No.

モーリシャス
沿岸資源・環境保全計画 F/U
運営指導調査団報告書

平成14年5月
（2002年）

国際協力事業団

自然水
JR
02-004

序　文

日本国政府は、モーリシャス共和国政府からの技術協力の要請を受け、「モーリシャス共和国沿岸資源・環境保全計画」を 1995 年 12 月から 2000 年 11 月まで 5 年間実施し、その後本体プロジェクトの F/U として同年 12 月から技術協力プロジェクト「沿岸資源・環境保全計画 F/U」を開始しました。

その協力開始後 2 年目にあたり、国際協力事業団(JICA)は、本計画の現状と進捗状況を把握し、同国の関係者や派遣専門家に対してプロジェクトの運営に関する指導と助言を行うため 2002 年 4 月 6 日から 4 月 15 日まで、海外漁業協力財団　技術顧問　松岡　玳良氏を団長とする運営指導調査団を派遣しました。

調査団は、モーリシャス政府関係者との協議およびプロジェクトサイトでの現地調査を実施し、プロジェクトの運営や事業内容などを検討し、必要な指導を行いましたが、この報告書はその結果を取りまとめたものです。

今後、本報告書がプロジェクトの推進に役立つとともに、この技術協力事業が両国の友好親善に一層寄与することを望みます。

終わりにあたり、この調査にご協力とご支援を賜った関係の皆様に対し、心から感謝の意を表します。

2002 年 5 月

国際協力事業団
理　事　鈴木　信毅

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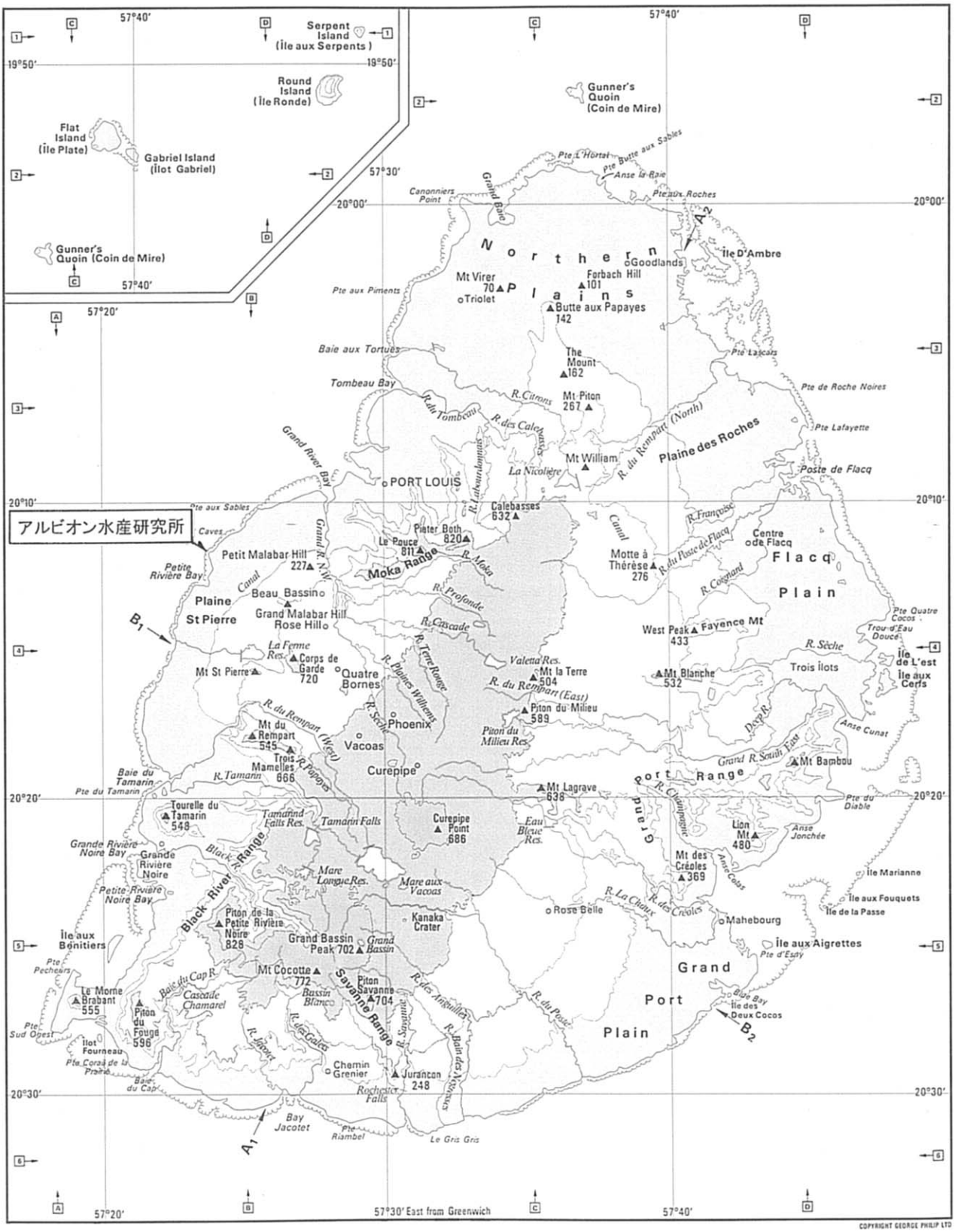
アルビオン水産研究所
Serpent Island (Île aux Serpents)
Round Island (Île Ronde)
Flat Island (Île Plate)
Gabriel Island (Îlot Gabriel)
Gunner's Quoin (Coin de Mire)
Northern Plains
Goodlands
Île D'Ambre
Mt Virer 70
Triolet
Forbach Hill 101
Butte aux Papayes 142
The Mount 162
Mt Piton 267
Mt William
Plaine des Roches
PORT LOUIS
Calebasses 632
Pieter Both 820
Le Pouce 811
Moka Range
Petit Malabar Hill 227
Beau Bassin
Grand Malabar Hill
Rose Hill
Plaine St Pierre
Mt St Pierre
Corps de Garde 720
Quatre Bornes
Phoenix
Vacoas
Curepipe
Mt du Rempart 545
Trois Mamelles 666
Motte à Thérèse 276
Centre de Flacq
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Fayence Mt
Mt Blanche 532
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Tourelle du Tamarin 548
Tamarind Falls Res.
Tamarin Falls
Curepipe Point 686
Eau Bleue Res.
Lion Mt 480
Mt des Créoles 369
Black River Range
Grande Rivière Noire
Mare Longue Res.
Mare aux Vacoas
Piton de la Petite Rivière Noire 828
Kanaka Crater
Grand Bassin Peak 702
Rose Belle
Mahebourg
Île aux Aigrettes
Île aux Benitiers
Mt Cocotte 772
Piton Savanne 704
Savanne Range
Le Morne Brabant 555
Piton du Fouge 596
Grand Port Plain
Chemin Grenier
Jurancon 248
Rochester Falls
Bay Jacotet
Le Gris Gris
Île Marianne
Île aux Fouquets
Île de la Passe
Anse Jonchée
Anse Cunat
Trou d'Eau Douce
Pte Quatre Cocos
Pte du Diable
Pte d'Esny
Ile des Deux Cocos
Baie du Cap
Pte Sud Oest
Pte Pecheurs
Pte aux Sables
Pte aux Piments
Pte aux Roches
Pte Lascars
Pte de Roche Noires
Pte Lafayette
Poste de Flacq
Baie aux Tortues
Tombeau Bay
Grand River Bay
Petite Rivière Bay
Grande Rivière Noire Bay
Petite Rivière Noire Bay
Baie du Tamarin
Pte du Tamarin
Canonniers Point
Anse la Baie
Grand Baie
Caves
Canal
Îlot Fourneau
Pte Coraz de la Prairie
Cascade Chamarel
Baie du Cap R.
R. Tombeau
R. des Calebasses
R. Citrons
R. Labourdonnais
R. du Rempart (North)
R. Poste de Flacq
R. Françoise
R. Congrand
R. Moka
R. Profonde
R. Cascade
R. Terre Rouge
R. Plaines Wilhems
R. Sèche
R. du Rempart (East)
R. Tamarin
R. Papayes
R. Champagne
R. La Chaux
R. des Créoles
R. des Anguilles
R. du Poste
R. Rivière des Anguilles
R. Jacquot
R. des Galets
Deep R.
Grand R. South East
Valeta Res.
Piton du Milieu Res.
Rochester Falls
57°40'
57°30'
57°20'
19°50'
20°00'
20°10'
20°20'
20°30'
57°30' East from Greenwich
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1　運営指導調査団の派遣

1-1　調査団の目的

本調査の目的は、当初計画及び年次計画に基づいて、終了時評価以降のプロジェクトの活動実績、カウンターパートへの技術移転状況、資機材等の利用・管理状況などについて目標達成度を調査し、評価の５項目（目標達成度、効果、効率、妥当性、自立発展性）の観点より評価を行うことである。

また、同評価に加え、協力終了後のプロジェクトの運営体制についても協議・確認を行う。

1-2：調査団の構成

・総括（2002 年 4 月 6 日～4 月 15 日）

松岡　玳良　財団法人　海外漁業協力財団　技術顧問

・評価管理（2002 年 4 月 6 日～4 月 15 日）

三村　一郎　国際協力事業団　森林・自然環境協力部　水産環境協力課

1-3　調査日程

			行程	調査内容
1	4月6日	土	東京→シンガポール	移動
2	4月7日	日	シンガポール→モーリシャス	移動、団内打ち合わせ、専門家との打ち合わせ
3	4月8日	月		水産省、経済企画省、AFRC表敬、専門家との打ちあわせ
4	4月9日	火		Ｃ／Ｐ及び専門家との個別インタビュー
5	4月10日	水		Ｃ／Ｐ及び専門家との個別インタビュー、AFRC にて協議
6	4月11日	木		AFRC にて協議、ミニッツ案作成
7	4月12日	金		ミニッツ署名
8	4月13日	土		現場調査（バラショア内養殖調査等）
9	4月14日	日	モーリシャス→	現場調査、移動
10	4月15日	月	→シンガポール→東京	

1-4：主要面談者

モーリシャス側

S.Fowder, Permanent Secretary, Ministry of Fisheries(MOF)

A.K.Utchanah, Principal Assistant Secretary,MOF

M.M.Munbodh, Chief Fisheries Officer,MOF

I.Jehamgeer, Principal Fisheries Officer,MOF
S.Rathacharen, Ag.Divisional Scientific Officer
A.Venkatasami, Divisional Scintific Officer,MOF
R.Moothien Pillay, Project Officer,IOC
C.N.Paupiah, Scientific Officer,MOF
O.Venkatasami, Scientific Officer,MOF
S.Khadum, Scientific Officer,MOF
S.Ramsaha Scientific Officer,MOF

日本側
沿岸資源・環境保全計画 F/U 専門家
・岩本　浩（プロジェクト・リーダー/資源増殖）
・播磨　秀一（業務調整）
・寺島　裕晃（沿岸生態調査）
個別専門家
・横川　次寛（水産開発プランナー）

1-5：協力実施の経過

相手国の要請内容と背景

2000 年 6 月に派遣された「モーリシャス沿岸資源環境・保全計画」（1998.12.1～2000.11.30）終了時評価調査の結果、本プロジェクト所期の目標達成には（「沿岸水産資源の増養殖及び生態系・環境調査について、AFRC(Albion Fihsery Research Center)の関連部署が有機的に機能し、研究能力が総合的に向上する」)、「健全で安定的な種苗生産」及び「サンゴ礁保全調査」分野での更なる技術向上が不可欠であるとの提言を受け、2000 年 12 月から引き続き、「資源増養殖」及び「沿岸生態調査」分野で、3 名の長期専門家体制の下（チームリーダー/資源増殖、業務調整、沿岸生態調査)、2 年間のフォローアップ協力が開始された。

フォローアップ開始後、「資源増養殖」部門では、ノコギリガザミ、ヘダイ両種ともにその生産手法に大きな向上が見られ生産能力が高まってきており、「沿岸生態調査」部門では、沿岸生態系調査関連技術に関して「モ」国水産省内外で評価を得るまでのレベルに達しつつある。

1-6：プロジェクト目標と活動内容

プロジェクト目標

沿岸水産資源の増養殖及び生態系・環境調査について、AFRC の関連部署が有機的に機能し、研究能力が総合的に向上する。

活動内容

○（1）種苗生産手法を確立する（アミメノコギリガザミ、ヘダイ）。

○（2）適正な放流手法を確立する。

（3）適正な親養成手法を確立する。

（4）沿岸環境モニタリングシステムを構築する。

○（5）沿岸生態研究及びモニタリング技術の方法を確立する。

（注）：○はＦ/Ｕ活動内容

2　プロジェクト全体評価

2-1：投入実績

（1）日本側投入

1）専門家派遣：チームリーダ/資源増殖、業務調整、沿岸生態調査の各分野において 3 名の長期専門家が派遣されている（下表参照）。また、必要に応じて２名の短期専門家が派遣され、プロジェクト終了までに更に１名が派遣される予定である。（下表）

-長期専門家一覧-

専門家氏名	分野	派遣期間
岩本　浩一	チームリーダー/資源増殖	1999.1.9-現在
播磨　秀一	業務調整	1998.11.14-現在
寺島　裕晃	沿岸生態調査	1998.5.16-現在

-短期専門家一覧-

専門家氏名	分野	派遣期間
清水　智仁	アミメノコギリガザミ種苗生産	2001.11.3-2002.1.15
内田　紘臣	サンゴ分類	2002.1.22-2002.2.19
野島　哲（予定）	サンゴ個性生態学	2002.7.22-2002.8.19

2）研修員受入：本フォローアップ実施期間、２名のカウンターパートを研修員として受け入れた。プロジェクト終了までに更に１名の受入を予定している（下表）。

-カウンターパート研修一覧-

研修員氏名	分野	研修期間	主な研修先
S.RAMKISSON	海水養殖	2001.6.25-2001.11.3	神奈川国際水産研修センター
K.R.M.PILLAY	サンゴ個体群生態学	2001.8.6-2001.9.22	九州大学天草臨海研究所

CODABACCUS BASSEER（予定）	島嶼におけるハタ類増殖資源管理	2002.5-2002.8	（社）日本栽培漁業協会

３）機材供与：フォローアップ実施中、日本側から、主に揚水ポンプ、フィッシングネット、プランクトンネット等が供与された（機材詳細については、別添資料参照)。

（２）モーリシァス側投入

１）運営費負担：本フェーズ（モーリシァス側負担額、1，020 万ルピー）に引き続き、フォローアップ期間中も、300 万ルピー（約 1，250 万円）が AFRC 全研究予算（他プロジェクト分も含む）として計上されており、電話代、電気代、機材引き取りに係る諸経費等は支障なく負担してきた。

２）職員配置：沿岸生態調査分門の研究員１名が、MRI (Marine Research Institute)に出向中ではあるが、引き続き本プロジェクト活動のために適切なカウンターパートが配置された。

３）施設：AFRC 内に本プロジェクト用執務室及び研究室が配置され、維持管理は適切に行われている。

2-2：活動実績

（１）資源増養殖分野

＊種苗生産

＜目　　標＞アミメノコギリガザミ、ヘダイの種苗生産技術を開発する

＜活　　動＞

アミメノコギリガザミ：

・幼生初期の減耗要因の特定と対策
・真菌防除手法の改善
・細菌性疾病防除試験手法の開発

ヘダイ：

・形態異常魚確認のための、骨格染色技術の改善
・形態異常魚の防止対策開発

＜成果の達成状況＞

アミメノコギリガザミ：

2000-2001

・F/U 初年度 1,081 尾の稚ガニ（C1）が生産された。
・改良飼育２区で両区４水槽とも 1kl あたり 500 尾の稚ガニ（C1）が生産された。
・改良飼育２区で両区４水槽とも Z5 での生残率 50%以上が達成された。

2001-2002

・第一回次生産試験で、初年度同様の改良飼育区で３水槽とも Z5 での生残率 50%以上であった。

・上記飼育区から 501 尾の稚カニを得た。

ヘダイ：

・更に簡易で低単価な骨染色技術を開発した

・当初 60%程度あった異常発生率が 10%程度まで低減した

＊放流調査

＜目　　標＞放流調査手法の習得

＜活　　動＞

ヘダイ：

・標識試験

・ラグーン内放流試験

＜成果の達成状況＞

ヘダイ：

・合計２回の大型魚（全長 10㎝以上）の放流試験（940 尾）を行った。

・焼印標識以外の標識手法として、スパゲッティ型・ナイロン糸方式を導入した。

・アルビオンラグーン内外での放流群の移動パターンが明らかになりつつある。

（２）沿岸生態調査分野

＊サンゴデータベースの充実およびサンゴ図鑑の作成

＜目　　標＞　モーリシァスに分布するサンゴの現状を把握するため、データベース、サンゴ図鑑を作成する。

＜活　　動＞

・サンゴの標本採集および標本同定

・サンゴ・データベース、サンゴ図鑑の作成

＜成果の達成状況＞

・本格フェーズ終了時評価以降、2002 年 2 月 20 日現在までに 31 回のサンプリングを行ない、267 標本を収集した。今後さらに複数回のサンプリングを予定している。

・現在、採集標本および撮影写真の整理・同定作業中である。2002 年 2 月 20 日現在、サンプリング１から 31 までの同定を終了し、14 科 45 属 154 種を記録した。1 月 25 日から 2 月 17 日まで約 3 週間、短期専門家として活動していただいた内田紘臣博士にも同定種の確認をしていただいた。しかし、採集した標本の中には同定が非常に難しい、あるいは未記載種である可能性が高いものが複数含まれており、今後さらに詳細な分析が必要である。

・データベース、サンゴ図鑑に使用する写真･説明文についても、前述の内田博士にアドバイスをお願いし、4 月中に初校を完成、その後、内田博士や AFRC 海洋科学部長の査読を経て 9 月中に最終原稿を完成させ、10 月中に印刷が終了する予定である。

＊個体群生態学

＜目　　標＞　サンゴ礁管理を行なう上で重要なサンゴ個体群生態学についての理解を深める。

＜活　　動＞

・サンゴ産卵状況の把握
・稚サンゴ着定状況の把握
・サンゴ白化状況の把握

＜成果の達成状況＞

・2001年10月下旬からAlbionラグーン内の枝サンゴの抱卵状況をモニターし、同ラグーンの優占種であるミドリイシ類の産卵が10月28日に行われたことを確認した。C/Pは、エダサンゴの抱卵確認、産卵日確認手法に習熟した。
・2000年に設置した244枚の稚サンゴ定着板上で1,250の稚サンゴを計数した。現在、稚サンゴの競合生物となる管棲ゴカイや海綿類の着生状況を整理･記録中。2001年のサンゴ産卵前に計400枚の稚サンゴ定着板を設置した。2月～3月中に回収して稚サンゴ着生状況を記録する予定。
・2000-2001年の夏期に観察したAlbionとGrand River South Eastのサンゴ白化状況の推移を約半年に渡ってモニタリングした。現在、データ整理中。

＊報告書・論文の作成

＜目　　標＞　科学論文の作成に習熟する。

＜活　　動＞

・本格フェーズの活動で蓄積されたデータ・資料をもとにした出版物・論文の作成。

＜成果の達成状況＞

・本格フェーズ中に準備した魚類図鑑「Field guide to Coastal Fishes of Mauritius」が出版され、関係機関に配布された。
・本格フェーズ中に準備した生物統計学テキスト「Basic Biostatistics for Marine Biologist」が出版され、関係機関に配布された。
･5/3-4にモーリシャス大学で行なわれたAnnual Meeting of Agriculture ScientistsでFlic en Flacのサンゴ礁、生物生息状況について発表すると共に、紀要に掲載する論文を作成、提出した。
・2000年11月に投稿した「Holothurian distribution in the lagoon at La Preneuse and Baie du Cap, Mauritius, Indian Ocean」が、海生研研報（Rep.Mar.Ecol.Res.Inst.）に受理され、2001年にレフェリーコメントに従って改訂した後、2001年6月に発行された。
・本格フェーズ中のサンゴ白化調査のデータを元に作成した論文「The extent and intensity of a mass bleaching event on the reefs of Mauritius, Indian Ocean」を2001年11月に日本サンゴ礁学会誌GALAXEAに投稿し2002年2月に受理された。今後レフェリーコメントにしたがって改訂する予定。
・本格フェーズ中の魚食魚胃内容物調査に関する報告書に基づいて作成した「Stomach contents analysis of some carnivorous fishes from various Barachois in Mauritius」を2001年12月にモーリシャス大学紀要に投稿した。現在、論文審査中。
・本格フェーズで行なった長期モニタリング結果を元に論文作成中。また、結果を元にプ

レゼンテーション用のV/Asを作成し、ステアリングコミッティおよび国内支援委員会、前述の内田博士の来モ中に行なわれたセミナーで口頭発表された。

2-3：評価結果

2-3-1：効率性

・投入のタイミングの妥当性：一部機材について、現地調達ルートの開拓に時間を要したことにより機材供与が遅れ、活動の進捗に影響を与えた（本試みは、プロジェクトの持続性維持の点から不可欠であると考えられる。また、ルート開拓後は、計画通り調達できている）。その他の投入については、ほぼ計画通り行われた。

・投入と成果の関係：機材の購送に係る税関手続き、免税措置及び水産省側の予算執行に時間を要し活動の進捗に影響を与えた。その他の投入については、ほぼ計画通り行われた。

2-3-2：目標達成度

・種苗生産手法の確立：

ノコギリガザミ

・容量５m^3以下の小型水槽を用いた種苗生産の基本的技術は習得された。また、餌生物の栄養価・真菌制御手法等への理解力も高まり、これらを検討するための実験手法も移転された。

ヘダイ

・基本的な飼育技術はプロジェクトの本格フェーズでほぼ習得していたが、F/Uでは前湾症防止対策を軸として種苗生産手法の改善が図られた。これらを通じて単位当たり生産性の向上・生残率の向上が見られた。骨格観察のための手法が開発され、C/Pによって全工程が処理できるようになった。この手法は、他魚種を含み、生態学検討にも必要な手法であり、今後応用範囲は広い。

・適正な放流手法の確立：焼印標識手法は簡単であるが、焼印時の魚体へ負荷が大きく、時として標識後の斃死を招き安いが、小型魚への適用も含み技術向上が見られ、処理後の斃死はほとんど見られなくなった。焼印標識のみでは、より正確な成長・成熟過程等の追跡は困難で、F/Uで新たにスパゲティ型のタグを採用しその利用手法を開発した。更に、簡易・低コストでエビ類にも活用可能なナイロン糸による標識の製作・装着手法も習得した。

・沿岸生態系研究およびモニタリング手法・技術の確立：沿岸生態系調査関連の技術向上

に関してはモ国水産省内外で高く評価されている。また、関係省庁が企画する沿岸環境の現況調査・モニタリングでの実質的な作業は、現在、生態系調査ユニットを中核とするAFRCに全て依存していると言っても過言ではない。このような現状から見てAFRCの関連部署が有機的に機能していることは自明であり、本成果がプロジェクト目標につながった度合いは、非常に高いと考えられる。

2-3-3：インパクト

・直接的効果：近年、モ国の沿岸開発が加速度的に増加する中、国民の沿岸資源・環境保全に関する関心も強くなってきている。沿岸生態系保全を目的とする様々な現況調査、モニタリングが、モ国環境省を始めとする内外関係省庁で開始または企画されており、プロジェクト実施によって、これらの調査能力を高めたAFRCの生態調査部門への依存度・期待度が非常に高くなった。資源増殖分野では、民間によるヘダイの海面生簀養殖計画（年間最大1，000トンを生産する計画）がすでに政府の許可を得て具体化しつつあり、それと同規模の計画も別の業者から出ており、これらプロジェクトF/Sの検証過程において、これまでプロジェクト活動を通じて得られた技術・知識情報が広く生かされている。今後は、漁場保全の観点からこれら業者へのより質の高い指導体制が必要になるであろう。

・間接的効果：魚類図鑑や各種出版物の製作・配布やヘダイ放流事業の広範なメディア報道などにより、沿岸環境生態系保護の啓蒙・普及が行えた。本格フェーズで完成させた魚類図鑑や生物統計学テキストは、AFRC内だけでなくモ国内外の調査・研究者の間でも広く利用されており、F/U終了までに出版予定のサンゴ図鑑を含めたこれら出版物は、沿岸資源の利用、沿岸環境の保全を継続的に行なう際の有効な参考図書となるものであると同時に日本の技術協力のプレゼンスを一般に広く広報する最適な材料となった。

資源増殖部門で対象魚種としたノコギリガザミの種苗生産技術・良質な魚類種苗生産技術あるいは放流技術はインド洋アフリカ沿岸国では未開発のものであり、これらの技術が確立されれば、今後モーリシャスがこれらの分野で国際的に指導的役割に立つこととなり、国際的評価が高まる事が期待される。

2-3-4：妥当性

・上位目標の妥当性：

・モーリシァスの水産開発政策は、「環境保全・資源保全を図りながら水産振興をはかる」ことであり、本プロジェクトの上位目標は現在でも妥当である。

・環境産業の著しい発展により、沿岸魚介類の需要は急激な増加がみられており、増

養殖分野の発展は期待されている。

・沿岸環境保全は沿岸漁場環境の保全と同時に沿岸観光産業の発展維持のために重要である。

・プロジェクト目標の妥当性：水産生物はモーリシャス国民の重要なタンパク源であり、かつ、著しい観光産業の発展により沿岸魚介類の急激な需要の増加がみられる。また、沿岸域の環境・生態の持続的な保全と同時に沿岸観光産業の開発・発展との共生のためにもきわめて重要である。そのためにもモーリシャス国唯一の水産環境研究機能を備えたAFRCの機能向上は不可欠であり、本プロジェクト目標は妥当である。

・計画設定の妥当性：成果及び投入として、資源増養殖、生態調査と上位目標達成に必要不可欠な分野が含まれており、上位目標、プロジェクト目標達成との相互関連性は妥当である。

2-3-5：自立発展性

・制度的側面：アルビオン研究所は、モ国における海洋環境調査を所掌する監督機関である。特に近年、沿岸環境生態調査の重要性が増しており水産開発10年計画に基づきより最適な運営管理体制への移行を図っているところであるが、全体的な予算の制限などで人的な拡充が容易ではない状況は依然変わっていない。小国であることの利点をいかして、環境省など他関連の機関とも、より一層連携を深めることでAFRC内に留まらず、移転技術の伝播を促進し国家レベルで持続的かつ重複のない効率的な調査体制が一層整備されるよう制度面の見直しが将来的に必要となろう。カウンターパートの定着率は高いが、FA(Field Assistance)は臨時職であり異動がたびたび行われている。各種調査においては、FAの知識･技術の向上も不可欠であることからFAの継続雇用とその重要性の再認識が望まれる。

・財政的側面：必要最低限な財源は確保されており、金額的な面では自立発展性は十分に期待できるレベルに有る。ただし、予算執行、調達事務には時間を要することが少なくなく、迅速な処理手続きができる体制を構築する事が望まれる。

・技術的側面：現在、アルビオン研究所の機材の保守管理体制は充分とはいえないが保守メンテナンス契約を予算処置するなどの努力はしている。一方、適当なサービス事業者が任国内に存在しない等の環境的制約もあり今後に体制構築の課題を残している。

3　提言

＊資源増養殖分野：

・ヘダイについては、プロジェクト終了までに後１回のトライアルが行える可能性が残されており、また、アミメノコギリガザミでは、現在抱卵親カニをかなり有しており、これらがふ化すれば、更に追加試験結果が得られる可能性がある。

・ヘダイ生産は数量的にもほぼ当初の目標値を達成し、形態異常魚の発生率も大幅に低減されており、成果が認められている。また、C/Pレベルでも、親魚確保から採卵、種苗生産、餌料培養等の一連の技術を習得し、仕事柄不可欠な休日出勤も輪番制で実施されており、生物の飼育とはいえ、とかく困難な国が多い中で、これが実施されていることは高く評価できる。この分野については早晩同国独自で、種苗の量産化が図れるものと思われる。

・本邦でも種苗の量産化が困難であり、諸外国でも未だに成功していないアミメノコギリガザミについては、F/U期間中、２年間とも種苗の生産には成功し、初期生産は目処が立ったようではあるが、ゾエア期後期の飼育には未だ問題が残されており、量産化にはもう少し時間を要すると思われる。

＊沿岸生態分野：

・サンゴ虫類の同定・分類、データーベースの作成等が精力的になされており、１５０種以上の入力がなされ、終了時までにはガイドブックの発刊がなされる等、予定通りの進捗状況であり、一部のC/Pのレベルの知識及び技術も著しく向上していることから高く評価できる。このガイドブックは、先に発刊された魚類の部と共にインド洋珊瑚礁海域では恐らく初めての刊行物となり、世界的にも注目され高く評価されるものと確信する。これが契機ととなり、今後他の動物及び海藻類等についての仕事がなされれば、同国の学術的地位の向上、海洋国としての認識が更に高まることは必至で、今後の活動が期待される。

＊両部門（資源増養殖分野、沿岸生態分野）とも同国の年報は無論のこと一部は国際的な学術雑誌にも投稿されている。これらの結果は最終時点で「業績集」として一覧表化する等して明記することがプロジェクト終了までの期間に求められる。

＊当プロジェクトで今までに実施した各活動項目についてはAFRCの所長及び副所長格の方々が、当プロジェクト終了後も引き続き実施することを明言し、持続的発展性の面からも今後の活動に期待ができる。

＊養殖分野の成果の受け皿は、同国でも徐々にではあるが育ちつつあり、バラショアという古来からの粗放的養殖の基盤がある当国では近い将来量産された種苗がこれらを始めとした民間業者に配布され、同国の養殖産業の発展に寄与するものと思われる。

＊本体プロジェクト期間内で実施していた海洋環境分野について、今回併せて協力終了後の同分野活動調査を実施したところ、協力時に実施していたモニタリングポイントに加え、更に6箇所を定点として増加させＣ／Ｐ独自で供与機材をフルに活用していることが確認された。

＊個別派遣専門家の時代から実施していたウシエビの種苗生産は、若干の餌料生物培養技術等の指導は行ったようであるが、現在では既にC/Pレベルで完全に親エビ確保から採卵、種苗生産まで実施しており、今年度も約２０万尾の生産ができており、アフリカでは１～２を競う技術となっている。同国における各種の調査・技術開発・研究協力はほぼ開花したといってよく、本プロジェクトは成功事例と思われる。

＊増養殖分野では、餌料生物の安定培養、変形魚発生率の数%台への低減、アミメノコギリガザミゾエア期４期以降の歩減り防止対策、沿岸生態分野では新たな地球環境の変化に伴うと思われる、サンゴの白化現象の正確な把握やこれの防止対策、C/Pの国際学会等での活躍、学位等の取得等が今後、プロジェクト成果を踏まえ検討を行う必要があると思料された。また、より一層プロジェクト活動成果を積極的に外部に対して伝える（一般者への環境教育、企業化を目指す養殖業者等への技術指導、等）ことが、国内外から求められている。

添　付　資　料

・　調査団議事録（M/M）

・　質問票要約

・　沿岸環境調査分野活動状況

・　ＰＤＭ

・　機材利用・管理状況

・　日本側・相手国側投入実績一覧表

・　Ｃ/Ｐ配置一覧表

・　組織図

調査団議事録（M/M）

THE MINUTES OF MEETING
BETWEEN
JAPANESE MANAGEMENT CONSULTATION TEAM
AND
THE AUTHORITIES CONCERNED OF THE GOVERNMENT OF THE REPUBLIC OF MAURITIUS
ON JAPANESE TECHNICAL COOPERATION
FOR
THE COASTAL FISHERIES RESOURCES AND ENVIRONMENT CONSERVATION PROJECT

The Japanese Management Consultation Team (hereinafter referred to as "the Team") organized by the Japan International Cooperation Agency (hereinafter referred to as "JICA") headed by Mr. Taira Matsuoka visited Mauritius for the purpose of evaluating the Coastal Fisheries Resources and Environment Conservation Project (hereinafter referred to as " the Project") from April 7 to April 14 in 2002.

During its stay, the Team has carried out a field survey and held a series of meetings with the Mauritian authorities concerned.

As a result of survey and meetings, both sides agreed to report to their respective Governments the matters referred to the documents attached hereto.

Port Louis, April 12, 2002.

Mr. Taira Matsuoka
Leader, Japanese Advisory Team
Japan International Cooperation Agency
Japan

Mr. S. Fowdur
Permanent Secretary
Ministry of Fisheries
Republic of Mauritius

Follow-up Project
for
The Coastal Fisheries Resources and Environment Conservation Project in Mauritius

Evaluation Report

Japanese Management Consultation Team
Organized by
Japan International Cooperation Agency
and
Ministry of Fisheries
Republic of Mauritius

April 12 2002

Evaluation Report
on
the Follow-up Project
for
the Coastal Fisheries Resources and Environment Conservation Project in Mauritius

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Evaluation Report
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in Mauritius

1. INTRODUCTION

Based upon the Record of Discussions (hereinafter referred to as "R/D") signed on November 6, 2000, the Government of Japan and the Government of the Republic of Mauritius agreed to the implementation of the Follow-up Project for the Coastal Fisheries Resources and Environment Conservation Project for the period of two (2) years commencing from December 1, 2000. The completion date is November 30, 2002 (Refer to ANNEX I).

In order to conduct the final evaluation precisely and efficiently, JICA dispatched the Management Consultation Team to Mauritius to evaluate the Project jointly with the Mauritian side and to give advice on the Project implementation for the remaining period and the Team has employed the JPCM (JICA Project Cycle Management) Methods. The following is a summary of the evaluation.

2. OBJECTIVES OF THE EVALUATION

The Objectives of the Project evaluation are as follows:

(1) To evaluate the achievements of technical cooperation and to give advice on the implementation of the Follow-up project for the remaining period.

(2) To recommend and suggest necessary measures to be taken after the termination of the Follow-up Project to the authorities of the respective Governments.

3. METHODOLOGY OF THE EVALUATION

3-1. Survey

The Project was evaluated jointly by the Japanese and Mauritian sides. The Team visited the Project site and had a series of interviews with Japanese Long-term experts and Mauritian counterpart personnel.

The JPCM evaluation methods is based on the Project Design Matrix (hereinafter referred to as"the PDM"), which shows the logical inter-relationships between components of the Project. The first PDM of the Project was prepared in July 2000 when the Japanese Evaluation team visited the Project. For evaluating the Follow-up phase, the Team amended the PDM again to adapt it to the current situation, then prepared the PDM for evaluation (PDME), which is shown in ANNEX II .

3-2. Items of the Evaluation

3-2-1. Accomplishment of the Project

Accomplishment of the Project has been measured in terms of its Inputs, Activities, Outputs and Project Purpose, all of which are stated in the R/D, Tentative Schedule of Implementation (TSI), PDM.

3-2-2. Analysis of Evaluation Issues

(1) Efficiency

Efficiency of the Project implementation was analyzed focusing on the relationship between Outputs and Inputs in terms of timing, quantity, and linkage with other cooperation schemes of JICA and other organizations.

(2) Effectiveness

Effectiveness was assessed by evaluating the extent to which the Project has achieved Outputs and the Project Purpose.

(3) Impact

Impact of the Project Activities was identified as Positive and Negative changes produced by the Project Directly and Indirectly (including unexpected change)

(4) Relevance

Relevance of the Project was reviewed as the validity of the Project Purpose and Overall Goal in connection with the development policy of the Government of Mauritius and the needs of the beneficiaries .

(5) Sustainability

Sustainability of the Project was focused on Organizational, Financial and Technical Aspects by examining the extent to which the achievement of the Project will be sustained or expanded after assistance is completed.

4. RESULTS OF EVALUATION

4-1. Accomplishments of the Follow-up Project

4-1-1. Accomplishment of Inputs

Dispatch of Experts, Counterpart Training and Procurement of Equipment are summarized in Annex Ⅲ,Ⅳ,Ⅴ.

4-1-2. Accomplishment of Activities and Outputs

The Activities and Outputs of the Project are in ANNEXVI.

4-2. Analysis on Evaluation Issues

4-2-1. Efficiency

The efficiency of the Follow-up Project has been evaluated as relatively high, in view of the satisfactory progress attained by the limited number of Japanese experts and Mauritian counterparts.

Expected Outputs were implemented efficiently and in good balance with inputs, since both the Japanese experts and Mauritian counterpart personnel are well qualified and enthusiastic about the successful implementation of the Project. However, it is obvious that efficiency would have been better still if more technical staff could be available from the

Mauritian side. This would also have had more positive impact on the transfer of techniques in the long term.

Regarding Counterpart Training in Japan, counterparts were able to acquire enough knowledge and skills and transfer them to the staff of the Albion Fishery Research Center (hereinafter referred to as "AFRC"). Although the delivery of some equipment was delayed, the Project was carried out as scheduled.

4-2-2. Effectiveness

The effectiveness of the Follow-up Project has been evaluated as relatively high. In terms of quality of seed production and numbers of marking technique, the Project Outputs "Technique of seed production of Mangrove crab and Sea bream are improved", "Technique of marking, release and research are improved (Sea bream)" were achieved. However, stability of yearly production could be improved by developing alternative feeds and providing additional staff to cope with the system of flexible working hours.

On the other hand, another Output "The methods of coastal ecosystem research and monitoring technique were improved, especially on corals" was achieved at satisfactory level and the staff of AFRC acquired sound knowledge and know-how. However, since some necessary activities, such as technical reports and scientific publications of the Project which were planned at the beginning of the Follow-up Project still remain, it is necessary that they be continued.

4-2-3. Impact

The Impact of the Project is mostly Positive.

(1) Main Direct Impacts are;

- More attention is being paid by the private sector to launch sea bream culture and in the long term, the aquaculture sector is expected to be very important in terms of supplying good animal protein and creating new job opportunities,
- The Project enhanced the capability of AFRC in writing, publishing report and scientific papers.
- The AFRC is now recognized as the focal point of Aquaculture and Marine Environment Assessment among the Mauritian people through the Project activities such as Resources Propagation and Coastal Ecosystem Research.

(2) Main Indirect Impact is;

- Outputs and Activities of the Project were reported by mass media ,such as TV, radio and newspapers, which as a result made the public know about the importance of coastal environment ecosystem and resources propagation.

4-2-4. Relevance

Overall Goal is valid since the Government of Mauritius puts strong emphasis on promoting the fishery industry and the preservation of the coastal environment and coastal ecosystem in healthy conditions. Due to the rapid growth of tourism industry in Mauritius, there are high demands for fisheries resources and a healthy coastal ecosystem. Therefore, the environment is very important for the sustainability of marine resources and for the

benefit of the public and the tourism industry. The AFRC is the only "center" in Mauritius to carry out research on the coastal environment. The Project Purpose is appropriate as it aims at improving the capacity of AFRC in order to contribute to the Overall Goal.
Activities were carried out by suitable inputs in Resources Propagation and Coastal Ecosystem Research. As these activities are necessary to achieve the Project Purpose and to contribute to the Overall Goal , the relationship between them is appropriate.

4-2-5. Sustainability

The overall sustainability of the Project seems to be relatively high.

Organizational Aspect

The sustainability of the Project on the Organization Aspect is judged rather satisfactory. As only AFRC has the responsibility to carry out research in the coastal environment and the public put great importance on the healthy environment around Mauritius, the Government of Mauritius gives its great support to AFRC. However, it was observed that the assignment of more technical staff would have strengthened the function of the AFRC.

Financial Aspect

The sustainability of the Project on Financial Aspects is judged medium. Although appreciable efforts have been made by the Government of Mauritius to allocate funds to AFRC for the Project Activities, sometimes delay of the Project Activities has occurred due to the lengthy procurement procedures.

Technical Aspect

The sustainability of the Project on Technical Aspect is judged high. Long-term and Short-term JICA experts transferred technical knowledge and skills in the two fields effectively to the Mauritian counterpart personnel. As a result of the transfer of techniques, the ability of counterpart personnel was upgraded and their confidence as researchers enhanced. Most of them are confidently continuing activities for seed propagation and coastal ecosystem research independently, based on the basic knowledge and skills obtained through the activities of the Project.

5. RECOMMENDATIONS

- For the remaining of the cooperation period, both the Japanese and Mauritian sides should make best effort to undertake the remaining tasks and accomplish the project purpose.
- It is desirable that technical reports and scientific papers be published regularly in order to disseminate the findings of research activities.
- The AFRC should continue its awareness program on coastal fisheries resources and environment conservation and distribute related publications to the public.
- Since the current working hours (09:00-16:00) is not suitable for some activities, flexible working hours should be maintained and reinforced by additional staff.
- To contribute to fisheries research and conservation of the marine environment in Mauritius, it is desirable for the Mauritian side to make efforts for maintaining the budget for AFRC.
- The Machinery and Equipment including those provided by Japan should be maintained in a good condition and it is desirable that adequate budget for periodical maintenance and

emergency repair of special equipment be secured.

- It is desirable that Mauritian counterparts and support staff be continuously assigned to maintain the transferred techniques for the long term.
- The Mauritian counterparts should be given the opportunity to attend international meetings and conferences related to the coastal fisheries resources and environment conservation.

6. CONCLUDING REMARKS

- The Mauritian side expressed the desire that the Japanese side continues to give the support on the work initiated at AFRC through training courses, attachments and technical assistance.
- The Mauritian side expressed its highest appreciation and deep gratitude to the Government of Japan and JICA for all the technical and financial assistance provided during the Project from its beginning.

Annex -I : Background of the Follow-up Project

In its 6th National Development Plan (1992-1994), Mauritius regarded research as indispensable for marking the best use of ocean resources on a sustainable basis. The AFRC is only institution in Mauritius to conduct studies on fishery and marine resources. This Project was requested with the objective of enhancing the capability of the center with regard to conservation of coastal resources and environment..

Under these circumstances the Coastal Fisheries Resources and Environment Conservation Project commenced in December 1995 with a project period of 5 years. The Overall Goal and the Project Purpose are as follows:

Overall Goal

To continuously utilize coastal fisheries resources and conserve the coastal environment in the Republic of Mauritius.

Project Purpose

To systematically strengthen the research capabilities of Albion Fisheries Research Center in the field of coastal fisheries resources propagation and research into the coastal ecosystem and environment.

During the planned project period of five years, the Project attained several Objectives in the fields of Resources Propagation, Coastal Environment Research and Coastal Ecosystem Research. However, some technical issues in the field of Resources Propagation and Coastal Ecosystem Research remain. As a result of the discussions between the Japanese and Mauritius sides in accordance with recommendations of the Final Evaluation Team of the Project, both sides agreed to implement a two-year Follow-up Project. The Follow-up Project was commenced on December 1, 2000 and is based on the R/D signed by both sides on November 6, 2000. The Project will be terminated by November 30, 2002.

The Outputs and Activities of Technical Cooperation during the Follow-up Project are as follows:

Outputs

Resources Propagation

1. Techniques of seed production of Mangrove Crab and Sea Bream are improved.
2. Techniques of marking, release and recapture are improved. (Sea Bream)

Coastal Ecosystem Research

3. The methods of coastal ecosystem research and monitoring techniques were improved, especially on "corals".

Activities

Resources Propagation

1-1. To conduct brood stocking of Mud crab
1-2. To conduct brood stocking of See bream
1-3. To conduct seed-production of Mud crab
1-4. To conduct seed-production of See bream
2. To undertake Sea bream release experiment and research

Coastal Ecosystem Research

3-1. Producing a database and field guide of corals in Mauritius.
3-1-1. To sample and identify coral species
3-1-2. To produce database and field guide of corals
3-2. Understanding population dynamics.
3-2-1-1. To predict and confirm coral spawning
3-2-1-2. To conduct coral recruitment study
3-2-2. To conduct bleaching coral study
3-3. Improving writing-skills for scientific papers.
3-3-1. To produce technical reports and scientific publications

Annex II : PDM (Project Design Matrix)

The Coastal Fisheries Resources and Environment Conservation Project in the Republic of Mauritius
(Duration: 1st December, 2000 - 30th November, 2002) - Follow-up Phase - Version: PDM$_E$ - 2002/4/10

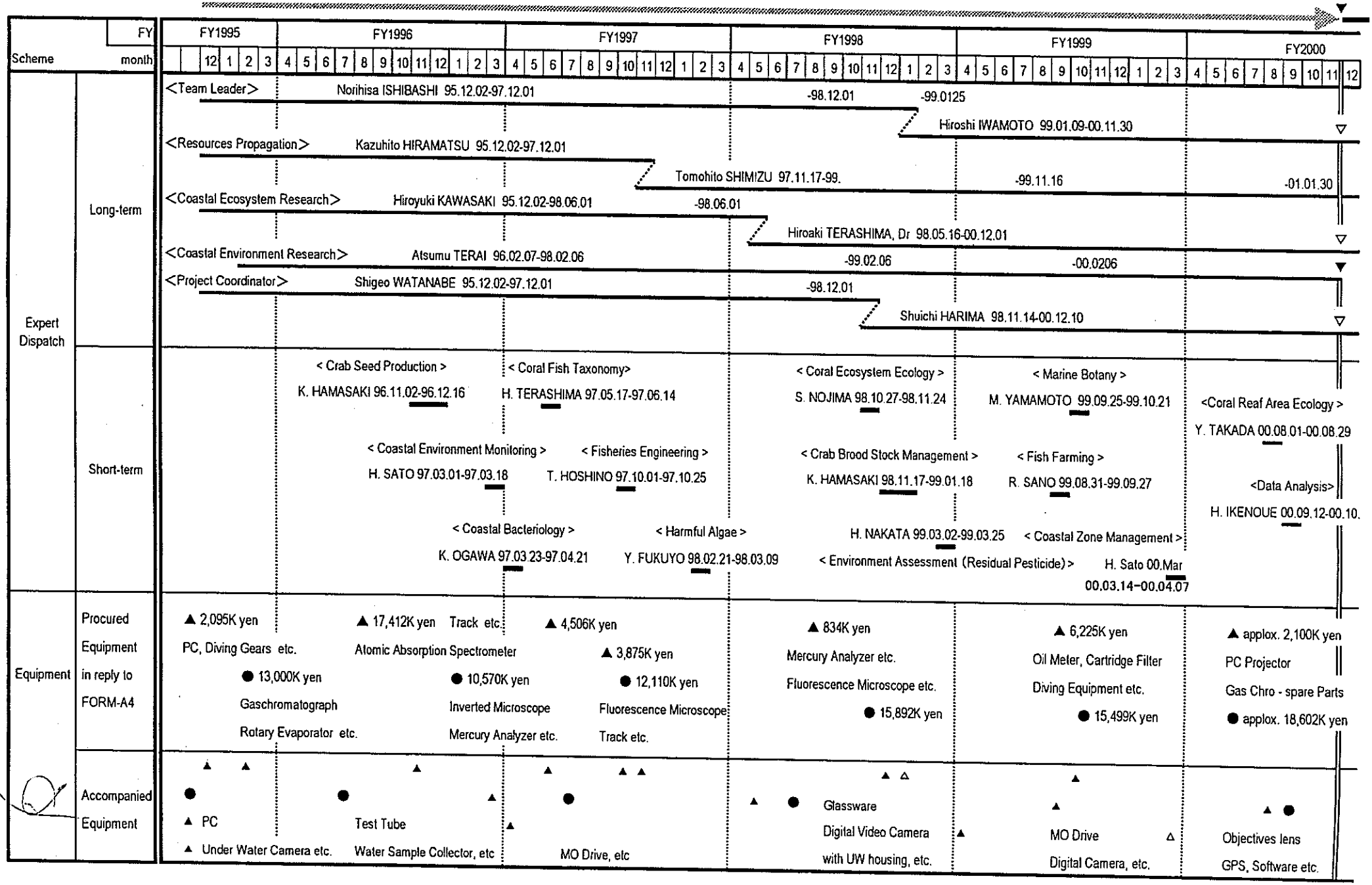
Narrative Summary	Objectively Verifiable Indicators	Means of Verification	Important Assumption
Overall Goal To continuously utilize coastal fisheries resources and conserve the coastal environment in the Republic of Mauritius.	· Data on catches by species · Data on tourists	· Fisheries Statistics · Tourism Statistics · White Paper on Environment	· Environmental State and Development Policy of Mauritius do not change.
Project Purpose To systematically strengthen the research capabilities of Albion Fisheries Research Center in the field of coastal fisheries resources propagation and research into the coastal ecosystem and environment.	· Number of publications, scientific papers · Number of conducted seminars, workshops · Number of trained staffs · Research & Analytical Equipment which have been enhanced the Center's capability.	· Record of activities of AFRC · References related to coastal fisheries and environment · Annual Report · Interview with C/P and Japanese Experts · Questionnaire ·	· Public and Tourists in Mauritius enhance their understanding and knowledge and cooperate to maintain natural resources in good condition. · Public accepts and supports AFRC activities.
Outputs **Resource Propagation** 1 Techniques of seed production of Mangrove Crab and Sea Bream are improved. 2 Techniques of marking, release and recapture are improved. (Sea Bream) **Coastal Ecosystem Research** 3 The methods of coastal ecosystem research and monitoring techniques were improved, especially on "corals".	1-1, 1-3 Mangrove Crab ; Achievement to the target number : 1,000 crab (C1) 1-2, 1-4 Quality of Sea Bream seed production : Incidence of Lordosis ; less than 15% 2-1 Acquisition of marking techniques. 2-2 Number of released Sea Bream in lagoon ; over 5,000 (TL 100 mm) 3-1 Database constituted on marine organism 3-2 Number of monitoring on colonies partially bleached, Number of recruitment plates deployed and retrieved. 3-3 Number of reports and scientific publications under the framework of the project.	· Monthly, quarterly and Annual reports · Reports & Publications · AMAS reports · Interview with C/P and Japanese Experts · Questionnaire · Database & Field guide of corals · Monthly, quarterly and Annual reports · Reports & Scientific Publications · AMAS reports · Interview with C/P and Japanese Experts · Questionnaire	· Qualified and sufficient number of staffs are allocated for AFRC. · Sufficient budgets are allocated for AFRC.
Activities **Resources Propagation** 1-1 To conduct brood stocking of Mud crab 1-2 To conduct brood stocking of Sea bream 1-3 To conduct seed-production of Mud crab 1-4 To conduct seed-production of Sea bream 2 To undertake Sea bream release experiment and research **Coastal Ecosystem Research** 3-1 To study the distributions of coastal resources. 3-1-1 To sample and Identify coral species 3-1-2 To produce database and field guide of corals 3-2 To design a monitoring system for the coastal ecosystem 3-2-1-1 To predict and confirm coral spawning 3-2-1-2 To conduct coral recruitment study 3-2-2 To conduct bleaching coral study 3-3 To produce technical reports and scientific publications	**Mauritian Inputs** **1 Counterpart Personnel** Resources Propagation 4 Coastal Ecosystem Research 4 **2 Land, Building, facilities** **3 Expense** applox. Rs. 5 m recurrent budget only * (FY2000-FY2002) *: Including expense incurred on other projects implemented by AFRC. Expenses related to electricity, telephone, water charges, transportation and salary of staff are not included. **Japanese Inputs** (m/m : man / month) **1 Long Term Experts** Team Leader (Resources Propagation) 24 m/m Coastal Ecosystem Research 24 m/m Coordinator 24 m/m **2 Short Term Experts** 4 m/m (3 experts) **3 C/P Training In Japan** JFY2000 (2) + 1 ( ) : within the previous phase JFY2001 2 JFY2002 1 **4 Expense(Unit: 1,000Japanese Yen)** Local Cost 4,904 K Yen (applox. Rs. 1.1m) Procurement of Equipment 17,736 K Yen (applox. Rs. 4.0m)	· Technically trained C/P will continue their service at AFRC. · Workload of C/P will not increase. · Maintenance of equipment and accessories are timely conducted. **Pre-conditions** · The unexpected weather/climate changes do not appear. · Budget necessary for conducting Project is secured by Government of Mauritius.

Annex III : Chart of Input <Japanese Side & Mauritian Side>

as of April 2002

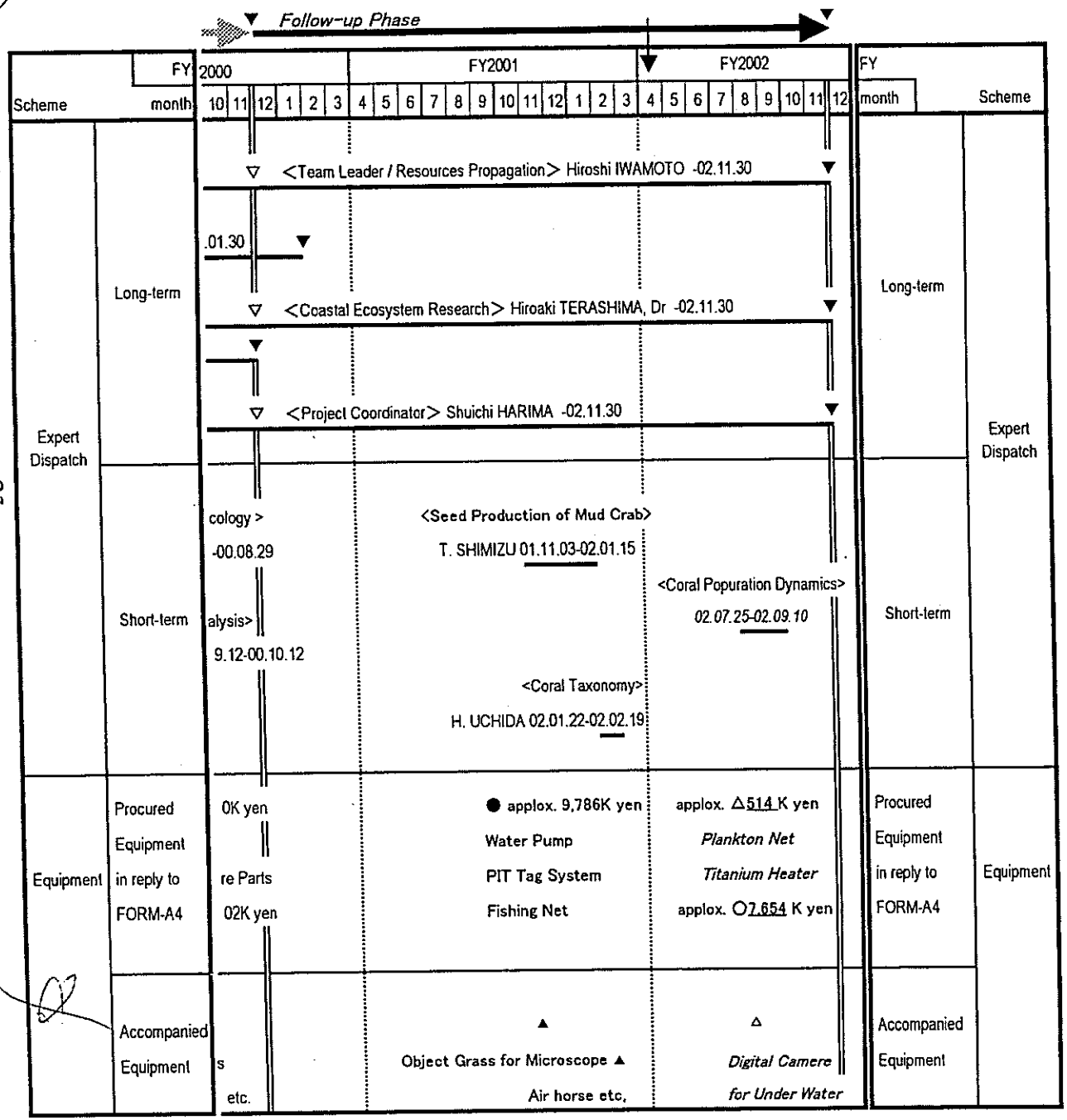
Coastal Fisheries Resources and Environment Conservation Project, Mauritius

1. Dispatch of Expert, Procurement of Equipment



Annex III : Chart of Input <Japanese Side & Mauritian Side> as of April 2002

1. Dispatch of Expert, Procurement of Equipment



Annex III : Chart of Input <Japanese Side & Mauritian Side> as of April 2002

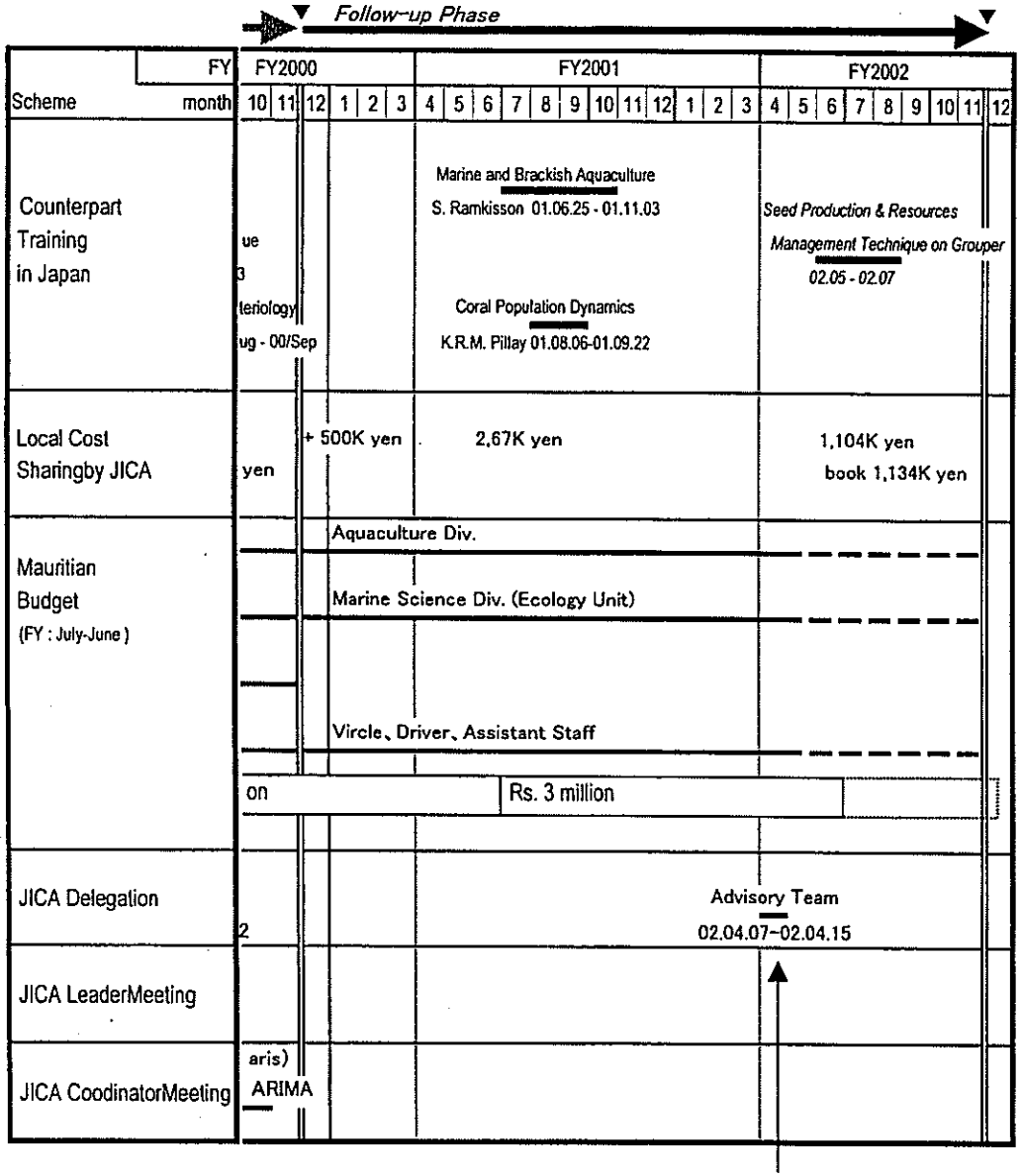
Coastal Fisheries Resources and Environment Conservation Project, Mauritius

2. Counterpart Training, Local cost sharing, Budget allocation, etc

Scheme \ FY / month	FY1995 12	FY1996 1 2 3	4 5 6 7 8 9 10 11 12	FY1997 1 2 3	4 5 6 7 8 9 10 11 12	FY1998 1 2 3	4 5 6 7 8 9 10 11 12	FY1999 1 2 3	4 5 6 7 8 9 10 11 12	FY2000 1 2 3	4 5 6 7 8 9 10 11 12
Counterpart Training in Japan	Project Management B. BOYRAMBOLI 96.03.26 - 96.04.11	Heavy Metal & Nutrient Analysis V.M. CHOORAMUN 96.09.10 - 96.11.12	Residual Pesticide & Chlorophyll P. NEERMUL 96.09.10 - 96.11.12	General Aquaculture C.R. SAMBOO 97.05.20 - 97.06.18	Observatin of Coastal Resources M.MUNBODH 97.09.01 - 97.09.16	Fish Nutrition O. VENKATASAMI 98.03.17 - 98.04.22	Coastal Biology V. MANGAR 98.08.11 - 98.09.29 Nutrient Circulation & Mechanism R.N.B. SOOGUN 98.05.19 - (98.06.30)	Liberation Technique S.K. KHADUN 99.05.18 - 99.08.03	Environment Monitoring (Water Quality) J.P.LUTCHMUN 99.09.15 - 99.11.08	Environmental Impact Assessment C.V. Chineah 00.05.09-00.06.18 Fish culture management technique H. Bhudoye 00.05.16 - 00.08.03 Seed Production S.RAMSAHA 00.03.28 - 00.05.30	Coastal Bacteriology Basant Rai 00/Aug - 00/Sep
Local Cost Sharingby JICA	1,680K yen	4,770K yen 2,430K yen		4,020K yen 366K yen		3,780K yen		3,780K yen 449K yen		2,546K yen book 1,776K yen	
Mauritian Budget (FY : July-June)	* Aquaculture Div. 3 C/P										
	* Marine Science Div. (Ecology Unit) 4 C/P										
	* Marine Science Div. (Chemistry Unit) 3 C/P										
	Vircle, Driver, Assistant Staff										
	Rs. 2 million	Rs. 2.2 million		Rs. 2 million		Rs. 2 million		Rs. 2 million		Rs. 2 million	
	Recurrent Budget (including expences incurred on other project implemented by AFRC)										
JICA Delegation		Consultation Team 96.06/09				Advisory Team 98.06.27-98.07.10				Evaluation Study 00.06.25-00.07.12	
JICA LeaderMeeting	(Tokyo) Mr. ISHIBASHI		(Paraguay) Mr. ISHIBASHI		(Tokyo) Mr. ISHIBASHI		(Tokyo) Mr. IWAMOTO		(Tokyo) Mr. IWAMOTO		
JICA CoodinatorMeeting		(Mexico) Mr. WATANABE					(London) Mr. WATANABE				(Paris) Mr. HARIMA

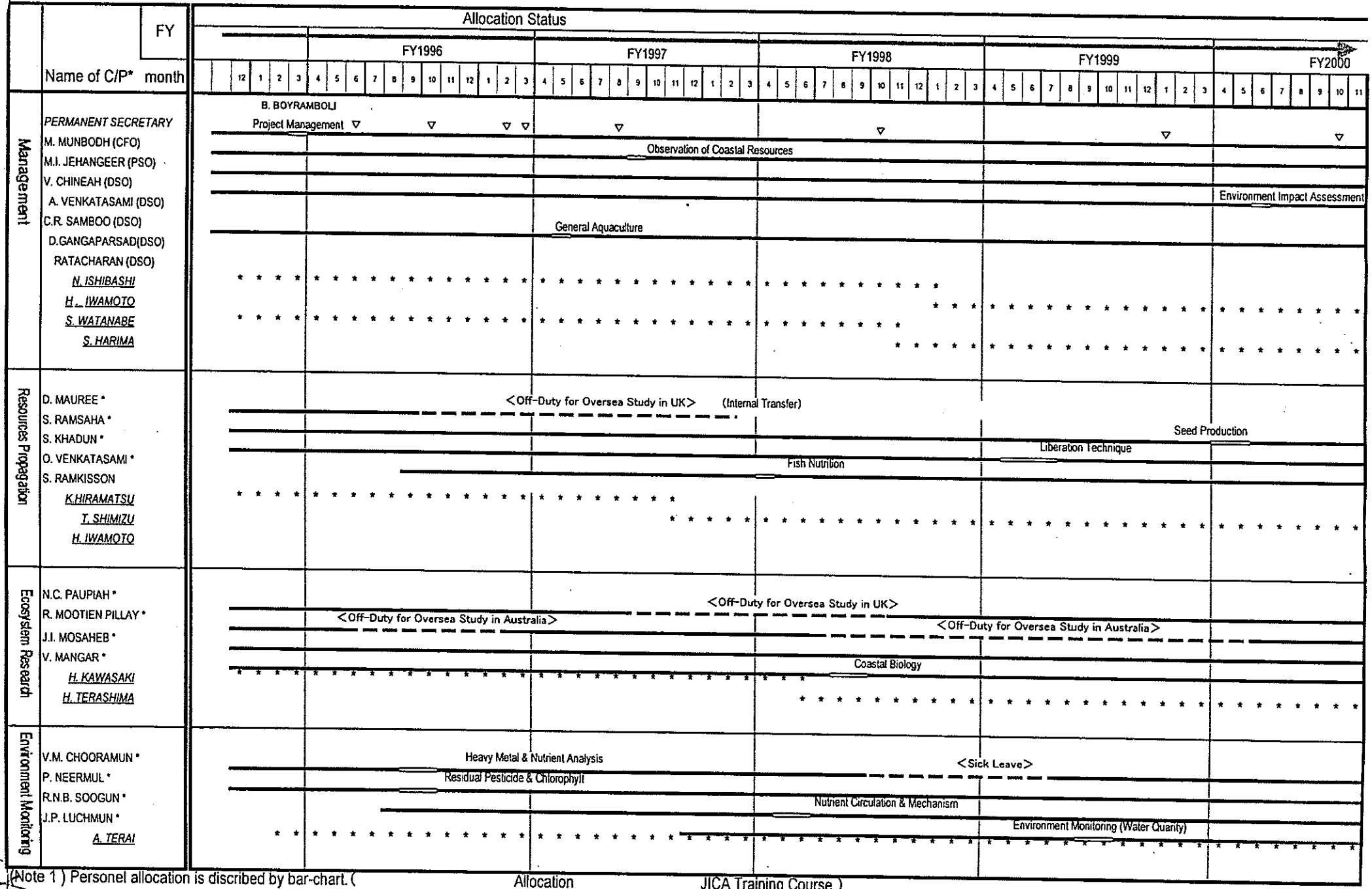
Annex III : Chart of Input <Japanese Side & Mauritian Side> as of April 2002

2. Counterpart Training, Local cost sharing, Budget allocation, etc



Annex IV : Chart of Counterpart Allocation / as of April 2002

Coastal Fisheries Resources and Environment Conservation Project, Mauritius



(Note 1) Personel allocation is discribed by bar-chart. (Allocation JICA Training Course)

Annex IV : Chart of Counterpart Allocation / as of April 2002

Coastal Fisheries Resources and Environment Conservation Project, Mauritius

	Name of C/P*	FY / month	Allocation Status	C/P Training in Japan: Duration	C/P Training in Japan: Majour Institute	Remarks
			Follow-up Phase; FY2001 (12 1 2 3 4 5 6 7 8 9 10 11 12); FY2002 (1 2 3 4 5 6 7 8 9 10 11 12)			
Management	*PERMANENT SECRETARY*		▽	96.03.26 - 96.04.11	Okinawa Suishi, Kankyo Eisei Shikenjyo	
	M. MUNBODH (CFO)			97.09.01 - 97.09.16	JASFA	
	M.I. JEHANGEER (PSO)					
	V. CHINEAH (DSO)			00.05.09 - 00.06.18	OECC	
	A. VENKATASAMI (DSO)					
	C.R. SAMBOO (DSO)			97.05.20 - 97.06.18	JASFA, Okinawa SaibaiGyugyou Ctr	
	D.GANGAPARSAD(DSO)					
	RATACHARAN (DSO)					
	N. ISHIBASHI		* *			
	H., IWAMOTO					
	S. WATANABE					
	S. HARIMA		* *			
Resources Propagation	D. MAUREE *					
	S. RAMSAHA *			00.03.28 - 00.05.30	Ehime, Okinawa, Kagoshima, JASFA	Moved
	S. KHADUN *			99.05.18 - 99.08.03	Shizuoka Suishi, JASFA-Hakatajima	almost on schedule
	O. VENKATASAMI *			98.03.17 - 98.04.22	Kagoshima Univ., Okinawa Suishi	almost on schedule
	S. RAMKISSON		Marine and Brackish Aquaculture			almost on schedule
	K.HIRAMATSU					
	T. SHIMIZU		* *			
	H. IWAMOTO		* *			
Ecosystem Research	N.C. PAUPIAH *					
	R. MOOTIEN PILLAY *		Coral Popuration Dynamics <Off-Duty for assinment in MOI >			Oversea study 1yrs
	J.I. MOSAHEB *					Oversea study 2yrs
	V. MANGAR *			98.08.11 - 98.09.29	Ryukyu Univ., Kyushu Univ-Amakusa	almost on schedule
	H. KAWASAKI					almost on schedule
	H. TERASHIMA		* *			
Environment Monitoring	V.M. CHOORAMUN *			96.09.10 - 96.11.12	Ehime Univ., Okinawa, Chuo-Sui-Ken	On leave for 8months
	P. NEERMUL *			96.09.10 - 96.11.12	Chuo Suiken, Ehime Univ., Okinawa Eiseiken	almost on schedule
	R.N.B. SOOGUN *		Cooperation in this feeld has been completed	98.05.19 - 98.06.30	Hiroshima Univ., Tokyo Univ of Fisheris	almost on schedule
	J.P. LUCHMUN *			99.09.15-99.11.08	<Group Training Course>	almost on schedule
	A. TERAI					

(Note 1) Personel allocation

Annex V : List of Provided Machinery and Equipment

Year	Item	Qty
FY2001	UV Lamp (VSO-200)	48
FY2001	Micro Meter for ECLIPSE E600	2
FY2001	Pumping-up pump (100 X 80 IFWM 2524)	1
FY2001	Packing for 150IFWM2515Y	50
FY2001	Packing for 100x80IFWM2514	50
FY2001	Packing for 125x100SALJ515	50
FY2001	Blood Corpiscle Meter (body 22-5552-01) & cover glass	10
FY2001	Titanium Heater with thermostat (RL-200N)	25
FY2001	Thermostat (RL-201N)	35
FY2001	Tag Gun	10
FY2001	Consumable Spaghetti Tag	10000
FY2001	PIT Tag System (TX1400L)	50
FY2001	Tag Reader (MPRH5901L)	1
FY2001	Thermometer (16-7702-02)	2
FY2001	Electronic Balance (AG204)	1
FY2001	Insulation Table (SK-1ALM)	1
FY2001	Oxygen Diffuser	4
FY2001	UV Sterilizing Lamp UVF-450 with Down Transfermer	2
FY2001	Fishing Net (200K)	1
FY2001	Fishing Net (120K)	1
FY2001	Fishing Net (80K)	1
FY2001	Fishing Net (60K)	1
FY2001	Vinyl Hose	40
FY2001	Air Pump (AP-130RDC)	1
FY2001	Net (N-29, N-34)	2
FY2001	Air Stone (EI-80)	30
FY2001	Cartridge Filter (Waterco Trimline C-100)	10
FY2001	Fishing Boots (F-98)	5
FY2001	Sample Bottle (9ml, 30ml, 110ml)	15
FY2001	Sample Bottle (500ml)	6
FY2001	Barrel (200L)	5
FY2001	Basket (200L)	5
FY2001	Water Tank (130L, 300L)	6
FY2001	Air Cock (4 way, 5 way)	60
FY2001	Thermometer (11-606-01)	20
FY2001	ELBARGE (100g X 10 X 10)	3

9,595,000 yen
(= applox. Rs. 2.1 m)

Year	Item	Qty
FY2002	Plankton Net (NY41-HC)	30
FY2002	Plankton Net (DIM100)	20
FY2002	Plankton Net (17XX, 80μm, W : 132cm)	20
FY2002	Plankton Net (11XX, 118μm, W : 102cm)	20
FY2002	1KW Titanium Heater	20
FY2002	Thermostat (1kw, TC-200)	20
FY2002	Polyethylene Tank 30L	20
FY2002	Polycarbonate Tank 30L	20
FY2002	Polycarbonate Tank 500L	5
FY2002	Polycarbonate Tank 501L	10
FY2002	Polyethylene Tank 1000L	10
FY2002	Polycarbonate hatching Tnak for Artemia 500 L	3
FY2002	Antibiotics (Elbarjyu)	40
FY2002	UV Lump for FUNAKOSHI HP12R	12
FY2002	Blood corpuscle counters	5
FY2002	Cover Glasse for slide	10
FY2002	Ink tape for Digital Cariper MITSUTOYO 500-152	50
FY2002	Sylicon Tubes (GI-1048-08)	5
FY2002	Sylicon Tubes (GI-1048-07)	5
FY2002	Cartridge Filter (mesh : 1μm, 50×φ18.5cm)	12
FY2002	Cartridge Filter TCW-05N-PPD (mesh : 0.5μm, 50c	100
FY2002	Antibiotics (Oxytetracycline)	30
FY2002	Counter	40
FY2002	Jiont Plug (AV rabu-cock)	100
FY2002	Sawing Machine	1
FY2002	Air Stone (maru 50)	100
FY2002	Air Stone (MA30)	150
FY2002	Air Stone (hanmaru 25)	150
FY2002	Tetoron Russel (Net), T-280	2
FY2002	Tetoron Russel (Net), T-180	2
FY2002	Tetoron Russel (Net), T-140	2
FY2002	Tetoron Russel (Net), T-90	2
FY2002	Net (2mm, 300×200m, grip : 390mm)	200
FY2002	Net (0.5mm, 300×200m, grip : 390mm)	50
FY2002	Net (2mm, 225×170m, grip : 260mm)	100
FY2002	Net (0.5mm, 225×170m, grip : 260mm)	100
FY2002	Net (2mm, 150×130m, grip : 230mm)	100
FY2002	Net (0.5mm, 150×130m, grip : 230mm)	100
FY2002	Net (0.5mm, 125×105m, grip : 230mm)	100
FY2002	Vynil Tube (Air Horse) 1 (in:4mm,out6mm,200m)	5
FY2002	Vynil Tube (Air Horse) 2 (in:8mm,out11mm,100m)	5
FY2002	Vynil Tube (Air Horse) 1 (in:12mm,out16mm,50m)	10
FY2002	Flexible vinyl hose (in : 25mm ,out 31.6mm, 50m)	5
FY2002	Flexible vinyl hose (in : 31mm ,out 38mm, 50m)	5
FY2002	1000L Fish Tank	2

estimated 8,672,900 yen
(= applox. Rs. 1.9 m)

Above items are scheduled to be procured in FY2002

Appendix VI

1. Resources Propagation

1-1.Seed production

< Objective >

Development of the seed production techniques for mangrove crab and sea bream.

< Activities >

Mangrove crab (*Scylla serrata*)

- Improve the mass mortality in early stages of larvae.
- Improve the fungal disease control techniques.
- Develop of experimental procedure to control bacterial disease.

Sea bream (*Rhabdosargus sarba*)

- Improve the bone staining technique for the purpose of examine of Lordosis.
- Develop the technique to prevent fish deformation (Lordosis).

< Achievements >

Mangrove crab (*Scylla serrata*)

2000-2001

- Some 1,000 crab juveniles (C1 stage) were produced.
- 500 crab/ kl produced in experimentally improved seed production trial.
- The survival rate of all of four tanks, which were applied improved seed production procedure, was higher than 50%(Z5), on the other hand the survival rate of two tanks of control showed 10.8% and 12.4 percent respectively.

Exp. No	Tank vol. (m^3)	Stocking No	Started on	No of harvested larvae	
				Z5	C1
1	0.5	12,500	18/01/01		
	5.0	125,000	21/01/01		
2	5.0	125,000	↑		
	5.0	125,000	↑		
	5.0	125,000	10/02/01		
3	5.0	155,000	↑		
	5.0	140,000	↑		2
	15	128,000	↑		
4	2.5	93,000	26/02/01		
	2.5	93,000	↑		282
5	0.5A	25,000	19/03/01	17,050	
	0.5A	25,000	↑	11,366	263
	0.5B	25,000	↑	12,980	
	0.5B	25,000	↑	7,810	521
	0.5C	25,000	↑	3,500	
	0.5C	25,000	↑	2,700	13
Total		1,196,500			1,081

Appendix VI

2001-2002

1st trial

- The survival rate of all of three tanks was higher than 50% (Z5).
- Some 500 crab juveniles (C1,2 stage) were produced.

Exp. No	Tank vol. (m^3)	Stocking No	Started on	No of harvested larvae	
				Z5	C1
1	0.5	31,000	26/01/02	-	-
2	0.5	31,000	26/01/02	16,500	501
	0.5	31,000	↑	16,800	
	0.5	31,000	↑	17,300	
Total		124,000		50,600	501

Sea bream (*Rhabdosargus sarba*)

- More cost effective and simple bone staining techniques were developed.
- The incident of Lordosis tends to decrease.

Incidence of Lordosis

	TL(min- max) mm	Examined No.	Lordosis (%)	Remarks
1999	92.8(57.7-141.5)	81	60.5	
2000	14.9(9.2- 35.1)	223	11.2	
	61.0(29.9-132.4)	81	13.6	
2001	72.7(50.2- 99.6)	132	12.1	Intensive Seed production
	77.5(55.2-102.6)	98	0	Extensive Seed Production

< Evaluation >

Mangrove crab (*Scylla serrata*)

Through the small scale seed production experiments, the basic techniques of seed production were improved and it became to clear that to improve of quality of live feed "Rotifer" is one of the most important factor for the improvement of survival rate and productivity.

Basic techniques of to prevent fungal and bacterial disease were acquired. These techniques can be applied and important for other species seed production technical improvement.

When AFRC succeeds with this technology it could be transferred to other tropical and sub-tropical countries.

The objective of this field has been achieved.

Sea bream (*Rhabdosargus sarba*)

The cost effective and simpler bone staining technique has been developed.

The incidence of Lordosis tends to decrease. It is expected that the quality of produced sea bream juveniles will improve furthermore.

The objective of this field has been achieved.

1-2-1. Release (extensive culture)

Appendix VI

< Objective >

Acquirement of suitable release technique.

< Activities >

Sea bream (*Rhabdosargus sarba*)

- Marking experiment.
- Release experiment in the lagoon.

< Achievements >

Sea bream (*Rhabdosargus sarba*)

- 940 large size of juveniles (larger than 10cm total length) were released in lagoon.
- New tagging methods (spaghetti anchor type and nylon thread method) were introduced.
- The moving pattern after releasing at in and out of Albion lagoon is becoming clear.

Release

Date	BL(mm) (Min-max)	FL(mm) (Min-max)	TL(mm) (Min-max)	BW(g) (Min-max)	No of released	Mark
27/02/01	121 (90-159)		157 (109-191)	56 (18-116)	940	Branding
25/11/01			170 (133-196)	104 (44-137)	325	Spaghetti Anchor
4-8/03/02		140 (79-264)			6,523	Branding + Spaghetti

TL =1.0681FL+2.2102
BL =0.8838FL-1.6484
$BW = 2E\text{-}05FL^{2.9895}$

Recapture

Date	BL(mm)	TL(mm)	BW(g)	Mark	Place
16/03/01	101	128	36	RA	Albion Barachois
	105	143	48	RA	↑
30/03/01	169	202	148	RA	Albion Lagoon

< Evaluation >

Sea bream (*Rhabdosargus sarba*)

The technique of branding was improved and applicable even for smaller size of sea bream.

New spaghetti anchor type tags, which have sequential number on the surface of tags, were provided by JICA. By using this new tagging method, it became possible to collect the data such as growth or maturation more accurately and easier.

The objective of this field has been achieved.

Appendix VI

2. Coastal Ecosystem Research

2-1. Database and field guide of corals

< Objective >

Producing a database and field guide of corals in Mauritius in order to understand the present status of those corals.

< Activities >

- Coral sampling and identification of corals collected.
- Producing database and field guide of corals.

< Achievements >

- Since September 2000 to 20th February 2002, the staff of ecology unit conducted 31 coral field samplings and collected 267 coral specimens (Table 1).

Table 1 Sampling sites and location

Sampling number	Date	Location	Site	Depth	No.of specimen
1	28-Sep-00	Bambous Virieux	BR	1	9
2	03-Nov-00	GRSE	BR	1	8
3	07-Dec-00	Albion	BR	1	6
4	11-Dec-00	Albion	RC	1-2	3
5	06-Feb-01	Poudre d'or	BR	1-5	8
6	06-Mar-01	Trou aux Biches	BR	1	1
7	08-Mar-01	GRSE	BR	1	1
8	20-Mar-01	GRSE	BR	1	4
9	08-May-01	Albion	FR	12-16	5
10	28-Jun-01	Balaclava	BR	1	10
11	25-Jul-01	Flic en Flac	FR	6	7
12	06-Oct-01	Balaclava	BR	1-6	5
13	09-Nov-01	Albion	FR	5-6	16
14	16-Nov-01	Albion	FR	8-11	16
15	23-Nov-01	Albion	FR	4-8	15
17	04-Dec-01	Anse la Raie	BR	2-3	6
18	07-Dec-01	Balaclava	FR	3-9	12
19	14-Dec-01	Albion	FR	7-10	9
20	16-Dec-01	T. A. B	FR	5-8	12
21	19-Dec-01	Blue Bay	BR	3-8	7
22	23-Dec-01	T. A. B	FR	5-10	9
23	30-Dec-01	T. A. B	FR	5-10	8
24	03-Jan-02	Blue Bay	BR	3-8	11
25	08-Jan-02	Bambous Virieux	SR	1-10	13
26	10-Jan-02	Bambous Virieux	BR	1-3	10
27	12-Jan-02	Bambous Virieux	SR	1-10	9
28	27-Jan-02	Blue Bay	BR	3-5	16
29	31-Jan-02	Trou d'eau Douce	SR	3-11	11
30	01-Feb-02	Bambous Virieux	SR	2-10	7
31	04-Feb-02	Balaclava	SR	1	12
				Total	267

Appendix VI

- The collected specimens have been identified, curated and registered. So far, the staff completed the identification of coral specimens collected within Sampling 1 to Sampling 31 and recorded 14 families, 45 genera and 154 species.
- The identity of some coral specimens collected has not been resolved yet. Detailed morphometric examinations of these specimens are being undertaken with Dr. Uchida, JICA short term expert who has been in Mauritius from 25th January to 17th February.
- Photographs of each coral are being arranged and descriptive notes for each species are being written. Concerning the field guide to corals in Mauritius (tentative name), the first draft will be completed with advice from Dr. Uchida by May, The final draft will be completed by September through proofreading by Dr. Uchida and Mr. Venkatasami, DSO of Marine science division. The field guide should be published within October. The tentative layout of the field guide is described in fig.1.

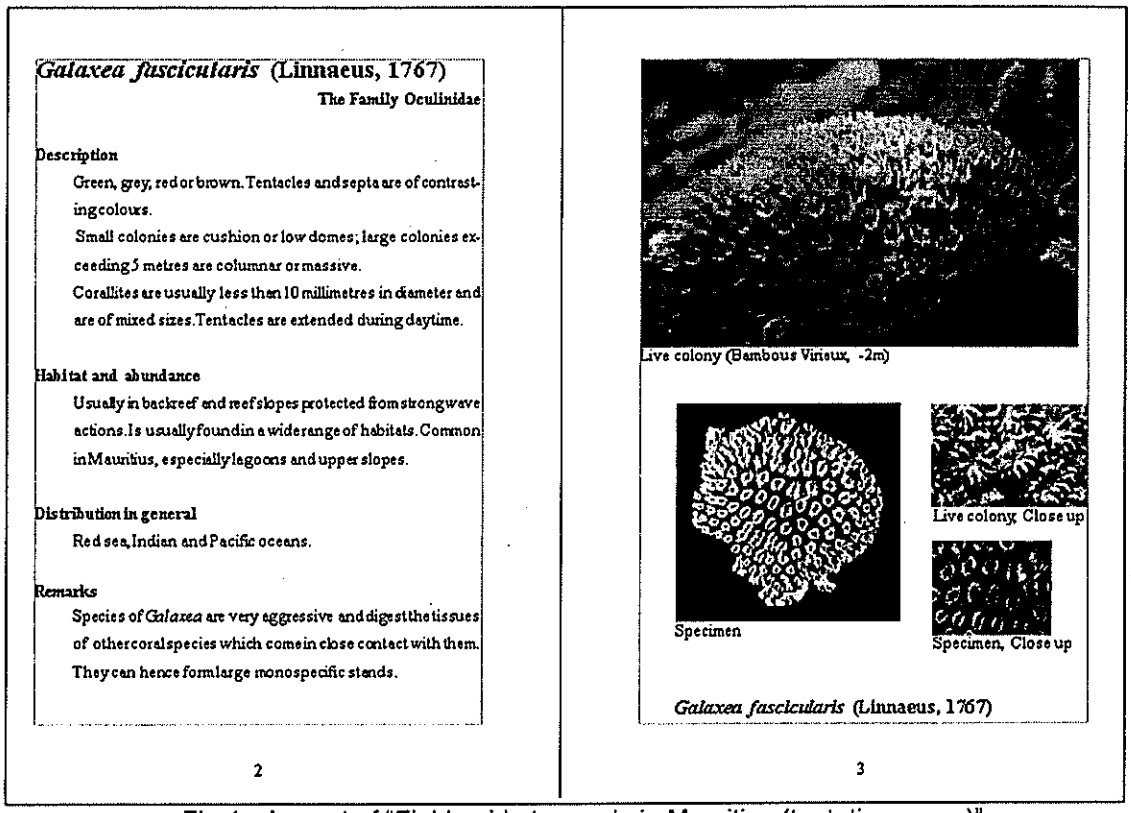


Fig.1 Layout of "Field guide to corals in Mauritius (tentative name)"

< Evaluation >

So far, 14 families, 45 genera and 154 species have been recorded. It is expected that almost 200 species in total will be recorded by end of the follow up period. Faure (1982) recorded 136 species from Mauritius whereas Veron (2000) reported that 282 species might exist in Mauritius from bio-geographical point of view. More detailed study will be needed for a better estimation of the number of existing coral species in Mauritius. However, number of species collected in this activity has already exceeded that of Faure (1982) and it appears most common coral species has already been collected. Through this activity, the staff has been in a position to acquire coral taxonomic know-how.

Appendix VI

2-2. Studying population dynamics of corals

< Objective >

Understanding population dynamics of corals which is important for proper coastal management.

< Activities >

- Prediction and observation of coral spawning.
- Conducting coral recruitment study.
- Conducting coral bleaching study.

< Achievements >

- Matulation of eggs within several branching corals (*Acropora* spp.) were observed in lagoon of Albion at October and it was confirmed that the branching coral would spawned on 28th October 2002.
- 1250 juvenile corals were observed on 244 recruitment plates deployed in October 2000 and retrieved in February 2001. Coral recruits are now being identified to genus level and the amount of other organisms which are competitors of juvenile coral are being estimated. The staff prepared and deployed 400 coral recruitment plates at sea prior to the annual coral spawning event in 2001. These coral recruitment plates will be retrieved at March 2002 for analysis of coral recruitment status of this season.
- Partial coral bleaching phenomenon observed at Albion and Grand River South East has been monitored for summer term between 2000 and 2001 (Table 2). The data obtained is being arranged and analysed now.

Table 2 Sampling dates for partial bleaching coral at Albion and G.R.S.E.

Albion	15m	10m	5m
April	17-Apr-01	18-Apr-01	18-Apr-01
May	08-May-01	09-May-01	09-May-01
June	04-Jun-01	05-Jun-01	05-Jun-01
August	09-Aug-01	09-Aug-01	09-Aug-01

Grand River South East	
February	22, 26, 28 Feb.-01
March	8, 20 Mar.-01
May	17, 22 May-01

< Evaluation >

It is important for monitoring activities related to population dynamics to understand the research procedures including sampling design and proper interval between each sampling. Most of the staff have acquired knowledge in the estimation and confirmation of coral spawning date, preparation and deployment of recruitment plates and monitoring of coral bleaching phenomenon so far. Most of the staff have become proficient in preparing coral recruitment plates and timing of the deployment and can proceed by their own initiative. They also designed different types of

recruitment plates. However, coral population dynamics studies involve not only field sampling but various types of laboratory works (e.g. census of coral recruits). Therefore, more effort of the staff is expected for data arrangement and analysis. A short-term expert on coral population dynamics will visit Mauritius around August 2002 and will review and comment on the result obtained in this activity.

2-3. Producing technical reports and scientific publications

< Objective >

Improving writing skills for scientific papers

< Activities >

- Producing technical reports and scientific publications

< Achievements >

- Two publications, "Field guide to Coastal Fishes of Mauritius" and "Basic Biostatistics for Marine Biologist" which were prepared in main phase of this project were published and were distributed to Organisations and persons concerned.
- Ecological and environmental status of Flic en Flac lagoon was presented at Annual Meeting of Agriculture Scientists (AMAS) on 4th May. A paper on this topic was also prepared and submitted to the FARC to be incorporated in the proceedings.
- A scientific paper "Holothurian distribution in the lagoon at La Preneuse and Baie du Cap, Mauritius, Indian Ocean" which was contributed to Report of Marine Ecological Research Institute in November 2000 was accepted by the journal and published in June 2001 after revision following the referee's comment.
- A scientific paper "The extent and intensity of a mass bleaching event on the reefs of Mauritius, Indian Ocean" based on the data of the research undertaken during the main phase of this project was contributed to Galaxea, the proceedings of Japan Coral Reef Society in November 2001 and accepted on February 2002. It will be revised following the referee's comment.
- A scientific paper "Stomach contents analysis of some carnivorous fishes from various Barachois in Mauritius" based on data of the research conducted during the main phase of this project was contributed to the proceedings of the University of Mauritius on December 2001. It is now being reviewed.
- A scientific paper based on the data collected during the long term monitoring program (the main phase of this project) is now being prepared. The visual aids for the presentation were prepared and presented at the steering committee, the Japan supporting committee and the seminar scheduled during Dr. Uchida's stay in AFRC.

< Evaluation >

Overall, C/Ps have acquired basic knowledge and skill for preparing scientific papers through several opportunities and practices for producing scientific paper. As a whole, the institutional capability has been largely enhanced. It has been also observed that the individual capacities of writing skill has been broaden from officer to officer, thus it is still needed to upgrade among themselves with their best effort and knowledge exchanges.

質 問 票 要 約

SUMMARY OF QUESTIONNAIRE

Efficiency

Q1. Questions concerning the Inputs from Japanese side

(1) Dispatch of Experts

1) Dispatch of long-term experts (LT experts)

	Appropriate	Nearly Appropriate	Not Appropriate
Number of LT Experts	12		
Capability	12		
Duration of dispatch	11	1	
Timing of Dispatch	12		

Reasons/Comments (if you have "Not appropriate", specify the LT Expert and give reasons)

2) Dispatch of short-term experts (ST experts)

	Appropriate	Nearly Appropriate	Not Appropriate
Number of ST Experts	12		
Capability	12		
Duration of dispatch	11	1	
Timing of Dispatch	11		

Reasons/Comments: (if you have "Not appropriate", specify the ST Expert and give reasons)

- **Research and management capabilities for a fish farm were enhanced. More ST experts in the field of resource propagation are required to share more knowledge in different type of research techniques.**

(2) Training in Japan

[Participated Field of Training:
1. **Liberation Techniques (1999)**
2. **Marine Aquaculture**
3. **Fish Nutrition**
4. **Seed Production**
5. **Conservation and Management of Coral Reefs**
6. **Sampling Technique in the Marine Ecosystem**
7. **Coral Population Dynamics**

1)Training program:

[6] Useful [ ] Nearly useful [ ] Not useful

Reasons/Comments:

- **Learnt importance of cage net management. How to perform branding and different tagging methods. Tagging methods for crabs and other types of tags for fish presently used in the world.**
- **Transfer of knowledge and technology.**
- **Helped to better understand feed formulation for brood stock management.**
- **Useful to bring improvements in the seed production of sea bream and crabs.**
- **My participation in above training course was very enriching experience. I gained valuable knowledge and contacts with aspects of coral reefs ecosystem and conservation. It broadened my views and know-how and skills in specific subjects such as coral transplantation and also identification.**
- **The training program has strengthened my research abilities in coral population dynamics, especially coral recruitment research. Furthermore, I was able to observe coral bleaching events at Isiugathe and Sesoko and compare these with bleaching in Mauritius.**

2) Training term:

[7] Appropriate [1] Nearly appropriate [ ] Not appropriate

Reasons/Comments:

- **Basic techniques of different fish species were studied together with the management of a Fisheries Research Station as well as branding and tagging methods.**
- **Most aspects of seed production were covered.**
- **The training was very intensive and to fully maximise it, the training term could be extended to three months.**

3) To what extent has the training program contributed to the Output ?

[8] Very much [ ] To some extent [ ] Hardly

Reasons/Comments:

- **Cage culture management can now be properly carried out at AFRC. Tagging technique was learned and has been put into practice.**
- **Improve the technique of seed production and phytoplankton culture.**
- **The knowledge gained during the training course helped in formulation and preparation of maturation moist feed used for shrimp and sea bream brood stock.**
- **Technique of seed production of sea bream and mangrove crab was improved. Further training is required to master the seed production of mangrove crab.**

(3)Provided equipment

	Appropriate	Nearly Appropriate	Not Appropriate
Number of item	10		
Quality of item	10		
Timing of provision	10	1	

Reasons/Comments: (if you have "Not appropriate", specify the equipment and give reasons)

Q2. Questions concerning the inputs from Mauritian side

(1) Allocation of necessary expenses for the implementation of the Project (Project budget)

1) How was the allocation?

[8] Appropriate [2] Nearly appropriate [ ] Not appropriate

Reasons/Comments:

- **Budget is scheduled for all aquaculture projects.**
- **Expenses for the development of aquaculture have been catered for in the different financial budget years.**
- **Funds provided by the Ministry of Finance to research has not increased for several years in spite of increase in research activities at AFRC.**

2) To what extent has the allocation contributed to the Output?

[8] Very much [3] To some extent [ ] Hardly

Reasons/Comments:

- **Allocated budget contributed in maintaining the survival of fish species. Control of infection by using more disinfectants. Contributing to release of bigger size fish species which will greatly enhance its survival in nature.**
- **Purchase of feed and fertilizer thus improving seed production.**
- **Purchase of fertilizers for phytoplankton culture, thus improving seed production.**
- **The production of seeds could be attained.**
- **Reached target set for sea bream and crab culture at project phase.**

(2)Allocation of budget (except for the Project budget)

	Appropriate	Nearly Appropriate	Not Appropriate
Amount	10	1	
Timing of provision	8	2	

Reasons/Comments: (if you have "Not appropriate", please specify and give reasons)

And to what extent has the allocation of budget contributed to the Output?

[9] Very much [2] To some extent [ ]Hardly

Reasons/Comments:

- **The target set for release of fish was achieved together with marking and tagging method.**
- **Maintenance of infrastructure and equipment. We reached the target of seed production.**
- **The target set for production of P. monodon post larvae was achieved.**
- **Facilities could be maintained for implementation of the project.**
- **Timely supply of equipment, chemicals, feeds and logistics have contributed to the achievement of culture targets.**

(3)Assignment of personnel

1)Number

	Appropriate	Nearly Appropriate	Not Appropriate
Nos. of Researcher	12		
Nos. of Field Assistant (FA)	7	5	
Nos. of Adm. Staff	12		

Reasons/Comments: (if you have "Not appropriate", please specify and give reasons)

- **However, each project should be run by a minimum of three to enhance their knowledge and transfer technology learnt to other officers. This will help to better manage such projects e.g. marking and release.**
- **Two Field Assistants assist the project and also other projects, hence they are not available full time for the smooth running of the project.**

2)Capability

	Appropriate	Nearly Appropriate	Not Appropriate
Capability. of Researcher	10	1	
Capability. of FA	10	1	
Capability. Of Adm. Staff	9		

Reasons/Comments: (if you have "Not appropriate", please specify and give reasons)

- **Management of project is well understood. However, for better management of any specific project, one team of researchers should carry out research on one project only.**
- **Some of the researchers lack of expertise and ability to conduct independent research. They used to be supervised and advised constantly.**

(4)Land, building, facilities

	Appropriate	Nearly Appropriate	Not Appropriate
Space of Land	12		
Space of building	9	3	
Condition of facility	9	3	

Reasons/Comments: (if you have "Not appropriate", please specify and give reasons)

- **Facilities at hand is sufficient to produce the targeted amount of fish species.**

Effectiveness

Q3. How do you evaluate the level of achievement of the Project purpose, "To systematically strengthen the research capabilities of Albion Fisheries Research Center in the field of coastal fisheries resources propagation and research into the coastal ecosystem and environment"?

[11] Fully achieved [1] Partly achieved [ ] Hardly achieved

Reasons/Comments:

- **Release, tagging and marking techniques have been achieved to study movement pattern and growth.**
- **Production of good quality shrimp post larvae. Reach the target of 200,000 post-larvae.**
- **Good quality of 200,000 shrimp post larvae was produced.**
- **Basic technique of seed production of sea bream and mud crab.**
- **Has strengthened research capabilities of the staff.**
- **Trained staff have contributed significantly to the timely achievement of outputs in seed production, marking/release and recapture techniques and improvements in methodology for ecosystem research.**
- **There used to be more multidisciplinary approach to ecological research (e.g. ecology, chemistry and hydrodynamics).**

Q4. To what extent have the following Outputs contributed to the achievement to the Project purpose?

(1) Technique of seed production of Mangrove Crab and Sea Bream are improved

*Please answer with reference to the following indicators:

(1)-1. Basic technique of seed production of Mangrove Crab and Sea Bream are established.

[5] Very much [1] To some extent [ ] Hardly

Reasons/Comments:

- **Objective has been achieved.**
- **Basic technique of seed production of sea bream almost established but for mud crab further studies are needed.**
- **Basic techniques for seed production of sea bream and mangrove crab have improved according to target set (more than 1000 C1 and release of more than 5,000 sea bream of total length 100 mm).**
- **More healthy juveniles were produced and trained staff became more confident in improving the situation further.**

(1)-2. Quality of Sea Bream seed production is improved.

[6] Very much [ ] To some extent [ ] Hardly

Reasons/Comments:

- **Some 200,000 seeds are produced annually. Incidence of Lordosis was 8.5%.**
- **Quality of sea bream seed production has improved. Incidence of Lordosis observed in only 8.5% of cultured sea bream.**
- **Incidence of "Lordosis" has been drastically reduced due to improved rearing techniques.**

(1)-3 Technique of bone observation was acquired.

[7] Very much [ ] To some extent [ ] Hardly

Reasons/Comments:

- **Staining technique was acquired.**
- **Staff efficiency in dealing with bone deformation has increased.**

(2) Technique of marking, release and recapture are improved.
*Please answer with reference to the following indicator:
(2)-1 Marking techniques were acquired.
[7] Very much [ ] To some extent [ ] Hardly
Reasons/Comments:

- **Marking, release and recapture techniques have been achieved. Marking and release techniques have been improved, have released more than 6,000 sea bream.**
- **Efficiency of staff in performing such work has increased.**

(3) The methods of coastal ecosystem research and monitoring technique were improved, especially on coral.
*Please answer with reference to the following indicators:
(3)-1 Enough numbers of coral sample and identification of corals ware collected.
[8] Very much [ ] To some extent [ ] Hardly
Reasons/Comments:

- **A significant number of coral samples from diverse species have been collected, identified and registered. Species new to the Indian Ocean region have been recorded. Methods and techniques of coral sampling and identification & upgraded by the short term visiting expert Dr. Uchida.**
- **It is reported from officers concern that more species of corals have been inventoried than previously known. Short-term experts contributed much to identification and training of staff in this field.**

(3)-2 Database and field guide of corals ware elaborated.
[6] Very much [1] To some extent [ ] Hardly
Reasons/Comments:

- **More works on corals to be carried out.**
- **On-going and will be published this year.**
- **Coral data base has been regularly upgraded and field guide on corals of Mauritius is currently under preparation for publication this year.**
- **A Field guide is being finalised for publication this year.**

(3)-3 Research procedure was acquired.
[6] Very much [ ] To some extent [ ] Hardly
Reasons/Comments:

- **Monitoring methods, sampling techniques and procedures in various aspects of marine ecological research have been upgraded and accentuated through the valuable assistance of JICA experts.**
- **Different methodologies have been introduced and staff are very conversant with new techniques.**

(3)-4 Enough numbers of reports and scientific publications under the framework of the projects ware elaborated.
[4] Very much [2] To some extent [ ] Hardly
Reasons/Comments:

- **Some papers are in the process of preparation and will be published.**
- **Some scientific papers are still under preparation and others are now awaiting publication of the level of foreign scientific institutions/journals.**
- **Several reports have been prepared, some have been published, others have been presented to seminars, scientific meetings. A few are still under preparation.**
- **More reports and scientific publications are under preparation.**

Impact

Q5.To what extent will the Overall Goal " To continuously utilize coastal fisheries resources and conserve the coastal environment in the Republic of Mauritius" be achieved?
Please answer with reference to the following indicators:
1. Activities of AFRC are recognized by Mauritian people.
[1] Very much [11] To some extent [ ] Hardly
Reasons/Comments

- **Annual reports, publication, scientific meetings.**

- Mauritian people are aware of the activities through the local news, reports, visits, publications, attachment of students to the centre and scientific meetings.
- Mauritian people are aware through the local news, publications, annual reports and scientific meetings.
- Through Newsletter publication, visits of public to the centre, film show, annual report.
- Through report, sensitization programmes, guided visits to AFRC, short-term attachments, talks, seminars.
- The views of AFRC is always sought on matters related to fisheries management and marine conservation (the press, ministry and other organisation).

2. Activities of AFRC affect Mauritian environment and fishery policy.
[11] Very much [2] To some extent [ ] Hardly
Reasons/Comments

- Many people have shown interest to develop aquaculture. Care is taken for a project to be technically feasible and environmental sound.
- In the formulation of fishery policy.
- The activities are to assist in producing more fish, which will provide more food for the population.
- Formulation of fisheries policy and resource propagation (lagoon restocking).
- In the formulation of fishery policy, management and the sustainable exploitation of the marine environment for its preservation and conservation, enforcement of the Fisheries and Marine Resources Act 1998.
- Results of monitoring work and research on environment and water quality are always taken into account by policy makers in policy formulation e.g. compensation to fishers, MPAs.

Q6. For those who chose "To some extent" or "Hardly", do you think the overall goal will be achieved in the future?
[8]Yes [ ]No
Reasons/Comments :

- Yes, on condition that the private sector invests in fish farming.
- With more accentuated effort on sensitizing the mauritian people.
- Sustainable utilisation as a goal is very broad. Constant achievement of small components of the goal will certainly contribute to the overall objective.
- It will depend of how the institution will manage its research component and public awareness campaign.

Q7. For those who chose "No", what is necessitated to achieve the overall goal?
Comments :

- In the long run more effort is required on each side to achieve our goal for specific fisheries project which will help us in decreasing our dependency in imported fish products.

Q8. As a result of the Project implementation, did any unexpected things, or positive/negative effect occur to you, to the community, to Mauritian society ?
[4]Yes [8]No
Reasons/Comments (if "Yes", please specify the effect.)

- Positive effect – More interested persons are visiting AFRC to seek information on culture techniques of different fish species.
- Positive effect to mauritian society – People give much consideration to the restocking of the lagoon with fish and shrimps.
- More informed about the protection of the marine environment.
- Research undertaken during the project has yielded a lot of the things, e.g. publications of scientific papers, fish book, more professional approach to survey and research. The quality of reports has been enhanced.

Relevance

Q9. What do you think about future necessity or importance of coastal fisheries resources and coastal environment conservation in Mauritius ?
[12] Will be more important [ ] Does not change [ ] Will be less important
Reasons/Comments

- Coastal fisheries resources is an area which will require more research and development and should be carried out in line with coastal environment conservation.
- More coastal fisheries resources (shrimp) will be required by a growing population in future.
- To preserve and conserve the coastal fisheries resources and the coastal environment in Mauritius for the future generations.
- Though the resource base of Mauritius is small, the country is experiencing a fantastic pace of development which are bound to impinge on the fragile ecosystem. It is important that

knowledge base on the environment is increased constantly.

Q10. Do you think the Project Purpose "To systematically strengthen the research capabilities of Albion Fisheries Research Center in the field of coastal fisheries resources propagation and research into the coastal ecosystem and environment." is still keeping with priority needs and concerns of Mauritian society?

[12] Yes [ ] No [ ] Not sure

Reasons/Comments

- This is an area where research capabilities should be enhanced to increase fish production for the benefit of local fishermen and decrease dependency on imported fishery products.
- More food production is a priority.
- To increase fish population dynamics in the coastal marine environment.
- The concern of mauritian society is to achieve sustainable development while maintaining a healthy environment. It is therefore imperative that research capacity to maintain this environmental component be sustained and that research capacity be upgraded continuously.

Q11. Do you think the Overall Goal "To continuously utilize coastal fisheries resources and conserve the coastal environment in the Republic of Mauritius" is still keeping with priority needs and concerns of Mauritian society?

[12] Yes [ ] No [ ] Not sure

Reasons/Comments

- Mauritian people of the younger generation do not want to enter the fishery line due to its difficulties and uncertainties. However, if the fisheries resources are increased, it will greatly help the younger generation to follow fisheries line.
- Through a sustainable development.
- More food production will always be a priority.
- It is the concern of everyone to maintain natural resources in good condition.
- Through sustainable fishery and development.
- This is also the stated goal of government policy.

Sustainability

Q12. Are you confident that you will conduct the current activities without the support of Japanese Experts ?

[5] Very much [7] To some extent [ ] Not sure

Reasons/Comments:

- As far as release by branding and tagging are concerned. However, more research will be required for in depth study of release techniques and their effects in nature.
- In certain field such as live feed production and diseases, we still need the guidance of Japanese experts.
- Sufficient knowledge has been acquired. However, assistance will still be required in specific areas (live feed production).
- More knowledge and skill need to be acquired in other related fields.
- From the general, favourable response on the part of officers concerned, and from the manner in which work are performed, it is deduced that officers will be able to carry on with similar activities.
- Some activities initiated during the project will be on-going whereas others will need to be phased out because of financial constraints.

Q13. Do you think the AFRC will have no problems in terms of budget in future?

[1] Yes [ ] No [11] Not sure

Reasons/Comments:

- AFRC has always been supplied with adequate budget. But in the future all budget depends policy, priority and budget availability.
- It depends on the government policy and economic situation.
- This is a matter of government policy.
- This will depend on the economic situation of mauritian.
- Depending on policy, state of the economy and the field of study.
- Depend upon the fiscal situation of the country.
- This will obviously depend on the political, social and especially the economic stability of the country as a whole.
- No serious problems have been experienced so far. However, budgeting will depend greatly on economic situation of the country and the priority that may be decided.
- The transfer of expertise from experts to counterparts has been quite successful. A lot of research activities have been initiated during the project and most of them have been successfully completed with very positive outcome. The staff has learned about sampling, designs, collection of data, interpretation of data and writing up of reports. These are skills,

which were lacking among the local counterparts. Having acquired so much skills from JICA expert, the local scientists are now in a better position to research and communicate among the local, regional and overseas scientific community.

Thank you for your cooperation.

If you have other suggestions and comments on the Project, please write in below.

Suggestions and Comments:

- **In my opinion any project carried out under joint programs should be led by one project leader for each species as well as for release purpose. This would decrease the heavy work load for each officer and each project leader will be in a position to make better progress for the work assigned to them.**
- **Long-term experts in resource propagation would be an essential component in the improvement of all aspects of coastal fisheries resources and would lead to the up-lifting and enhancing the socio-economic conditions of fishermen and the mauritian in general.**
- **We have acquired much knowledge but still the guidance of Japanese experts are needed in certain field such as live feed culture, disease and resource propagation.**
- **Sufficient knowledge has been acquired, however assistance will still be required in specific areas (live feed production).**
- **Request further technical assistance in the field of seed production of mud crab.**
- **Assistance in terms of long-term experts in the various fields of aquaculture, namely: Mullet culture, Siganid culture, Milk fish culture, Line feeds.**
- **Further studies not covered by the present collaboration may be considered: inventory of marine algae, study of benthos and study of inter-tidal and estuarine ecology.**
- **Areas where we would need JICA expertise in the future:**
  a) **Impacts of coastal engineering works on the coastal zone of Mauritius;**
  b) **Study (biology and biology) of marine algae in the waters of Mauritius;**
  c) **Studies on Plankton (productivity) in the waters of Mauritius.**
- **I feel greatly indebted and grateful to the Government of Japan and the JICA Authority especially towards the timely intervention and goodwill of the long-term and short-term experts, who have all given their utmost in the good performance of the project as well as good personal interaction and relationship. But still, I do feel that we need to further strengthen our research capabilities and skill in some other closely related aspects in marine ecosystem such as the following: analytical techniques in assessing impacts of coastal development works in the marine ecosystem and designing, solutions/measures for sustainable utilization and conservation; benthic ecology with reference to polychaets; further aspects of coral reef ecosystem research.**
- **In have to pay tribute to the professional manner in which this project has been executed, from the planning and implementation to monitoring stages. Thanks are due to JICA staff for their patience and goodwill in dealing with their mauritian counterparts who benefited much from such interactions.**
- **Sampling technique in the field of marine botany, especially mangrove areas, would have been much useful and helpful in the study of mangrove ecology.**

沿岸環境調査分野活動状況

The Coastal Fisheries Resources and Environment Conservation Project in the Republic of Mauritius
Management Consultation Team

QUESTIONNAIRE

Questions to the ex-counterpart of Coastal Environmental Research Component

It would be very much appreciated if you could answer the following questions in view of the post-project monitoring of the activities on "Coastal Environment Research" component.

Name: V.M. Chooramun
Designation: Scientific Officer

Q1. How many staff are currently allocated for the activities of coastal environment research and monitoring.

- 1 Scientific Officer
- 2 Technical Officers
- 1 Field Assistant
- 1 Field Assistant (part-time)

Q2. Would you describe the current research/monitoring activities (criteria) and its' frequency?

- Monitoring of water quality for physico-chemical parameters which was initially carried out at 8 sites have been increased to 14 sites.
- Analysis of pesticide and trace metal have been started since 2000.
- Analysis of pesticide in water collected from 7 sites.
- Trace metals determination in water samples collected from 7 sites.

Q3. Would you briefly describe the flow of your laboratory analysis and field survey?

- Preparation of equipment and waters; determination; field sampling; for collection of samples and record of physical parameters; preparation of reagents and standard in laboratory; treatment of samples for analysis; calibration of all equipment for testing; analysis of samples; compilation of data base.

Q4. Would you list up any reports or publications that your team have produced so far and its' frequency?

- Annual reports (annually);
- AMAS reports (annually);
- Ad-hoc reports on pollution and fish mortality (almost every week);
- Reports on survey carried out (almost every week).

Q5. Would you explain the current status and usage of the Manual "Methodologies" for Coastal Environment Monitoring in Mauritius", which your team has produced?

- The manual has been edited and is currently being used as reference by staff of the Coastal Environment Research Project for the running of the monitoring of water in coastal areas.

Thank you for your cooperation.

P D M

PDM (Project Design Matrix)

The Coastal Fisheries Resources and Environment Conservation Project in the Republic of Mauritius
(Duration: 1st December, 2000 - 30th November, 2002) - Follow-up Phase - Version: PDM$_E$ - 2002/4/10

Narrative Summary	Objectively Verifiable Indicators	Means of Verification	Important Assumption
Overall Goal To continuously utilize coastal fisheries resources and conserve the coastal environment in the Republic of Mauritius.	· Data on catches by species · Data on tourists	· Fisheries Statistics · Tourism Statistics · White Paper on Environment	· Environmental State and Development Policy of Mauritius do not change.
Project Purpose To systematically strengthen the research capabilities of Albion Fisheries Research Center in the field of coastal fisheries resources propagation and research into the coastal ecosystem and environment.	· Number of publications, scientific papers · Number of conducted seminars, workshops · Number of trained staffs · Research & Analytical Equipment which have been enhanced the Center's capability.	· Record of activities of AFRC · References related to coastal fisheries and environment · Annual Report · Interview with C/P and Japanese Experts · Questionnaire	· Public and Tourists in Mauritius enhance their understanding and knowledge and cooperate to maintain natural resources in good condition. · Public accepts and supports AFRC activities.
Outputs **Resource Propagation** 1 Techniques of seed production of Mangrove Crab and Sea Bream are improved. 2 Techniques of marking, release and recapture are improved. (Sea Bream) **Coastal Ecosystem Research** 3 The methods of coastal ecosystem research and monitoring techniques were improved, especially on "corals".	1-1, 1-3 Mangrove Crab ; Achievement to the target number : 1,000 crab (C1) 1-2, 1-4 Quality of Sea Bream seed production : Incidence of Lordosis ; less than 15% 2-1 Acquisition of marking techniques. 2-2 Number of released Sea Bream in lagoon ; over 5,000 (TL 100 mm) 3-1 Database constituted on marine organism 3-2 Number of monitoring on colonies partially bleached, Number of recruitment plates deployed and retrieved. 3-3 Number of reports and scientific publications under the framework of the project.	· Monthly, quarterly and Annual reports · Reports & Publications · AMAS reports · Interview with C/P and Japanese Experts · Questionnaire · Database & Field guide of corals · Monthly, quarterly and Annual reports · Reports & Scientific Publications · AMAS reports · Interview with C/P and Japanese Experts · Questionnaire	· Qualified and sufficient number of staffs are allocated for AFRC. · Sufficient budgets are allocated for AFRC.
Activities **Resources Propagation** 1-1 To conduct brood stocking of Mud crab 1-2 To conduct brood stocking of Sea bream 1-3 To conduct seed-production of Mud crab 1-4 To conduct seed-production of Sea bream 2 To undertake Sea bream release experiment and research **Coastal Ecosystem Research** 3-1 To study the distributions of coastal resources. 3-1-1 To sample and Identify coral species 3-1-2 To produce database and field guide of corals 3-2 To design a monitoring system for the coastal ecosystem 3-2-1-1 To predict and confirm coral spawning 3-2-1-2 To conduct coral recruitment study 3-2-2 To conduct bleaching coral study 3-3 To produce technical reports and scientific publications	**Mauritian Inputs** **1 Counterpart Personnel** Resources Propagation 4 Coastal Ecosystem Research 4 **2 Land, Building, facilities** **3 Expense** applox. Rs. 5 m recurrent budget only * (FY2000-FY2002) *: Including expense incurred on other projects implemented by AFRC. Expenses related to electricity, telephone, water charges, transportation and salary of staff are not included. **Japanese Inputs** **(m/m : man / month)** **1 Long Term Experts** Team Leader 24 m/m (Resources Propagation) Coastal Ecosystem Research 24 m/m Coordinator 24 m/m **2 Short Term Experts** 4 m/m (3 experts) **3 C/P Training in Japan** JFY2000 (2) + 1 ( ) : within the previous phase JFY2001 2 JFY2002 1 **4 Expense(Unit: 1,000Japanese Yen)** Local Cost 4,904 K Yen (appllox. Rs. 1.1m) Procurement of Equipment 17,736 K Yen (appllox. Rs. 4.0m)	· Technically trained C/P will continue their service at AFRC. · Workload of C/P will not increase. · Maintenance of equipment and accessories are timely conducted. **Pre-conditions** · The unexpected weather/climate changes do not appear. · Budget necessary for conducting Project is secured by Government of Mauritius.

機材利用・管理状況

機材の利用・管理状況表

（160万円以上の機材）

供与年度	番号	機材名（メーカー名・型式）	価格（千円）	数量	利用（保管）場所	利用状況	管理状況	備考（特記事項）
平成7年	1	ガスクロマトグラフ（SHIMAZU 14A）	2,967	1	スタディルーム1	稼動中	良好	薬品の取り揃え済
平成8年	2	原子吸光光度計（VARIAN製、Spectr AA200 Double Beam）	5,028	1	重金属分析室	稼動中	良好	
平成8年	3	液体クロマトグラフ（HEWLETT PACKARD製）	7,459	1	スタディルーム1	稼動中	良好	ガードカラム、取り付け済み
平成8年	4	車輌（トヨタ製、ランドクルーザー2.8Lディーゼル）	2,792	1	野外	稼動中	良好	沿岸調査（全部門）、資材搬送用
平成8年	5	水銀測定装置（日本インスツルメンツ、RA-2P20）	1,655	1	重金属分析室	稼動中	良好	
平成9年	6	蛍光顕微鏡装置	2,340	1	沿岸細菌検査室	稼動中	良好	
平成9年	7	トラック	2,700	1	野外	稼動中	良好	資源増殖部門資材搬送用
平成10年	8	マーキュリー・ガスアナライザー（及び付属品）	3,632	1	重金属分析室	稼動中	良好	
平成10年	9	蛍光顕微鏡装置	2,300	1	養殖部門検査室	稼動中	良好	
平成11年	10	油分濃度計	1,424	1	重金属分析室	稼動中	良好	
平成12年	—	—	—	—				
平成13年	—	—	—	—				
平成14年	—	—						

機材の利用・管理状況表

モーリシャス 沿岸資源・環境保全計画
2002年4月現在

（10万円以上160万円未満の機材）

供与年度	番号	機材名（メーカー名・型式）	供与数	処分数	現有数	利用状況	管理状況	（処分理由等）
平成7年	101	活魚タンク（アース、円形1000リットル）	2	0	2	使用中	良好	
平成7年	102	アルテミア孵化槽（アース、SBR-500）	6	0	6	使用中	良好	
平成7年	103	振とう器（Ikemoto Rika、67-305）	1	0	1	使用中	良好	
平成7年	104	ロータリーエバポレーター（SIBATA、R-124）	1	0	1	使用中	良好	
平成7年	105	超純水製造装置（Millipore、M111-Q SP TOC）	1	0	1	使用中	良好	
平成7年	106	薬品保存棚（IUCHI、T-1）	1	0	1	使用中	良好	
平成7年	107	超音波洗浄装置（SHARP SILENT SONIC UC-602）	1	0	1	使用中	良好	
平成7年	108	乾熱滅菌器（SIBATA ST-450）	3	0	3	使用中	良好	
平成7年	109	デスクトップPC（FUJITSU FMV 5DH1& DH6、Power Macintosh 7200/90）	3	0	3	使用中	ほぼ寿命	
平成7年	110	レーザープリンター（CANON LPB-A405Jr、Macintosh Lazer Writer Sellect）	2	0	2	使用中	良好	
平成7年	111	ラップトップコンピューター（COMPAC Contura 410C/V）	1	0	1	使用中	ほぼ寿命	
平成7年	112	クデルナ・ダニッシュ濃縮装置（SIBATA 8123-1）	1	0	1	使用中	良好	
平成8年	113	ダイビング用エアシリンダー（SHERWOOD製、アルミニウム12リットル）	5	0	5	使用中	良好	
平成8年	114	モジ網（ARCE：N44-105）	2	0	2	消耗品。在庫残僅か	良好	
平成8年	115	モジ網（ARCE：N44-140）	2	0	2	消耗品。在庫残僅か	良好	
平成8年	116	モジ網（ARCE：N44-200）	2	0	2	消耗品。在庫残僅か	良好	
平成8年	117	振とう器（Ikemoto Rika、67-302）	1	0	1	使用中	良好	
平成8年	118	ホットプレート（アサヒ理化製作所、APS-500）	2	0	2	使用中	良好	
平成8年	119	倒立顕微鏡（ニコン TMS-F12）	1	0	1	使用中	良好	
平成8年	120	プランクトンネット地（アース DIN 130）	1	0	1	消耗品。在庫残僅か	良好	
平成8年	121	pH／イオンメーター（東亜電波工業、HM-12P）	1	0	1	使用中	良好	
平成8年	122	ヴァック・エルート・チュービングセット（ジーエルサイエンス 6030-18012）	1	0	1	使用中	良好	
平成8年	123	吸引マニホールド（ジーエルサイエンス 6030-12220）	1	0	1	使用中	良好	
平成9年	124	携帯水質チェッカー	2	0	2	使用中	良好	
平成9年	125	バンドーン採水器	2	0	2	使用中	良好	
平成9年	126	デジタル天秤	1	0	1	使用中	良好	
平成9年	127	ルーツ・エアブロア	1	0	1	使用中	良好	
平成9年	128	FRP水槽	8	0	8	使用中	良好	
平成9年	129	フレキシブルホース（内径25mm、外形31.6mm、400m）	1	0	1	使用中	良好	
平成9年	130	フレキシブルホース（内径31mm、外形38mm、200m）	1	0	1	使用中	良好	

機材の利用・管理状況表

モーリシャス 沿岸資源・環境保全計画

2002年4月現在

（10万円以上160万円未満の機材）

供与年度	番号	機材名（メーカー名・型式）	供与数	処分数	現有数	利用状況	管理状況	（処分理由等）
平成9年	131	溶存酸素計	1	0	1	使用中	良好	
平成9年	132	プランクトンネット地（オープニング60ミクロン、幅102cm、20m）	1	0	1	消耗品。在庫残僅か	良好	
平成9年	133	pH／メーター	1	0	1	使用中	良好	
平成9年	134	エアーブロア（200W, Max 300L／分）	2	0	2	使用中	良好	
平成9年	135	ビデオカメラ	1	0	1	使用中	修理済、良好	
平成9年	136	デスクトップコンピューター	2	0	2	使用中	良好	
平成9年	137	水中照度計	1	0	1	使用中	良好	
平成9年	138	薬用冷蔵庫	2	0	2	使用中	良好	
平成10年	139	溶存酸素計 （F-102-5）	1	0	1	使用中	良好	
平成10年	140	プランクトンネット （DIN 100）, 40M	1	0	1	消耗品。在庫残僅か	良好	
平成10年	141	プランクトンネット （11XX）, 20M	1	0	1	消耗品。在庫残僅か	良好	
平成10年	142	ネットケージ（240k）W100CM, 151.5M	3	0	3	消耗品。在庫残僅か	良好	
平成10年	143	ネットケージ（160k）W100CM, 151.5M	3	0	3	消耗品。在庫残僅か	良好	
平成10年	144	ネットケージ（90k）W100CM, 151.5M	3	0	3	消耗品。在庫残僅か	良好	
平成10年	145	実体顕微鏡 （NIKON：SMZ-U-3）	1	0	1	使用中	良好	
平成10年	146	デシケータ （BIGDRY B-2）	2	0	2	使用中	良好	
平成10年	147	UVランプ （UVF-250）	3	0	3	使用中	良好	
平成10年	148	一眼レフカメラ （F90XD）	2	0	2	使用中	修理済、良好	
平成10年	149	カメラハウジング（ネクサス for NIKON F90X）	1	0	1	使用中	良好	
平成10年	150	水中スピードライト （SB-104）	1	0	1	使用中	良好	
平成10年	151	フォトマイクログラフィック機材 （U-III-35-PL 1）	1	0	1	使用中	良好	
平成10年	152	無停電電源装置	1	0	1	使用中	良好	
平成11年	153	水質測定機ICボード	1	0	1	使用中	良好	
平成11年	154	冷凍庫	1	0	1	使用中	良好	
平成11年	155	デスクトップ・コンピュータ（Acer Power 6100）	4	0	4	使用中	良好	
平成11年	156	除湿機	1	0	1	使用中	良好	
平成11年	157	鑑賞水槽用濾過装置	1	0	1	使用中	良好	
平成11年	158	光源ランプ	1	0	1	使用中	良好	
平成12年	159	マルチメディア・プロジェクター（Panasonic PT-L557EA）	1	0	1	使用中	良好	
平成12年	160	水中カメラ用広角レンズ（Nikon UW 15mm F2.8N）	1	0	1	使用中	良好	

機材の利用・管理状況表

モーリシャス 沿岸資源・環境保全計画

2002年4月現在

（10万円以上160万円未満の機材）

供与年度	番号	機材名（メーカー名・型式）	供与数	処分数	現有数	利用状況	管理状況	（処分理由等）
平成12年	161	液クロ（HP1050C）用マニュアル・インジェクター （ G1328A ）	1	0	1	使用中	良好	
平成12年	162	スペアーパーツ （ Nebulizer Kit 99-100437-00 ）	2	0	1	使用中	良好	
平成12年	163	プランクトンネット （ PET40 (W102cm x L20m)）	1	0	1	消耗品。在庫残僅か	良好	
平成12年	164	プランクトンネット （ NY-60HD (W102cm x L20m)）	1	0	1	消耗品。在庫残僅か	良好	
平成12年	165	プランクトンネット （ P17XX (W102cm x L20m)）	1	0	1	消耗品。在庫残僅か	良好	
平成12年	166	フィッシング・ネット （ 200K (W1m x L151.5m)）	2	0	1	消耗品。在庫残僅か	良好	
平成12年	167	水質分析キット （ Quality Checker Kit U-10 (2m) ）	1	0	1	使用中	良好	
平成12年	168	ニスキン採水器 (Type 1010 w/ Messenger, Rope (100m))	1	0	1	使用中	良好	
平成13年	169	揚水ポンプ （ Ebara 100x80 IFWM2524 ）	1	0	1	使用中	良好	
平成13年	170	RTF タグ・リーダー （ MPRHS5900L ）	1	0	1	使用中	良好	
平成13年	171	デジタル天秤 (AG204)	1	0	1	使用中	良好	
平成13年	172	防振架台 （ Insulation Table SK-1ALM ）	1	0	1	使用中	良好	
平成13年	173	紫外線ランプ （ UV Sterlizing Lamp UVF-450 ）	2	0	1	保管/使用準備中	良好	
平成13年	174	フィッシング・ネット （ Fishing Net 200K ）	1	0	1	保管/使用準備中	良好	
平成13年	175	フィッシング・ネット （ Fishing Net 120K ）	1	0	1	保管/使用準備中	良好	
平成13年	176	水産用エルバージュ（ 100g x 10 x 10 ）	3	0	1	保管/使用準備中	良好	
平成14年	-	-	-	-	-	-	-	
	-	-	-	-	-	-	-	

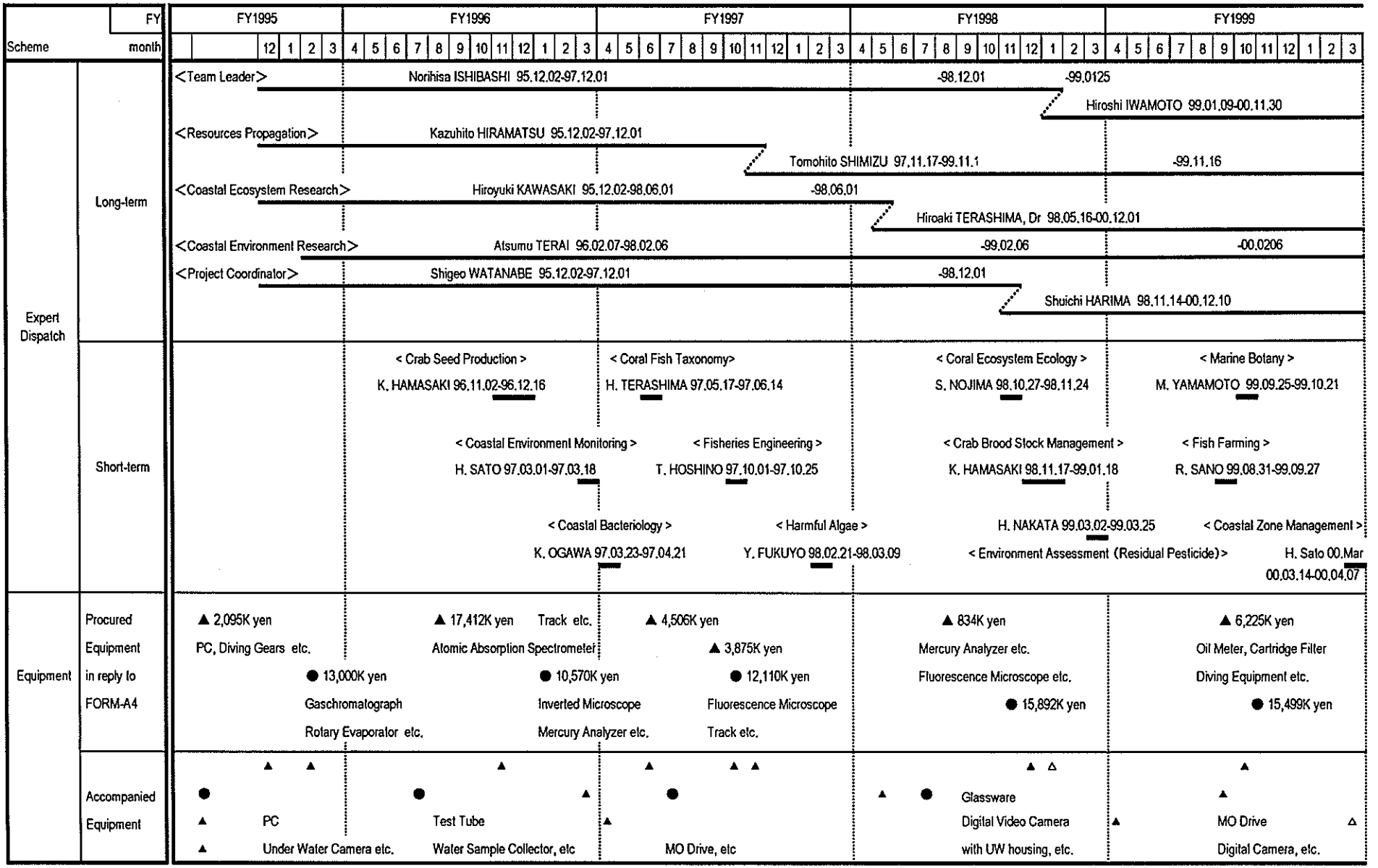
日本側・相手国側投入実績一覧表

日本側・相手側投入実績一覧表

1. 専門家派遣、機材供与

モーリシァス沿岸資源・環境保全計画

2002年4月現在

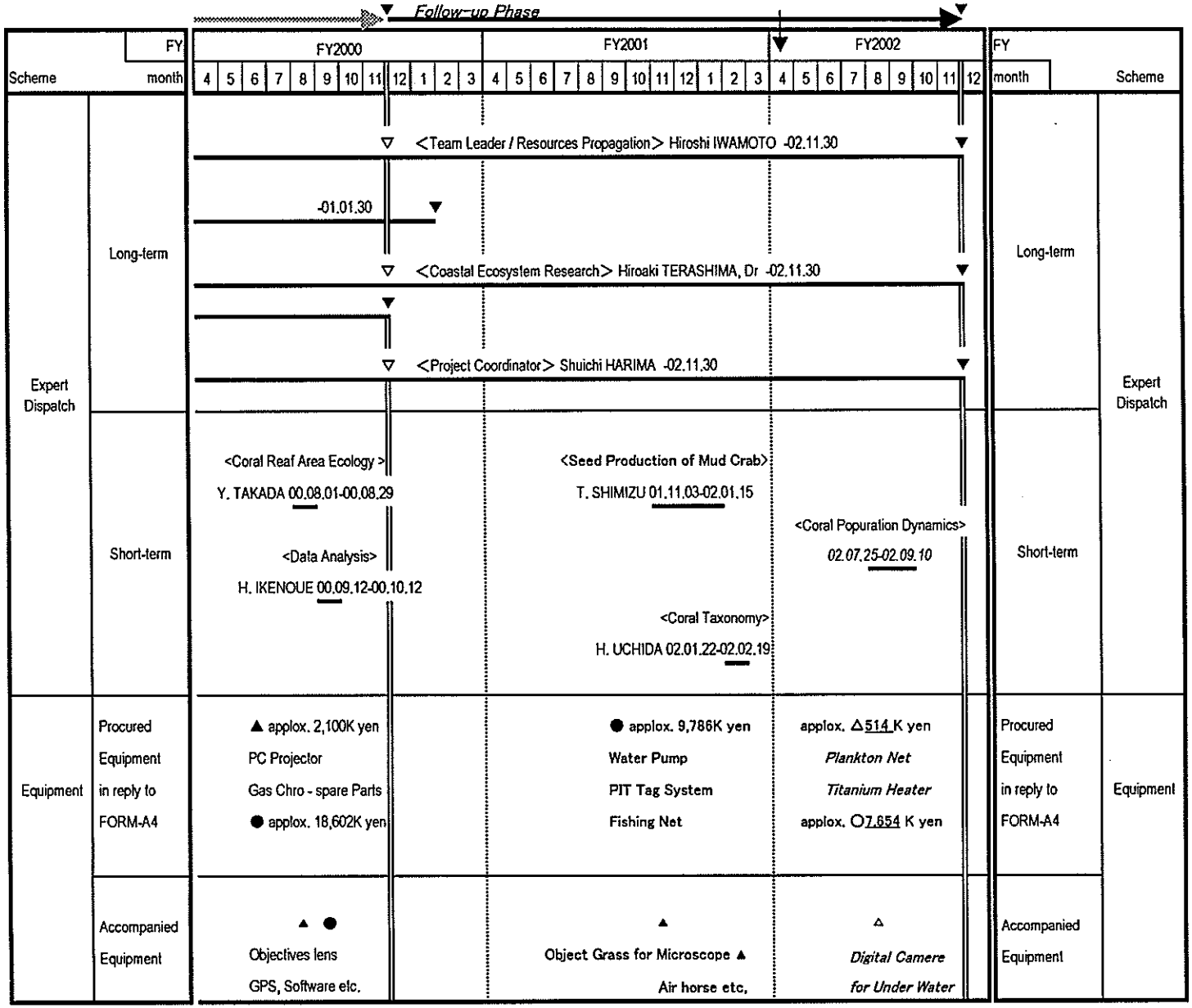


日本側・相手側投入実績一覧表

モーリシャス沿岸資源・環境保全計画

1. 専門家派遣、機材供与

2002年4月現在



日本側・相手側投入実績一覧表

モーリシャス沿岸資源・環境保全計画

2. CP研修、ローカルコスト負担、他

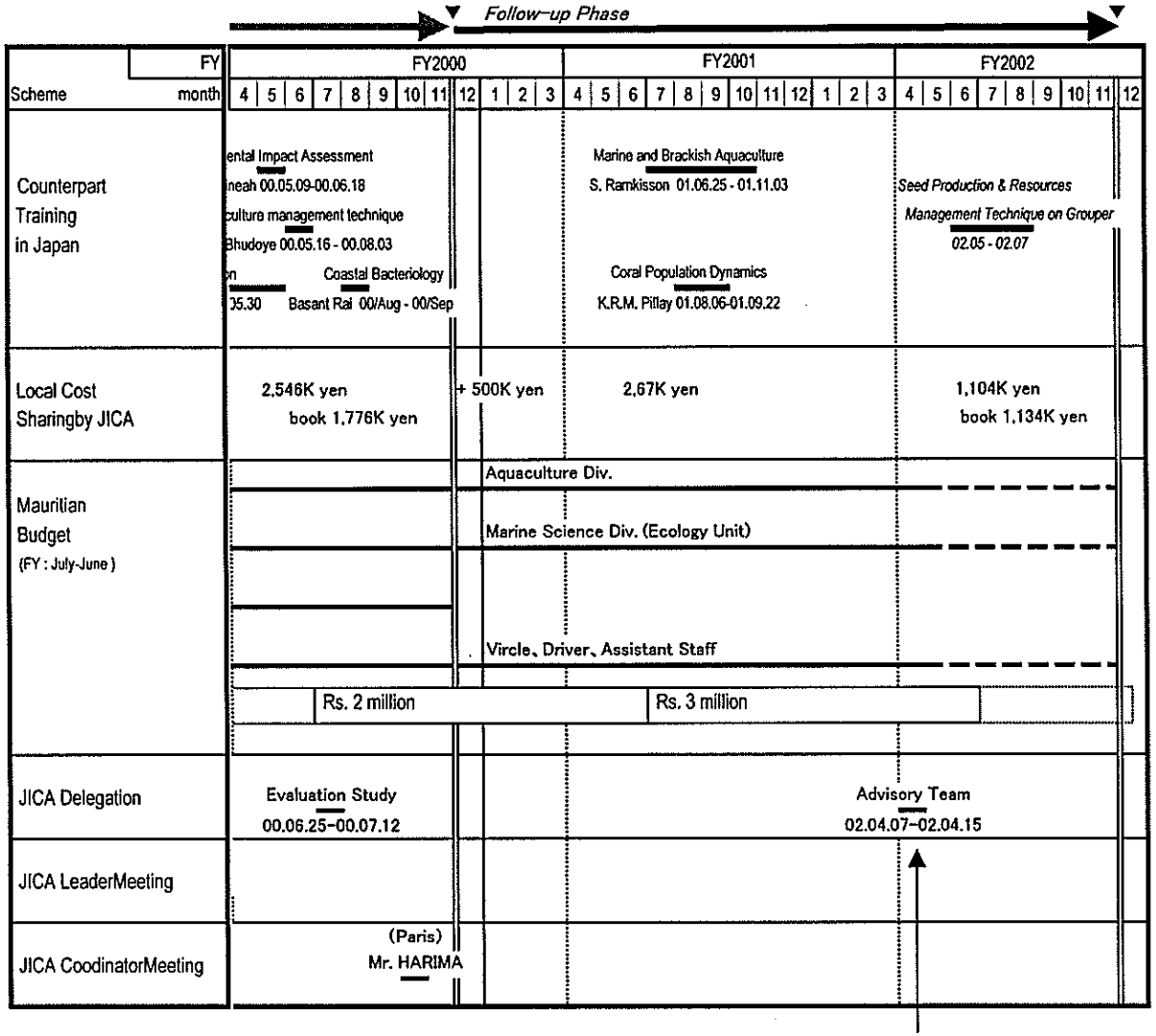
2002年4月現在

Scheme \ FY / month	FY1995 12 1 2 3	FY1996 4 5 6 7 8 9 10 11 12 1 2 3	FY1997 4 5 6 7 8 9 10 11 12 1 2 3	FY1998 4 5 6 7 8 9 10 11 12 1 2 3	FY1999 4 5 6 7 8 9 10 11 12 1 2 3
Counterpart Training in Japan	Project Management B. BOYRAMBOLI 96.03.26 - 96.04.11 Heavy Metal & Nutrient Analysis V.M. CHOORAMUN 96.09.10 - 96.11.12 Residual Pesticide & Chlorophyll P. NEERMUL 96.09.10 - 96.11.12		General Aquaculture C.R. SAMBOO 97.05.20 - 97.06.18 Observatin of Coastal Resources M.MUNBODH 97.09.01 - 97.09.16	Fish Nutrition O. VENKATASAMI 98.03.17 - 98.04.22 Coastal Biology V. MANGAR 98.08.11 - 98.09.29 Nutrient Circulation & Mechanism R.N.B. SOOGUN 98.05.19 - (98.06.30)	Liberation Technique S.K. KHADUN 99.05.18 - 99.08.03 Environment Monitoring (Water Quality) J.P.LUTCHMUN 99.09.15 - 99.11.08 Seed Productio S.RAMSAHA 00.03.28 - 00.0
Local Cost Sharingby JICA	1,680K yen	4,770K yen 2,430K yen	4,020K yen 366K yen	3,780K yen	3,780K yen 449K yen
Mauritian Budget (FY : July-June)	* Aquaculture Div. 3 C/P * Marine Science Div. (Ecology Unit) 4 C/P * Marine Science Div. (Chemistry Unit) 3 C/P Vircle、Driver、Assistant Staff				
	Rs. 2 million	Rs. 2.2 million	Rs. 2 million	Rs. 2 million	Rs. 2 million
	Recurrent Budget (including expences incurred on other project implemented by AFRC)				
JICA Delegation	Consultation Team 96.06/09			Advisory Team 98.06.27-98.07.10	
JICA LeaderMeeting	(Tokyo) Mr. ISHIBASHI	(Paraguay) Mr. ISHIBASHI	(Tokyo) Mr. ISHIBASHI	(Tokyo) Mr. IWAMOTO	(Tokyo) Mr. IWAMOTO
JICA CoodinatorMeeting		(Mexico) Mr. WATANABE		(London) Mr. WATANABE	

日本側・相手側投入実績一覧表

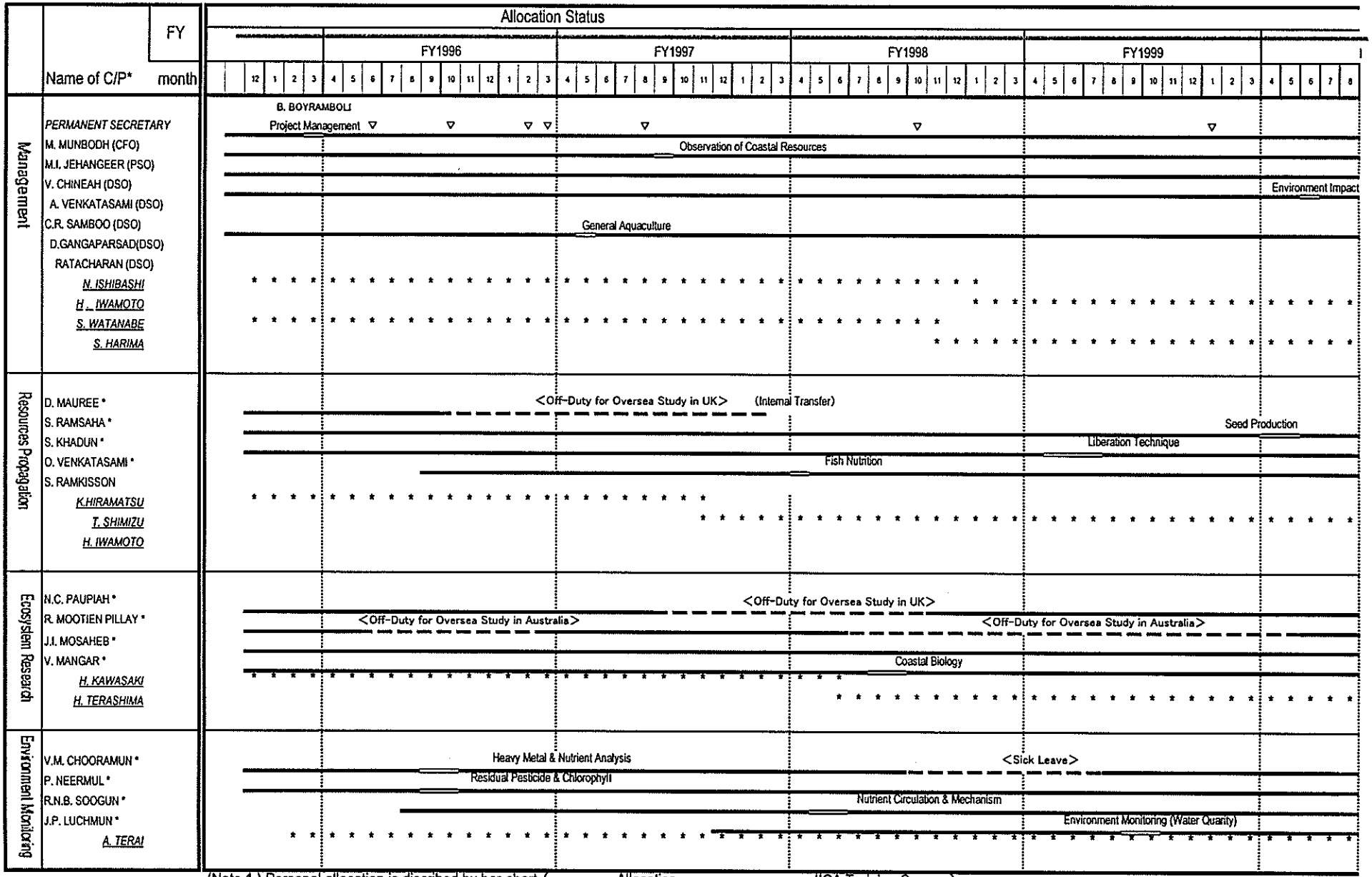
2. CP研修、ローカルコスト負担、他

2002年4月現在



C / P配置一覧表

C／P配置一覧表　　2002年4月現在　　モーリシァス沿岸資源・環境保全計画



(Note 1) Personel allocation is discribed by bar-chart. (＿＿ Allocation　　＝＝ JICA Training Course)

C／P配置一覧表　　2002年4月現在　　モーリシァス沿岸資源・環境保全計画

	Name of C/P*	FY / month	Allocation Status	Duration	Majour Institute	Remarks
			FY2000 (9 10 11) / Follow-up Phase / FY2001 (12 1 2 3 4 5 6 7 8 9 10 11 12) / FY2002 (1 2 3 4 5 6 7 8 9 10 11 12)	C/P Training in Japan		
Management	*PERMANENT SECRETARY*		▽ ▽	96.03.26 - 96.04.11	Okinawa Suishi, Kankyo Eisei Shikenjyo	
	M. MUNBODH (CFO)			97.09.01 - 97.09.16	JASFA	
	M.I. JEHANGEER (PSO)					
	V. CHINEAH (DSO)		t Assessment	00.05.09 - 00.06.18	OECC	
	A. VENKATASAMI (DSO)					
	C.R. SAMBOO (DSO)			97.05.20 - 97.06.18	JASFA, Okinawa SaibaiGyugyou Ctr	
	D.GANGAPARSAD(DSO)					
	RATACHARAN (DSO)					
	N. ISHIBASHI					
	H . IWAMOTO		* *			
	S. WATANABE					
	S. HARIMA		* *			
Resources Propagation	D. MAUREE *					Moved
	S. RAMSAHA *			00.03.28 - 00.05.30	Ehime, Okinawa, Kagoshima, JASFA	almost on schedule
	S. KHADUN *			99.05.18 - 99.08.03	Shizuoka Suishi, JASFA-Hakatajima	almost on schedule
	O. VENKATASAMI *			98.03.17 - 98.04.22	Kagoshima Univ., Okinawa Suishi	almost on schedule
	S. RAMKISSON		Marine and Brackish Aquaculture			
	K.HIRAMATSU		* * * * *			
	T. SHIMIZU		* *			
	H. IWAMOTO					
Ecosystem Research	N.C. PAUPIAH *					Oversea study 1yrs
	R. MOOTIEN PILLAY *		Coral Popuration Dynamics ＜Off-Duty for assinment in MOI＞			Oversea study 2yrs
	J.I. MOSAHEB *					almost on schedule
	V. MANGAR *			98.08.11 - 98.09.29	Ryukyu Univ., Kyushu Univ-Amakusa	almost on schedule
	H. KAWASAKI					
	H. TERASHIMA		* *			
Environment Monitoring	V.M. CHOORAMUN *			96.09.10 - 96.11.12	Ehime Univ., Okinawa, Chuo-Sui-Ken	On leave for 8months
	P. NEERMUL *		Cooperation in this feeld has been completed	96.09.10 - 96.11.12	Chuo Suiken, Ehime Univ., Okinawa Eiseiken	almost on schedule
	R.N.B. SOOGUN *			98.05.19 - 98.06.30	Hiroshima Univ., Tokyo Univ of Fisheris	almost on schedule
	J.P. LUCHMUN *			99.09.15-99.11.08	＜Group Training Course＞	almost on schedule
	A. TERAI		* * *			

組　織　図

AFRC Staff Organigram (as at Feb 2002)