islands and a site near Fort-Dauphin in the South) concluded that there would be a potential for about 140,000 visitors from 1995.

The other more recent one was carried out by UNDP in 1992 and concluded that the tourist number could increase within 10 years from about 70,000 to some 460,000. Those figures exemplify the uncertainty involved in such an estimation, but suggest too the extent of Madagascar's potential in that field.

Realization of the estimations would require a very rapid program of infrastructure and development of accommodation facilities, which would need private external funding at least for the hotel sector.

To date, a new hotel of Antananarivo and some sites in the South and in the North of Toamasina and funding of some access roads in south tourism sites have been completed. So far as short/medium-term development is concerned, small scale hotel projects seem to be more realistic than those exceeding 100 rooms.

It would then be possible at a first stage, by relying on existing infrastructures, to receive some 70,000 tourists a year; in general, hotels would serve individual travellers at a relatively low cost. So development might start from seaside resort tourism and group tours.

Madagascar's natural resources, low price levels and the importance Madagascan people place on quality service are favorable elements for tourism development. This development is obstructed by long market distance and high transport costs. Transit by air is limited as there are only regular services between the capital and Europe, Nairobi, Mombasa and Re-Union. Planned liberalization of inland transport will facilitate transfer of tourist from actual arrival (Antananarivo) towards other tourist sites.

In parallel with mid-term traffic development, possibility of direct access to Nosy-Be (as it is already operational at Toamasina) would promote the development of regional tourist traffic (South Africa and Indian Ocean) which would represent 20 % of the total traffic. The other constraints affecting tourism development are essentially lack of appropriate infrastructures, telecommunications, electricity, water.

Total estimated foreign tourists are between 100,000 to 150,000 a year by the year 2000 in a modest development hypothesis. It would generate foreign currency receipts of about 80 to 120 million dollars a year (compared to about 50 million for vanilla and 45 million for shrimps), with an added value of about 53 to 80 million. In terms of hotel capacity, it implies doubling the currently available number rooms (3,000) in classified hotels.

Beauty and diversity of natural landscapes, magnificence of nature and its biologic diversity are great advantages for tourism development in Madagascar. "Ecological" tourism shows the most rapid growth. From estimations, the number of tourists specially visiting Madagascar to admire nature has increased from 4,000 to 8,000 between 1988 and 1990.

Environment protection thus constitutes, as for agriculture, one of the necessary conditions for developing tourism and employment. Traditional tourism will equally be kept by the maintenance of sites and beaches.

Natural Reserve, National Park and Protected Area in Madagascar

There are many Natural Reserves, National Parks and particularly Protected Areas in Madagascar. In addition to those, there are two private protected areas. The total area reaches 12,470.12 square kilometers which is only 2.1 percent of the territory. Natural Reserves, National Parks and protected areas in Madagascar are shown in Table 1-7-16 and Figure 1-7-2.

There are twelve Natural Reserves, where precious fauna and flora are strictly protected. The total area is 5,995.42 square kilometers or 48.1 percent of the total protected area.

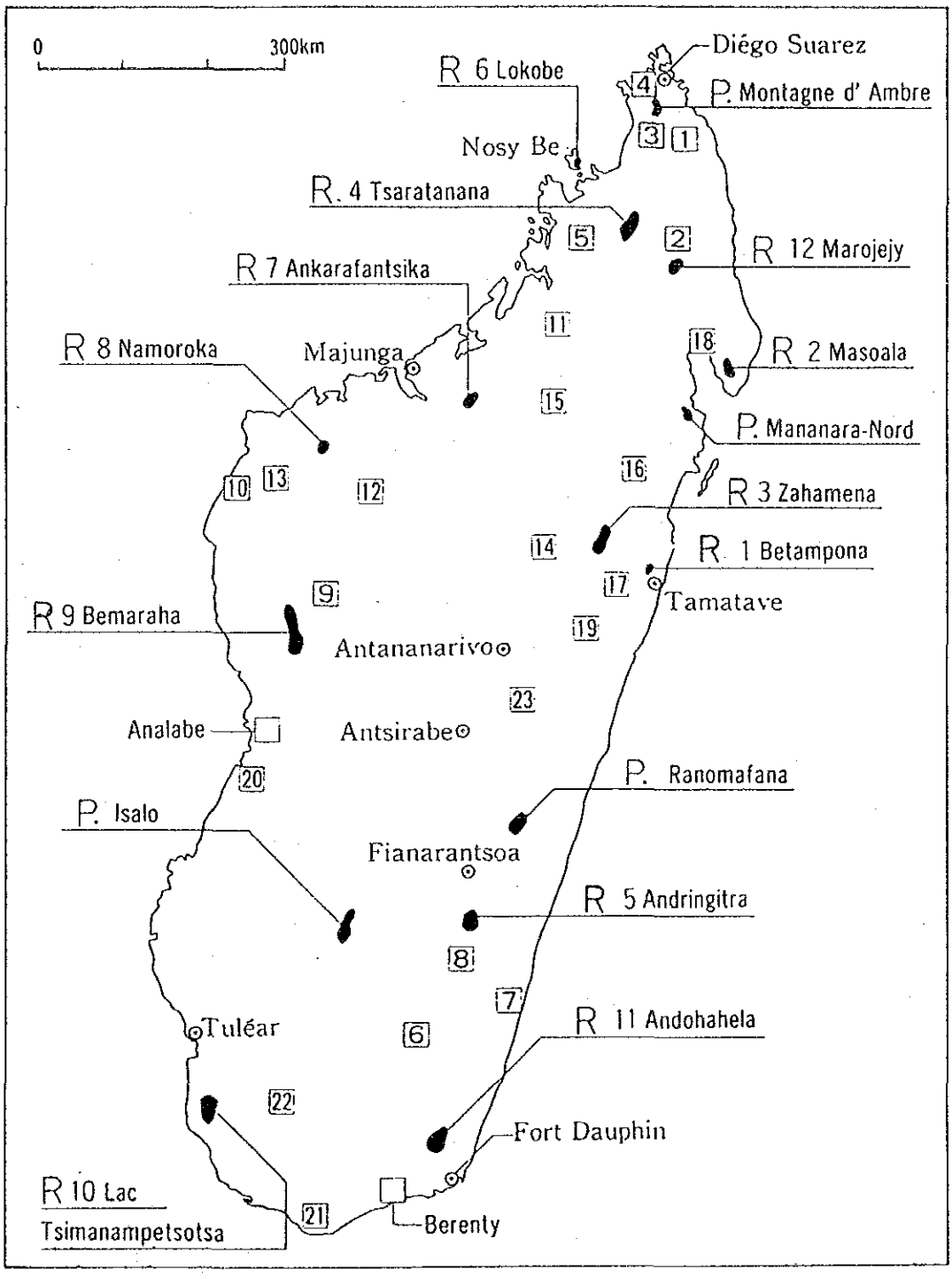
There are three National Parks and a fourth is now being planned. The total area is 2,797.4 square kilometers or 22.4 percent of the total protected area.

There are 23 Special Protected Areas covering 3,654.8 square kilometers or 29.3 percent of the total protected area.

Table 1-7-16 Area of National Park and Protected Area In Madagascar
<New data was added to Andriamampianina, 1984>

No.	[NATURAL RESERVE]	Km²	
1	Betampona	22.28	
2	Masoala	300.00	
3	Zahamena	731.60	
4	Tsaratanana	486.22	
5	Andringitra	311.60	
6	Lokobe	7.40	
7	Ankarafantsika	605.20	
8	Namoroka	217.42	
9	Bemaraha	1,520.00	
10	Lac Tsimanampetsotsa	432.00	
11	Andohalela	760.20	
12	Marojejy	601.50	
	<sub total>	5,995.42	(48.1%)
	[NATIONAL PARK]		
1	Isalo	815.40	
2	Montagne d'Ambre	182.00	
3	Mananara-Nord	1,400.00	
4	Ranomafana(under Planning)	400.00	
	<sub total>	2,797.40	(22.4%)
	[PARTICULAR PROTECTED AREA]		
1	Analamerana	347.00	
2	South Anjanaharibe	321.00	
3	Ankara	182.20	
4	Ambre Forest	48.10	
5	Manongarivo	352.50	
6	Kalambatritra	282.50	
7	Manombo	50.20	
8	Ivohibe	34.50	
9	Ambohijanahary	247.50	
10	Bemarivo	115.70	
11	Bora	47.80	
12	Kasijy	188.00	
13	Maningozo	79.00	
14	Marotandrano	422.00	
15	Analamaitso	171.50	
16	Ambatovaky	600.50	
17	Mangerivola	8.00	
18	Nosy Mangabe	5.20	
19	Analamazaotra-Perinet	8.10	
20	Andranomena	64.20	
21	Cape Sainte Marie	17.50	
22	Beza Mahafaly	5.80	
23	Ambohitantely	56.00	
	<sub total>	3,654.80	(29.3%)
	[PRIVATE PROTECTED AREA]		
	Berenty	2.50	
	Analabe	20.00	
	<sub total>	22.50	(0.2%)
	TOTAL	12,470.12 Km²	

Note;The total area of the National Park and Protected Area is 2.1% of the National Territory.



LEGEND:

R ; Natural Reserve, P. ; National Park

[3]; Special Protected Area, ☐; Private Protected Area

Figure 1-7-2 Location Map of Natural Reserve, National Park and Protected Area

There are two private protected areas but their share in the total protected area is only 0.2 percent.

North West Virgin Island Coast

It stretches along the whole North West Coast from Soalala to Ambre Cape and a part of the North East, including Antsiranana (Diego-Suarez) and Sambava. Devoted to seaside resort tourism, it offers a favorable climate, except during the cyclonic season from January to April.

Attractive seaside resort activities can be offered by land or maritime discovery tourism which can be realized by utilizing the entire island and its vast natural resources. Three poles are identified Nosy-Be, Antsiranana and Mahajanga (Majunga) on account of their exceptional qualities.

These activities require a long-term total capacity of more than 8,000 rooms or about 15,000 beds. Actual supply represents about 5 % of the necessary capacity, highlighting the importance of development. Table 1-7-17 shows the number of hotels and rooms in Faritany Antsiranana.

Table 1-7-17 Hotels and Rooms in Antsiranana Province

<Year 1991>

Grade	Items	Hotel	Rest.	NBC	NBP
5 stars	Actually	1	0	122	244
	Extension	0	0	0	0
	Total	1	0	122	244
4 Stars	Actually	0	1	0	0
	Extension	0	0	0	0
	Total	0	1	0	0
3 Stars	Actually	6	4	196	392
	Extension	0	0	53	104
	Total	6	4	249	496
2 Stars	Actually	6	4	95	195
	Extension	0	0	44	92
	Total	6	4	139	287
1 Star	Actually	4	9	64	132
	Extension	0	0	0	0
	Total	4	9	64	132
Sous-Total	Actually	17	18	477	963
	Extension	0	0	97	196
	Total	17	18	574	1159
1-2-3 Rabinala	Actually	16	22	119	236
	Extension	—	—	24	48
	Total	16	22	143	284
Total General	Actually	33	40	596	1199
	Extension	0	0	121	244
	Total	33	40	717	1443

Res.: Restaurant
NBC: Number of rooms
NBP: Number of Bed-rooms

Souce: Ministry of Tourism

1.8 Regional Development

1.8.1 Industrial Development Plan in Madagascar

In 1977, the Madagascar government established a long-term economic target (1978-2000) which aimed at doubling GDP per capita. They divided the development period into three phases and set the average growth rate of GDP up to 6.3 % throughout the period.

- First phase (1978-1984)
  - to construct and keep infrastructure in good condition
  - to promote agricultural processing industries
- Second phase (1985-1992)
  - to industrialize
  - to enlarge production of consumption goods
- Third phase (1993-2000)
  - to increase the share of the industrial sector of GDP up to 30%
  - to achieve full employment

Though GNP per capita peaked in 1980 at US$ 430, GNP per capita decreased steadily thereafter, and in 1990 it was scarcely US$ 210. Table 1-8-1 shows the key indicator of Madagascar. The key indicators of typical developing countries are shown from Table 1-8-2 to Table 1-8-5.

Table 1-8-1 Key Indicator of Madagascar

ITEMS	UNIT	1971	1977	1980	1983	1986	1989	1990	1991
Population	million	6.91	8.03	8.71	9.44	10.29	11.31	11.67	12.03
Labor force	thousand	—	—	—	—	—	—	—	—
Employed	thousand	—	—	—	—	—	—	—	—
Agliculture	thousand	—	—	—	—	—	—	—	—
rate	%	83.4	81.7	80.9	—	—	—	—	—
Manufacturing	thousand	—	—	—	—	—	—	—	—
rate	%	—	—	—	—	—	—	—	—
Mining	thousand	—	—	—	—	—	—	—	—
rate	%	—	—	—	—	—	—	—	—
Others	thousand	—	—	—	—	—	—	—	—
rate	%	—	—	—	—	—	—	—	—
Unemployed	thousand	9	13	41	30	—	—	—	—
rate	%	—	—	—	—	—	—	—	—
Current GNP per capita	US $	170	300	430	380	290	220	230	210

Source: WB

Table 1-8-2 Key Indicator of Indonesia

ITEMS	UNIT	1971	1977	1980	1983	1986	1989	1990	1991
Population	million	120.00	138.20	148.04	158.08	168.35	179.14	177.58	181.00
Labor force	thousand	—	49,443	52,421	58,993	70,193	75,508	—	—
Employed	thousand	—	43,815	51,553	57,811	68,338	73,425	—	—
Agliculture	thousand	—	29,694	28,834	32,014	37,644	41,284	—	—
rate	%	—	60.1	55.0	54.3	53.6	54.7	—	—
Manufacturing	thousand	—	4,171	4,680	5,339	5,606	7,335	—	—
rate	%	—	8.4	8.9	9.1	8.0	9.7	—	—
Mining	thousand	—	—	387	405	—	—	—	—
rate	%	—	—	0.7	0.7	—	—	—	—
Others	thousand	—	14,450	17,652	20,053	25,088	24,806	—	—
rate	%	—	29.2	33.7	34.0	35.7	32.9	—	—
Unemployed	thousand	—	1,128	868	1,182	1,855	2,083	—	—
rate	%	—	2.3	1.7	2	2.6	2.8	—	—
Current GNP per capita	US $	90	320	470	610	530	510	560	610

Source: WB

Table 1-8-3 Key Indicator of Malaysia

ITEMS	UNIT	1971	1977	1980	1983	1986	1989	1990	1991
Population	million	11.13	12.57	13.76	14.89	16.11	17.35	17.76	18.18
Labor force	thousand	—	4,765	5,122	5,727	6,222	6,834	7,046	—
Employed	thousand	—	4,476	4,835	5,429	5,707	6,351	6,603	—
Agliculture	thousand	—	1,941	1,800	1,711	1,807	1,958	1,975	—
rate	%	—	40.7	35.1	29.9	29.0	28.7	28.0	—
Manufacturing	thousand	—	663	749	841	861	1,079	1,159	—
rate	%	—	13.9	14.6	14.7	13.8	15.8	16.4	—
Mining	thousand	—	88	62	50	37	38	39	—
rate	%	—	1.8	1.2	0.9	0.6	0.6	0.6	—
Others	thousand	—	1,784	2,224	2,828	3,002	3,276	3,430	—
rate	%	—	37.4	43.4	49.4	48.2	47.9	48.7	—
Unemployed	thousand	—	289	287	298	516	483	443	—
rate	%	—	6.1	5.6	5.2	8.3	7.1	6.3	—
Current GNP per capita	US $	410	1,010	1,690	1,900	1,850	2,130	2,340	2,520

Source: WB

Table 1-8-4 Key Indicator of Thailand

ITEMS	UNIT	1971	1977	1980	1983	1986	1989	1990	1991
Population	million	36.88	43.44	46.72	49.73	52.65	55.45	56.34	57.15
Labor force	thousand	—	20,477	22,728	25,849	27,754	31,206	—	—
Employed	thousand	—	20,308	22,524	25,184	26,612	30,612	—	—
Agliculture	thousand	—	14,922	15,943	17,401	17,750	20,402	—	—
rate	%	—	72.9	70.1	67.3	64.0	65.4	—	—
Manufacturing	thousand	—	1,329	1,789	1,843	2,063	2,770	—	—
rate	%	—	6.5	7.9	7.1	7.4	8.9	—	—
Mining	thousand	—	50	37	51	—	—	—	—
rate	%	—	0.2	0.2	0.2	—	—	—	—
Others	thousand	—	4,007	4,755	5,888	6,799	7,440	—	—
rate	%	—	19.6	20.9	22.8	24.5	23.8	—	—
Unemployed	thousand	—	169	204	614	966	433	—	—
rate	%	—	0.8	0.9	2.4	3.5	1.4	—	—
Current GNP per capita	US $	210	460	670	810	800	1,220	1,410	1,570

Source: WB

Table 1-8-5 Key Indicator of Chile

ITEMS	UNIT	1971	1977	1980	1983	1986	1989	1990	1991
Population	million	9.68	10.66	11.15	11.71	12.33	12.96	13.13	13.39
Labor force	thousand	—	—	3,635	3,702	4,250	4,675	—	—
Employed	thousand	—	—	3,257	3,150	—	4,425	—	—
Agliculture	thousand	—	—	530	484	—	857	—	—
rate	%	—	—	14.6	13.1	—	18.3	—	—
Manufacturing	thousand	—	—	700	495	—	1,069	—	—
rate	%	—	—	19.3	13.4	—	22.9	—	—
Mining	thousand	—	—	72	70	—	103	—	—
rate	%	—	—	2.0	1.9	—	2.2	—	—
Others	thousand	—	—	1,949	2,098	—	2,395	—	—
rate	%	—	—	53.6	56.7	—	51.2	—	—
Unemployed	thousand	—	—	378	552	374	250	—	—
rate	%	—	—	10.4	14.9	8.8	5.3	—	—
Current GNP per capita	US $	990	1,040	2,090	1,890	1,320	1,780	1,940	2,160

Source: WB

Current GNP per capita (US$) of Indonesia, Malaysia and Thailand in 1991 is six or seven times as much as each index in 1971. Current GNP per capita (US$) of Chile is over twice as much as that in 1971. But that of Madagascar is only 1.2 times compared with the other four countries. Table 1-8-6 shows the socio-economic indicator of a developing country and Table 1-8-7 shows the selected development indicators for the developing member countries (DMC).

Table 1-8-6 Socio-economic Indicator of Developing Country

	croissance population en %	PNB/hab (US $)	Taux de croissance du PIB	Emplois non agric % pop.	Espérance de vie à la naiss.	% adultes sachant lire Hommes	% adultes sachant lire Femmes	Km de routes par Km2 de territoire
	1980-91	1991	1980-91	1991	1991	1991	1991	1991
Malaisie	2,6	2.490	5,6	27,0	71	87	70	122
Thaïlande	1,8	2.580	7,8	17,4	69	96	90	143
Indonésie	1,8	610	5,8	18,5	60	84	68	115
Chili	1,7	2.160	3,4	n.d.	72	94	93	105
Ile Maurice	1,0	2.420	7,2	21,5	70	86	76	966.
Madagascar	3,0	210	0,5	2,7	51	88	73	84

Source: Banque Mondiale, BIT, PNUD

Table 1-8-7 Selected Development Indicators for DMCs

	Average Annual Growth of Population	GNP Per Capita		Share of Agriculture in GDP	
	(per cent) 1980-1989	($) 1990	Average Annual Growth (per cent) 1965-1989	(per cent) 1965	1989
Hong Kong	1.5	11,540	6.3	2	...
Korea	1.2	5,400	7.0	38	10
Singapore	1.2	12,310	7.0	3	0
Taipei,China	1.5	8,000	...	27	4
China	1.4	370	5.7	44	32
Mongolia	2.7	...	...	...	15
Indonesia	2.1	550	4.4	56	23
Lao PDR	2.7	170	...	...	60
Malaysia	2.6	2,320	4.0	28	21
Philippines	2.5	760	1.6	26	24
Thailand	1.9	1,420	4.2	32	15
Viet Nam	2.1	200	...	...	52
Bangladesh	2.6	200	0.4	53	44
Bhutan	2.1	190	...	...	45
India	2.1	350	1.8	44	30
Myanmar	2.1	200	...	38	48
Nepal	2.6	170	0.6	65	58
Pakistan	3.2	380	2.5	40	27
Sri Lanka	1.5	470	3.0	28	26
Fiji	1.5	1,770	1.8	...	24
Papua New Guinea	2.5	860	0.2	42	26
Solomon Islands	3.7	580	...	...	48
Tonga	0.8	1,010	...	...	30
Vanuatu	3.1	1,060	...	...	21
Western Samoa	0.5	730	...	...	...

Sources: Asian Development Bank [1975 and 1991b]; World Bank [1991]; United Nations Development Programme [1991]; and staff estimates.

The share of the production of industrial sector has remained at an almost constant value, near 13 % in the past 10 years (see Table 1-5-4).

The low share of the industrial sector of GDP (around 13 percent-excluding construction section) resulted largely from a lack of investment in industry. Agriculture also suffered from a lack of investment. The balance of the foreign liabilities went on increasing and amounted to 3.8 billion US$ in 1990.

1.8.2 Industry of the Province of Antsiranana

(1) The position of the industry of the province of Antsiranana in Madagascar

1) The position of the province of Antsiranana in the territory

Madagascar has six provinces (Faritany) in the territory and the total area is 587 thousand km^2. The province of Antsiranana, comprised of eight districts, is in the northern part of Madagascar and the total area is 43.0 thousand km^2 which is 7.3 % of the territory.

The population in Faritany Antsiranana is 1,110,000, which represents about 10 % of Madagascar's total population of 12.2 million. Thus Faritany Antsiranana is, relative to the rest of the country, densely populated. Table 1-8-8 shows the area, population and population density of Madagascar and Faritany Antsiranana.

Table 1-8-8 Area, Population and Density of Madagascar/Antsiranana

	Area (km^2)	Population (thousand)	Density (person/km^2)
Madagascar	587,051	11,197	19.1
Faritany Antsiranana	43,056 (7.3 %)	1,107 (9.9 %)	25.7

Source: BDE and Government of Faritany Antsiranana(1990)

Antsiranana city, capital of the Province, has a population of about 150 thousand comprising district I and II. Table 1-8-9 shows the population in Faritany Antsiranana.

Table 1-8-9 Population of Faritany Antsiranana

Fivondronampo-kontany de:	AUTOCHTONES (1)			ETRANGERS (2)			TOTAL	
	M	F	Total	M	F	Total	Nombre	Part(%)
Antsiranana I	38,356	38,572	76,928	1,152	920	2,072	79,000	7.6
Antsiranana II	36,889	31,763	68,652	66	49	115	68,767	6.6
Ambilobe	60,383	68,095	128,478	212	240	452	128,930	12.4
Ambanja	46,506	46,791	93,297	215	90	305	93,602	9.0
Nosy-Be	18,931	19,693	38,624	667	914	1,581	40,205	3.9
Vohemar	66,441	67,946	134,387	111	61	172	134,559	13.0
Sambava	97,926	103,171	201,097	205	94	299	201,396	19.4
Antalaha	81,481	80,190	161,671	281	250	531	162,202	15.6
Andapa	61,573	67,498	129,071	26	16	42	129,113	12.4
1986 <A>	508,468	523,718	1,032,186	2,935	2,634	5,569	1,037,755	100.0
Antsiranana I	33,561	35,544	69,105	1,307	1,271	2,578	71,683	6.5
Antsiranana II	34,875	33,320	68,195	48	22	70	68,265	6.2
Ambilobe	66,355	76,284	142,639	1,113	1,146	2,259	144,898	13.1
Ambanja	49,148	50,401	99,549	317	216	533	100,082	9.0
Nosy-Be	14,437	14,748	29,185	369	378	747	29,932	2.7
Vohemar	72,889	76,882	149,771	75	56	131	149,902	13.5
Sambava	106,605	112,169	218,774	147	159	306	219,080	19.8
Antalaha	87,862	92,634	180,496	420	201	621	181,117	16.4
Andapa	68,271	73,665	141,936	27	16	43	141,979	12.8
1990 <B>	533,985	565,645	1,099,630	3,823	3,465	7,288	1,106,918	100.0
<B>-<A>/4	6,379	10,482	16,861	222	208	430	17,291	
Croissance	1.3	2.0	1.6	7.6	7.9	7.7	1.7	

Source: Ministere de l'Interieur/Faritany d'Antsiranana

Antsiranana city has a secondary port next to Tamatave (Toamasina) and the total handling volume of the port of Antsiranana reached 195,305 tons and was 9.2 % of the total handing volume of Madagascar in 1990. Still, the handling volume of the port of Toamasina reached 1,392,593 tons or 65.5 % of the total volume of Madagascar in 1990. Further, the total value of the exports of Faritany Antsiranana is 30 % of that of Madagascar. Generally speaking, Faritany Antsiranana has high potential.

2) Total industrial production

Table 1-8-10 shows the total industrial production of Madagascar and the capacities of Madagascar and Faritany Antsiranana. Table 1-8-10 reveals that Madagascar's industry is dominated by the food relevant industry. In particular, the productions of salt (CSM), sugar (SIRAMA), beef and soap are remarkable. These products are also mainly produced in Faritany Antsiranana. The salt products of Faritany Antsiranana account for 90 % of the total in Madagascar. The sugar products of Faritany Antsiranana account for over 50 % of the total in Madagascar. In addition, Peche et Froid Ocean Indien (PFOI) established a tuna canning factory in March, 1991 and production by 1992 had

already reached about 15,000 tons. Societe d'Etudes de Construction et de Reparation Navales (SECREN) at the port of Antsiranana is the one and only ship-repair and shipbuilding company of Madagascar.

Table 1-8-10 Results and Capacity of Industrial Production

BRANCH OF ACTIVITY AND PRODUCTS	UNITE	1987	1988	1989	1990	Provision 1991	Prevision 1992	CAPACITE Madagascar	Antsira.	part
INDUSTRIE ALIMENTAIRE										
Sel	tonnes	42,339	52,658	57,508	49,080	52,000	60,000	46,500	40,000	86.0
Tapioca	tonnes	102	33	40	15	52	80	300	150	50.0
Fecule	tonnes	552	642	497	423	278	250	1,200	600	50.0
Viande(bov)	tetes	41,790	31,571	25,491	23,496	13,300	25,000	224,000		
Viande(por)	tetes	2,800	1,375	1,569	1,122	548	1,100	70,000		
Charcuterie	tonnes	161	185	176	220	147	250	575		
Conserve/Viande	tonnes	248	62	87	33	16	40	675		
Conserve/Thon	tonnes	—	—	—	—	5,875	14,696	20,000	20,000	100.0
Sucre	tonnes	101,216	114,708	120,407	110,934	90,852	70,000	135,000	75,000	56.3
Huiles	tonnes	7,956	6,913	5,911	6,226	5,384	6,000	18,400	1,000	5.4
Biere	h-litres	240,257	201,371	232,411	298,462	170,990	310,000	240,257		
Lait concentre sucre	tonnes	3,476	3,324	2,708	2,838	1,868	2,000	5,300		
INDUSTRIE DU TABAC										
Tabac a macher	tonnes	878	626	625	630	630	680	2,185		
Tabac a fumer	tonnes	7	15	13	13	10	15	—		
Cigarettes	tonnes	2,669	1,817	2,341	1,955	1,950	2,000	2,100		
TEXTILE										
Tissus /coton	km	62,492	56,468	59,496	49,123	47,351	50,000	64,800		
Sacs d'emballages	tonnes	182	502	865	921	688	980	900		
Couvertures	tonnes	1,541	1,985	1,942	3,207	2,359	2,400	3,990		
Ficelles/cordages	tonnes	1,501	1,610	1,686	1,947	2,113	2,500	2,270		
INDUSTRIE DU PAPIER										
Papier brut	tonnes	7,742	8,188	9,046	9,310	7,725	9,400	28,000		
Papier transforme	tonnes	5,096	5,786	6,397	5,945	2,510	4,300	—		
INDUSTRIE CHIMIQUE										
Savons	tonnes	14,563	12,594	14,527	14,923	15,614	16,000	50,280	5,220	10.4
Allumettes	boites	—	—	—	—	—	56,000	120,000		
Bougies	tonnes	2,727	1,475	1,849	1,264	1,650	1,700	7,450		
Peintures	tonnes	2,477	2,594	1,878	2,397	2,000	2,100	5,600		
Oxygene	m3	62,306	479,636	503,664	506,043	180,000	510,000	63,000		
Acetylene	m3	138,377	137,943	147,378	151,753	130,000	160,000	230,000		
Piles electriques	1000 u.	16,202	15,715	13,335	13,388	12,000	25,000	29,000		
Accumulateur	unites	15,490	11,460	9,213	9,188	69,994	12,500	30,000		
MATERIAUX DE CONSTRUCTION										
Ciment	tonnes	44,490	32,820	23,607	28,600	29,800	50,000	185,000		
Toles	tonnes	3,409	3,149	2,298	3,320	2,500	3,500	19,400		
Pointes	tonnes	942	801	861	676	600	700	2,200		
Futs/boites	tonnes	1,223	1,261	1,302	1,428	1,200	1,700	12,000		
FABRICATION DE CHAUSSURES										
Chaussures en cuir	paires	340,000	277,000	267,459	298,750	273,500	360,000	221,800		
Chaussures en plastique	paires	955,000	411,000	728,050	1,015,327	1,500,000	2,000,000	2,546,100		
Autres	paires	391,000	346,000	351,193	509,167	185,000	185,000	2,300,000		
FABRICATION D'APP · ET FOURN ERECT.										
Radio	Pieces	—	4,987	6,446	19,499	15,000	20,000			
Radio cassette	Pieces	4,326	2,763	7,581	2,000	2,500	2,500			
PRODUCTION D'ENERGIE ELEC.										
Hydraulique	1000 kwh	88,843	303,550	312,000	341,338	335,498	345,000			
Thermique	1000 kwh	117,259	126,263	129,000	138,833	137,216	139,000			
PRODUITS PETROLIERS										
Essence	M3	65,093	68,909	39,049	72,626	69,023	122,617			
Kerosene	M3	44,178	47,309	24,399	31,611	46,307	52,795			
Gas-oil	M3	84,837	101,758	53,910	87,237	91,160	143,500			
Fuel-oil	M3	127,108	153,728	90,172	128,036	146,585	201,070			
Butane	M3	2,934	4,426	2,825	7,521	4,641	11,398			

Source: Data bank

(2) Features of the province of Antsiranana

Features of Faritany Antsiranana are as follows;

- The west of Faritany Antsiranana has land which can be used for industrialization compared with the east of Faritany Antsiranana.

- Antsiranana city, with a port and a shipyard, is the urban and socio-economic center of the province.

- Nosy-Be, Ambanja and Ambilobe in the west of the province shall be regional industrial centers in promoting the regional agricultural production.

- The province has a problem in that roads which are indispensable for development of the future industrial area are lacking or in bad condition.

- As the communication system is far from advanced, it is difficult to proceed with international or nationwide industrial development in the area.

- A modernization plan has already been initiated at SIRAMA (sugar refining and alcohol brewing) and STAR (beer brewing) which will reduce maintenance costs and increase productivity.

- There is room for improvement in the main industries like food processing industries if operations are integrated and expanded.

- There are some industrial development programs like plywood industry and wood processing factory in Societe d'Etudes de Construction et de Reparation Navales (SECREN) which have been playing the important roles though recently some cautionary problems have emerged.

- One of the most important issues to resolve the above mentioned problems is improving the state of finances.

Road conditions in the province are as follows;

- The national road which runs through the west of Faritany Antsiranana from south to north (Ambanja-Ambilobe-Antsiranana) is under construction and repair and will be completed in 1994.

- The national road which runs through the east of Faritany Antsiranana from

south to north (Antalaha-Sambava-Vohemar) is now undergoing partial repairs.

- The national road which runs across from west to east (Ambilobe-Vohemar) was constructed 20 years ago. Since then, the road has scarcely been repaired and is not in good condition. The rehabilitation program of the road has not yet been planned as of 1993.

(3) The number and scale of enterprises

1) The number of registered enterprises

The number of registered enterprises in Madagascar and Faritany is shown in Table 1-7-10.

Enterprises in Faritany Antsiranana with a share of more than 10 % in all of Madagascar are as follows;

	share(%)
* Agriculture, livestock, fishery	27.9
* Hotel, restaurant & gargote	12.3
* Recreation & social service	12.2
* Transport & telecommunication	12.0
* Retail trade	10.5

Industries that exceed the average share of the area (7.3%) are as follows;

	share(%)
* Metallurgical industry	9.1
* Food processing	8.8
* Health	8.8
* Construction	7.8
* Wood industry	7.8
(Total average)	9.8

The primary sector (agriculture, livestock and fishery) of Faritany Antsiranana predominates compared with other provinces in Madagascar. The service industry in Faritany Antsiranana is so large because of the resort island, Nosy-Be. In the share in food processing industries, that of Faritany Tananarivo represents 58 %, that of Toamasina is 16 % and that of Faritany Antsiranana is 8.8 %. The share of the wood processing industries of Faritany Tananarivo occupies 75 % of the total and is followed by Faritany Antsiranara.

2) The composition by the management organizations

There are a variety of types of enterprises: state enterprises, the enterprises composed of state and private funds, private enterprises using only domestic funds, multinational enterprises consisting of foreign and domestic funds or the enterprises using foreign funds. Examples of each type of enterprise are as follows;

<State enterprize>

* SIRAMA(Societe SIRAMARY MALAGASY)
  content: sugar and alcohol
* SOLIMA(Solitany Malagasy)
  content: petroleum
* JIRAMA(JIRO SY RANO MARAGASY)
  content: electric energy and water

<Enterprize by state and private funds>

* SECREN(Societe d'Etudes de Construction et de Reparation Navales>
  content: ship-repair and shipbuilding
  funds: state 37.5 %, OMNIS 26.5 %,
  2 banks 15.75 %, CNAPS 20.25 %
* CMN(Conpagnie Malgache de Navigation)
  content: shipping company(feeder)
  funds: state 97.51 %,
  private enterprize and an individual 2.49 %

<Private enterprize>

* SMC(Societe Malgache de Cabotage)
  content: shipping company(cabotage)
  funds: SCAC Madagascar 51 %, Tatienne(individual) 49 %
* AUXIMAD(Societe Auxiliaire Maritime de Madagascar)
  content: agent of shipping company and customhouse broker
  funds: SMTM 30 %, DELMAS 30 %, CMN 9 %, ARO 20 %

<Multinational enterprize consisting of foreign and domestic found>

* SCAC Madagascar
  content: agent of shipping company and customhouse broker
  funds: SCAC(French)
* CSM(Compagnie Saliniere de Madagascar)
  content: salt manufacture
  funds: (French) 77 %, SONAPA(Ma.) 15 %, BANK(Ma.) 8 %
* CMDM(Compagnie Malgache de Manutention)

content: harbor loading and unloading
funds: (French) %, (Madagascar) %

* SMTM(Societe Malagasy des Transports Maritimes)
content: shipping company(foreign voyage)
funds: state 59 %
private 41 % <Delmas(French), CGM(French), Sea Madagascar>

<Foreign enterprize>

* PFOI(Peche et Froid Ocean Indien)
content: tuna canning factory(bonded factory)
funds: Peche et Froid(French) great portion(%)
CMDM few portion(%)

(4) Industrial classification in Faritany Antsiranana

It is remarkable that the main industries in Faritany Antsiranana consist of manufacturing such as food processing, wood processing etc. Industries and main companies by category are as follows;

1) Manufacturer

* SECREN	ship-repair/shipbuilding, furniture
* SIRAMA	sugar manufacture, alcohol refining
* SOLIMA	petroleum refining(distribution center)
* PFOI	tuna canning
* CSM	salt manufacture
* SCIM	soap, cotton oil, soy bean oil, copra oil
* LA SOAVANIO	coco, copra oil, oils and fats
* (many)	wood processing factory
* (many)	fishery factory

2) Agent of shipping company

* Auximad	agent of shipping company, customhouse broker
* SCAC Madagascar	agent of shipping company, customhouse broker

3) Shipping company

* SMTM (Long carry)
* CMN (Feeder)
* SMC (Cabotage)

4) Harbor loading and unloading

* CMDM

5) Construction company
   * Colas

1.8.3 *Industrial and Agricultural Distribution in the Province of Antsiranana*

(1) Agricultural production of Faritany Antsiranana by region

The agricultural production of each region in Faritany Antsiranana is as follows;

1) Ambanja (located in the southwestern of the province)

Cash crops such as coffee, cacao, vanilla, cashew nuts, fruits and vegetables are mainly produced in this district.

2) Ambilobe (middle west)

The Ambilobe District produces sugar cane, cashew nuts, coffee and etc. Further, several tons of gold are mined every year.

3) Nosy-Be (an island in the west sea of Ambanja)

The island produces coffee, pepper, sugar cane, perfume and etc. This island is the most famous tourist spot in Madagascar, having many hotels and restaurants. Nosy-Be district is prosperous for the above mentioned reason.

4) Antsiranana (northern part of the province)

Antsiranana District produces pea nuts, tobacco, cotton etc.

5) Vohemar (northeast)

Vohemar District produces sugar cane, cashew nuts and tobacco. Further, the heads of cattle in this region outnumber the human population.

6) Sambava (middle east)

Sambava District produces sugar cane, coco from which coconuts, cocoa, coco butter, coco milk, coco matting and tobacco.

7) Antalaha (southeast)

Antalaha District produces palm oil, tobacco, coco and sugar cane.

8) Andapa District

Andapa District in the mountainous region produces sugar cane and peanuts. This district also produces much lumber.

(2) Industrial distribution of Faritany Antsiranana

The main enterprises and the productions of each region in Faritany Antsiranana are as follows;

1) Antsiranana I & II

* SECREN:	ship-repair	(see Table A-1-8-1)
* STAR:	beer manufacture	35,000 h-litters/1989
* CSM:	salt manufacture	50,000 tons/1989, 40,000 tons/1988
* PFOI:	tuna canning	20,000 tons/1991
* SOAM:	oxygen/athetylen	
* RODIMA:	leather	
* SAGA Ocean Indien:	soap	
* Imprimerie Maneva-Nord:	printing	
* SCIM:	soap, food oil	

2) Ambilobe

		Ambilobe	Nosy-Be
* SIRAMA:	sugar manufacture & rhum	34,300 tons (Moy: 1984-1988)	12,800 tons
* HASYMA:	cotton		

3) Ambanja

* Establishment MILLOT: oil essence/marketing of local products
* KAFEMA: coffee
* Imprimerie Reliure OPRA: printing

4) Nosy-Be

* SIRAMA: sugar & rhum
* SPPM: oil essence
* Enterprise Goulamary Nordine: oil essence
* Societe Anony Me BEVOAY: oil essence
* Pecheries de Nosy Be(PNB): fish and shrimp freezing

5) Sambava and other districts

* SCIM: soap, cotton oil, soy bean oil, copra oil

* LA SOAVANIO: copra 8,000 tons/year
  oils and fats 4,000~4,800 tons/year
* Societe Generale de Sambava(SOGESAM): soap
* EVACOCO: oil and perfume
* SOMACONORD: printing

6) Antalaha
* Taillerie Industrielle d'Antalaha (TIA): quarts
  684 tons/years (1980~1985)
* Distillerie Industrielle d'Antalaha (DIA): liquors
* SAMICA: vanilla and clove
* Limonadier d'Antalaha: lemonade/soft drink

1.8.4 Productive Movement of Main Products in the Province of Antsiranana

(1) The growth products of Faritany Antsiranana

The growth products of Madagascar are shown in Table 1-8-11.

Table 1-8-11 Growth Rate of Product in Madagascar (1980-1990)

Produit	Vateur exporte en 1990 (mill. US$)	Indice de resistance comparatif (1)	Part du marche mondial 1988~1990 (%)
Conserve de poisson	0.3	5.4	0.005
Mais	5.1	19.4	0.056
Fruits frais	15.5	4.8	0.058
Legumes frais	7.7	1.9	0.035
Sucre-Miel	12.8	2.9	0.176
Cannelle	1.9	8.3	2.070
Peaux	0.9	6.0	0.016
Noix oleagineux	2.0	3.9	0.013
Bois traville	1.9	17.0	0.006
Coton	2.2	3.6	0.019
Quartz	2.1	8.1	1.640
Chromite	15.2	2.0	3.740
Prod, bruts origine animale	0.9	2.7	0.020
Bois manufactures	0.6	6.8	0.007
Fibres vegetables(Sisal)	0.6	201.2	0.800
Cordes et cordages	1.3	7.1	0.221
Autres textiles	0.9	14.6	0.010
Produits base minerale	2.1	14.8	0.035
Pierres prec., semi-prec.	5.2	4.8	0.140
Meubles	0.6	10.7	0.002
Article de voyage	0.1	2.1	0.001
Vetements	11.6	5.0	0.006
Jouets, art de sport, chasse.	0.8	6.3	0.003
Animaux de zoo	0.3	11.3	0.086
total	92.6		

The growth products of Faritany Antsiranana in the Table 1-8-11 are as follows;

* Growth products in the past
  vegetables and fruits, palm, wood processing, quartz, cotton

* Recent growth products
  tuna canning, beer and refreshing beverage,

The representative products of Faritany Antsiranana are as follows;
  coffee, salt, sugar, vanilla, pepper, cinnamon, clove, crustacea

(2) The growth products by the factor of the site condition

1) The products that depend on the yield of raw materials

  salt, sugar, vegetable and fruits, palm oil, wood processing, quarts, cotton products, leather, leather processing, footwear, edible oil, coffee, beer, vanilla, pepper, cinnamon, clove, crustacea, applied arts

2) The products that depend on the activities of the port

  tuna canning, salt, petroleum products, construction material, vessels, fishery boat, wood processing

3) The products that depend on urban consumption

  beer/refreshing beverage, construction materials, illuminator, salt, sugar

1.8.5 Movement of Export/Import Goods of the Province of Antsiranana

The main export goods of Madagascar together with their percentages in the world market are shown in Table 1-8-12. The majority of the goods except mineral, mica and graphite are produced in Faritany Antsiranana.

Table 1-8-12 World Market Shares of Madagascan Export

(%)

	1970-72	1980-82	1988-90
Café	1.4	1.1	0.7
Vanilla	77.0	61.6	56.3
Autres épices	8.6	7.6	2.5
Dont: poivre	1.9	1.7	0.8
cannelle	3.6	0.4	2.1
girofke	38.6	44.4	36.8
Crustacés	0.7	0.6	0.4
Mica	5.7	4.9	3.2
Graphite	17.6	12.4	7.3

Source: CNUCED

(1) Movement of the export/shipment goods of Faritany Antsiranana

The main exports good in Faritany Antsiranana are agricultural products such as coffee, cacao, cashew nuts, vanilla, clove, vegetable and foods which are mainly exported to Europe. The other export goods are lumber, salt, tuna, general merchandise. In 1991, PFOI began exporting canned tuna. The volume of exports (mainly to Europe) in 1992 was 40 million cans, or about 560 containers.

The main outbound goods in Faritany Antsiranana are salt, sugar, and beer. Salt loaded at the port of Antsiranana is transported to various ports except Faritany Toliala. Sugar loaded at Port Saint Louis near Ambilobe and the port of Hell Ville in Nosy-Be is transported to Toamasina and other ports.

(2) Movement of the import/shipment goods of Faritany Antsiranana

The main import goods are construction materials such as cement and metal products, food (rice and flour), and fertilizer. The import of fertilizer, however, has been almost nil in recent years.

The main inbound goods are general cargoes from the port of Toamasina.

1.8.6 Industrial Policy of the Province of Antsiranana

Antsiranana city, which is the capital of the province, must be a base point of the development zone of the north area of Madagascar. The population of the province is now about 1.1 million and will be about 2.0 million assuming a growth rate of 2.5 % after 20 or 25 years. As the administration, the infrastructure and the industries of Antsiranana city and its environs (Antsiranana Zone) function very well, 25 % or 30 % of the total population of the province is expected to concentrate here.

(1) *Industrial development in the Antsiranana Zone*

Industrial development in the Antsiranana Zone is considered to have the following advantages;

- able to absorb external/internal funds and the investment

- able to extend the foreign trade and to enter the international specialization/international competition

- able to obtain up-to-date technologies and to develop the industry aiming at export and substituting import goods

- able to develop together with the west and the east of the province

- position as the economic, trade and financial center which has multi purpose functions

(2) Preferential taxation system for investment

Madagascan Government enacted the laws and the related to the free processing zone on 29th of December, 1989 and on 12th of August, 1991.

Madagascar Government established the law concerning to the enforcement of the free trade zone (FTZ) on 9th of September, 1992.

Péche et Froid à Boulogne-Sur-Mer, the parent company of PFOI, concluded an agreement concerning the FTZ with the Madagascan Government in December of 1987 before the lows were enacted. Later, representatives of both parties examined the details concerning the establishment of the tuna canning factory. PFOI was instituted as the free trade factory of a form of FTZ based on the concept of the law on March of 1991. The features of PFOI as a free trade factory are as follows;

- EC countries (CCCF and BFI) provided founds for PFOI to construct the canning factory.

- PFOI purchases tuna taken in Indian Ocean from the foreign ship (mainly France and Spain), processes it in its canning factory and exports it to Europe, mainly to France.

- PFOI imports the materials for the canning, tinplate, oil and corrugated cardboard, from France.

- PFOI imports the materials for the canning, salt and water, from the local end.

- PFOI has a right to export up to 10 % of its products to Madagascar by agreement.

- PFOI operates the factory on a two-shift system (from 6:00 to 14:00 and from 14:00 to 22:00)

- PFOI has to employ local staffs for the factory workers.

- PFOI has rights to be treated with courtesy regarding corporation tax and the income tax.

- PFOI has some rights to be treated with courtesy for taxes on land, apparatus, materials of the canning, and products.

1.8.7 Problems for Industrial Development of the Province of Antsiranana

The main industries of Faritany Antsiranana have been food processing industries, salt, sugar, alcohol, crops etc. For these industries to successfully continue their business, there are many problem to be solved as follows;

- To construct and maintain infrastructure of Antsiranana city as the center of the northern part of Faritany Antsiranana

- To make the urban planning and the zoning of Antsiranana city between the existing urban district and Antsiranana airport (see Figure 1-8-2)

- Reconstruction and expansion of the facility of the port of Antsiranana

- Construction/reconstruction and expansion of the facilities of the small ports of

the province

- Establishment of the sea route among the port of Antsiranana and the other ports of the province; securing of necessary number of ships

- To improve/maintain and fill up the link road of the west of the province, Ambilobe, Ambanja and etc.

- To improve/maintain and fill up the link road of the east of the province, Vohémar, Sambava, Antalaha, Andapa and etc.

- To repair/maintain and expand the crosscut route from Ambilobe to Vohémar

- To construct the shortcut route from Antsiranana city to the cities in the east of the province, Vohémar and etc. (see Figure 1-8-1)

- To promote the introduction of foreign funds and technologies by the rearing of the local industry and executing the FTZ.

Figure 1-8-1 Road of Antsiranana Province

1.8.8 The Direction for Industrial Development of the Province of Antsiranana in the Future

Although almost all industries are poor except PFOI and SECREN at present, there is a high potential for developing industry in the province of Antsiranana and it is strongly expected to solve the current problems and reach its potential.

(1) FTZ

What are generally called "Free Trade Zones" comprise the following three categories;

- Free Ports such as Hong Kong where all the imported foreign cargoes, whether they are to be transhipped or domestically consumed, are basically custom-exempt.

- Transit Zones where the Customs Act or the Import Control Regulations are inapplicable to the imported cargoes and the cargoes are stored in bond, exempt from custom duties.

- Free Trade Zones in a strict sense where imported articles are basically duty-free on condition that they are used as raw materials for the production of export goods in the factories of the areas.

In the Province of Antsiranana, FTZ has been established and zoning plan has already drafted (Figure 1-8-2). Taking the merits of FTZ into account, adaptable industries are appraised. The results are shown in Table 1-8-13 and Table 1-8-14.

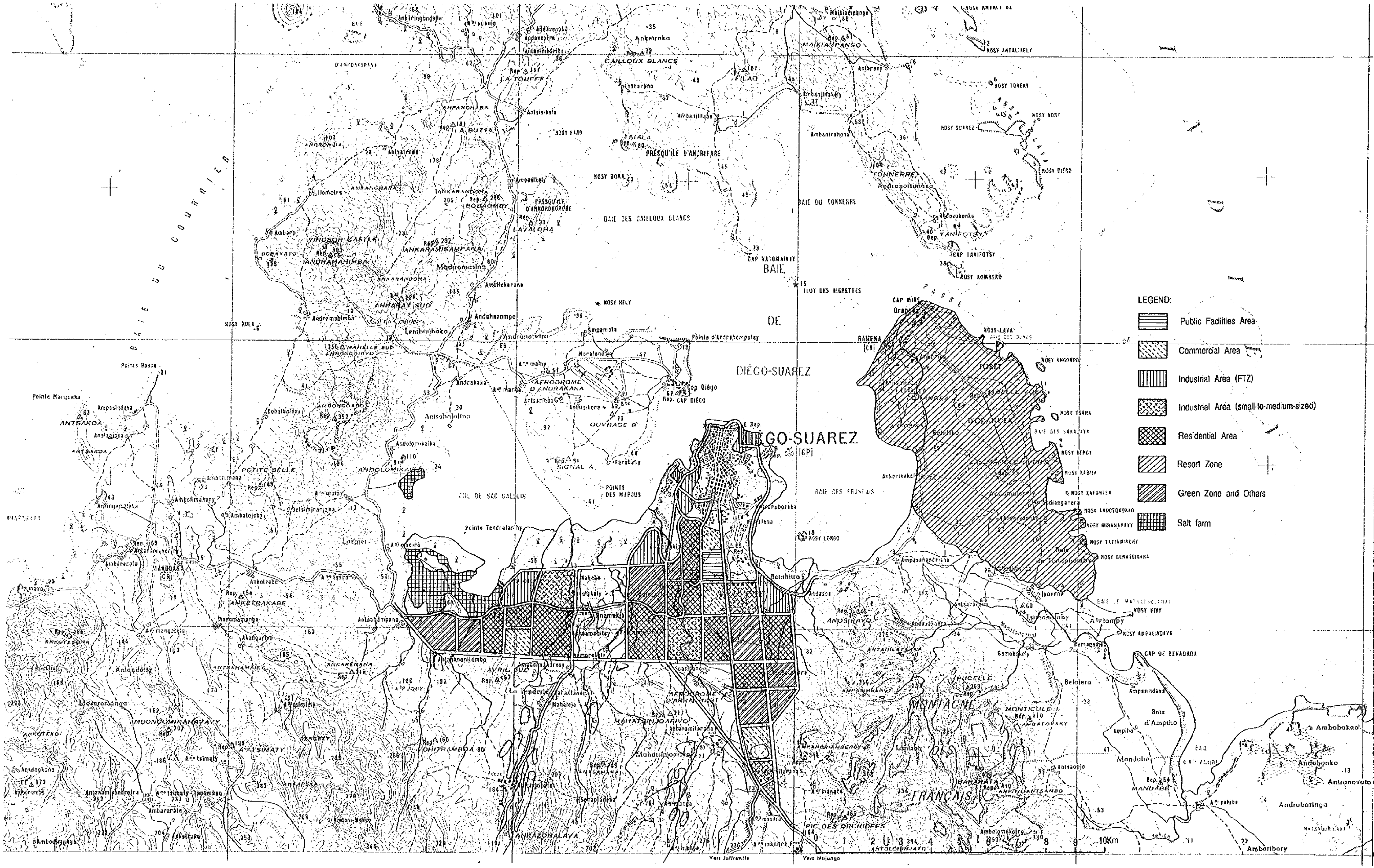


Figure 1-8-2 Plan of Zoning of Antsiranana City

Table 1-8-13 Appraisal of Adaptability of Industrial Situation (1)
(Industry using quay of port/waterfront)

Industry (classification)	Adaptability		Condition for Situation				Remarks	Total Appraisal
	FTZ	Domestic	Site	Water supply	Energy supply	Urban institution		
Crop clearing/flour	○	○	○	◎	◎	△	food industry zone	◎
Sugar product/honey	○	○	○	◎	◎	△	food industry zone	◎
Vegetable oil/fats	○		○	◎	◎	△	food industry zone	◎
Sawing/wood products	○	○	○	◎	◎	○	food industry zone	◎
Lumber/plywood	○	○	○	◎	◎	◎	food industry zone	◎
Pulp	○		△	△	○	△	paper making/manufacture	△
Paper	○	○	○	◎	○	△	by purchased pulp	○
Forage	○	○	○	○	○	△		○
Fertilizer	○		○	○	○	△	petrochemical complex	△
Caustic soda	◎	○	○	△	○	△	made from salt	◎
Organic chemicals	○		X	△	○	△	petrochemical complex	X
Oil refining	○	○	X	△	○	△	large full-dress factry	X
Glass/glass products	○	○	○	◎	○	◎	medium scall factory	○
Iron manufacture by blast furnace	○		X	X	○	○	large full-scale factory	X
Steel/rolling	○		△	△	○	○	connecting iron manufac.	△
Nonferrous metals/ first refining	○		△	○	○	○	Al. coherence/medium scale	○
Nonferrrous metal alloy/rolling	○		○	○	○	◎	connecting Al. manufac.	○
Oxygen/acetylene	◎	◎			○		medium scale factory	◎
Shipbuilding/repairing		◎	△	◎	◎	△	medium scale factory	○

※ Total appraisal
Mark ◎ : having high-adaptability for situation
Mark ○ : having adaptability for situation
Mark △ : having adaptability on the site condition
Mark X : no adaptability in waterfront

Table 1-8-14 Appraisal of Adaptability of Industrial Situation (2)
(Industry not using quay of port/waterfront)

Industry (classification)	Adaptability		Condition for Situation				Remarks	Total Appraisal
	FTZ	Domestic	Site	Water supply	Employ-ment	Environ-ment		
Livestock products	○	○					food industry zone	◎
Sea food products	○	○					food industry zone	◎
Canning vegetable & fruits	○						food industry zone	◎
Condiments	○						food industry zone	◎
Breads/confectionery		○					food industry zone	◎
Beverage	○	○		*			large factory/water supply	○
Fodder/fertilizer	○	○					conbination/food zone	◎
Spinning	○							◎
Textile	○							◎
Clothes	○							◎
Bag for package	○							◎
String/rope	○							◎
Wooden container	○	○					wood industry zone	○
Furniture	○						wood industry zone	○
Wooden products	○				*		wood industry zone	◎
Paper container		○					small-scale urban enterpr.	◎
Newspaper		○					typical urban enterprize	○
Inorganic chemicals	○					*	countermeasure for some products	○
Chemical fiber		○						○
Fat/oil processing	○							◎
Medicines	*							△
Soap	○							◎
Matches	○							○
Candle	○							○
Paint	○							○
Other chemical products	○							○
Lubricating oil/grease		○					relevant to oil refining	○
Coke		○					relevant to iron factory	○
Tyre/tube	○		*	*		*	independence for big car	△
Other rubber products	○							◎
Leather	○							◎
Leather footwear	○							◎
Cement/cement products	○	○				*	environmental pollution	◎
Clay products for cons.	○	○					constru. material center	◎
Aggregate/mason products		○					constru. material center	◎
Iron manufacture by non blast furnace	○	○	*	*		*	relevant to iron manufac. by blast furnace	○
Other iron manufacture		○						○
Nonferrous metals/ second refining		○						○
Electric wire/cable	○	○						○
Metal products for cons.		○						◎
Other metal products		○						◎
Industrial equipment		○						○
Office/service equipment	○	○						◎
Apparatus for welfare		○						◎
Illuminator	○	○						◎
Communication apparatus	○	○						◎
Dry/strage battery	○							◎
Application of electric.	○							◎
Electric/corresp. parts	○							◎
Other electric machine	○							◎
Bicycle and parts	○							◎
Motor car and parts	○						independantly instituted	△
Medical apparatus	○							◎
Optical instrument/glass	○	○						◎
Spectacles	○							◎
Precious metals	○	○						◎
Office supplies(pen ...)	○	○						◎
Trinkets/ornaments		○			*		small-scale urban enterpr.	○
Other manufacture	○	○						◎
Other manufacture		○			*		small-scale urban enterpr.	○

※ Total appraisal
Mark ◎ : having high-adaptability for situation
Mark ○ : having adaptability for situation
Mark △ : having adaptability on the site condition
Mark * : check matters for institute

(2) Adequate industries

As mentioned above, the Province of Antsiranana is blessed with natural resources and excellent companies such as PFOI and SECREN are already in operation. Based on such a present situation, Madagascar government has earmarked the following industries for further development;

- The food processing industry
- Light industry such as spinning and weaving, textile, clothes and etc.
- Leather and leather processing industry
- Fertilizer and forage
- Construction materials, cement, iron products etc, which are currently imported from foreign countries.
- Wood processing industry

Later, as to some of above industries, a preliminary examination is executed as follows;

1) Cement industry

i) Raw materials

a. Limestone

There is abundant limestone in the surroundings of the Diego-Suarez Bay and at Mt. Ansiravo. The quantity of the magnesium oxide is so small that the limestone will produce a fine quality of cement.

b. Pozzolana

Pozzolana is yielded plentifully in the volcanic zone of Mt. Ambre. There are ten stopes of pozzolana near the road connecting Diego and Joffre ville. It has been confirmed that the pozzolana is of good quality, and can be used for the production of pozzolana cement. Moreover, pozzolana is also yielded abundantly in the Island of Nosy-Be and the stopes are concentrated at a place that is easy of access.

Further, pozzolana can be used for road construction materials.

ii) Cement industries of Madagascar

a. Existing cement factories

There are now two factories in Madagascar; one is at Antsirabe which is about 130 km due south of Antananarivo Capital; the other is at Mahajanga which is

about 580 km due north-northeast of Antananarivo city. The two factories have problems in both the scale of production and the quality. An outline of the factories is given in Table 1-8-15.

Table 1-8-15 Outline of Cement Factories in Madagascar

LOCATION Name of factory	Capacity 1000 ton/year	Type Nombers	Eatablish- ment	Quality
ANTSIRABE ES CIMENT D'ANSIRABE	110	Vertical 2	1955	
Ibity-(Ai)-	80		1985	no good for construction
MAHAJANGA NOUVELLE CIMENTERIE	27		1956	
D'AMBOANIO Mahajanga-(AMm)-	20			high

Note: Upper Data in each column refer to the world Cement Directory <1989>.
Lower Data in each column are based on hearings with Ministry of Industry.

b. Import of cement

The recent quantity of cement imported from foreign countries is 100 to 150 thousand tons per year. The quantity of the internal production amounts to 100 thousand per year at most between the two factories. The quantity of cement of the internal products which is adapted for construction materials is small.

iii) Construction of cement factory, marketing etc.

a. Situation of cement factory The required conditions for cement factory are as follows;

- plenty of limestone yielded nearby
- supply of electric power
- water supply
- supply of coal(considering import from foreign countries)
- a place conveniently situated near the port of Antsiranana(within 30 km from the port, if possible it is desirable less than 15 km)

The required materials, water, electric, fuel etc. to produce cement per one ton are shown in Table 1-8-16.

Table 1-8-16 Standard Unit for Cement Production
(water, electric, fuel etc. to produce clinker of 1 ton)

Items	Unit	Quantity	Example (per year)
Clinker <limestone 1.5 t>	ton	1	500,000
Heavy oil	ton	0.08	40,000
Coal <6000 Cal.>	ton	0.12	60,000
Electric power	kw	0.1	50,000
Water	ton	0.4	200,000

Source: a Japanese cement company

b. The production capacity of cement factory

As the demand for cement in Madagascar will increase more and more, the import of cement will increase gradually unless capacity is raised. The optimum target of the capacity of the cement factory is more than 300 thousand tons per year using both the planned factory and the existing facilities to meet the demand in future.

The cement factories at Antsirabe and Mahajanga are remarkable for their deterioration. The quality of the cement is poor or the quantity is not abundant.

Considering the above condition, a cement factory which has a production capacity of more than 200 thousand tons per year should be constructed in Madagascar as a tentative measure.

As the cement industry is as an enterprize of national importance, the current problems must be faced and overcome. Besides, Antsiranana district has the appropriate conditions, raw materials (limestone, pozzolana), water supply, port and can import raw materials such as coal and fuel oil and then export products, etc., for the reasons of above-mentioned.

It is required to promote the cement factory after executing sufficient feasibility studies and marketing researches.

c. Investment funds

The cost of constructing a cement factory which has modern production facilities and a production capacity of 200 thousand tons per year will be somewhere in the range of 28 to 46 million US$.

d. Marketing

As well as supplying internal needs, it would be beneficial to export cement to other countries. The target countries are the island countries in the West Indian Ocean, Mauritius, Re-Union, Comoro, Seychelles etc. including the countries in east Africa, Kenya, Tanzania, Mozambique etc.

As many of the above countries have some cement production capacity or plan to have in future, it is important to calculate the production cost itself and to estimate the existing and planning production facilities and the demand of cement of each country.

2) Chemical (caustic soda)/fertilizer industry making use of salt

Salt is abundantly produced from the salt farms in the Diego-Suarez Bay. Chemical industries, caustic soda, chlorine etc., in this district can benefit by using this salt.

3) Brick/pottery industry

a. Marlstone/clay

Thick layers of marlstone and clay are confirmed at the route of Diego-Oranjea which runs under Mt. France near the Antsiranana airport. This, not genuine clay but clayey marlstone, can be used in high quality pottery.

b. Kalium

The syenite nephelique and phonolite on the peninsula of Ankify includes the raw materials required for a Kalium industry. These raw materials are adapted for the pottery industry and glass manufacturing.

4) Wood processing/plywood

The southern part of the province of Antsiranana receives a heavy amount of precipitation. There are many existing forests in the district. Wood processing manufacturing and plywood industries which use the abundant lumber in the district are the main local industries.

i) Supply of lumber

The southern districts of the province are listed below.

* Tsaratanana district in which gathering point is Ambanja
(the lumber is transported by road)
* Gathering points are the districts of Andapa/Sambava/Antalaha
(the lumber is transported by sea route)

ii) Wood processing

SECREN is now working at repairing ships on a large scale. The interior equipment of the ships is a part of the work. SECREN actually produces the woodwork, desks, chairs etc. and has a good grounding in the full-dress wood processing industry.

iii) Plywood industry

SECREN made a plan for a plywood factory and secured the factory site in 1987-1988. But, the plan was interrupted by political trouble involving the former president and his party in 1990-1992.

iv) Tree planting

Tree planting and forestry conservation are necessary to continue the industries relevant to wood. Tree planting is important and must be begun in early stages of lumbering. Forests in Madagascar now cover only 20 % of the total area, down from 80 % 40 or 50 years ago.

(4) Subjects to be coped with for further development

To promote the above industries, the Madagascar government is focusing on the following items;

- Expanding the urban area and strengthening the connection with satellite cities

- Cultivating new markets

- Developing a large economic bloc by linkage of the coastal area and strengthening urban function of antsiranana

- Enlarging its international distribution role by developing the port of Antsiranana

CHAPTER 2

PORT ACTIVITIES IN MADAGASCAR

2. PORT ACTIVITIES IN MADAGASCAR

2.1 General

Because of its mountainous geography and the fact that Madagascar is an island, almost all commodities, which includes import of daily necessities and industrial goods and export of raw materials and agricultural products and so on, are carried through ports.

Madagascar has 17 ports along its 5,000 km coastline. Functionally, a decree classifies all the ports into four categories: main long distance carrier ports, secondary long distance carrier ports, main cabotage ports and secondary cabotage ports, detailed in section 2.3.1 (Figure 2-1-1).

Nine ports are located along the east coast and eight ports are along the west coast. In the coast, exposed to the Indian Ocean swells, sea conditions are severe and the ports are sometimes hit by cyclones. On the other hand, in the west coast, they are conversely calm in general. However, a lot of ports are suffering from siltation caused by the silty materials carried by rivers.

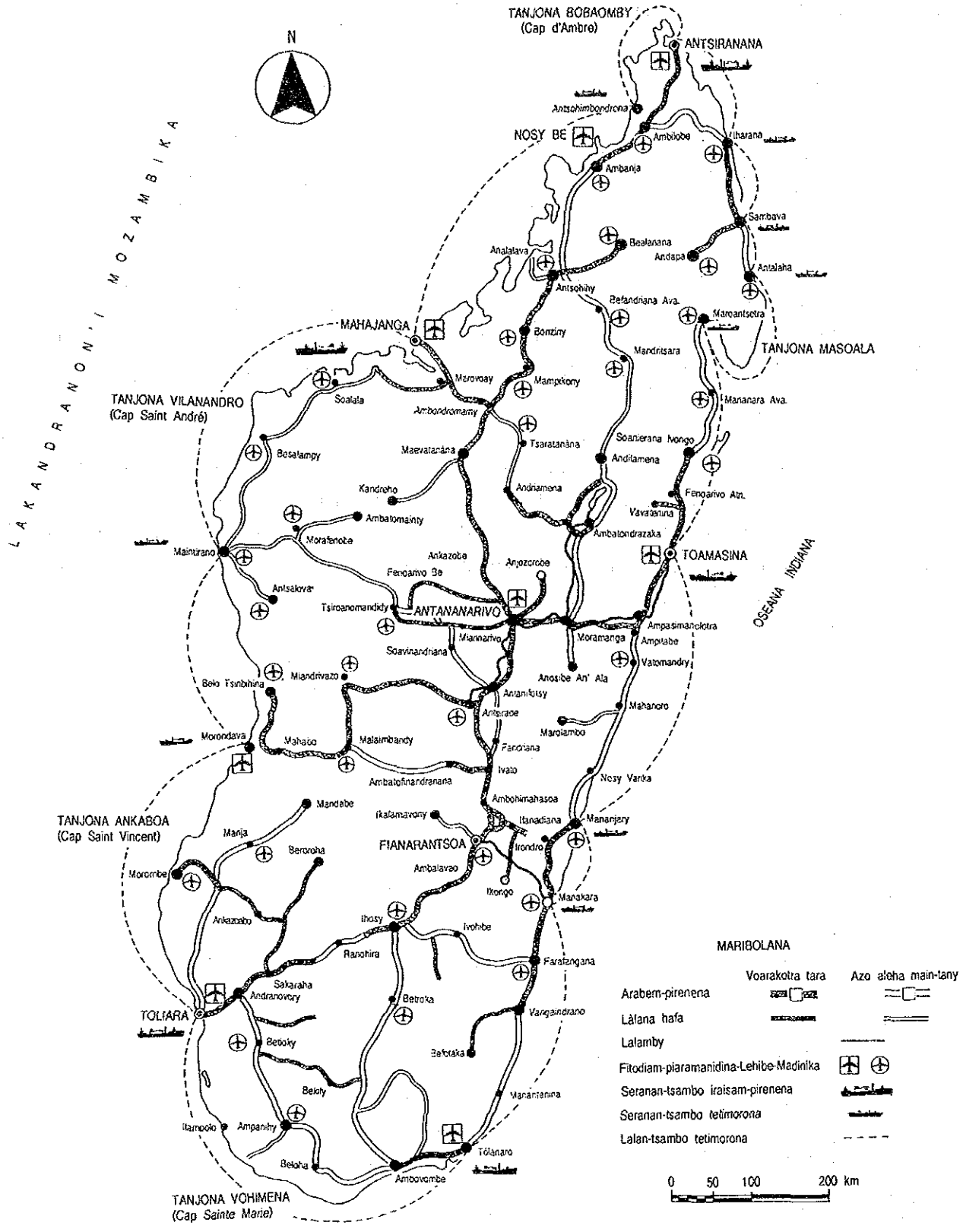


Figure 2-1-1 Map of Transport Network

2.2 Cargo Traffic and Facilities

2.2.1 Cargo Traffic Volume

The following is a summary of the cargo throughput at 17 ports of Madagascar for the period between 1986 to 1990. In general, cargo volume handled at ports indicate the socio-economic activities of the country. Yearly variations in the cargo volume reflects changes in the economy of a nation, which often are result of some political occurrence. Unfortunately, the economy of Madagascar has been in a slack period due to the political instability.

It should be noted that the statistics presented hereunder show the cargo traffic during the period when the socio-economic activity was temporarily depressed. Thus, when these cargo volume are used to draw a picture of the socio-economic frame of the country, especially in the forecast, above mentioned background should be taken into consideration. It should be also be noted that, as usual, the statistics often include some date which are not reliable.

Table 2-2-1 and Figure 2-2-1 show cargo traffic volume for five years from 1986 to 1990 at all ports in Madagascar. Tables 2-2-2(1) and 2-2-1(2) give a breakdown of loaded and unloaded cargoes from 1988 to 1990. In spite of the efforts of the Study Team to attain the latest information, complete data after 1991 was not available.

As shown in these tables, the port of Toamasina is the largest port with 65.5% of the nation's total cargo throughput, handling 85.9% of total imports and 65.2% of total exports in 1990. The port of Toamasina is playing an important role of gateway to the capital and is connected to the densely populated Central Highlands by road and railway.

The port of Antsiranana is the second largest followed by the port of Mahajanga which is the third, handling respectively 9.2% and 8.9% of the total cargo volume of Madagascar. In the port of Antsiranana, long carrier cargo has been increasing year, but cabotage has a tendency to decline. Long carrier cargo volume exceeded that of cabotage in 1988 and its share is 67.4% in 1990 (Figure 2-2-2).

On the other hand, in the port of Mahajanga, the total cargo volume is relatively stable remaining within the range of about 180-190 thousand tons and cabotage cargo volume shares 70.3% of the total volume.

The other secondary long distance carrier port, Toliara, is the fourth largest port. Its cargo volume has also shown an increasing trend recently, especially in the case of long carriers.

The port of Nosy-be (including the port of Saint-Louis) follows the top four ports in terms of cargo traffic volume. It has agricultural products such as coffee in its hinterland.

Table 2-2-1 Cargo Traffic Volume of Maritime Transport

PORTS	1986			1987			1988		
	Long carrier	Cabotage	TOTAL	Long carrier	Cabotage	TOTAL	Long carrier	Cabotage	TOTAL
Toamasina	905,141	250,256	1,155,397	996,611	230,394	1,227,005	1,862,250	204,835	2,067,085
Mahajanga	47,958	131,354	179,312	53,068	126,944	180,012	48,738	127,123	175,861
Antsiranana	42,201	104,504	146,705	77,123	133,687	210,810	89,036	73,375	162,411
Nosy-Be (1)	25,187	56,612	81,799	33,308	53,800	87,108	26,294	59,086	85,380
Toliary	49,118	38,584	87,702	17,576	35,872	53,448	17,759	26,160	43,919
Tolagnaro	14,570	15,815	30,385	8,672	12,988	21,660	12,083	12,373	24,456
Manakara	6,269	63,352	69,621	-	62,111	62,111	28	43,207	43,235
Mananjary	2,028	14,628	16,656	-	15,857	15,837	28	11,671	11,699
Morondava	14,167	20,148	34,315	15,034	26,017	41,051	9,427	18,977	28,404
Morombe	1,758	4,152	5,910	1,012	4,436	5,448	4,996	3,251	8,247
Sambava	-	2	2	-	40	40	30	1,324	1,354
Antalaha	491	1,523	2,014	735	2,159	2,894	1,103	5,358	6,461
Maroantsetra	279	6,016	6,016	601	6,486	7,087	-	4,855	4,855
Vohemar	193	22,409	22,409	1,001	29,339	30,340	4,371	17,834	22,205
Analalava (2)	418	19,829	20,248	165	8,259	8,424	-	6,781	6,781
TOTAL	1,109,772	749,184	1,858,956	1,204,906	748,369	1,953,275	2,076,143	616,210	2,692,353

(Unit:ton)

1989			1990		
Long carrier	Cabotage	TOTAL	Long carrier	Cabotage	TOTAL
1,061,290	200,658	1,261,948	1,191,846	200,747	1,392,593
59,336	129,742	189,078	55,923	132,421	188,344
129,280	67,754	197,034	131,661	63,644	195,305
15,855	41,172	57,027	22,304	59,094	81,398
41,222	23,702	64,924	70,169	21,891	92,060
13,854	12,371	26,225	17,274	12,045	29,319
-	32,348	32,348	106	47,854	47,960
-	7,315	7,315	-	9,547	9,547
7,200	12,307	19,507	11,926	15,055	26,981
2,811	3,909	6,720	4,112	4,608	8,720
15	1,707	1,722	-	-	-
1,424	7,827	9,251	3,684	11,249	14,933
-	8,858	8,858	152	8,344	8,496
5,963	13,846	19,809	7,032	16,982	24,014
-	7,923	7,923	186	7,046	7,232
1,338,250	571,439	1,909,689	1,516,375	610,527	2,126,902

Note: (1) includes Port Saint-Louis
(2) includes Antsohihy
Source: Customs

Table 2-2-2(1) Loaded Cargo Traffic Volume of Maritime Transport

Loaded (Unit:ton)

PORTS	1988			1989			1990		
	Long carrier	Cabotage	TOTAL	Long carrier	Cabotage	TOTAL	Long carrier	Cabotage	TOTAL
Toamasina	348,805	157,102	505,907	359,395	155,930	515,325	348,372	155,651	504,023
Mahajanga	17,720	23,472	41,192	28,695	29,338	58,033	23,484	23,217	46,701
Antsiranana	59,888	40,746	100,634	88,855	29,521	118,376	66,235	34,283	100,518
Nosy-be (1)	8,099	33,570	41,669	13,517	15,575	29,092	9,671	32,557	42,228
Toliary	13,409	4,269	17,678	27,803	1,646	29,449	48,702	1,373	50,075
Tolagnaro	11,303	1,228	12,531	11,327	1,114	12,441	16,944	1,464	18,408
Manakara	-	11,431	11,431	-	9,152	9,152	106	14,188	14,294
Mananjary	-	4,037	4,037	-	2,573	2,573	-	3,205	3,205
Morondava	6,669	6,523	13,192	3,221	2,859	6,080	6,265	3,344	9,609
Morombe	4,996	955	5,951	2,811	1,915	4,726	4,112	3,364	7,476
Sambava	30	531	561	15	675	690	-	-	-
Antalaha	871	1,921	2,792	1,422	2,898	4,320	3,608	4,593	8,201
Maroantsetra	-	2,271	2,271	-	5,525	5,525	152	3,876	4,028
Vohemar	4,334	3,827	8,161	5,437	5,224	10,661	6,731	3,731	10,462
Analalava (2)	-	1,724	1,724	-	1,976	1,976	186	907	1,093
TOTAL	476,124	293,607	769,731	542,498	265,921	808,419	534,568	285,753	820,321

Note: (1) includes Port Saint Louis
(2) includes Antsohi
Source: Customs

Table 2-2-2(2) Unloaded Cargo Traffic Volume of Maritime Transport

Unloaded (Unit:ton)

PORTS	1988			1989			1990		
	Long carrier	Cabotage	TOTAL	Long carrier	Cabotage	TOTAL	Long carrier	Cabotage	TOTAL
Toamasina	1,513,445	47,733	1,561,178	701,895	44,728	746,623	843,474	45,096	888,570
Mahajanga	31,018	103,651	134,669	30,641	100,404	131,045	32,439	109,204	141,643
Antsiranana	29,148	32,629	61,777	40,425	38,233	78,658	65,426	29,361	94,787
Nosy-be (1)	18,195	25,516	43,711	2,338	25,597	27,935	12,633	26,537	39,170
Toliary	4,350	21,891	26,241	13,419	22,056	35,475	21,467	20,518	41,985
Tolagnaro	780	11,145	11,925	2,527	11,257	13,784	330	10,581	10,911
Manakara	28	31,776	31,804	-	23,196	23,196	-	33,666	33,666
Mananjary	28	7,634	7,662	-	4,742	4,742	-	6,342	6,342
Morondava	2,758	12,454	15,212	3,979	9,448	13,427	5,661	11,711	17,372
Morombe	-	2,296	2,296	-	1,994	1,994	-	1,244	1,244
Sambava	-	793	793	-	1,032	1,032	-	-	-
Antalaha	232	3,437	3,669	2	4,929	4,931	76	6,656	6,732
Maroantsetra	-	2,584	2,584	-	3,333	3,333	-	4,468	4,468
Vohemar	37	14,007	14,044	526	8,622	9,148	301	13,251	13,552
Analalava (2)	-	5,057	5,057	-	5,947	5,947	-	6,139	6,139
TOTAL	1,600,019	322,603	1,922,622	795,752	305,518	1,101,270	981,807	324,774	1,306,581

Note: (1) includes Port Saint Louis
(2) includes Antsohihy
Source: Customs

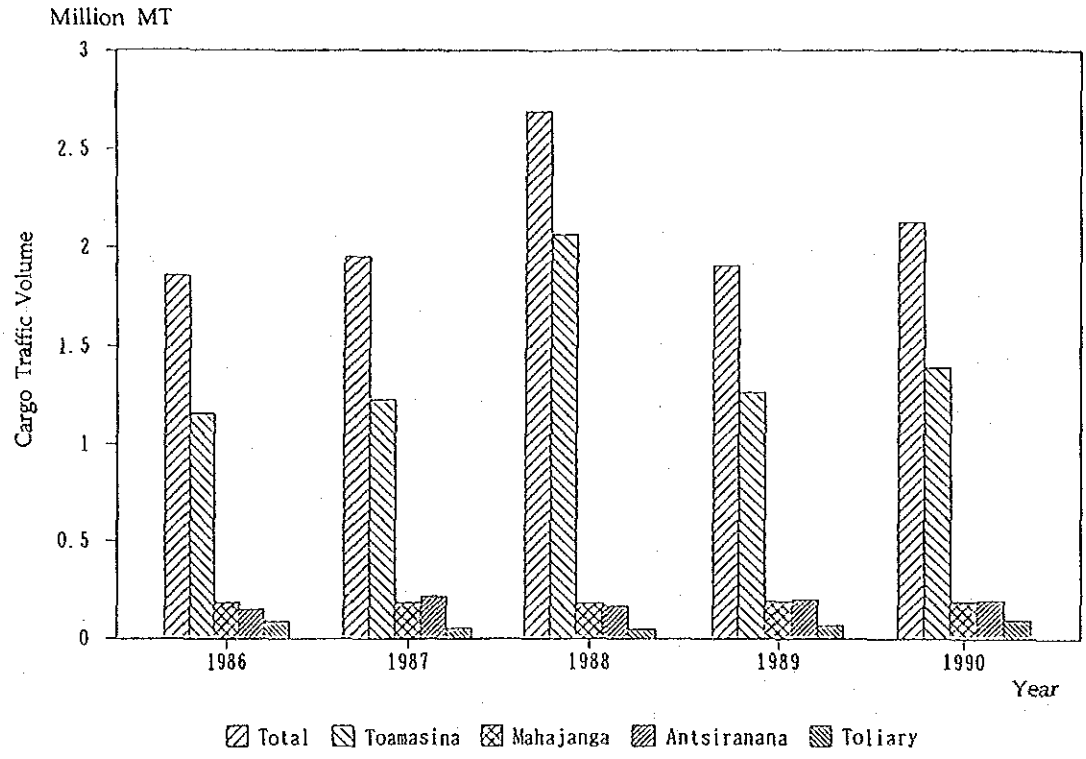


Figure 2-2-1 Cargo Traffic Volume of Maritime Transport

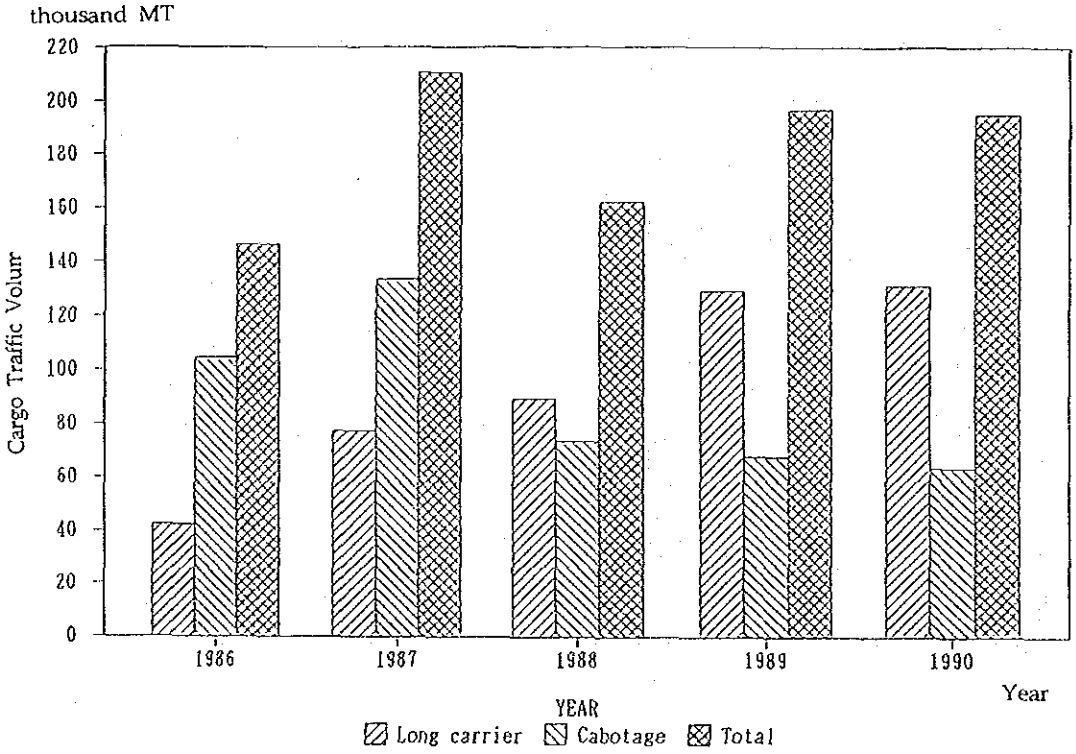


Figure 2-2-2 Cargo Traffic Volume of the Port of Antsiranana

2.2.2 Facilities

Table 2-2-3 shows the present situation of port facilities (See Appendix A-2.2. for the ground plans of main ports). The port of Toamasina and Antsiranana have sufficient water depth to receive large vessels. The quays of the port of Toliara are jetties located offshore. As seen in Table 2-2-3, the port of Toamasina is the sole port having a very spacious warehouse and open yard. Because of this, the port of Toamasina is the only port which can accommodate ocean-going vessels of larger size.

Table 2-2-3 Present Situation of Port Facilities

P O R T	Q U A Y		Warehouse	Open Yard
	L(m)	D(m)	(sq. m)	(sq. m)
Toamasina	706	8.5-10.5		
	314	6-8	45,070	75,225
	-	12		
Antsiranana	301	8.5		
	62	4.5	8,379	5,638
	51	2		
Mahajanga	586	2	16,713	5,290
Toliara	150	7-8	4,496	7,450
	60	3		
Morombe	-	-	2,319	3,681
Maroantsetra	-	-	450	-
Morondava	107	2	3,000	2,028
Vohemar	100	5-7	1,400	7,521
Antalaha	-	-	1,085	4,443
Maintirano	18	1	40	500
Antsohihy	180	0-3	600	8,894
Port St. Louis	198	3	9,997	2,000
Nosy-be	290	2-3.5	3,484	10,431
Mananjary	180	2.5	3,295	880
Manakara	365	1.5	7,365	5,718
Tolagnaro	145	2.5	2,896	3,500

Note: (1) The quays of Toamasina are used for ocean-going vessels, cabotage and tankers from top to downward, while in the port of Antsiranana, the upper and the middle lines are the same as with Toamasina but the lower is for small boats.

(2) Area of warehouse and open yard represents the total of the port. In the case of Toamasina, the area of open yard is for container stacking.

Source: MTM and SEPT

2.3 Administration, Management and Operations

2.3.1 Administration and Management as Provided by Law

(1) Classification of ports

In Madagascar, commercial ports are classified into four categories, main long distance carrier ports, secondary long distance carrier ports, main cabotage ports and secondary cabotage ports, by decree. Generally, the main and the secondary long distance carrier ports shall be opened to all vessels, and the main and the secondary cabotage ports shall only be opened to coastal vessels.

Toamasina, the largest port in Madagascar, is the only one classified as a main long distance carrier port.

Antsiranana, Majunga and Tulear are classified as secondary long distance carrier ports.

Fort-Daupfin, Manakara, Mananjary, Moronbe, Nosy-Be (Port Saint-Louis) and Vohemar are classified as main cabotage ports.

Analalava, Antalaha, Maintriano, Maroantsetra, Saint-Marie and Sanbava are classified as secondary cabotage ports.

(2) Port management

Commercial ports in Madagascar are managed by the Direction of Maritime Transport (DTM). DTM is mainly in charge of port operation, maritime transport and maritime navigation. DTM is under the control of Ministry of Transportation and Meteorology (MTM). The organization charts of MTM and DTM are shown in Figure 2-3-1 and 2-3-2 respectively.

The main long distance carrier port is managed by the director assigned by DTM. He is responsible for maintenance and use of the port facilities. He is also in charge of the contracts concerning public property concession and occupancy authorizations.

The port advisory committee gives advice on matters concerning the use and equipment of the port such as;

- Projection of the Annex Budget of the ports, as for the items relating to the port
- Fiscal Year Account concerning the port
- Revision of charge and dues of all port taxes as a whole
- Composition and working conditions of the public services to ensure port

operation

- Equipment procurement and master plans
- Any measure aiming at improving the function of port, especially the docker's work.

The secondary long distance carrier ports are managed by the chiefs of DTM. They are responsible for coordinating the activities of all services from the various ministerial departments involved in the port exploitation.

The committee for a secondary long distance carrier port shall have to be consulted on all the matters relating to the port operation, improvement and equipment.

The main and the secondary cabotage ports are managed by agents of DTM who shall ensure the operation and maintenance of the port.

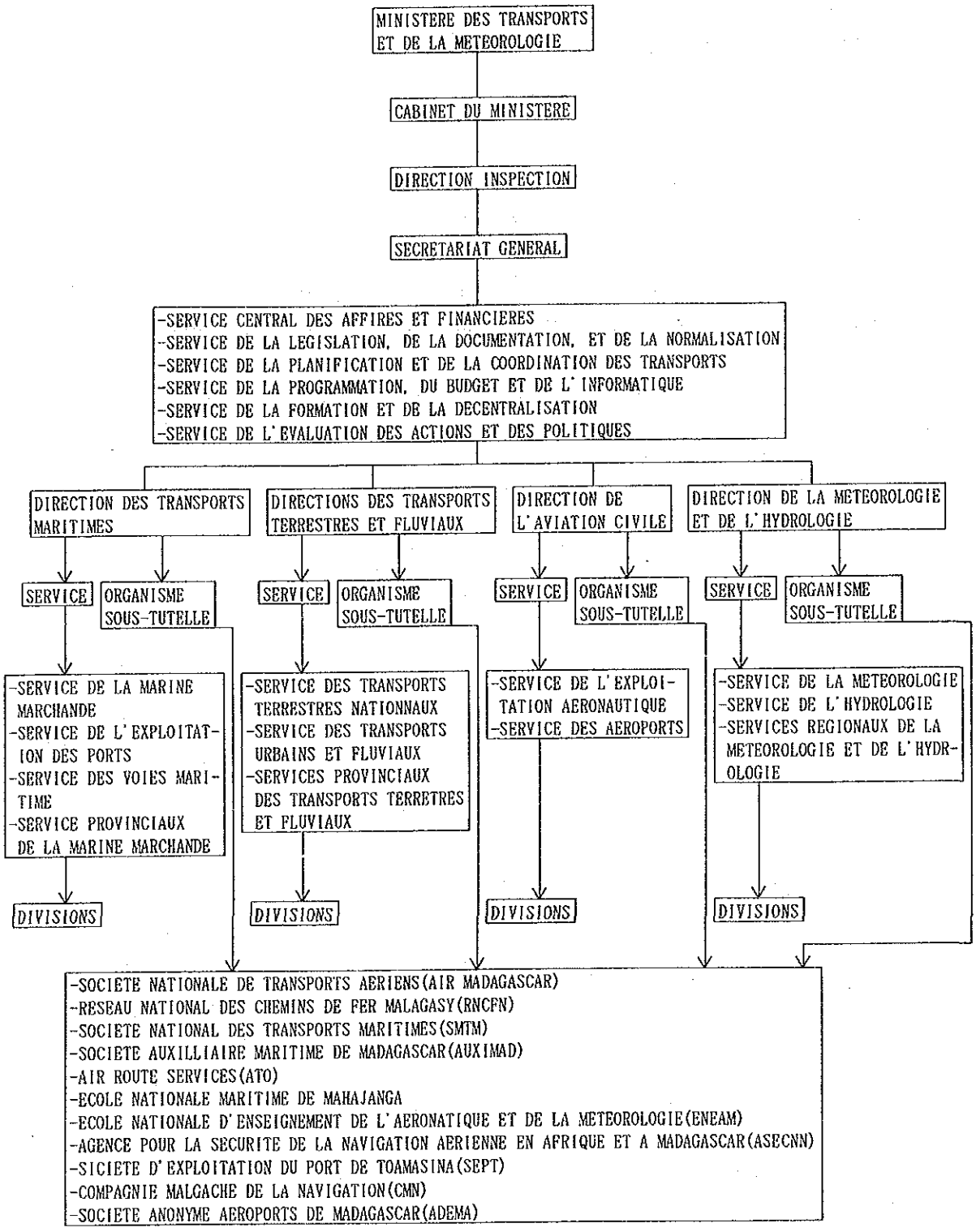


Figure 2-3-1 Organization Chart of MTM

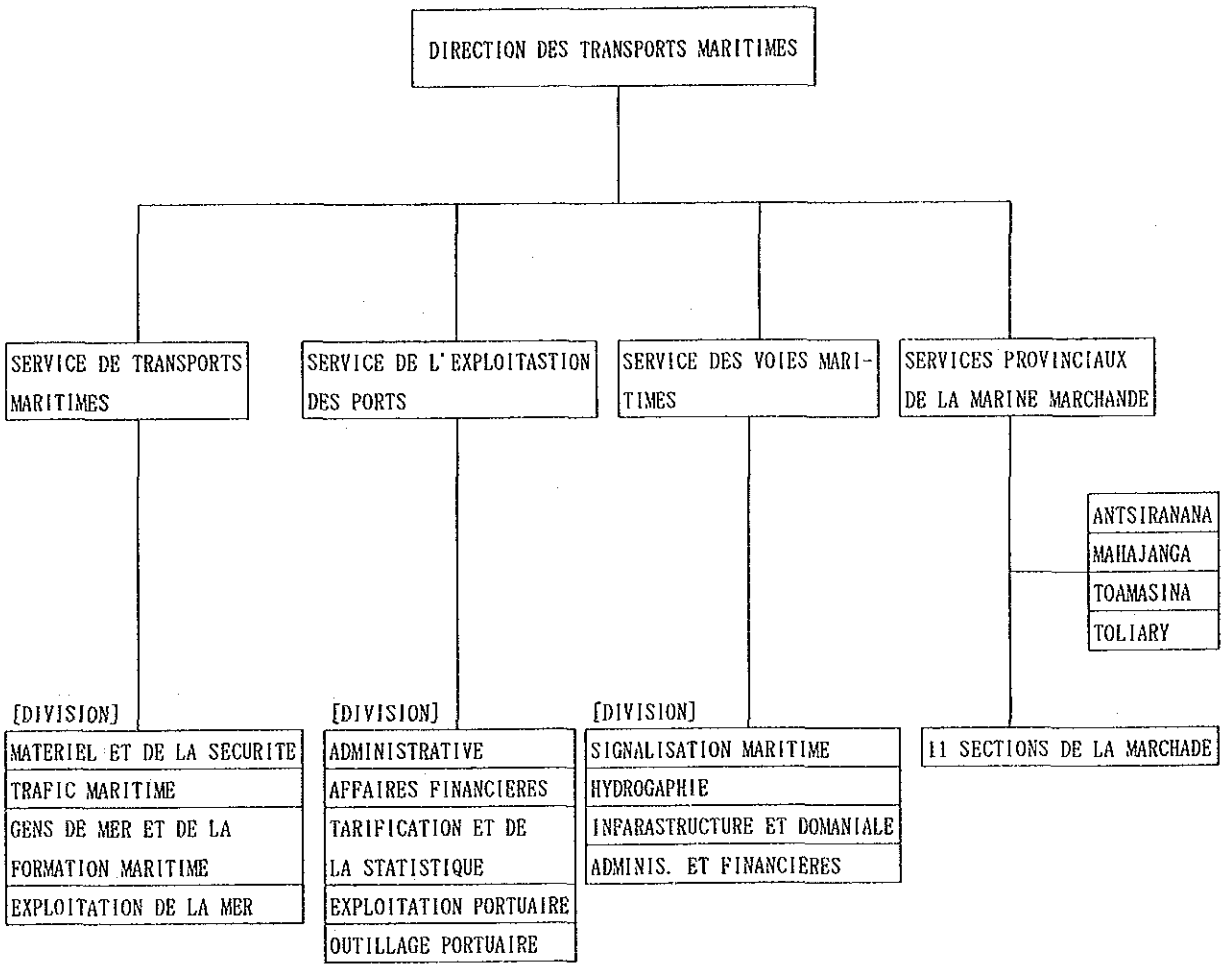


Figure 2-3-2 Organization Chart of DTM

2.3.2 Actual Management and Operations

(1) Actual management

At the main long distance carrier port, Port Director is in charge of port management and coordination of maritime companies. Unlike other ports of Madagascar, Toamasina, the only main long distance carrier port, is managed and operated by the SOCIETE D'EXPLOITATION DU PORT DE TOAMASINA (SEPT) which was created with government funds and established in 1976. SEPT is made up of five departments and employs about 2,400 people. With the exception of this case, ports are managed by a port chief and agents.

Number of staff at each port under control of DTM is shown in Table 2-3-1.

(2) Actual operations

Generally, port use and berth assignment are granted by port chief or agent who provide pilotage, towage and line handling services. Cargo handling service is conducted by private companies.

Table 2-3-1 Number of Staff at Each Port

SERVICE CENTRAL	S. E. P.	D. T. M.	S. V. M.	S. M. M.	TOTAL
ANTANANARIVO	63	2	7	1	73
PORT ANTSIRANANA	7		4		11
PORT TULEAR	12		4		16
PORT MAHAJANGA	21		1		22
PORT TOLAGNARO	5		1		6
PORT MANAKARA	4		7		11
PORT MANANJARY	2		2		4
PORT VOHEMAR	7				7
PORT MONORNDAVA	3		5		8
PORT ANTALAHA	2		1		3
PORT NOSY-BE	7				7
PORT MOROANTSETRA	1		1		2
PORT SAINT-LOUIS	1				1
PORT MAINTIRANO			2		2
PORT AMBANJA	2				2
PORT MOROMBE			1		1
PORT ANTSOHIHY	4				4
TOTAL	141	2	36	1	180

REMARK
S. E. P. :Service de l'Exploitation des Ports
D. T. M. :Direction des Transports Matitimes
S. V. M. :Service des Voies Maritimes
S. M. M. :Service de la Marine Marchande

2.3.3 Port Tariffs

(1) Classification of ships

In view of levying port charge, ships are classified in terms of their net volume as follows;

Class	Volume
1	Up to 250
2	Over 250 up to 500
3	Over 500 up to 1,500
4	Over 1,500 up to 3,000
5	Over 3,000 up to 9,000
6	Over 9,000 up to 35,000
7	Over 35,000

(2) Tariffs

1) Use of port

Class of ship	FMG	FMG	FMG/m3			
	2	3	4	5	6	7
Secondary long distance carrier port:						
Antsiranana	5,000	10,000	7	8	10	12
Toliary	5,000	10,000	7	8	10	12
Mahajanga	5,000	10,000	7	7.5	9	11
Main cabotage port	5,000	10,000	7	7.5	9	11
Secondary cabotage port	5,000	10,000	6.5	7	8	10

2) Wharfage

Secondary long distance carrier port

Class of ships	Warfage FMG/m/h	Anchorage FMG/100m3/h	Exclusive use FMG/100m3/h
2	5,000	5,000	5,000
3	8	6	13
4	8	8	17
5	11	11	24
6	71	37	57
7	147	50	150

Main and secondary cabotage port

Class of ships	Warfage FMG/m/h	Anchorage FMG/100m3/h	Exclusive use FMG/100m3/h
2	5,000	5,000	5,000
3	8	6	13
4	8	8	17
5	11	11	24
6	57	30	57
7	123	43	150

3) Passenger charge

	Embarkation	Disemrbakation
Domestic	250FMG/passenger	250FMG/passenger
International	3,300FMG/passenger	3,300FMG/passenger

4) Loading/unloading Charge

Loading	1,140 FMG/tonne
Unloading	570 FMG/tonne

5) Pilotage

Class of ships	
1,2,3	180,000FMG(Minimum charge)
4	180,000FMG+6,000FMG/100m3(over 1,500m3 up to 3,000m3)
5	270,000FMG+5,000FMG/100m3(over 3,000m3 up to 9,000m3)
6	570,000FMG+4,000FMG/100m3(over 9,000m3 up to 35,000m3)
7	1,670,000FMG+3,000FMG/100m3(over 35,000m3)

6) Tugboat charge

Class of ships	
1, 2, 3	35, 000FMG
4	35, 000FMG+3, 000FMG/100m3(over 1, 500m3 up to 3, 000m3)
5	80, 000FMG+2, 000FMG/100m3(over 3, 000m3 up to 9, 000m3)
6	200, 000FMG+1, 000FMG/100m3(over 9, 000m3 up to 35, 000m3)
7	450, 000FMG+500FMG/100m3(over 35, 000m3)

7) Storage

Class of ports	FMG/m2/month
Secondary long distance carrier port	200 up to 500
Main and secondary cabotage port	100 up to 300