Report No. 14527-MAS

Mauritius
Biodiversity Restoration Project

Project Document
June 7, 1995

Infrastructure Division
Central Africa and Indian Ocean Department
Africa Region

REPUBLIC OF MAURITIUS

BIODIVERSITY RESTORATION PROJECT

GRANT AND PROJECT SUMMARY

Recipient: Government of Mauritius

Beneficiaries: (a) Ministry of Agriculture, Fisheries & Natural Resources (MOA)

(b) Ministry of Environment & Quality of Life (MEQL)

(c) Mauritian Wildlife Fund (MWF)

Amount: SDR million (US $1.2 million)

Terms: Grant

Financing Plan:

Source	Local	Foreign (US$ million)	Total
GEF	0.5	0.7	1.2
GOM	0.2		0.2
MWT	0.15		0.15
Private Sector	0.05		0.05
TOTAL	0.9	0.7	1.6

Poverty Category: Not applicable

Economic Rate of Return: Not applicable

Map: IBRD 26793

PART I : Project Summary

MAURITIUS

BIODIVERSITY RESTORATION PROJECT

Country Economic Background and Environmental Context

1. Mauritius is one of the Third World's economic success stories. Led by a burgeoning export-based industrial sector, the country transformed itself within two decades from a sugar-dependent economy with a per capita income of US$400 to a middle-income country with a per capita income of about US$3,000, an annual average increase of 9.6% in current dollar terms. However, the economic activities associated with human occupation in the last few centuries have taken a significant cumulative toll on the nation's biodiversity.

2. Small oceanic islands such as the Mascarenes (of which Mauritius is a part) present special challenges for the conservation of biodiversity because they are often characterized by extensive habitat degradation and high rates of species extinction. The Mascarenes encompass a number of islands in the Western Indian Ocean, including the largest islands of Mauritius and Rodrigues, and numerous remote and smaller islands. Their diverse climatic, geological and topographical regimes have resulted in the evolution of diverse biota with a high degree of endemism, further promoted by the islands' age and isolation.

3. With the exception of some of the more remote oceanic islands, Mauritian ecosystems were profoundly modified and degraded after the uninhabited Mascarenes were discovered and colonized. A period of lumber (ebony) extraction in the seventeenth century was followed by agricultural development for sugar cane. As a result, only relictual areas of original habitat survive. With this habitat loss has come a series of extinctions, most notably of the endemic flightless avifauna, among others of the dodo and the solitaire, and of reptile species like giant tortoises. The loss of species and populations has been caused by out-competition and predation by invasive exotic species (plants as well as animals), uncontrolled exploitation and the inherent genetic/demographic vulnerability of small populations. Even if all remnant habitat areas were protected, species and habitat loss would continue because of the continuing influence of exotic species and the poor demographic security of small populations.

4. Now that the major period of historical habitat loss has passed, the surviving remnants of the biota offer an opportunity for the restoration of largely destroyed, pre-colonial ecosystems, and in particular for their associated endangered species. The islands of Rodrigues, Round Island, and Ile aux Aigrettes offer differing but complimentary opportunities for habitat restoration and species recovery.

5. **The biodiversity of Mauritius.** Despite these historical pressures, Mauritius and its dependency of Rodrigues are still globally recognized as centers of endemism for vascular plants, birds, reptiles and mollusks. Between 800 and 900 plant species occur on Mauritius, including eight endemic genera. About 300 species are endemic to Mauritius, of these approximately 80% are threatened. The flora of Rodrigues counts 145 indigenous species, of which 41 are endemic. A large proportion of the threatened plant species survive as tiny relictual populations that possess a very high probability of imminent extinction. The floristic inventory has yet to be completed.

6. **Rodrigues Island.** Recognized since the nineteenth century as one of the world's most degraded tropical islands, Rodrigues has 45 endemic species. The majority of these are critically threatened, seven of which now survive with fewer than 10 wild individuals. The island Forestry Service, with support from World Wide Fund for Nature (WWF) volunteers, has been running a successful propagation and reintroduction program. However, the long term success of this work is seriously compromised by poor facilities and a lack of professional training in horticulture, applied conservation biology, project planning and monitoring. Without additional resources, a number of critically endangered species are likely to become extinct or have their chances for long term conservation reduced through poor genetic/demographic management.

7. **Round Island.** Round Island is the site for one of the best documented island restoration efforts. It represents the largest area in the Mascarenes free of introduced animals and contains the last remnants of the palm savannah once characteristic of northern Mauritius. Drawing on expertise in restoration ecology of both Mauritius and New Zealand, the Jersey Wildlife Preservation Trust (JWPT) and the Ministry of Agriculture, Fisheries and Natural Resources (MOA) prepared a management plan for the restoration of Round Island. Following the successful removal of feral animals (goats and rabbits) and ongoing efforts to eradicate exotic plants, the island can now be restored and the original palm savannah and hard wood forest re-established. Locally extinct animals can be reintroduced. Because of the widely prevalent threats to endemic species on the main island of Mauritius, Round Island represents one of the best chances to restore and maintain endangered Mauritius plant and animal communities.

8. **Ile aux Aigrettes.** Leased by the Mauritius Wildlife Fund (MWF), this 25 hectare island contains the last viable area of coastal ebony forest, a type of forest now lost on the island of Mauritius. Under the direction of MWF, an ambitious habitat restoration program was initiated which can be developed in parallel to the restoration of Round Island to restore the coastal forest and palm savannah communities and re-introduce missing elements of the fauna.

9. **Mauritian Wildlife Fund.** The Mauritian Wildlife Fund is a non-governmental group promoting the integrated management of threatened species in Mauritius. It is known internationally for innovative approaches to threatened species management, and most notably for its captive breeding, genetic and demographic studies, reintroduction and habitat management of the Mauritian kestrel and pink pigeon. For 10 years, it has

lead to the reintroduction of other lost ecosystem components (flightless rails, giant tortoise). A small nursery would be developed on Ile aux Aigrettes to serve its needs and those of Round Island, with improved accommodation for field workers and researchers.

14. The project total cost is estimated at US$1.6 million and would consist of four components:

i. a survey for (a) the identification of original habitat/community types for determining species recovery and habitat restoration targets at the three sites, Rodrigues Island, Ile aux Aigrettes and Round Island, and (b) the eradication or control of undesired exotic species ($110,000);

ii. investment in required infrastructure (nurseries, buildings) for the ex-situ propagation and cultivation of threatened plants ($125,000);

iii. supplies and equipment for propagation, replanting and reseeding of endemic plants, and reintroduction of endemic animals from captive-bred populations ($685,000); and

iv. technical assistance to strengthen the governmental and non-governmental institutions involved, based on a skills audit and training needs analysis ($670,000). This would develop: (a) skills in project planning and administration, (b) horticultural expertise and facilities to ensure the viability of support propagation services and the long term holding of plant populations, (c) expertise in applied conservation biology including the genetic/demographic management of endangered plant populations, and (d) skills in habitat monitoring.

Project Cost and Financing

15. The project cost summary is given below and detailed estimates are shown in Schedule A:

	(MRs '000)			(US$ '000)			% Foreign Exchange	% Total Base Costs
	Local	Foreign	Total	Local	Foreign	Total		
1. Rodrigues Island Habitat Restoration	1,485	5,094	6,579	83	283	366	77	25
2. Round Island Forestry Restoration	180	90	270	10	5	15	33	1
3. Ile aux Aigrettes Ebony Forest	2,700	-	2,700	150	-	150	-	10
4. Institutional Strengthening and Technical Assistance	10,235	6,804	17,039	569	378	947	40	64
Total BASELINE COSTS	14,600	11,988	26,588	811	666	1,477	45	100
Physical Contingencies	306	280	586	17	16	33	48	2
Price Contingencies	1,006	602	1,607	56	33	89	37	6
Total PROJECT COSTS	15,912	12,870	28,781	884	715	1,599	45	108

Taxes and duties have been excluded from cost estimates. Any taxes and duties on the project components will be either exempted (eg. for imported equipment) or borne by the Ministry of Agriculture, Fisheries and National Resources (MOA), the beneficiary. A grant of US$1.2 million is sought from the Global Environment Facility Trust Fund

(GEF), while $0.4 million in related local costs would be funded locally. The financing plan would include GEF, GOM, and contributions from sugar estates and NGOs as follows: (i) GEF would finance civil works, equipment, operating costs and consultants/technical assistance, both local ($500,000) and foreign ($700,000); (ii) GOM would finance about $200,000 for salaries, local transport and other recurrent costs of MOA; and (iii) Sugar estates and NGOs, through MWF, would contribute services valued at $200,000. A detailed financing plan is shown in Schedule A.

Incremental Costs

16. The Government of Mauritius is in the process of executing priority elements of a $109 million Environmental Investment Plan, using its operating budget and borrowing from IBRD and other financiers. While GOM has demonstrated clear commitment to biodiversity protection in its NEAP and EIP, and through financing the establishment of the Black River Gorges National Park, it cannot afford to pay for the full cost for biodiversity protection initiatives. There are clearly global benefits in conserving unique island endemic, species of plants and animals which do not occur outside Mauritius, and the project therefore qualifies for GEF resources. The government contribution, valued at $200,000, includes the MOA salaries, transportation and other recurrent costs to coordinate the activities. In addition, GOM is donating land for nurseries and has leased for a nominal fee ($1 per year for 20 years) the entire island of Ile aux Aigrettes to the MWF. The private sector would provide free labor (estimated value of at least $50,000 over five years) and international and national NGOs are expected to contribute an estimated $150,000 to their support for captive breeding facilities. On completion of the project, recurrent costs would be covered by MWF and its supporting international NGOs. Of the total estimated project cost of $1.6 million, the GEF grant of $1.2 million would cover the incremental costs.

Rationale for GEF Financing

17. The project addresses high priority issues identified in Mauritius' NEAP and EIP, and complements the Black River Gorges National Park initiative financed by GOM. It seeks to preserve highly threatened endemic species and ecosystems by going beyond traditional protection measures and establishing a replicable model for species reintroduction and habitat and ecosystem restoration and monitoring, which would be especially valuable for other island ecosystem and species projects. It involves Government-NGO partnerships, and brings together international, domestic and private sector expertise and/or resources, raising awareness domestically and internationally and increasing opportunities for future resource mobilization. It builds upon the restoration work initiated by MWF, WWF and UNDP/GEF by expanding and amplifying activities on critical island habitats. Finally, it strengthens local technical and administrative capacity to identify and respond to similar biodiversity threats in the future. The project is consistent with priorities identified by the first Conference of the Parties of the Convention on

Biological Diversity since it is a demonstration project to promote conservation of endemic species in small island ecosystems.

Lessons from Previous Bank and GEF Involvement, and GEF Technical Review

18. The Bank's considerable experience in environment policy, development and project execution in Mauritius, including environment projects, yields several lessons which have been reinforced and detailed by the recommendations of the technical reviewers. In general, project implementation has been relatively successful, due largely to the good institutional capacity. The lessons from experience have been incorporated as follows: (i) All key institutions need to be involved at the onset to ensure strong ownership. The project was prepared in close cooperation with and enjoys strong commitment from relevant stakeholders in GOM and the environmental NGO community. The associated NGOs are experienced in Mauritius and were active in the formulation of the NEAP and EIP. Two (JWPT, WWF) participated meaningfully in the appraisal of the Black River Gorges National Park component of the Environmental Monitoring and Development Project. (ii) The preparation experience of the Pilot GEF Forest Restoration Project , as well as the technical reviewers, highlighted the need to continuously monitor and guard against invasive species. The proposed project therefore chooses to work on off-shore islands to isolate restored species and habitats from invasive species, and to work with organizations with long-term commitments to these sites.

Project Sustainability

19. The crucial element for sustainability would be continued monitoring and maintenance of habitats under restoration. Sugar estates already provide MOA with workers, free of charge, to weed exotic species and plant desired species during the industry's off-season, and this is expected to continue. Using sugar laborers can have the secondary benefit of raising public awareness of biodiversity conservation issues. Through its local Forestry Department staff, GOM would maintain the project on Rodrigues. MWF has long-term leases to manage Ile aux Aigrettes, and is expected to continue to raise funds internationally and domestically for its activities, including monitoring and maintenance of project sites. As the project is executed, diminishing maintenance is expected since the restored ecosystems would grow towards a stable climax state. In the unlikely event MWF does not renew its lease, GOM may consider visitor fees for Ile aux Aigrettes (the only accessible site of the three in this project) to raise funds to support conservation activities. The project emphasizes strengthening of local technical and administrative capacity to identify and respond to similar biodiversity threats in the future, and takes full advantage of the cooperative spirit between government, NGOs and the private sector to establish long-term relationships.

Issues and Actions to be Agreed

20. Agreement should be reached during negotiations that the following actions will be completed as conditions of effectiveness: (i) A subsidiary agreement acceptable to the GEF will have been executed on behalf of GOM and MWF to delegate to MWF the procurement of works, goods and services; and (ii) the Mauritian Wildlife Fund would have hired a program plant conservation manager, a plant conservation officer for Rodrigues, and a resident warden for Ile aux Aigrettes. In addition, not later than December 31, 1995, MWF would prepare a comprehensive training program as indicated in the Project Description. In the same time period, MWF would also develop an annual work program for the project, and expand its indicators of success from earlier restoration activities to cover the proposed project's activities.

Project Implementation

21. The project would be implemented by the MWF in collaboration with MOA (project administration, local transport, some labor), the Jersey Wildlife Preservation Trust (island restoration and vertebrate reintroductions), the Royal Botanical Gardens, Kew (training in horticultural and conservation management of threatened plants) and the Faunal and Floral Preservation Society (training and organizational strengthening). Close cooperation would be established with the National Parks and Conservation Service and the Department of Forestry of the MOA, whose staff would work part time in the project. These staff have submitted a request for a demonstration and research project which aims to test various eradication and reintroduction methods in a humid upland forest in the Black River Gorge National Park. The proposal is quite different in scope, ecological threats addressed, and ecosystem type from the project described in this document, but its experience with the application of various herbicides will be useful for both projects. The fact that the same persons will work part time in both projects will ensure that experience gained in both projects will be shared. The project would be implemented within five years (Annex 2), and include finalization of the project work and training programs, institutional strengthening and construction of facilities from mid 1995 to mid-2000.

Procurement

22. Procurement would be in accordance with IBRD's guidelines for Procurement. **Civil Works and Equipment** would be undertaken on the basis of National Competitive Bidding (NCB) in accordance with IBRD's guidelines. Schedule B summarizes the proposed methods of procurement for the project categories. The Borrower's procurement regulations and procedures have recently been reviewed by Bank staff, and have been found acceptable.

23. During project implementation, award for GEF-financed goods and works contracts above a threshold of US$100,000 would be subject to the Bank's prior review. All equipment and spare parts are expected to be bought through local shopping, on the basis of at least three price quotations. A quarterly report will be sent to the Bank, indicating: (i) revised cost estimates for individual contracts and the total project; (ii) revised timing of procurement, including advertising, bidding, contract award, and completion time for individual contracts; and (iii) compliance with aggregate limits on specified methods of procurement.

24. **Consultant services** financed by GEF will be contracted on the basis of the World Bank Consultant Guidelines. The Guidelines require the Bank to review and to comment on each step by which the Borrower selects consulting firms, including: (i) preparation of terms of reference and budget; (ii) choice of selection procedure; (iii) preparation of shorlist (if not single source) and Letter of Invitation; (iv) submission of winning proposal or evaluation report; and (v) negotiation of draft contract. A simplified review process may be used to hire individual consultants.

25. For small contract value provided by consulting firms and individuals, mandatory prior review is not required when the cost of submission and prior review of the necessary procurement documentation out-weighs the benefits derived. Prior review thresholds have been established for consultant' contracts, at $100,000 equivalent for consulting firms selected competitively and $50,000 equivalent for individuals. Below these thresholds, the Bank conducts post review for single source contracts with firms, all TORs and contract amendments bringing the total above the respective thresholds. At least one contract in five is selected by random sampling for post review.

Disbursements

26. Schedule B shows the estimated disbursements which take into account the disbursement profile for projects in Mauritius. The minimum application size for payments directly from the Grant Account or for issuance of Special Commitments will be US$100,000. Disbursements will be fully documented, except that withdrawals will be made on the basis of Statement of Expenditures (SOEs) for: civil works and equipment contracts valued at less than US$100,000 equivalent; consulting firm contracts valued at less than US$100,000 equivalent, and individual consultant contracts valued at less than US$50,000 equivalent; and local training.

27. If requested by the Borrower, and to facilitate disbursements against eligible expenditures, a Special Account (SA) will be established in the name of MWF. The SA will be opened and maintained in a commercial bank, acceptable to the Bank, with an authorized allocation of US$100,000 corresponding to about six months of expenditures. Replenishment applications will be submitted at monthly intervals and will include reconciled bank statements as well as other appropriate supporting documents.

Monitoring, Supervision and Audit

28. Monitoring of the biodiversity component is inherent in project design since resident technicians would be constantly on location, monitoring project progress and exotic species invasions, (in case of such invasions, off-season sugar estate labor would be used to respond). Progress reports would be submitted every six months, and every two years MWF would prepare, as it already does now, evaluation reports for its activities (Annex 3). MOA/MWF would jointly prepare a final project evaluation within 6 months of the project closing date. Supervision will be carried out by the Bank, in line with the program shown in Annex 4. Annual audits by independant auditors acceptable to the Bank will be conducted for the project account and submitted to the Bank no later than six months after the end of each fiscal year.

Environmental and Social Impact and Participation.

29. The project would have a very positive impact on the environment which it would aim to restore to its original condition; the restoration of the habitat would help save threatened species from extinction and contribute to the preservation of world natural heritage. This project is not expected to have any negative social impacts. Its target areas are not only uninhabited, but are not currently used for economic purposes. It was prepared with support from MOA and MEQL, and would be executed by MWF, a respected local NGO. Through the use of off-season labor from sugar estates, it would increase local awareness and ownership of biodiversity restoration efforts.

Project Benefits.

30. The project would result in the preservation of endemic flora and associated fauna, and serve both as a model for ecosystem restoration and a learning experience for similar projects in the region and elsewhere.

Risks

31. The project is exposed to various risks, including damage from hurricanes, drought and the inadvertent introduction of alien species. The risks would be addressed by the presence of a warden and other project staff on the project site and by detailed project monitoring. Another risk would be if participating NGOs and sugar estates discontinued their involvement. They have not indicated any intention to withdraw support. The Government has agreed to provide labor support as required.

Schedule A
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PROJECT COST BY CATEGORY OF EXPENDITURE
(in US$ '000)

Disbursement Categories	Local (Excl. Taxes)	For. Exch.	Base Cost Total	Total Incl. Contng	% Physical Contng.	% For. Exch.	% Base Costs
I. Rodrigues Island							
A. Propagation Facilities at Solitude	45	0	45	53	10	0	4
B. Equipment, supplies & materials							
4WD Vehicule (1 unit)	0	23	23	24	5	100	
Motorbikes (2 units)	0	6	6	6	5	100	
Laptop computer & softwares (1 unit)	0	10	10	11	5	100	
Horticultural/forestry equipment	0	25	25	27	5	100	
Technical Documentation	0	10	10	11	5	100	
Horticultural supplies	15	15	30	35	5	50	
Supplies & materials for Logistics	23	23	45	52	5	50	
Subtotal Equipment, supplies & materials	38	112	149	165			11
C. Technical Assistance							
Plant Conservation Officer	0	160	160	169	0	100	
Transportation costs	0	13	13	14	5	100	
Subtotal Technical Assistance	0	173	173	183			12
Total Part I	83	283	366	401			27
II. Round Island							
A. Construction of a storeroom	10	0	10	12	10	0	
B. Field Equipment	0	5	5	5	5	100	
Total Part II	10	5	15	17			1
III. Ile aux Aigrettes							
A. Development of facilities	50	0	50	60	10	0	
B. Resident warden	100	0	100	115	0	0	
Total Part III	150	0	150	175			12
IV. Institut. Strengthening & Tech. Assistance							
A. Equipment, supplies & materials							
4WD Vehicule (1 unit)	0	23	23	24	5	100	
Motorbikes (2 units)	0	6	6	6	5	100	
Laptop computer & softwares (1 unit)	0	10	10	11	5	100	
Technical Documentation	0	20	20	22	5	100	
Logistics	23	23	45	52	5	50	
Subtotal Equipment, supplies & materials	23	82	104	115			8
B. Technical Assistance							
Plant Conservation Manager	0	160	160	169	0	100	
Development Director for MWF	111	0	111	128	0	0	
Project Management	0	70	70	74	0	100	
Transportation costs	0	33	33	36	5	100	
Subtotal Technical Assistance	111	263	374	407			28
C. Training							
Training for Government & NGO staff	35	35	70	85	10	50	6
D. Support Services							
Support from GOM (local salaries)	150	0	150	150	0	0	
Support from GOM (local transports)	30	0	30	30	0	0	
Support from GOM (other)	20	0	20	20	0	0	
Support from NGOs	150	0	150	150	0	0	
Support from Private Sector	50	0	50	50	0	0	
Subtotal Support Services	400	0	400	400			28
Total Part IV	569	378	947	1,006			68
Total Baseline Costs	811	666	1,477				100
Physical Contingencies	17	16	33	-			2
Price Contingencies	56	33	89	-			6
Total Project Cost	884	715	1,598	1,599			108

PROJECT COST BY CATEGORY OF EXPENDITURE

	(Mrs '000)			(US$ '000)			%	% Total
	Local	Foreign	Total	Local	Foreign	Total	Foreign Exch.	Base Costs
A. Civil Works	1,890	-	1,890	105	-	105	-	7
B. Equipements, supplies & materials	1,080	3,528	4,608	60	196	256	77	17
C. Technical Assistance	3,800	7,830	11,630	211	435	646	67	44
D. Training	630	630	1,260	35	35	70	50	5
E. Support Services	7,200	-	7,200	400	-	400	-	27
Total Baseline Costs	**14,600**	**11,988**	**26,588**	**811**	**666**	**1,477**	**45**	**100**
Physical Contingencies	306	280	586	17	16	33	48	2
Price Contingencies	1,006	602	1,607	56	33	89	37	6
TOTAL PROJECT COSTS	**15,912**	**12,870**	**28,781**	**884**	**715**	**1,599**	**45**	**108**

Note: Figures may not add up to total due to roundings.

FINANCING PLAN
(in US$ '000)

	GOM Amount	MWT Amount	GEF Amount	Private Sector Amount	Total Amount	Foreign Exch.	Local (Excl. Taxes)
1. Rodrigues Island Habitat Restoration	0	0	401	0	401	302	98
2. Round Island Forestry Restoration	0	0	17	0	17	5	12
3. Ile aux Aigrettes Ebony Forest	0	0	175	0	175	0	175
4. Institutional Strengthening & Tech Assist	200	150	606	50	1,006	407	599
TOTAL DISBURSEMENT	**200**	**150**	**1,199**	**50**	**1,599**	**715**	**884**

Note: Figures may not add up to total due to roundings.

Schedule B
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SUMMARY OF PROPOSED PROCUREMENT ARRANGEMENTS

	PROCUREMENT METHOD		
Project Element	NCB	Other	TOTAL (US$ '000)
Civil Works	125 (125)		125 (125)
Equipment		285 (285)	285 (285)
Consultant Services & Engineering		705 (705)	705 (705)
Training		85 (85)	85 (85)
Support Services		400	400
TOTAL	125 (125)	1,474 (1,074)	1,599 (1,199)

Note: Figues in parenthesis are the respective amounts financed by GEF.

DISBURSEMENT CATEGORIES AND PERCENTAGES (in US$ '000)

Categories	Amount of Loan Allocated	% of Expenditures to be Financed
Civil Works	0,110	100 FE, and 90 LC
Equipment and Spare Parts	0,260	100 FE, and 90 LC
Consultant Services and Engineering	0,640	100 FE, and 90 LC
Training	0,070	100 FE, and 90 LC
Unallocated	0,120	
TOTAL	1,200	

FE = Foreign Exchange; LC = Local Currency. *Note*: Figures may not add up to total due to roungings.

DISBURSEMENTS BY SEMESTER (US$ '000)

	Financing Source				To be Financed
Semester	GOM Amount	NGO Amount	GEF Amount	Priv Sect Amount	Project Costs
1	20	15	172	5	212
2	20	15	172	5	212
3	20	15	124	5	164
4	20	15	124	5	164
5	20	15	103	5	143
6	20	15	103	5	143
7	20	15	99	5	139
8	20	15	99	5	139
9	20	15	102	5	142
10	20	15	102	5	142
Total	200	150	1,199	50	1,599

TIMETABLE OF KEY PROJECT PROCESSING EVENTS

(a)	Time Taken to Prepare	:	6 months (June 1994 to December 1994)
(b)	Prepared by	:	Government, MOA, MEQL and MWF, with IBRD assistance
(c)	Appraisal Mission Departure	:	January 1995
(d)	Negotiations	:	May 1995
(e)	Planned Date of Effectiveness	:	August 1995

Staff Review Arrangements. The project was identified in connection with the Port Development and Environment Protection Project by Messrs. A.F. Ballereau, A. Zohoré, M. Audigé, and J. Post. The project Task Manager is A.F. Ballereau. Mrs. Maryvonne Plessis-Fraissard is the Division Chief, and Mr. A. Rogerson is the Country Department Director. The Lead Advisor is Mr. J. Post. The Technical Reviewers are Messrs. David A. Rickert, Ph.D (US Geological Survey), and Mark J. Plotkin, Ph.D (Conservation International).

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MAURITIUS
Status Of Bank Group Operations In MAURITIUS
PFDBR25 - Summary Statement Of Loans and IDA Credits
(LOA data as of 4/30/95 - MIS data as of 05/24/95)

By Country
Country: MAURITIUS

Loan or Credit No.	Fiscal Year	Borrower	Purpose	Amount in US$ million (less cancellations) Bank	IDA	Undis-bursed	Closing Date
Credits							
5 Credits(s) closed					20.42		
All closed for MAURITIUS							
TOTAL number Credits = 0							
oans							
21 Loans(s) closed				218.23			
L31320-MU	1990	MAURITIUS	HIGHWAYS II	30.00		.75	06/30/95(R)
L32770-MU	1991	MAURITIUS	ENVIRON MONIT. & DEV	12.37		7.75	06/30/96
L33330-MU	1991	MAURITIUS	AGRIC SERVICES	10.00		9.57	06/30/99
L34010-MU	1992	MAURITIUS	IND AND VOCAT TRAINI	5.40		4.81	12/31/98
L34580-MU	1992	MAURITIUS	SUGAR ENERGY DEVELOP	15.00		15.00	12/31/96
L35780-MU	1993	MAURITIUS	EDUCATION SECTOR	20.00		19.16	12/31/98
L37360-MU	1994	MAURITIUS	TECH ASST.	7.70		7.70	06/30/99
L38590-MU	1995	MAURITIUS	H & T EDUCATION	16.00		16.00	12/31/00
TOTAL number Loans = 8				116.47		80.75	
TOTAL***				334.70	20.42		
of which repaid				143.72	3.59		
TOTAL held by Bank & IDA				190.98	16.83		
Amount sold 4.95							
of which repaid 4.95							
TOTAL undisbursed						80.75	

Notes:

* Not yet effective
** Not yet signed
*** Total Approved, Repayments, and Outstanding balance represent both active and inactive Loans and Credits.
(R) indicates formally revised Closing Date.
(S) indicates SAL/SECAL Loans and Credits.

Net Approved and Bank Repayments are historical value, all others are market value.

Signing, Effective, and Closing dates are based upon the Loan Department offical data and are not taken om the Task Budget file.

MAURITIUS
Statement of IFC Investments
(as of December 31, 1993)

			Amount in US$ million		
Fiscal Year	Obligator	Business	Loan	Equity	Total
1981	Rogers	Tourism	1.8	0.0	1.8
1987	Socota Mills	Textile	5.0	1.0	6.0
1990	Saxon Properties	Tourism	2.6	1.0	3.6
1991	CSL	Iron & Steel	0.5	0.2	0.7
1991	Haulage (AEF)	Transport	0.2	0.0	0.1
1991	Dinarobin	Tourism	6.0	0.0	6.0
1991	Big Game	Tourism	0.2	0.0	0.2
1991	Textile Industries	Textile	3.1	0.0	3.1
1992	MCB-AL	Capital Market	10.0	0.0	10.0
1993	Mauritius Fund	Capital Market	0.0	5.0	5.0

Total gross commitments	US$36.5 millic
Total commitments now held by IFC	US$28.1 million
Total undisbursed (including participant's portion)	US$12 million

PROJECT IMPLEMENTATION AND DISBURSEMENT STATUS

Mauritius' performance in the implementation of its Bank-associated projects has traditionally matched the high quality of its economic management. As part of the country's drive to reach a higher level of economic performance, the focus of new operations has become directed towards more complex institutional goals, often requiring for their achievement the cooperation of various interest groups. This has led to slow preparation of projects and delayed start-up of implementation and slow disbursement. For example, the preparation of the Industrial and Vocational Training Project was slow, as it required close cooperation between GOM and the private sector. Similarly, the effectiveness of the Bagasse Energy Development Project was delayed by time-consuming negotiations of contracts between GOM and the prospective private sector partner in the project. Efforts made in FY94 to resolve start-up difficulties are beginning to yield results. Staffing problems that delayed the inception of activities under the Agricultural Management and Services Project (AMSP) have been overcome. The contract negotiations under the Sugar Energy Development Project (SEDP) have been concluded and project implementation has begun. All projects have implementation manuals and a project workshop was held in May 1995 to launch the newest addition to the portfolio--Higher and Technical Education. Mauritius has no problem projects and no issues of counterpart funding. Procurement problems also do not exist. The key implementation problem of the Mauritian portfolio of recent years--slow pace of implementation of a new range of projects--is being addressed by intensified supervision efforts aimed at facilitating and speeding-up decision-making among the interested parties. With the addition of two new projects in FY94-95, the disbursement ratio in FY95 may well be under 10%, considerably below the 19.8% achieved in FY94. Consequently, sustained efforts are needed to return Mauritius to its former superior rating.

PART II : Technical Annexes

TECHNICAL ANNEXES

SUMMARY OF TECHNICAL REVIEW AND OUTCOMES

1. The technical reviewer commented positively on the proposal for the Mauritius Biodiversity Restoration Project, appreciating such project features as: (a) establishing a model for species/ecosystem protection and rehabilitation; (b) building on successful local initiatives already underway; (c) involving collaboration with high quality international NGOs; and (d) being limited but feasible in scope. The reviewer recommended building in long-term monitoring and control of exotic species in the future, and requiring local counterpart financing.

2. The reviewer recommendation that long-term monitoring and control of exotic species was made part of the project design. This would be done by ensuring that the principal executing agencies (Department of Forestry and MWF) have staff assigned and long-term commitments to the project sites to monitor the success of eradication programs of exotic species. Furthermore, the control of exotic species will be made easier due to the isolation and/or protection of all three sites; hence there is a relatively low risk of introduction of exotic species. A local counterpart contribution additional to the financial support pledged by the Government and the MWF is an arrangement with sugar estates to provide the project with labor to weed exotic species. This is a popular program among laborers and estate owners which was tested elsewhere. It is not expected to change. Finally, local NGO's support to the project was obtain through a wide circulation of the project documentation.

REPUBLIC OF MAURITIUS
BIODIVERSITY RESTORATION PROJECT
Project Implementation Schedule

ID	Task Name	Duration
1	Project Effectiveness	0d
2	1. Rodrigues Island	1250d
3	A. Facilities at Solitude	52w
4	B. Equipment & materials	1250d
5	4WD Vehicle (1 unit)	12w
6	Motorbikes (2 units)	12w
7	Computer & softwares	12w
8	Horticultural equipment	24w
9	Technical Documentatio	250w
10	Horticultural supplies	250w
11	Supplies for Logistics	250w
12	C. Technical Assistance	1250d
13	Plant Conservation Offic	250w
14	Transportation costs	250w
15	2. Round Island	500d
16	A. Const. of a storeroom	100w
17	B. Field Equipment	52w
18	3. Iles aux Aigrettes	750d
19	A. Development of facilities	150w
20	B. Resident warden	250d

1995 | 1996 | 1997 | 1998 | 1999 | 2
Qtr 2 | Qtr 3 | Qtr 4 | Qtr 1 | Qtr 2 | Qtr 3 | Qtr 4 | Qtr 1 | Qtr 2 | Qtr 3 | Qtr 4 | Qtr 1 | Qtr 2 | Qtr 3 | Qtr 4 | Qtr 1 | Qtr 2 | Qtr 3 | Qtr 4 | Qtr 1 | Qtr 2

Project:
Date: 6/22/95

Task | Milestone | Summary

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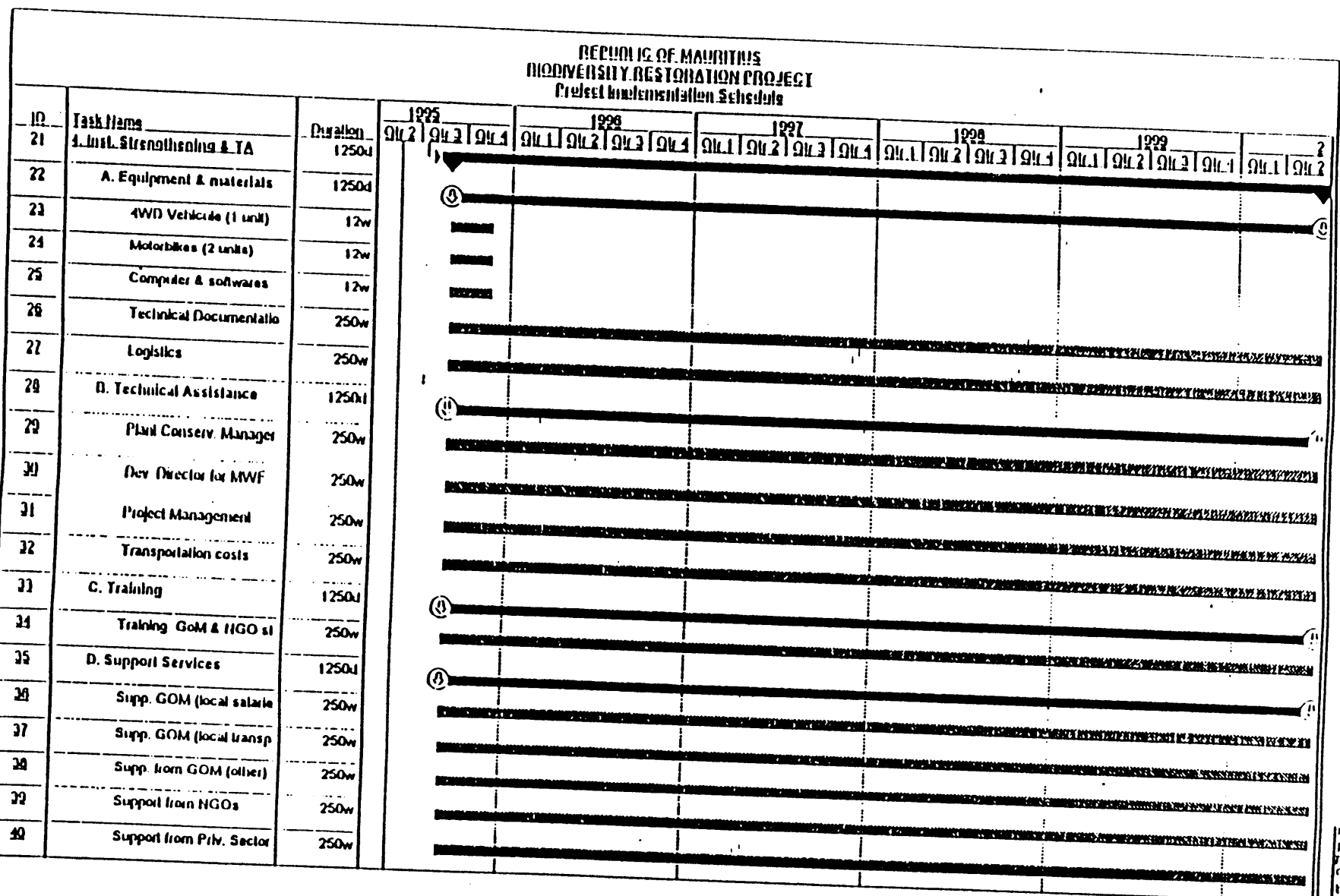
REPUBLIC OF MAURITIUS
BIODIVERSITY RESTORATION PROJECT
Project Implementation Schedule

ID	Task Name	Duration
21	1. Inst. Strengthening & TA	1250d
22	A. Equipment & materials	1250d
23	4WD Vehicule (1 unit)	12w
24	Motorbikes (2 units)	12w
25	Computer & softwares	12w
26	Technical Documentatio	250w
27	Logistics	250w
28	B. Technical Assistance	1250d
29	Plant Conserv. Manager	250w
30	Dev. Director for MWF	250w
31	Project Management	250w
32	Transportation costs	250w
33	C. Training	1250d
34	Training GoM & NGO st	250w
35	D. Support Services	1250d
36	Supp. GOM (local salarie	250w
37	Supp. GOM (local transp	250w
38	Supp. from GOM (other)	250w
39	Support from NGOs	250w
40	Support from Priv. Sector	250w



Project:
Date: 5'
Task
Milestone
Summary
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Page 4
5/2.

OUTLINE OF SEMI-ANNUAL PROGRESS REPORTS

1. The purpose of these reports is to provide information on significant events which occurred during the reporting period, together with an evaluation of progress achieved and the prospects of future progress. To this end, the information contained in the reports should cover at least the following aspects the project:

(a) physical work accomplished during the reporting period;

(b) a comparison of the actual progress at the end of the reporting period with the original forecast of progress at that date;

(c) actual or contemplated material deviations from the original plans or schedules, except that any such changes which would require prior consultation with the Bank should be reported immediately and subsequently included in the next report;

(d) other changes, events or conditions which would materially delay the implementation of the project or increase its cost; and

(e) the expected dates of completion of the principal physical elements of the project.

Works

2. Progress should be reported on all the main items of this component of the project as follows:

2.1 Preparatory work

2.2 Main items of works

- weeding,
- replanting,
- construction of buildings

2.3 Supervision of the above

2.4 MWF's activities and effectiveness

2.5 Cooperation between MWF and MOA

Equipment

3. Progress on procurement of equipment should be mentioned with particular reference to the:

- vehicles
- supplies

Technical Assistance

4. Information contained in the reports should include the following information:

- the selection of personnel,
- training, and
- the current status of the restoration (ie. number of hectares (ha.) restored; number of species propagated; number of species reintroduced).

Text of the Report

5. The text of the report should describe the work performed on each major item during the reporting period, following the heading given above. Where appropriate, the text should include explanations of and comments on the following:

(a) Actual or expected material deviations from the original (or amended) plan/design or implementation schedule.

(b) Actual or expected difficulties or delays, any measures taken or planned to correct them, and the probable effects on the implementation schedule.

(c) Expected changes in the completion date of any major part of the project or the project as a whole.

(d) Actual or expected delays in delivery of major items of equipment. Reasons for such delays should be given, and their possible effects on the implementation schedule should be estimated.

(e) Numbers in the work force of the private sector, MWF and MOA.

(f) Any actual or expected event or condition which may effect the cost of the project.

(g) Any unusual occurrences affecting the progress of the project.

(h) Project expenditures and disbursements and a comparison of actual with estimates and reasons for the deviation, if any.

Drawings

6. Drawings showing the lay-out of civil engineering works should be included. Construction progress should be indicated on the drawings by color or other markings.

Implementation Schedule

7. A bar chart should show separately scheduled and actual progress on principal activities of each project component.

SUPERVISION PLAN

Timing	Main Activities	Skills Required	Staff Weeks
9/95 (a)	Initial Review: (i) steps taken to comply with requirements for Grant effectiveness; (ii) preparation for bidding of works and equipment; (iii) selection staff; (iv) status of private sector participation; (v) local supervision arrangements; (vi) arrangements for monitoring, progress reporting and training	Project Management Ecologist.	3
(b)	Project Launch Workshop: Review of all key procedures of Bank-executing agencies interactions, procurement, disbursement, compliance with loan/loan covenants, implementation schedule, updating cost estimates and progress reporting requirements.		
2/96	General Supervision: (i) review overall progress of each component issues and agree on follow up action; (ii) review and reach agreement on arrangements for training.	Ecologist	2
9/96	Major Supervision: In depth review of implementation status with emphasis on: (i) Progress of restoration (No. of ha. restored); (ii) adequacy of ecological restoration (including structures); (iii) MWF's conduct of training; (iv) operating and financial performance of MWF.	Ecologist Civil Engineer	3

2/97	General Supervision: (i) review overall progress of each component identify issues and agree on follow up action; (ii) review and reach agreement on arrangements for training.	Project Management Operation	2
9/97 Mid-Term Review	Major Supervision: In depth review of implementation status with emphasis on: (i) contractor's performance; (ii) adequacy of ecological restoration; (iii) consultant's conduct of training; (iv) operating and financial performance of MWF	Project Management Ecologist	3
2/98	General Supervision: (i) review overall progress of each component identify issues and agree on follow up action; (ii) review and reach agreement on arrangements for training.	Project Management Operation	2
9/98	Major Supervision: In depth review of implementation status with emphasis on: (i) contractor's performance; (ii) adequacy of environmental protection measures; (iii) consultant's conduct of studies; (iv) operating and financial performance of MWF.	Ecologist Civil Engineer	3
2/99	General Supervision: (i) review overall progress of each component identify issues and agree on follow up action; (ii) review and reach agreement on arrangements for training.	Project Management Operation	2

9/99	Major Supervision: In depth review of implementation status with emphasis on: (i) contractor's performance; (ii) adequacy of environmental protection measures; (iii) consultant's conduct of studies; (iv) operating and financial performance of MWF.	Ecologist Civil Engineer	3
2/2000	General Supervision: (i) review overall progress of each component identify issues and agree on follow up action; (ii) review and reach agreement on arrangements for training.	Project Management Operation	2
9/2000	Major Supervision: In depth review of implementation status with emphasis on: (i) contractor's performance; (ii) adequacy of environmental protection measures; (iii) consultant's conduct of studies; (iv) operating and financial performance of MWF.	Ecologist	2
2/2001	ICR mission:	Project Management Ecologist	3

Total: 30 Person/weeks [1]

[1] This represents 50% of the time in the field and the other 50% in Headquarters for Project management and report writing.

DESCRIPTION OF PROJECT SITES AND RESTORATION PROGRAMS

1. Ile Aux Aigrettes

(a) Physical description

Ile Aux Aigrettes lies about a mile offshore along the South-Eastern part of Mauritius. It is a low-lying flat island of only 25 ha. Access is easy by boat through a shallow lagoon. There are simple quarters on the island for the warden and for the volunteers who work in the restoration project. There is also a small plant nursery. The island contains the last viable area for coastal ebony forest, a type of forest now lost on the island of Mauritius. However, the island is also heavily overgrown with invasive exotic plant species from the mainland, in particular the Chinese Guava, which threatens to outcompete the endemic species. Because of its easy access, flat topography and proximity to the mainland, the island will eventually be suitable for limited ecotourism.

(b) Conservation background.

Ile Aux Aigrettes has been leased for 20 years by the Mauritian Government to the Mauritius Wildlife Fund (MWF) which has started an ambitious restoration program. Invaluable assistance is obtained free of charge from the sugar estates which supply labor during the off-season. This labor is mainly used for weeding and planting. Recently, a reintroduction program has started for the Mauritius Kestrel and the Pink Pigeon which seems to be successful. A small group of Aldabra tortoises is held in captivity on Ile Aux Aigrettes for eventual release in the wild.

(c) Biological value of Ile Aux Aigrettes

After implementation of the project, Ile Aux Aigrettes will be the only area of coastal ebony forest in the Mascarenes. It will also harbor endemic species of fauna, the most important being the Mauritius Kestrel and the Pink Pigeon. Being isolated from the mainland, there is no threat from animals introduced on the mainland such as wild boars, deer or monkeys which have had such a disastrous effect on the native plants of Mauritius itself. Because it will be impossible to eradicate these species, the sustainable rehabilitation of large areas on the Mauritian mainland will

probably not be possible. Also, seed dispersion from exotics by wind and by birds will be much less than on the mainland and therefore it is to be expected, that once restored, Ile Aux Aigrettes will require much less maintenance than the restoration areas on the mainland.

(d) Ecological Restoration

The aim of the project is the complete restoration of the island, which means eradication of all exotic species by weeding and replanting the island with indigenous species. Much research will have to be done into propagation methods and optimal species composition. Already a remarkable success has been achieved in a few hectares and much experience has been gained for the implementation of the project. Within the first three months of the project, MWF will develop a year-by-year work program for the project and provide indicators of success.

2. **Round Island.**

(a) Physical Description

The uninhabited Round Island lies 22.5 km. NE of the Mauritian mainland, has an area of 151 ha. and rises to a height of 280 m. From a distance it looks like a dome shaped cone rising out of the sea. It is one of six small uninhabited islands immediately North of Mauritius.

Slopes are steep, averaging 10-15 degrees over the lower two-thirds of the island, and steepening to 20-25 degrees in the upper third. The crater, which has been breached and partly eroded away by wave action from the south-east, forms the eastern side of the island where the general slope is 32 degrees.

The rock throughout the island is composed of successive beds of tuff formed from deposits of volcanic ash and contained a few large boulders of solid basalt. High intensity rainfalls during cyclonic storms have cut ravines on all sides of the island which become deeper as the shoreline is approached. Physical weathering from wind and water is very active and the overlapping ash beds have been sculptured into numerous cavernous overhangs, steps pedestals and other weird shapes. The Northern end of the island is a mixture of cliffs, narrow ledges and very steep slopes, and the greater part of the shoreline is bounded by sheer cliffs 50-100 m. high. The combination of broken topography and weathered rock, which is often

treacherous for foot or hand holds, means that care must be exercised at all times in traversing the island.

Access by boat to the island is very difficult as there is usually a high swell and jagged rock descends steeply into the sea all around the island. There are a few ledges in places and the "easiest" way to get on shore is by swimming and climbing onto one of these ledges. This difficulty of access is at the same time a great advantage for the conservation of the island. The only safe and easy access for restoration parties in the future is by way of helicopter as has been done in the past.

(b) Conservation background.

Round Island was designated a Nature Reserve in 1957 and is administered by the Ministry of Agriculture, Fisheries and Natural Resources. Rabbits appear to have been introduced on the island in the late eighteenth century and goats around 1850. As has happened on many oceanic islands, the effect of these browsing and grazing mammals has resulted in dramatic degradation of the vegetative cover. The island's palm savanna community was seriously depleted and its hardwood forest lost altogether. When goats were eradicated from Round Island in 1979, followed by rabbits in 1986, the island became the largest area in the Mascarene group free of introduced mammals. After more than a century of destructive modification by these animals, as well as man, it suddenly became possible to begin reversing the trends which were taking the island's native palms, lizards and snakes to extinction.

(c) Biological values of Round Island.

Round Island has exceptional biological value in:

(i) Being the largest area, and the only relatively large island in the Mascarenes free of introduced mammals. It is also one of the very few remaining elevated tropical islands in the world that is rodent free.

(ii) Being the largest area of native vegetation and the only relatively large island in the Mascarenes free of major woody weeds.

(iii) Supporting the last remnants of a palm savanna once characteristic of the Northern Plain of Mauritius.

(iv) Providing habitat for at least ten species of threatened native plants including six species endemic to Mauritius.

(v) Providing habitat for eight species of native reptile including six species that are endangered: two geckos, two skinks and two primitive boa snakes. All of these species are endemic to the Mascarenes and four now occur only on Round Island.

(vi) Providing the only known breeding ground in the Indian Ocean for a race of the Herald Petrel (Ptrerodroma arminjoniana). The island has the largest breeding populations of wedge-tailed shearwaters (Puffinus pacificus chlororhynchus) and white tailed and red tailed tropic birds (Phaeton lepturus, Phaeton rubricauda) in the Mascarenes. Round Island may also support small breeding populations of Bulwer's petrel (Bulweria bulwerii), recorded only rarely in the Indian Ocean, Audubon's shearwater (Puffinus bailloni) and little shearwater (Puffinus assimilis), all of which have been found on the island between 1986 and 1988.

(d) Ecological Restoration

In 1989, the Mauritian Ministry of Agriculture in cooperation with the Jersey Wildlife Preservation Trust prepared a Management Plan for the Restoration of Round Island. This Management Plan provides a detailed timetable for essential management actions on Round Island for ten years. Restoration will initially focus on the palm savanna and re-establishment of the hardwood forest. Nine species of pioneer hardwood species have already been selected. Restoring locally extinct animals to Round Island is a longer term goal. The initial activities will mainly consist of weeding and monitoring trips three times per year and trials of reseeding and replanting of native species.

3. **Rodrigues.**

(a) Physical description.

Rodrigues, the second largest island belonging to Mauritius, lies 500 km. to the East of Mauritius. The central part of the island is mountainous with steep slopes and gorges in places where the remnants of the original largely endemic flora and fauna have found a last refuge, due to the inaccessibility of the terrain. Closer to the ocean, there are flatter areas. Unlike on Mauritius, the vegetation has not been cleared primarily for sugar cane cultivation, but for livestock ranching with equally devastating results.

Consequently, most of the vegetation is grassy and trees have mainly been planted to provide fruits or timber. The island is surrounded by extensive coral reefs which offer good opportunities for the development of marine ecotourism.

The main access to the island is by air and there are frequent flights from Mauritius.

(b) Conservation background

Less known than the Dodo of Mauritius, Rodrigues also had its flightless bird, the Solitaire, which similarly vanished soon after the island became settled. An endemic species of land tortoise was so numerous that ships made a special detour to stack their hulls with live tortoises which supplied their crews with fresh meat for months. They also became extinct within a short time. Special conservation efforts have so far been given to the endangered endemic Rodrigues fruit bat which is bred in captivity in the Jersey Zoo and in the Black River captive breeding station on Mauritius.

The Forestry Department is at present actively engaged in a reforestation program including the restoration with endemic tree species of three reserve areas: Grande Montagne, Cascade Mourouk and Anse Quitor. These areas are fenced off against cattle and goats and a weeding and replanting scheme is being implemented. The endemic species to be replanted are propagated in a nursery. Already an increase in the numbers of the two endemic bird species (Rodrigues Fody and Rodrigues Warbler) has been noted in Grande Montagne due to the early results of the restoration activities.

(c) Biological value of Rodrigues

The biological value of Rodrigues is considerable because of its high level of botanical endemicity. The only chance for this botanical richness to survive is in the three restoration areas. There are at least 45 endemic higher plants and trees on Rodrigues. Most of these are critically endangered, seven species survive with fewer than 10 individuals and of one (a species of wild coffee which may have commercial interest) only one individual is left. One species of Hybiscus (Hybiscus liliflorus) with beautiful pink flowers could have considerable potential as an ornamental plant. There are only two very old individuals left. Animal species of particular conservation interest are two species of highly endangered

endemic birds, the Rodrigues Fody and the Rodrigues Warbler and the endemic Rodrigues Fruit Bat.

(d) Ecological Restoration

The project will focus on three different areas, two are mountain slopes and one area is part of a river gorge. Of the surviving 45 endemic higher plant species of Rodrigues, 41 can be propagated in a nursery and planted in the reserves. Research will be carried out into the propagation technique of the other four which eventually might be propagated and planted as well. A major part of the work will consist of weeding exotics and fencing of the areas to prevent browsing by cattle and goats.

MAURITIUS

PORT DEVELOPMENT AND ENVIRONMENT PROTECTION PROJECT

PROJECT LOCATION

ENVIRONMENTAL COMPONENTS INCLUDE THE ISLANDS OF RODRIGUES, AUX AIGRETTES, AND ROUND ISLAND.

ROUND ISLAND

ARTERIAL ROADS

MOTORWAY

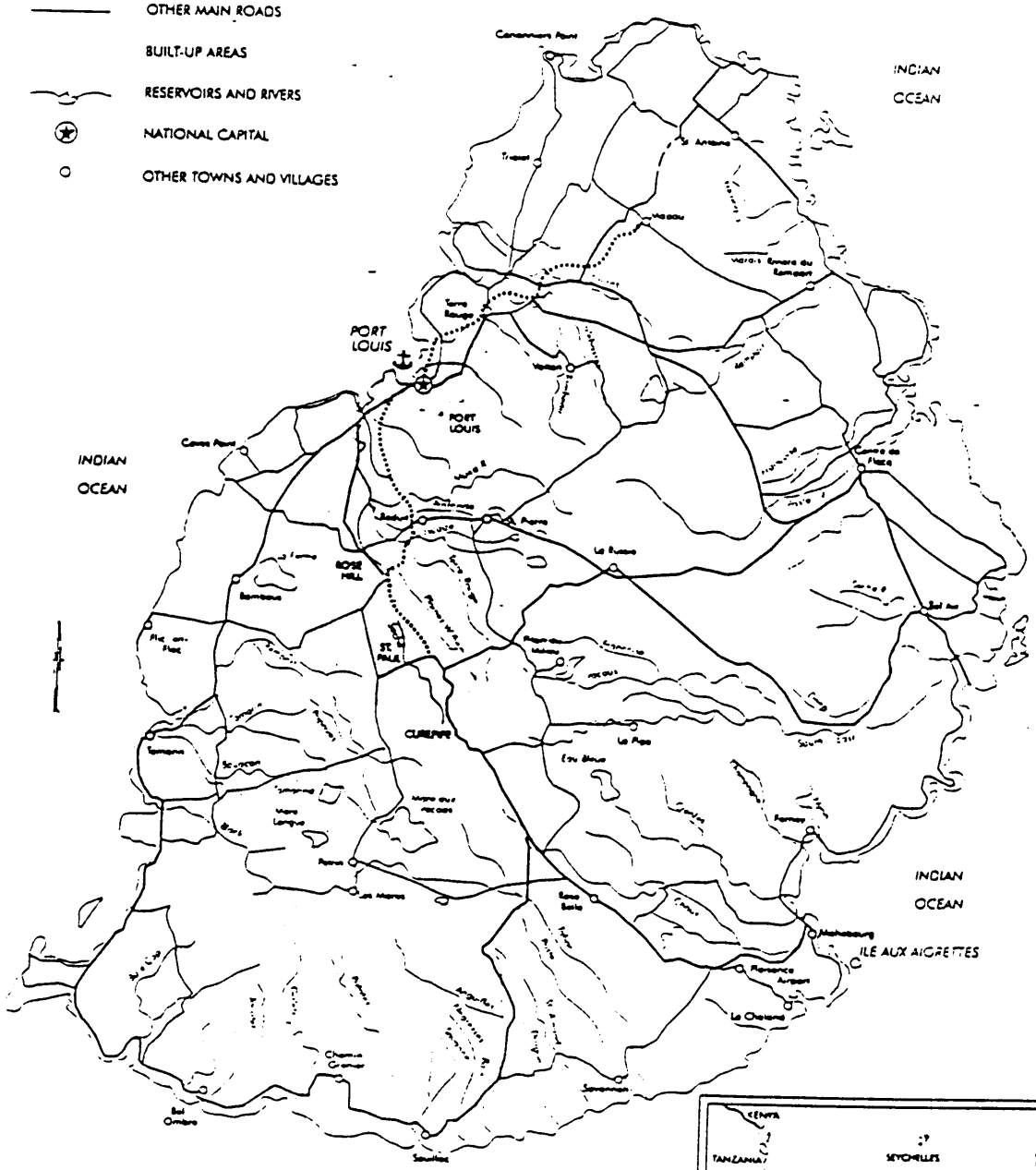
OTHER MAIN ROADS

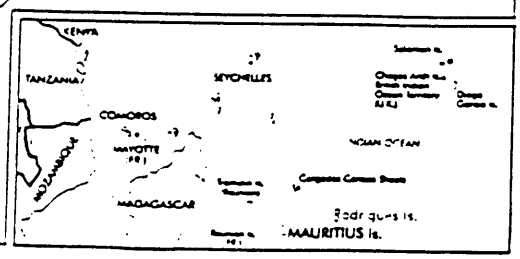
BUILT-UP AREAS

RESERVOIRS AND RIVERS

NATIONAL CAPITAL

OTHER TOWNS AND VILLAGES





MARCH 1995