

付 属 資 料 1

ミニッツ（中間評価）

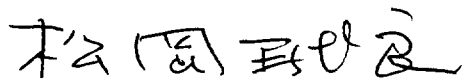
**THE MINUTE OF MEETING
CONCERNING
THE TECHNICAL COOPERATION
FOR
THE COASTAL RESOURCES AND ENVIRONMENT CONSERVATION PROJECT
IN
THE REPUBLIC OF MAURITIUS**

The Japanese Advisory Team (hereinafter referred to as "the Team") organized by the Japan International Cooperation Agency (hereinafter referred to as "JICA") and headed by Mr. Taira MATSUOKA, Managing Director, Japan Sea-farming Association, visited the Republic of Mauritius from June 28 to July 8 in 1998.

During its stay, the team had a series of discussions and evaluated the achievement of the Coastal Resources and Environment Conservation Project (hereinafter referred to as "the Project") and exchanged views on the possible technical cooperation programs to be further implemented to fulfill the Master Plan of the Record of Discussions signed on 1st of September, 1995.

As a result of discussion, the Mauritius and Japanese sides agreed upon the matters referred to in the documents attached hereto.

Port Louis, 7th of July, 1998



Mr. T. MATSUOKA
Leader
Advisory Team
Japan International Cooperation Agency
JAPAN



Mr. S. C. SEEBALLUCK
Permanent Secretary
Ministry of Agriculture,
Fisheries and Cooperatives
REPUBLIC OF MAURITIUS

THE ATTACHED DOCUMENT

I. INTRODUCTION

Members of the Team paid visits to the project site, and had interviews and discussions with Mauritian counterparts and Mauritian government officers in charge, concerning the situation of the Project activities and management in respective fields and confirmed the progress and achievement of activities.

In order to evaluate past performance and achievement, the Team used the following materials as the references:

- (1) The Record of Discussion
- (2) The Minutes of Meetings , the Annual Work Plans and other documents agreed upon or accepted in the course of implementation of the Project.

Using above materials, the Team evaluated the progress of Project in terms of 'Output and Achievement', 'Efficiency', 'Rationale' and 'Sustainability'.

II. BACKGROUND AND SUMMARY OF THE PROJECT

According to the R/D, the Project purpose is to systematically strengthen the research capabilities of Albion Fisheries Research Center (hereinafter referred to as AFRC) in the field of coastal fisheries resources and propagation and research into the coastal ecosystem and environment.

The fields of the Japanese technical cooperation of the Project are Resource Propagation, Coastal Ecosystem Research and Coastal environmental Research.

III. MID-TERM EVALUATION

1. OUTPUT AND ACHIEVEMENT

Achievement : compared with annual implementation plan, the progress of activities were evaluated according to following criteria.

A : the activity progresses according to the schedule of implementation plan.

B : there seems some delay in the progress of activity.

C : the activity is delayed.

1) RESOURCES PROPAGATION

1-1) Seed Production <Achievement : "B" for Mangrove Crab, "A" for Sea bream, "A" for Black tiger shrimp>

The annual target of seed production of Sea bream and Black tiger shrimp has been achieved, and appropriate feeding regime was established. In addition, counterpart acquired necessary skills for seed production. Therefore, the mass seed production of these species may be achieved in the near future.

Further study is required on the disease control of Mangrove crab.

1-2) Barachois Study

1-2-1) Liberation <Achievement : "B">

The first liberation of Black tiger shrimp in barachois was conducted in July 1997, and some shrimps had been recaptured by March 1998. Tail cutting marking method is established. This activity started in the 2nd year, so it needs more time for the improvement of the method and to examine its effectiveness.

1-2-2) Culture <Achievement : "B">

Cage and pen culture experiments have been conducted in 10 barachois. Some barachois owners have difficulty in making appropriate arrangement for the experiment.

Dry pellet for sea bream has been developed jointly with a private company.

1-2-3) Basic Research & Transplantation of Bivalves <Achievement : "B">

A list of 14 species of edible shells was compiled. Biological characteristic research and transplantation experiment of Betail was conducted.

1-3) Broodstock <Achievement : "A" for Black tiger shrimp, "B" for Mangrove crab>

As a result of development of new technique in broodstock rearing, the maturation rate of shrimp and fertilization rate of the eggs increased. A manual for artificial insemination was compiled. Crab rearing is being carried out in the tank. Spawning was successful but eggs suffered from fungal infection. Preventive measures to control the infection are being taken.

2) COASTAL ECOSYSTEM RESEARCH

2-1) Field Activities

2-1-1) Pilot Study

① Distribution Pattern of Marine Organisms <Achievement : "A">

The establishment of a database on marine organisms was carried out and is continuing. Collection of fish/coral specimens and ecological photos were conducted in order to understand the fauna and flora in Mauritius. A hundred and ninety-three (193) species of fish were observed in Mauritius waters. Over hundred specimen of corals were collected and thirty (30) species were identified. With this activity an album and a Poster on "Common Coral Reef Fishes", and a pamphlet on "coral and coral reef" of Mauritius was produced.

As concern the counterparts abilities, the techniques for collecting and recording specimens, such as diving, underwater-photograph, underwater-video etc., have considerably improved.

② Fish-Habitat Interaction <Achievement : "B⁺">

The samplings on substrata coverage and abundance of damsel fish have been carried out and completed. The ability and knowledge of the staff on ecological sampling and data collection have been improved. The data obtained will be analyzed in the near future.

③ Ecological Impact Assessment <Achievement : "B⁺" >

This is "the key stone" subject to conserve the coastal ecosystem of Mauritius. The field survey requires well experienced and high technique of SCUBA diving. Data are being collected at four sites for ecological impact assessment. The sampling designs and techniques obtained on-the-job training (OJT) were applied during the EIA works. The demands for field survey in all coastline have been reliably filled up and some assessment sites will be set up the east coast.

2-1-2) Barachois Study <Achievement : "B">

Regular survey was conducted in barachois for the study of the influence of aquaculture on the ecosystem. The collection of information on fauna and flora in barachois is ongoing. Additional quantitative survey on fish and other macro-organisms by visual census was attempted but was discontinued because of poor visibility in most barachois and is replaced by plankton study.

2-1-3) Individual Research <Achievement : "A">

The objectives is to encourage independent researchers through field and laboratory works eventually to produce scientific reports and papers. Three counterparts were assigned for the their research topics on Coral reef ecology (namely corals and coral reef fishes identification) and plankton analysis and ecology. In some topics, their research activities recently produced as scientific reports and articles.

2-2) Monitoring System

2-2-1) Biostatistics <Achievement : "A">

Counterparts acquired basic skills in data processing procedures such as calculation of average, standard deviation, standard error, etc. However, they still need more time to master bio-statistics procedures such as t-test, One-way ANOVA, and Chi-square test for accurate data analysis.

2-2-2) Data and Specimen Collection <Achievement : "A">

Monitoring of coral reef ecosystem on a pilot study were carried out at five sites for collection of data on substrate cover and fish abundance along transects. Counterpart gained skills in the establishment of line transects and familiarise themselves with sampling methods and design techniques.

2-2-3) Literature <Achievement : "A">

A library has been set up comprising books, scientific journals and references for use by counterparts and other staff.

3) COASTAL ENVIRONMENT RESEARCH

3-1) Set Up <Achievement : "A">

The laboratory, equipment and spaces for analysis were set up. Necessary information was collected from various institutions and the monitoring plan has been established.

3-2) Coastal Environment Monitoring <Achievement : "B⁺">

Regular parameters - Sampling was conducted as scheduled at the twelve sites. Determination of physico-chemical parameters viz: salinity, pH, water temperature, biochemical oxygen demand (BOD), dissolved oxygen (DO) and nutrients (nitrate and phosphate) were effected. BOD was replaced by chemical oxygen demand (COD) a more appropriate parameter for seawater analysis as from February 1998.

New parameters (heavy metals and pesticides) - Analyses of water for these parameters will start as from the third year as reagents were received and

installation of equipment were completed in April 1998.

3-3) Barachois Study <Achievement : "A">

Regular survey was conducted at Montague and Humbert barachois for the study of the influence of aquaculture (cage culture) on the environment. The general characteristic survey was conducted at ten barachois. The same parameters as in the regular monitoring were measured on water samples and ignition loss was determined on sediment samples. Results of analyses showed that there was no significant change in the water quality at both the barachois mentioned above. A report has been prepared. A similar study is presently being carried out at Beau Rivage barachois as from January 1998.

Sampling and analysis techniques have been improved as follows through the coastal environment monitoring and barachois study.

- 1) Sampling technique and determination of dissolved oxygen (DO) by Winkler method has remarkably improved the analytical precision.
- 2) Analysis technique of chemical oxygen demand (COD) by Alkaline - potassium permanganate method was introduced. By this method the organic matter content of water from coastal areas can be more precisely determined.
- 3) Techniques for analysis of nutrients using auto-analyzer enabled determination of a large number of samples efficiently and with high precision.
- 4) The conductivity method for measurement of salinity was introduced and it enabled the collection of more precise data on that parameter.
- 5) The ignition loss method was introduced instead of COD for analysis of sediment samples for better efficiency.

Long term monitoring by these established system will help to understand the environmental conditions in the coastal areas of Mauritius.

3-4) Guideline of Seawater Quality Standard <Achievement : "A">

An inter-ministerial technical committee was set up in August 1997 to establish guidelines for coastal water quality under the Environment Protection Act and the Ministry is a member of the committee. Relevant information and data were collected. A draft guideline was prepared on coastal water quality and submitted to the committee. The committee meets regularly to review the Ministry's proposal and advice is given on the draft guideline. These guidelines once finalised will be published under the Environment Protection Act to promote the conservation of coastal environment.

3-5) Data Analysis <Achievement : "A">

Data collected are computerised and analysed. Results are published in the monthly and annual reports. Capability of officers to process data has been improved.

Accumulated data would be used to assess the environmental changes in the coastal area in the future.

3-6) Manual for Coastal Environment Monitoring <Achievement : "A">

A manual for coastal environment is under preparation for dissemination of information on coastal water quality monitoring. This manual will comprise four sections namely monitoring plan, survey method, chemical analysis and data analysis. The analytical and the flow charts for chemical analysis have been prepared and materials for the survey method are being compiled. The manual will be published during the fifth year.

This manual will be the first of its types to be published for the monitoring of the coastal environment in Mauritius. It is expected that this manual will not only enhance monitoring techniques but will also help to promote the conservation of the coastal environment.

2. EFFICIENCY

Efficiency of the Project is measured by the timing and appropriateness of inputs provided. Analysis was made to examine whether the timing, quantity and quality of provision of inputs were appropriate to realize expected outputs.

Generally, the efficiency of the Project in the past years was satisfactory. However, it was observed that some equipment and reagents were not provided on time, which delayed the progress in the fields of research on heavy metals and residual pesticides in coastal environment. From this experience, planning and designing of delivery of machinery would be carefully undertaken in the future.

3. RATIONALE

Rationale of the project plan seems to be high in general because of the project purpose and each activities are in line with government policies.

However, the activities of implementation plan seems to be too ambitious to be conducted in the present situation. Hence there is need for modification of implementation plan.

4. SUSTAINABILITY

4-1) Organizational aspect

The reorganisation of AFRC has been proposed in the "ten year development plan for the fisheries sector" which prepared by the cooperation of UNDP and FAO.

Because this plan aims to separate administration and research section, it has a possibility to improve present situation mentioned at 4-3), if there is no staff reshuffling in AFRC.

4-2) Financial aspect

The Mauritian government allocate necessary budgets constantly. Sustainability in terms of finance seems to be rather high, and continuing this situation is essential for successful implementation of the Project.

4-3) Technical aspect

In each fields, it seems that most of counterparts acquired capability enough to conduct their activities. It has been pointed out that counterparts have carried out extra work such as reviews of EIA's, surveys, attending meetings and administrative work in addition to the research activities. Moreover, staff reshuffling also prevents the accumulation of the know-how transferred by the Japanese experts.

VI. RECOMMENDATION

1. Suggestion for modifying present implementation plan

As a whole, the Project is moving to a desirable direction. The most outstanding problem is excessive quantity of total activities in present situation.

The suggestion for modifying plan is as follows :

(1) Resource propagation

It seems better to exclude bivalves and snapper from target species in order to focus on main species, especially mangrove crab. In addition to this, the target numbers of each activities should be revised downward respectively according to capacity of facilities.

(2) Coastal ecosystem research

Distribution of marine organisms and monitoring system, scheduled in early stage of the project, needs to be continued in the latter half stage of the project.

(3) Coastal environment research

Coastal environment monitoring system needs to be continued in the latter half stage of the project.

2. Allocation of counterparts

Allocation of enough staff is still most important for successful implementation of the Project. Therefore, much efforts should be devoted to making conditions more conducive for counterparts to concentrate on their own jobs.

Consideration should be given to continued allocation of staff.

3. Running costs of equipment

Provisions should be made for the proper maintenance of all equipment for the running of the Project.

付 属 資 料 2

ミニッツ（後半活動計画）

THE MINUTES OF THE JOINT COORDINATING COMMITTEE
HELD AT MAURITIUS 7TH JULY, 1998

The Second Joint Coordinating Committee was held for the purpose of discussing the implementation plan of remaining years and other related matters concerned with the technical cooperation for the Coastal Resources and Environment Conservation Project in Mauritius.

Both Japanese side and the Mauritian authorities concerned exchanged views with regard to the above mentioned plan and the desirable measures to be taken by both governments for the successful implementation of the Project.

As a result of the discussions at the Committee, the Japanese and Mauritian sides agreed on the matters as attached hereto.

Port Louis, 7th of July, 1998

石橋 矩之

Mr. N. ISHIBASHI
Team Leader
Coastal Resources and Environment
Conservation Project
JAPAN



Mr. S. C. SEEBALLUCK
Permanent Secretary
Ministry of Agriculture,
Fisheries and Cooperatives
REPUBLIC OF MAURITIUS

石橋 矩之

I. PROGRESS REPORT

I-1. GENERAL

1) Personnel Allocation

1-1) JICA Expert

1-1-1) Long-term Expert

JICA dispatch five long-term experts to AFRC throughout the five years' project term :

① Team Leader:	N. Ishibashi	'95.12.2 ~
② Resources Propagation:	K. Hiramatsu	'95.12.2 ~ '97.12.1
	T. Shimizu	'97.11.17 ~
③ Coastal Ecosystem Research:	H. Kawasaki	'95.12.2 ~ '98.6.1
	A. Terashima	'98.5.16 ~
④ Coastal Environment Research:	A. Terai	'96.2.7 ~
⑤ Project Coordinator:	S. Watanabe	'95.12.2 ~

1-1-2) Short-term Expert

A few short-term experts are dispatched to AFRC every year depend on the necessity. Six experts has been sent as follows:

<JFY*1996/97 > (*1JFY: Japanese Financial Year, 1st April to 31st March)

① Crab seed production:	K. Hamasaki	'96.11.4 ~ '96.12.15
② Coastal Environment Monitoring:	H. Satou	'97.3.3 ~ '97.3.14
③ Coastal Bacteriology:	K. Ogawa	'97.3.26 ~ '97.4.19

<JFY1997/98>

④ Coral Fish Taxonomy:	H. Terashima	'97.5.19 ~ '97.6.10
⑤ Fisheries Engineering:	T. Hoshino	'97.10.3 ~ '97.10.22
⑥ Harmful Algae :	Y. Fukuyo	'98.2.21 ~ '97.3.9

1-2) AFRC Counterpart

AFRC allocated the following staff for the project :

① Resources Propagation:	S. K. Ramsaha	'95.12 ~
	S. K. Khadun	'95.12 ~
	D. Mauree	'95.12 ~ 96.9
	O.G. Venkatasami	'96.9 ~
② Coastal Ecosystem Research:	K. R. Moothien Pillay	'95.12 ~
	C. R. Paupiah	'95.12 ~
	J. I. Mosaheb	'95.12 ~
	V. Mangar	'95.12 ~
③ Coastal Environment Research:	V. M. Chooramun	'95.12 ~
	P. Neermul	'95.12 ~
	S. R. N. B. Soogun	'96.8 ~
	J. P. Luchmun	'97.12 ~

2) Counterpart Training in Japan

JICA accept a few AFRC counterpart trainee every year. Seven trainee has already completed the course.

<JFY1995/96>

① Project Management : B. Boyramboli '96.3.26~'96.4.11

<JFY1996/97>

② Heavy Metal & Nutrient Analysis : V. M. Chooramun '96.9.10~'96.11.12

③ Residual Pesticide & Chlorophyll : P. Neermul '96.9.10~'96.11.12

<JFY1997/98>

④ General Aquaculture : C. R. Samboo '97.5.20~'97.6.18

⑤ Observation on Coastal Resources
Environment Conservation : M. Munbodh '97.9.1~'97.9.16

⑥ Fish Nutrition : O. G. Venkatasami '98.3.17~'98.4.22

<JFY1998/99>

⑦ Nutrient Circulation & Mechanism
of Algal Bloom : S. R. N. B. Soogun '98.5.19~'98.6.30

3) Equipment Allocation

Research & analytical equipment valued 9.4 million rupees (51.6 million yen) are procured to AFRC by JICA. Major equipment procurement will complete by additional equipment valued 1.7 million rupees in early 1999. Equipment has been chosen considering self-development of AFRC, and moreover, preparation of spare parts and self-management by AFRC is required for the sustainable research development after the termination of the Project.

Procured main equipment and condition are shown in Table 1.

Table 1. Main equipment and condition

Equipment (Make · Model)	Value (1000 Rs.)	Unit	Equipped Location	Utility Condition	Management Condition
Gas-chromatograph (Shimazu 14A)	5 4 0	1	Study Room 1	Regular	Good
Atomic Absorption Spectrophotometer (Varian, Spectr AA200 Double Beam)	9 1 5	1	Environment Lab.	Regular	Good
Liquid-chromatograph (Hewlett Packard)	1, 3 5 6	1	Study Room 1	Regular	Good
Vehicle (Toyota, Land cruiser 2.8L diesel)	5 0 7	1	Field	Frequent	Good
Mercury analyzer (Nihon Instruments, RA-2P20)	3 0 2	1	Environment Lab.	Regular	Good
Lorry (Toyota, Dyna300)	4 1 1	1	Field	Frequent	Fair
Spectrophotometer (Hach, DR4000)	3 1 5	1	Environment Lab.	Regular	Good

4) Operating Expenditure

4-1) JICA

JICA has granted about 2.4 million rupees until the end of JFY 1997 to support the project operating expenses; 1.9 million of general expenditure, 442 thousands of emergency expenditure and 67 thousands of extension expenditure. Annual details are mentioned on Table 2.

General expenditure is spent to purchase consumption article, to maintain machinery and to exchange messages with related organizations etc. Emergency expenditure

covered the rehabilitation of the broken fresh water supply system for aquaculture. Extension expenditure was utilized to publish poster titled "Common Coral Reef Fishes of Mauritius", and pamphlet to introduce the project activity to the public.

4-2) AFRC (*2MFY: Mauritius Financial Year, 1st July to 30th June)

Mauritius government has appropriated 2 million rupees in MFY*21995/96, 2.2 million rupees in MFY 1996/97 and 2 million rupees in MFY 1997/98, respectively for AFRC. This recurrent budget cover the overall research activity; consumption article, maintenance cost etc.

AFRC also secure research assistant, secretary, driver and official vehicle for the smooth implementation of the project.

Table 2. Recurrent expenditure of each financial year

(Unit:1,000 rupees, Exchange rate: 1 rupee=5.5yen)

Budget \ Financial Year		1995/96	1996/97	1997/98	1998/99	1999/00	2000/01	Total
J I C A	General expenditure	3 0 5	8 6 7	7 3 1	(6 8 8)			1,9 0 3
	Emergency exp.		4 4 2					4 4 2
	Extension exp.			6 7				6 7
	JICA Total	3 0 5	1,3 0 9	7 9 8				2,4 1 2
AFRC Recurrent expenditure		2,0 0 0	2,2 0 0	2,0 0 0				6,2 0 0

I-2. RESOURCES PROPAGATION

1) Seed Production

The target set for seed production of both the black tiger shrimp and sea bream was achieved. This success is explained by the disease control and the appropriate feeding regime. However, seed production of mangrove crab has not been totally established due to fungal occurrence. Appropriate measures are being taken to control it. The maximum annual number of seed produced were mangrove crab 1,667, sea bream 198,600 and black tiger shrimp 537,500.

2) Barachois Study

2-1) Liberation

Liberation experiment and extensive culture of shrimp were conducted in lagoon and barachois. 139,000 marked shrimps (tail cut) were liberated in the lagoon at Grand Sable and Bambous Virieux. 22,770 shrimps were released in barachois at Butte a l'Herbe for extensive culture. Some of the released shrimps were caught from the barachois and lagoon for evaluation of growth rate.

Liberation of sea bream has been started.

2-2) Culture

Experimental cage and pen culture of shrimp and sea bream were carried out at the Center and selected barachois.

Dry pellet for sea bream was developed jointly with a private company. Semi-intensive and intensive culture of shrimp were carried out at Center. Study in barachois could not be completed due to predation, high cost of moist feed and poor management.

2-3) Basic Research and Transplantation

Fourteen species of edible mollusc have been identified. Biological characteristic research of Betai (*Asaphis violaciens*, Semelidae) has been carried out. Transplantation experiments of Betai were conducted in the barachois at Beau Rivage and Albion. Transplantation at Beau Rivage was not successful, as crabs and fish predated upon the Betai, and at Albion the Betai could not survive due to salinity fluctuation.

3) Broodstock Study

Broodstock experiment of shrimp was continued. The maturation rate of shrimp had increased by the controlled photo-period and improved feed regime. The fertilization rate of eggs was improved by artificial insemination. Feed formulation for induce spawning is still being conducted. A manual on artificial insemination has been prepared.

Crab rearing is being carried out in the tank. Spawning was successful but eggs suffered from fungal infection.

I-3. COASTAL ECOSYSTEM RESEARCH

1) Field Activities

1-1) Pilot Study

1-1-1) Distribution of Marine Organisms

The ecological research team conducted field surveys to collect fish/coral specimens and ecological photos on fish and coral at the five study sites in order to establish a database on fauna and flora in Mauritius.

1-1-2) Fish-Habitat Interaction

The sampling on substrata coverage and fish abundance of damselfish was carried out from January 1997 to March 1998. The data obtained will be analyzed in the near future.

In terms of sampling method, the staff of the ecological research unit including Fisheries Assistant were trained in data collection and underwater sampling techniques. This has upgraded their skills and knowledge.

1-1-3) Ecological Impact Assessment

After the studies conducted at four sites and having acquired the necessary skills, permanent stations are now being set up at several sites around island for ecological impact assessment on the coral reefs. The data collected during the studies have been compiled and analyzed.

The ecological research unit has to carry out the extra EIA works approximately 4-6 cases monthly. Several sampling designs and techniques were applied as a sort of On the Job Training (OJT) during the EIA works. Various EIA cases have been studied by the ecological research unit especially those that had direct impact on the coastal marine ecosystem.

1-2) Ecological Survey within Barachois

The barachois study was undertaken as a joint survey with Aquaculture and Marine Science. The ecological research unit surveyed the substrata type and fish species and also collected plankton samples in each barachois to provide ecological information on barachois.

1-3) Individual Research under The Framework of Project

Counterparts selected individual research topics in order to improve their research capability and to produce scientific reports and articles.

2) Monitoring Systems

2-1) Biostatistics

Various lectures on the different aspects of biostatistical analysis were given to the staff of ecological research unit. A brief handbook on biostatistics is now under preparation. This handbook will highlight the basic statistical tests required for data analysis and presentation.

2-2) Data / Specimen Collection and Processing

The specimen collection and the improvement of database were undertaken.

Monitoring of coral reef ecosystem on a pilot study were carried out at five sites for collection of data on substrate cover and fish abundance along transects. Counterpart gained skills in the establishment of line transects and familiarise themselves with sampling methods and design techniques.

2-3) Literature

The relevant literatures and the scientific journals were purchased or subscribed for providing research information on coastal ecosystem research.

The ecological research unit had conducted several collaborative works with relevant agencies and NGOs.

I-4. COASTAL ENVIRONMENT RESEARCH

1) Set Up (Planing, Information, Laboratory)

- a) Site visit was conducted to check regular monitoring sites and decided to continue with present eight monitoring sites.
- b) Necessary information were collected from related organization.
- c) Laboratory equipment were allocated to proper places for new analysis.

2) Barachois Study

19 field work studies at 12 barachois were conducted by the end of 1997 and a report was prepared on the work carried out. As from January 1998, Beau Rivage barachois was selected as a regular site and survey was conducted every three months to check the influence of cage culture.

3) Coastal Environment Monitoring and Data Analysis

Coastal environment monitoring (Annex) was conducted and 6 parameters were monitored. Harbour, Tombeau bay and Terre Rouge estuary were added to regular sites as from the 2nd year. The river Belle Eau (Albion) was also added as from September 1997. Auto-analyzer method, Winkler method and multi water checker with conductivity sensor to determine nutrients, dissolved oxygen (DO) and salinity were introduced respectively for more accurate results. Biochemical oxygen demand (BOD) measurement was replaced by chemical oxygen demand (COD). Low range reagent for HACH-DR/2000 was selected to measure nitrate-nitrogen in coastal water because of its low detection limit. Heavy metals and residual pesticides analysis were postponed due to the delayed installation of equipment and delivery of reagent. The results of this monitoring study were submitted in monthly and annual reports.

4) Guideline for Seawater Quality Standard

Information and data on water quality standard were collected from several countries. Draft guideline on coastal water quality was prepared and submitted to the Technical Committee at Ministry of Local Government and Environment. Counterparts and Japanese expert attended the meetings to discuss about the guideline and provided necessary advice. The discussion is still on-going.

5) Manuals for Coastal Environment Monitoring

A manual for coastal environment is under preparation for dissemination of information on coastal water quality monitoring. This manual will comprise four sections namely monitoring plan, survey method, chemical analysis and data analysis. The analytical and the flow charts for chemical analysis have been prepared and materials for the survey method are being compiled. The manual will be published during the fifth year.

II. MODIFICATION OF THE PROJECT

The Project activities are modified according to the Advisory Team's suggestion as hereunder:

1) RESOURCES PROPAGATION

1-1) Seed Production

It's understood that the seed production target set up in the five year plan was too high to be achieved on account of productivity and demand.

The seed production of black tiger shrimp and bivalves are excluded from the targeted species under the technical cooperation.

Study will be focused on mangrove crab and sea bream so as to establish appropriate technique for seed production.

1-2) Liberation

It is targeted to release 10,000 juvenile of mangrove crab, 100,000 larvae (30 mm in TL) of sea bream, and 100,000 (2-5 g in BW) juvenile of black tiger shrimp per annum.

The above target may be fluctuated depending on the availability of spawners and the result of seed production at hatchery level.

Sea bream has been included in the liberation program as request by Aquaculture Division; 100,000 larvae (30 mm in TL) to be released per annum.

1-3) Culture

The target of sea bream culture is revised downward from 100,000 to 60,000 larvae of size 30 mm per annum due to the capacity of rearing tank.

1-4) Basic Research & Transplantation

This item is excluded from the Latter Half Project Activity Plan due to the excessive activity.

1-5) Brood stock

Study will be focused on mangrove crab so as to establish complete brood stock management, therefore the new species: snapper is excluded from the list of brood-stock experiment.

2) COASTAL ECOSYSTEM RESEARCH

2-1) Field Activities

Since the pilot studies are already completed, the sub-title "Pilot Studies" is replaced by "Ecological Studies". Distribution of marine organisms, scheduled for implementation in the early stage of the project, needs to be continued in the latter half stage of the project.

2-2) Monitoring system

Monitoring system, scheduled for implementation in the early stage of the project, needs to be continued in the latter half stage of the project.

To clarify the activity of biological statistics research, the title of activity "Biometrics" is replaced by "Biostatistics".

3) COASTAL ENVIRONMENT RESEARCH

3-1) Coastal Environment Monitoring

BOD is replaced by COD a more appropriate parameter for coastal water analysis.

Total organic carbon(TOC) is omitted from the monitoring programme due to its high correlation with COD and its high running cost.

Oil hydrocarbon, scheduled to start in the last quarter of the 3rd year, will start in the 4th year due to increase in the number of monitoring sites and inclusion of new parameters.

3-2) Barachois Study

Measurement of COD in sediment sample is replaced by ignition loss due to the variation in value and determination of ignition loss is easier and more efficient.

3-3) Guideline of Seawater Standard

Activity of this item is to advise on the establishment of guidelines for coastal water quality.

III. LATTER-HALF ACTIVITY PLAN

III-1. RESOURCES PROPAGATION

1) Seed production

Species: Mangrove crab Scylla oceanica, Sea bream Rhabdosargus sarba

Objectives: Establishing the mass-production technique of the seed of the above-mentioned species

Contents: Mangrove crab:

- <3rd year> 1) Improvement of the survival rate of early-stage larvae,
- 2) Experimental seed production

- <4th & 5th year> 1) Improvement of feed formulation,
- 2) Experimental seed production

Sea bream:

- <3rd year> 1) Experimental seed production
- 2) Improvement of feed formulation

- <4th year> Experimental seed production

Target: Mangrove crab: 10,000 juveniles (C1) in 3rd, 4th and 5th year
Sea bream: 200,000 larvae (20mm in TL) in 3rd and 4th year

2) Barachois Study

2-1) Liberation

Species: Black tiger shrimp Penaeus monodon, Sea bream, Mangrove crab

Objectives: Study on the effect on the liberation in barachois.

Contents: Black tiger shrimp:

- <3rd year> 1) Marking method survey, 2) Study on the growth and survival of liberated juveniles in barachois and lagoon by tail cut method

- <4th & 5th year > Study on the effect of liberation from fishing data

Sea bream:

- <3rd year> 1) Marking method survey, 2) Study on the growth and survival of released juveniles in barachois and lagoon by dorsal spine cut method

- <4th & 5th year > Study on the growth and survival of juveniles

Mangrove crab:

- <4th & 5th year> Study on the growth and survival of juveniles in barachois

Target: Black tiger shrimp: 100,000 juveniles (1g in BW) in 3rd, 4th year
Sea bream: 100,000 juveniles (30mm in TL) in 3rd and 4th year
Mangrove crab: 10,000 juveniles (C1) in 5th year

2-2) Culture

Species: Sea bream and Black tiger shrimp

Objectives: Continue study on the feasibility of net cage and pen culture of above-mentioned species in barachois

Contents: Black tiger shrimp:

- <3rd year> Study on the growth and survival of juveniles in floating cage and pen

- <4th & 5th year> Study on the growth and survival of juveniles in barachois

Sea bream:

<3rd year> Study on the growth and survival of juveniles in floating cage and pen

<4th & 5th year> Study on the growth and survival of juveniles in barachois

Target: Black tiger shrimp: 100,000 (1g in BW)

Sea bream: 100,000 (30mm in TL)

3) Broodstock Study

Species: Black tiger shrimp and Mangrove crab

Objectives: 1) Study on the system of through-year induce spawning of black tiger shrimp

2) Study on the system of breeding spawners of mangrove crab

Contents: Black tiger shrimp:<3rd year>

1) Feeding experiment,

2) Inducement of spawning by photo-period control method

Mangrove crab: <3rd, 4th & 5th year>

1) Rearing method survey,

2) Inducement of spawning by eye-ablation

Target: Black tiger shrimp: Stocking 150 adult shrimp (75 female and 30 males) in the experimental broodstock tank

Mangrove crab: 1) 30 adult female crabs stocking for the rearing experiment,

2) 20 adult female crabs stocking for spawning experiment

4) Technical Manuals

<4th & 5th year>

Preparation of technical manuals on the seed-production, the culture, and the brood-stock techniques of these species.

5) Counterpart Training

<4th year>

Liberation techniques

Objectives: Learning the techniques on the liberation of the juveniles of crustaceans

Period: May to June 1999

<5th year>

Seed production

Objectives: Learning the techniques on the seed production of fish and crab

Period: May to June 2000

6) Short-term Expert

<3rd year>

Crab Broodstock Study

T/R: Lecture and advice for the proper crab broodstock management and related disease control.

Period: November to December 1998

<4th year>

Fish Aquaculture

T/R: Lecture on the fish aquaculture, evaluation and advice for the aquaculture development in Mauritius, and suggestion for the future research work of Centre.

Period: November to December 1999

Five-year Activity Plan revised on July 1998

[Resource Propagation]

Year	1st Dec. 95- Nov. 96				2nd Dec. 96- Nov. 97				3rd Dec. 97- Nov. 98				4th Dec. 98- Nov. 99				5th Dec. 99- Nov. 00			
Quarterly period	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
1. Seed production																				
Crab (<i>S. oceanica</i>)																				
Ecological Survey																				
Sea bream (<i>R. sarba</i>)																				
Shrimp (<i>P. monodon</i>)																				
2. Barachois study																				
2-1 Liberation and extensive culture																				
Crab (<i>S. oceanica</i>)																				
Shrimp (<i>P. monodon</i>)																				
Sea bream (<i>R. sarba</i>)																				
2-2 Culture																				
Sea bream (<i>R. sarba</i>)																				
Shrimp (<i>P. monodon</i>)																				
2-3. Basic research & transplanting																				
Bivalves																				
Ecological survey on useful bivalves																				
Bivalves transplanting experiment																				
3. Broodstock																				
Shrimp (<i>P. monodon</i>)																				
Crab (<i>S. oceanica</i>)																				
4. Technical manual																				
Seed-production																				
Culture																				
5. Counterpart Training																				
General aquaculture																				
Fish nutrition																				
Liberation technique																				
Seed-production																				
5. Short-term expert																				
Crab seed-production																				
Fisheries engineering																				
Crab brood-stock study																				
Fish culture																				

III - 2. COASTAL ECOSYSTEM RESEARCH

1) Field Activities

1-1) Ecological Studies

1-1-1) Distribution of Marine Organism

Objectives: Establishment of a database on the distribution of marine organisms in Mauritius.

Activities: The specimen and underwater photos will be collected in the survey for understanding the fauna and flora in coastal waters. These data will be classified and utilized for making out the database. The study will continue and will be evaluated at the end of the project.
Commercially important fishes in coral reef will be assessed by visual census at several selected sites. Collected data will be analyzed to understand the difference of abundance on these fishes around the island.

1-1-2) Ecological Impact Assessment

Objectives: Conducting long-term monitoring and assessing the coastal ecosystem.

Activities: 1) The monitoring on corals, fishes and other organisms will be undertaken by visual census and quantitative sampling at both forereef and backreef in several permanent stations which are selected around the Island. The survey will be conducted at least twice a year.

2) The monitoring of the sea grass beds will be conducted in back reef at least 4 times a year.

3) The ecological impact assessment will be undertaken at the site formerly proposed for offshore sand mining.

The above mentioned activities will continue until 5th year and data analysis and evaluation will be implemented on 4th and 5th year.

1-2) Ecological Survey within Barachois

Objectives: Assessing the influence of aquaculture on the ecosystem.

Activities: <3rd year>

The community structure will be researched by various sampling methods.

<4th & 5th year>

Analyzing stomach contents of collected fish in order to analyze food chain in barachois. Monitoring of plankton abundance will be conducted in a barachois.

1-3) Individual Research under the Framework of the Project

Objectives: Up-grading the self-study ability of the counterparts on coastal ecosystem research under the framework of the project.

Activities: Conducting field activities and data analysis, and writing scientific report under the framework of the project. The study will continue and will be evaluated at the end of the project.

2) Monitoring System

2-1) Biostatistics

Objectives: Understanding the basic Biostatistics required for ecological analysis.

Activities: <3rd year>

Counterparts in charge will give a short lecture on basic biostatistics to the staff

of ecological research unit and relevant researchers.

<4th, 5th year>

Some of biostatistics such as ANOVA and multivariate analysis will be undertaken in order to analyze collected data.

2-2) Data / Specimen Collection and Processing

Objectives: Understanding the importance of establishing the database on coastal marine organisms in order to recognize the present condition of marine ecosystem.

Activities: Reviewing previous year's activities and improving the database of the fauna and flora in the coastal waters until 5th year.

2-3) Literature

Objectives: 1) Understanding the current coastal ecosystem study through reviewing scientific literature and discussing on the topics.

2) Generating a national and regional monitoring network.

Activities: Reviewing the previous years activities and improvement work will be executed after discussion. Conducting collaborative works with relevant agencies and NGOs to build up common research information on coastal ecosystem studies. The activities will be continued until 5th year.

3) Counterpart Training

<3rd year>

Coral biology

Objectives: Understanding coral-reef area ecology including mangrove and, seagrass bed and sandy bottom .

Activities: Lectures and practice for up-grading the knowledge and techniques of the ecological research in coral reef area.

<5th year>

Data analysis

Objectives: Making full use of biostatistics for ecological analysis.

Activities: Lectures on biostatistics and practical activities for up-grading the knowledge and techniques on the ecological data analysis.

4) Short-term Expert

<3rd year>

Coral reef ecology

Objectives: Understanding appropriate procedure of ecological monitoring and data analyzing on coral reef ecosystem.

Activities: Lectures and field works on coral biology, coral reef ecology and coral identification. Field works will include sample collection and research on coral reproduction.

<4th year>

Marine botany

Objectives: Understanding ecology and monitoring procedure on seagrass and mangrove area.

Activities: Lectures on marine botany including the identification and ecology. Field

works including sample collection and distribution research.

<5th year>

Coral area ecology

Objectives: Analyzing and considering the coastal area ecology.

Activities: Lectures, field works and case studies for coastal area ecology.

Five-year Activity Plan revised on July 1998
[Coastal Ecosystem Research]

Year	1st Dec.95-Nov.96				2nd Dec.96-Nov.97				3rd Dec.97-Nov.98				4th Dec.98-Nov.99				5th Dec.99-Nov.00			
Quarterly period	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
1. Field Activities																				
1.1. Ecological studies																				
1.1.1. Distribution	←																			→
1.1.2. Interaction	←								→											
1.1.3. Impact Assessment							←													→
1.2. Barachois	←																			→
1.3. Individual Research		←																		→
2. Monitoring system																				
2.1. Biostatistics		←																		→
2.2. Data/Specimen		←																		→
2.3. Literature		←																		→
3. Counterpart Training																				
3.1. Coral biology									↔											
3.2. Data analysis																		↔		
4. Short-term Expert																				
4.1. Coral Fish Taxonomy					↔															
4.2. Harmful algae								↔												
4.3. Coral Reef Ecology									↔											
4.4. Marine Botany													↔							
4.5. Coastal Zone Management																		↔		

III - 3. COASTAL ENVIRONMENT RESEARCH

Target

The targets of half period are accumulation of the data, improvement of analysis precision, acquisition of new analysis techniques.

Activity Plan

1) Coastal Environment Monitoring

Objectives: Accumulation of basic data and understanding of present coastal environment condition.

Content: Field works will continue until 5th year at twelve regular sites and additional site for collection and analysis of samples.

Analysis of heavy metals and residual pesticides will start as from the 3rd year and oil hydrocarbon as from the 4th year.

Method: 1) Monitoring parameters are water temperature, salinity, pH, DO, COD and nutrients (nitrate and phosphate). Water temperature, salinity and pH are measured on field by multi- water checker. DO is determined by Winkler method, COD is determined by Alkaline-potassium permanganate method and nutrients are determined by Auto-analyser or HACH- DR/2000 and DR/4000 at laboratory.
2) Sampling for heavy metals and residual pesticides will be conducted every three month at river mouths and streams. Heavy metals will be determined by Atomic Absorption Spectrophotometer(AAS) and residual pesticides by Gas Chromatograph (GC) or High Performance Liquid Chromatograph (HPLC). These parameters will also be determined in organisms and sediments when required.

2) Barachois Study

Objectives: Examination on the efficient use of barachois.

Content: Study on the influence of cage culture on sediment and water quality.

Method: <3rd year>

Monitoring will be continued at Beau Rivage barachois every three months and also at other barachois including those where prawns and fish are/will be released. Sampling points will be identified at each new barachois for monitoring of sediment and water quality.

<4th, 5th year>

A one-day continuous survey will be effected at Beau Rivage barachois during spring and neap tide. Sediment quality under the cage will be monitored by ignition loss to study the influence of cage culture.

3) Data Analysis

Objectives: Establish data-base on the different parameters monitored.

Content: Periodical process and analysis of collected data during the research activity.

Method: Input of collected data and calculation of average, maximum, minimum value, standard deviation to study temporal and spatial variations.

4) Guideline of Seawater Quality Standards

Objectives: Establishment of guideline for coastal water quality standard to promote conservation of coastal environment.

Content: Advice for the establishment of the guideline for coastal water quality.

Method: Attendance at the committee meeting and provide advice to establish and publish the guidelines.

5) Manual for Coastal Environment Monitoring

Objectives: Publication of a manual for coastal environment monitoring.

Content: The manual will comprise four sections, namely, monitoring plan, survey method, chemical analysis and data analysis. Description of common errors occurring through work and explanation of sampling method and analysis operations by using picture and flowchart will be included in the manual.

Method: The sections on chemical and data analysis will be prepared in the 3rd year, monitoring plan and survey method in the 4th year and editing and publishing in the 5th year.

6) Counterpart Training

<4th year>

Heavy metal analysis

Objectives: Improvement of counterpart's ability on heavy metal research.

Content: Acquisition of analysis technique and general knowledge about heavy metals.

Method: Training will be on the study of sampling/analysis method, and substance characteristics such as toxicity and accumulation at University and Research institute.

<5th year>

Integrated coastal zone management

Objectives: To study the sustainable use of coastal resources towards the management: conservation and protection of the coastal environment.

Content: 1) Study at environmental institute on above-mentioned subject
2) Visit to institutions carrying out environment impact assessment study for development project.
3) Visit to waste water and sewage treatment facilities.

7) Short-term Expert

<3rd year>

Environment Assessment

Objectives: Improvement of techniques for residual pesticides analysis and ability on data processing and analysis.

Content: Determination of residual pesticides in coastal water, sediment and marine fauna.
Training in data processing and analysis. Organization of a one-day seminar on global movement of residual pesticides and their influence on organism.

Method: Determination of the levels of Diuron, 2-4 D, Ioxynil and Atrazin in samples by GC or HPLC will be conducted under the supervision of the short-term expert.

<4th year>

Coastal Zone Management

Objectives: Promotion of coastal environment protection.

Content: Advice and organisation of a one-day seminar on coastal environment protection.

Method: The short-term expert will give advice on the preparation of the manual on coastal environment monitoring.

<5th year>

Data analysis

Objectives: Training in data analysis, interpretation and report writing.

Content: Lecture and guidance on data processing, analysis and interpretation.

Method: Short-term expert will give lecture and training to counterparts and researchers at AFRC.

Five-year Activity Plan revised on July 1998
[Coastal Environment Research]

Year	1st Dec.95-Nov.96	2nd Dec.96-Nov.97	3rd Dec.97-Nov.98	4th Dec.98-Nov.99	5th Dec.99-Nov.00
Quarterly Period	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4
1. Set up	↔				
2. Coastal Environment Monitoring					
Water temperature , pH	←				→
Salinity, COD (BOD), DO	←				→
Nutrients	←				→
Heavy Metals:			←	→	→
Residual Pesticides			←	→	→
Oil Hydrocarbon				←	→
3. Barachois study					
Water temperature , pH	←				→
Salinity, COD, DO, Nutrients	←				→
Ignition Loss (Sediment)	←				→
4. Data Analysis			↔	↔	↔
5. Guideline for Seawater Quality Standards	←			→	
6. Manual for Coastal Environment Monitoring		←			→
7. Counterpart Training					
7.1. Heavy metal	↔				
7.2. Residual Pesticide	↔				
7.3. Nutrient			↔		
7.3. Heavy metal				↔	
8. Short-term Expert					
8.1. Coastal environment		◆			
8.2. Coastal bacteriology		↔			
8.3. Environmental assessment			◆		
8.3. Coastal zone management				◆	
8.4. Data analysis					◆

付 属 資 料 3

後半活動計画（和文）

資源増殖

1. 種苗生産

対象種： アミメノコギリガザミ (*Scylla oceanica*), ヘダイ (*Rhabdosargus sarba*)

目的： 上記種について、種苗大量生産の技術移転を行う

内容及び方法： アミメノコギリガザミ：

＜3年次＞ 1) 初期幼生の生残率の向上 2) 種苗生産試験

＜4, 5年次＞ 1) 餌料系列の改善 2) 種苗生産試験

ヘダイ：

＜3年次＞ 1) 大量種苗生産技術 2) 餌料系列の改善

＜4年次＞ 種苗生産試験

種苗生産目標数： アミメノコギリガザミ：10,000尾 (C1, 3～5年次), ヘダイ：200,000尾 (TL 20mm, 3, 4年次)

2. バラショア研究

2-1 放流（及び粗放的養殖）試験

対象種： ウシエビ (*Penaeus monodon*), ヘダイ, アミメノコギリガザミ

目的： 上記種について、バラショア内外での放流及び粗放的養殖の効果を調査する

内容及び方法： ウシエビ：

＜3年次＞ 1) 標識試験 2) 放流及び粗放的養殖試験の追跡調査

＜4, 5年次＞ 放流及び粗放的養殖試験追跡調査

ヘダイ：

＜3年次＞ 1) 標識試験 2) 標識種苗（背鰭一部切除）の放流及び粗放的養殖試験の追跡調査

＜4, 5年次＞ 放流及び粗放的養殖試験追跡調査

アミメノコギリガザミ：

＜4, 5年次＞ 粗放的養殖試験追跡調査

目標放流数： ウシエビ：100,000 (体重 1g 種苗, 3～5年次)

ヘダイ：100,000 (TL 30mm, 3～5年次)

アミメノコギリガザミ：10,000 (C1, 5年次)

2-2 養殖試験

対象種： ウシエビ, ヘダイ

目的： 上記種のバラショア内網生簀養殖及びペン養殖の可能性を調査する

内容及び方法： ウシエビ：

＜3～5年次＞網生簀及びペン養殖での成長及び生残の調査

ヘダイ：

＜3～5年次＞網生簀及びペン養殖での成長及び生残の調査

目標養殖数： ウシエビ：100,000 (体重 1g 種苗), ヘダイ：60,000 (TL 30mm)

3. 親魚養成

対象種： ウシエビ, アミメノコギリガザミ

目的： 年間を通じたウシエビ催熟手法の調査

親ガニの飼育手法調査

内容及び方法： ウシエビ：

1) 餌料試験、2) 日照時間による産卵誘発試験

アミメノコギリガザミ：1) 親ガニ養成水槽での飼育試験 2) 眼柄
切除法を用いた産卵誘発試験

目標養成尾数： ウシエビ：150 尾の成エビ（雌 75 尾、雄 75 尾）に対し、産卵誘発試
験を行う

アミメノコギリガザミ：1) 15 尾の親ガニに対し飼育試験を行う

2) 10 尾の親ガニに対し産卵誘発試験を行う

4. カウンターパート研修

・種苗放流技術

研修内容： 魚類種苗放流技術及びデータ解析手法について研修を行い、放流技術
の習得を行う

期間： 1999 年 5 月～6 月

・種苗生産技術

研修内容： 魚類及びガザミ類の種苗生産技術の習得

期間： 2000 年 5 月～6 月

5. 短期専門家

・親ガニ養成技術

業務： アミメノコギリガザミの成熟雌ガニ選定・管理手法及び卵への真菌症
感染防除手法に関する技術指導

期間： 1998 年 11 月～12 月

・魚類養殖

業務： モーリシアスの魚類養殖実態に関する評価及び将来に向けた研究への
助言。バラショア養殖に関わる助言

期間： 1999 年 11 月～12 月

5 力年活動計画
[資源増殖]

年次	1 95.12 - 96.11				2 96.12 - 97.11				3 97.12 - 98.11				4 98.12 - 99.11				5 99.12 - 00.11			
四半期	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
1. 種苗生産																				
アミメノコギリガザミ																				
生態調査																				
ヘダイ																				
ウシエビ																				
2. バラショア研究																				
2-1 放流及び粗放養殖試験																				
アミメノコギリガザミ																				
ウシエビ																				
ヘダイ																				
2-2 養殖試験																				
ヘダイ																				
ウシエビ																				
2-3. 基礎調査及び移植試験																				
有用二枚貝類生態調査																				
有用二枚貝類移植試験																				
3. 親魚養成																				
ウシエビ																				
アミメノコギリガザミ																				
4. マニュアル作成																				
種苗生産																				
養殖																				
5. カウンターパート研修																				
養殖一般																				
魚類栄養																				
放流技術																				
種苗生産																				
6. 短期専門家																				
ガザミ種苗生産																				
水産土木																				
親ガニ養成技術																				
魚類養殖																				

沿岸生態調査

1) 沿岸生態系調査活動

1-1) 生態系調査

1-1-1) 分布調査

活動目的: モーリシャス沿岸生物相・分布状況の把握、データベースの構築

活動内容: 沿岸生物相を把握し、標本採集・水中生態写真撮影を行う。データベース構築のため、得られたデータの分類・整理を行う。

モーリシャスで水産利用されている魚類の分布状況を、複数の地点でビジュアル・センサスによって調査し、分布状況を把握する。

1-1-2) 生態系影響調査

活動目的: 沿岸生態系の把握・効率的な影響調査の実施。

活動内容:

- 1) モーリシャス周辺に複数の調査地点を設定し、その礁外縁と内縁でライン・トランセクト法によってサンゴ礁、魚類、その他生物のモニタリング調査を行う。調査は6ヶ月おきに継続して行われる。
- 2) 礁内縁の海草場のモニタリングを行う。調査は3ヶ月毎に継続して行われる。
- 3) 採砂場として将来利用される可能性がある地点で長期モニタリングを行う。

上述の各調査は5年次まで行われ、主に4年次に得られたデータを解析する。

1-2) バラショアでの生態調査

活動目的: 生態系に対する養殖、放流の影響を把握するための生態基礎調査を行う。

活動内容:

<3年次>

生物相把握のための一般調査を行う。

<4年次および5年次>

バラショア内の魚類相調査および捕食魚の胃内容物調査を行う。

バラショア内のプランクトン量の把握を試みる。

1-3) 個別研究

活動目的: 各カウンターパートの自主的な調査・研究を行うことにより、各自の能力アップを図る。

活動内容: 各自が調査・解析を行い、レポート作成あるいは報告を行う。各自の活動内容をプロジェクト終了時までに総括する。なお、この各自の研究活動は、プロジェクト活動内容に関連した項目について行われる。

2) モニタリング・システム

2-1) 生物統計学

活動目的: 生態調査に必要な基本的な生物統計学を習得する。

活動内容:

<3 年次>

担当カウンターパートが沿岸生態調査グループおよび関連職員に対して生物統計学のレクチャーを行う。

<4 年次および 5 年次>

統計的検定手法や多変量解析手法を用いて、調査活動で得られたデータを解析する。

2-2) データ／標本収集と処理・解析

活動目的: 沿岸生態系の現況把握のために、沿岸生物相のデータベースを構築することの重要性を理解する。

活動内容: 1, 2 年次の活動内容を検討し、沿岸生物相のデータベースの構築する。

2-3) 文献

活動目的: 1) 文献調査により、沿岸生態系の現況を把握し、関連項目に付いて検討する。

2) 関連地域との情報交換網を形成する。

活動内容: 1, 2 年次の活動内容を検討し、さらに改善する。他の関連期間や非政府組織(NGO)との協力関係を強化し、沿岸生態系に付いての情報収集を円滑に行うようにする。

3) カウンターパート研修

<3 年次>

サンゴ礁生物学

目的: マングローブ域や砂泥域も含めたサンゴ礁域の生態学を理解する。

内容: サンゴ礁域の生態研究についての情報や技術を研修する。

<5 年次>

データ解析

目的: 生態学的解析に必要な生物統計学を習得する。

内容: データ解析に必要な知識や技術を研修する。

4) 短期専門家

<3 年次>

サンゴ礁生態学

目的: サンゴ礁生態系をモニタリング・解析するために必要な技術を理解する。

内容: サンゴ生物学、サンゴ礁生態系、サンゴ同定法などの講義。データ収集、サンゴの再生産調査など、各種調査手法の理解・習得。

<4 年次>

水産植物学

目的: 海草・藻類、マングローブの生態やモニタリング手法を理解する。

内容: 水産植物の分類学や生態学についての講義。標本採集や分布調査など、各種調査手法の理解・習得。

<5 年次>

沿岸生態学

目的: 沿岸生態系について解析する。

活動: 沿岸生態系についての講義。現地調査。

5 力 年 活 動 計 画
[沿 岸 生 態 系 調 査]

年 次	1	2	3	4	5
	95.12 - 96.11	96.12 - 97.11	97.12 - 98.11	98.12 - 99.11	99.12 - 00.11
四 半 期	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4
1. フィールド調査					
1.1. 生態系調査					
1.1.1. 分布調査	←				→
1.1.2. 魚類／生息域関係	←		→		
1.1.3. 影響調査		←			→
1.2. バラショア調査	←				→
1.3. 個別研究課題	←				→
2. モニタリングシステム					
2.1. 生物統計学	←				→
2.2. データ／標本処理	←				→
2.3. 文献	←				→
3. 研修員派遣					
3.1. サンゴ礁域生物学			↔		
3.2. データ解析					↔
4. 短期専門家					
4.1. 魚類学(分類)		↔			
4.2. 有害微細藻類			↔		
4.3. サンゴ礁生態学			↔		
4.4. 水産植物学				↔	
4.5. 沿岸域管理					↔
5. ワークショップ等		◆	◆ ◆	◆	◆

沿岸環境調査

1. 活動計画

活動目標

データの蓄積、分析精度の向上と新しい分析技術の習得。

1) 沿岸環境モニタリング

目的：基礎データの蓄積と沿岸環境の現状把握。

内容：既存の12定期調査点、臨時調査点でのサンプリングと試料分析の継続。重金属と残留農薬分析は3年目から、油分の分析は4年目から開始する。

方法：1)測定項目は、水温、塩分、pH、溶存酸素(DO)、化学的酸素要求量(COD)、栄養塩（窒素、リン）である。水温、塩分、pHは現場において多項目水質測定器で測定する。DOはウインクラ法、CODはアルカリ過マンガン酸カリウム法、栄養塩はオートアナライザー或いはHACH-DR2000/4000を用いて分析室で測定する。

2)重金属と残留農薬分析試料水のサンプリングを3ヶ月毎に河口域、灌漑水路で行い、重金属は原子吸光光度計で、残留農薬はガスクロマトグラフィ(GC)或いは、高速液体クロマトグラフィで測定する。また生物、底質中の濃度についても必要に応じて測定する。

2) バラショア調査

目的：バラショアの有効利用調査

内容：生け簀養殖の水質、底質への影響調査。一般調査

方法：＜3年目＞

定期調査点として Beau Rivage バラショアを3ヶ月毎に調査する。また、ヘダイ、エビを放流した、或いは放流予定のバラショアを含むその他のバラショアについては単発的に調査する。各バラショアにおいて調査点を設定して、サンプリングを行い水質（水温、塩分、pH、DO、COD、栄養塩）、底質（強熱減量）を調べる。

＜4、5年目＞

Beau Rivage バラショアにおいて、大潮、小潮時に干潮から満潮までの連続調査を行う。生け簀下の底質について強熱減量を測定し、養殖による影響を調査する。

3) データ解析

目的：各調査項目の基本データを確立する

内容：調査活動で得られたデータを定期的にまとめ解析する。

方法：調査活動で得られたデータをパソコンに入力し平均値、最大値、最小値、標準偏差などを計算し、時間的、空間的变化を調べる。

4) 沿岸水質ガイドライン作成の助言

目的：沿岸環境保全を推進するための沿岸水質ガイドラインを作成する。

内容：沿岸水質ガイドライン作成のための助言。

方法：委員会に出席しガイドラインの作成、出版に必要な助言をする。

5) 沿岸環境調査マニュアル

目的：沿岸環境調査のマニュアルの作成。

内容：本マニュアルは調査計画、調査手法、分析手法、データ解析の4章で構成される。モニタリング活動を通して犯しやすいミスについて記述する。また、サンプリング手法や分析操作は、写真、図表を取り入れて説明する。

方法：3年目は、分析手法とデータ解析の章を作成する。4年目は調査計画と調査手法の章を作成し、5年目に編集を行い製本する。

6) C/P研修

<4年目> 重金属分析

目的：カウンタパートの重金属に関する研究能力の向上。

内容：重金属に関する分析技術と一般知識の修得。

方法：大学と研究所においてサンプリング手法と分析手法の訓練を行う。また、各重金属の蓄積性や毒性などの特性について学ぶ。

<5年目> 総合沿岸管理

目的：沿岸環境保全管理のために沿岸資源の継続利用について学ぶ。

内容・方法：

- 1) 環境研究所において上記の項目を学ぶ
- 2) 開発プロジェクトに関する環境影響評価の調査を行っている研究施設の訪問。
- 3) 下水処理場の視察

7) 短期専門家

<3年目> 環境アセスメント

目的：残留農薬分析技術の向上とデータ処理・解析能力の向上。

内容：沿岸水、底質、海洋生物中の残留農薬濃度の測定。データ処理・解析手法の指導。残留農薬の地球規模的挙動と生物への影響に関する1日セミナーの開催。

方法：短期専門家の指導の元で、ガスクロマトグラフィ、液体クロマトグラフィを使用して、試料中のジウロン、2-4D、アイオキシニル、アトラジン濃度を測定する。

<4年目> 沿岸管理

目的：沿岸環境保全の推進。

内容：沿岸環境保全に関する助言と1日セミナーの開催

方法：沿岸環境調査マニュアル作成に関する助言を行う。

<5年目> データ解析

目的：データ解析、結果の解釈、報告書作成に関する指導。

内容：データ処理・解析と結果の解釈に関する講義と指導。

方法：アルピオン水産研究所においてC/Pと研究者に対して講義と指導を行う。

5 力 年 活 動 計 画

[沿 岸 環 境 調 査]

年次	1	2	3	4	5
	95.12 - 96.11	96.12 - 97.11	97.12 - 98.11	98.12 - 99.11	99.12 - 00.11
四半期	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4
1. 準備	↔				
2. 沿岸環境モニタリング					
水温、pH、COD、D.O					→
栄養塩					→
重金属			←	→	→
残留農薬			←	→	→
油分				←	→
3. バラショア調査					
水温、pH、COD、D.O	←				→
栄養塩	←				→
強熱減量（底質）	←				→
4. データ解析			↔ ↔	↔ ↔	↔ ↔
5. 水質基準のガイドライン 作成の助言	←	→			
6. 沿岸環境調査マニュアル の作成		←			→
7. カウンターパート研修					
重金属	↔				
残留農薬	↔				
栄養塩			↔		
重金属				↔	
総合沿岸管理					↔
8. 短期専門家					
沿岸環境モニタリング		↔			
沿岸細菌		↔			
環境アセスメント			↔		
沿岸管理				↔	
データ解析					↔

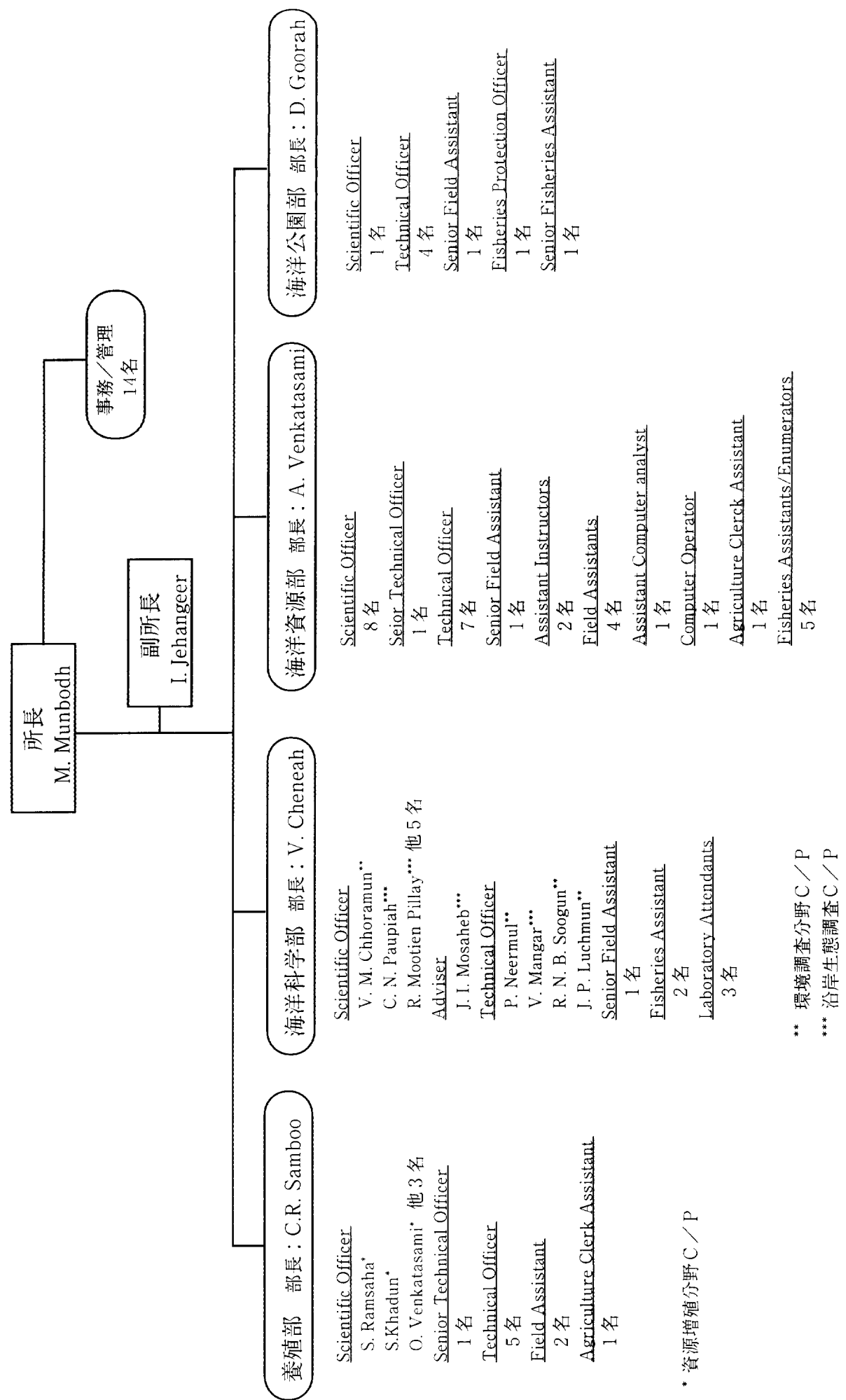
付 属 資 料 4

アルビオン水産研究所組織図

1998.6. 現在

アルビオン水産研究所組織図

(モーリシアス沿岸資源・環境保全計画カウンタパート名、各職位スタッフ数付記)



* 資源増殖分野 C/P

** 環境調査分野 C/P

*** 沿岸生態調査 C/P

付 属 資 料 5

セ ミ ナ ー、 運 営 会 議 開 催 実 績

プロジェクト主催のセミナー等一覧

年月日	セミナー名（講師）	参加人数（主要外部参加機関）
1997.03.17	海洋環境に関するセミナー （東京水産大学 佐藤博雄助教授）	約40名（環境省中央研究所、 サトウキビ 産業研究所、モーリシアス大学）
1997.04.12	沿岸バクテリア調査セミナー （中井研究所 小川数也）	約25名（環境省中央研究所、 モーリシアス大学、下水道局）
1997.06.09	サンゴ礁魚類相に関するセミナー （阪神臨海測量 寺島裕晃）	約30名（水産事務所）
1997.10.20	パラショア・リハビリに関するセミナー （国際気象海洋 星野高士）	約30名（パラショア・オーナー）
1997.02.24 ～03.04	有害微細藻類同定のワークショップ （東京大学 福代康夫）	9名
1997.03.05	有害微細藻類に関するセミナー （東京大学 福代康夫）	約45名（環境省中央研究所、 サトウキビ 産業研究所、モーリシアス大学）

プロジェクト運営に係る会議一覧及び要旨

年月日	会 議 名 / 要 旨
95.12.27	第1回プロジェクト運営委員会（参加者：10名、於水産海洋資源省） 各専門家に対するカウンターパート配置の確認、当面の業務運営方針検討
96.01.10	第1回プロジェクト作業委員会（参加者：15名、於アルビオン水産研究所） プロジェクトの概要説明、PDMの解説
96.02.13	第2回プロジェクト作業委員会（参加者：18名、於アルビオン水産研究所） 各分野の今四半期活動予定、沿岸環境調査の機材配置
96.03.08	第2回プロジェクト運営委員会（参加者：11名、於水産海洋資源省） 各分野5年計画（案）の提示、プロジェクト運営に係る情報収集・報告の在り方
96.03.13	第3回プロジェクト作業委員会（参加者：12名、於アルビオン水産研究所） 各分野5年計画（案）の技術的な検討、エビ養殖の民間普及への試算
96.04.19	第4回プロジェクト作業委員会（参加者：12名、於アルビオン水産研究所） 前四半期活動報告、今後のバラショア共同調査の進め方
96.05.17	第5回プロジェクト作業委員会（参加者：16名、於アルビオン水産研究所） 1・2年次詳細計画、5年計画（案）の討議、バラショア共同調査具体案
96.05.22	第3回プロジェクト運営委員会（参加者：11名、於水産海洋資源省） 各分野の活動状況報告、1・2年次詳細計画、5年計画（案）の討議
96.06.17	第1回プロジェクト合同委員会（参加者：22名、於水産海洋資源省） 各分野の活動進捗状況報告、1・2年次詳細計画、5年計画（案）の討議、 ミニッツの交換
96.08.30	第6回プロジェクト作業委員会（参加者：14名、於アルビオン水産研究所） 平成9年度活動計画案、機材供与・C/P研修計画の検討
96.10.08	第7回プロジェクト作業委員会（参加者：13名、於アルビオン水産研究所） 各分野の前四半期活動状況報告・討議
96.10.11	第4回プロジェクト運営委員会（参加者：12名、於水産海洋資源省） 各分野の前四半期活動状況報告・討議、バラショア共同計画討議
97.01.31	第8回プロジェクト作業委員会（参加者：16名、於アルビオン水産研究所） 各分野の前四半期活動状況報告・討議、バラショア共同計画検討
97.03.10	第5回プロジェクト運営委員会（参加者：13名、於組合水産海洋資源省） 各分野の前四半期活動状況報告及び問題点
97.04.14	第9回プロジェクト作業委員会（参加者：11名、於アルビオン水産研究所） 平成9年度活動計画検討（含短期専門家、研修、機材計画）
97.06.13	第10回プロジェクト作業委員会（参加者：14名、於アルビオン水産研究所） 前四半期活動状況報告・検討
97.06.14	第6回プロジェクト運営委員会（参加者：11名、於組合水産海洋資源省） 前四半期活動概要報告・検討

年月日	会 議 名 / 要 旨
97.08.08	第11回プロジェクト作業委員会（参加者：14名、於アルビオン水産研究所） プロジェクト・パンフレット作成検討
97.10.01	第12回プロジェクト作業委員会（参加者：15名、於アルビオン水産研究所） 前四半期活動状況報告・検討、平成10年度活動計画案検討
97.10.29	第7回プロジェクト運営委員会（参加者：13名、於農業水産組合省） 前四半期活動概要報告・検討、平成10年度活動計画案検討
97.11.24	第13回プロジェクト作業委員会（参加者：15名、於アルビオン水産研究所） 1・2年次活動報告、3年次活動計画検討
98.02.20	第8回プロジェクト運営委員会（参加者：11名、於農業水産組合省） 前四半期活動概要報告・検討、1・2年次活動報告、3年次活動計画検討
98.04.07	第14回プロジェクト作業委員会（参加者：14名、於アルビオン水産研究所） 前四半期活動状況報告・検討、バラショア調査報告
98.04.10	第9回プロジェクト運営委員会（参加者：12名、於農業水産組合省） 前四半期活動概要報告・検討、バラショア調査報告

付 属 資 料 6

調 査 研 究 報 告 リ ス ト

主要調査研究報告リスト

報告年月

レポーター名 / 報告者

-
- 97.08. The shrimp marking test.
S. Khadun, H. Bhudoye, K. Hiramatsu & R. Hassea
- 97.01 Growth of sea bream, *Rhabdosargus sarba*, fingerling in floating net cages cultured at different stocking densities.
H. Bhudoye, S. Khadun, K. Hiramatsu & R Hassea
- 97.01 The experiment on the induced spawning of the shrimp, *Penaeus monodon*.
O. Venkatasami, K. Hiramatsu & S. Ramkisoorn
- 97.01 The effect of Formalin, Copper sulphate & Malachite green treatment on the sea bream, *Rhabdosargus sarba*, fingerlings infected with Oodinium disease.
L.M.D. Ramkhelawon & K. Hiramatsu
- 97.01 The effect of copper sulphate treatment on Oodinium disease occurred in the larval rearing tanks of sea bream, *Rhabdosargus sarba*.
L.M.D. Ramkhelawon, H. Bhudoye & K. Hiramatsu
- 97.07 Album of the coral reef fishes in Mauritius
H. Terashima, C. Paupiah & H. Kawasaki
- 97.07 Substrate coverage at Sugar Beach Bathing area. & Monitoring of the dredged passages in Bamboux Viriex.
C. N. Paupiah, J. I Moisaheb *et al.*
- 97.08 EIA for the making passages in Passe Vacoa Trou d'Eau Douce
C. N. Paupiah, J. I Moisaheb *et al.*
- 97.07 Growth and feed efficiency of sea bream, *Rhabdosargus sarba*, (gueule pavee) with four different diets.
Hans Bhudoye, R. Hassea
- 97.09 Substrate cover at Albion & Composition in substrate cover between seasons
R. Mootien Pillay & H. Kawasaki
- 97.11 Ecological survey of the area prior to sinking of the vessel investigator.
R. Mootien Pillay & J. I. Mosaheb
- 97.12 Substrate cover at Ile aux Benitier., Monitoring of the bathing area of Suger Beach Hotel. & Monitoring of the dredged boat passages
R. Mootien Pillay & H. Kawasaki *et al.*
- 97.12 Lagoonal water quality and ecosystem in small island development states
V. M. Chooramun

98.01	Response of sea bream fingerlings fed with 3 different test diets of varying protein contents. H. Bhudoye & N. Ishibashi
98.02	Coral spawning event in Mauritius. H. Kawasaki & R. Mootien Pillay
98.02	Coral reef ecosystem and its protection R. Mootien Pillay
98.02	Monitoring of the boat passages at Bamboux Virieux. R. Mootien Pillay & H. Kawasaki <i>et al.</i>
98.04	Shrimp extensive experiment on barachois, Butte a l'herbe. S. Khadun, R Hassea & N. Ishibashi
98.04	Aquaculture trials in barachois (in Barachois Study) S. Khadun, R Hassea, K. Hiramatsu & N. Ishibashi
98.04	Environmental and ecological researches on Barachois in Mauritius (in Barachois Study) A. Terai, P. Neermul, V. Mangar, J. Mosaheb & H. Kawasaki
98.06	Rehabilitation of barachois (from coastal engineering point of view) T. Hoshino & S. Khadun

付 属 資 料 7

分 野 別 野 外 調 査 実 績

- ・ 資源増殖分野主要野外活動実績
- ・ 沿岸生態調査分野主要調査活動・講座開催実績
- ・ 環境調査分野調査活動実績、会議及び関連機関・委員会
出席実績
- ・ 3 部門共同バラショア調査

資源増殖分野主要野外活動実績

(1995年12月～1998年5月)

1) 親魚入手

ヘダイ		ウシエビ		アマメノギリガザミ	
入手場所	回数	入手場所	回数	入手場所	回数
Beau Riverge	4	Bocambous	33	Albion	1
Montague	1	Grand Sable	72	Bocambous	3
Virginia	1	Le Blanc	1	GRSE	1
				Le Blanc	6
				Mahebourg	10
				Nozaic	1
				Rodorigues	1
				Rouillard	8
				Virginia	1

2) 放流（及び粗放養殖）

ヘダイ		ウシエビ		アマメノギリガザミ	
放流場所	回数	放流場所	回数	放流場所	回数
Beau Riverge	1	Bocambous	9	Butte a l'Herbe	1
Montague	1	Grand Sable	4	Le Blanc	1
St. Francois	1	Butte a l'Herbe	2	Nozaic	1
Roillard	1			Roillard	1
Melville	1				

3) 養殖（生簀及び囲い網）への種苗供給

ヘダイ		ウシエビ			
養殖場所	回数	養殖場所	回数	養殖場所	回数
Beau Riverge	4	Beau Riverge	5	Nozaic	4
Choisy	1	Bocambous	2	Oozeerally	2
Montague	4	Butte a l'Herbe	3	Rouillard	1
Nozaic	2	Choisy	3	St. Francois	1
Virginia	2	Le Blanc	10	Virginia	2
Oozeerally	1	Montague	10	Humbert	1
St. Francois	1				

4) 養殖及び放流後調査

調査場所	ヘダイ (回)	ウシエビ (回)	二枚貝類 (回)
Bocambous		8	
Beau Riverge	2	2	1
Butte a l'Herbe	1	5	
Choisy	2	2	
Humbert		1	
Melville			2
Montague	3	3	
Nozaic			7
Oozeerally	1	1	
Le Blanc	4	4	
St. Francois	1		

沿岸生態調査分野主要調査活動・講座開催実績

(1995年12月～1998年5月)

1) 野外調査活動

調 査 地	回数	調 査 地	回数	調 査 地	回数
Albion	68	GRSE	5	Pointe aux Sable	11
Anse la Raie	4	Grand Bay	1	Pomponette	1
Baie du Cap	1	Grand Gaube	3	Pte. Mayenne	13
Bain des Dames	1	Grand Port	1	Souillac	1
Balaclava	18	Ile aux Benitiers	9	Trou aux Biches	11
Bambous Virieux	10	Le Morne	1	Trou d'Eau Douce	6
Belle Mare	4	La Passe Trois	1	Wolmar	3
Blue Bay	1	La Preneuse	1	Passe Demion*	1
Poste La fayette	1	Mahebourg	2	Port Sud Eston*	1
Calodyne	1	Palmar	1	Poite La Venuse*	1
Cap Malheureux	3	Passe Vacoas	2	Passe Grenadeon*	1
Flic en Flac	6	Pointe aux Canonniers	1		

*ロドリゲス島

2) 講座

日付	講 座 名	発表者	参加者
96.06	Biometrics	J. I. Mosaheb	Eco unit and relative staffs
96.06	Coastal zone management	C. N. Paupiah	Eco unit and relative staffs
96.09	Coral reef ecology and its protection	R. Mootien Pillay	Students of Mauritius Instituite of Education
97.01.26	Handling of coral specimen from field to laboratory	R. Mootien Pillay	Eco unit and relative staffs
97.02.03	Biometrics	J. I. Mosaheb	Eco unit and relative staffs
97.02.11	Biometrics	J. I. Mosaheb	Eco unit and relative staffs
97.02.17	Biometrics	J. I. Mosaheb	Eco unit and relative staffs
98.02.06	Methodology of field monitoring	R. Mootien Pillay & V. Mangar	Rodrigues Under-water Group (NGO)
98.02.12	Coral taxonomy and specimen treatment	R. Mootien Pillay	Rodrigues Under-water Group (NGO)
98.02.13	Biology and ecology of coral	R. Mootien Pillay	Rodrigues Under-water Group (NGO)

環境調査分野調査活動実績、会議出席および関連機関・委員会

1) 定期調査：1998年5月末現在

調 査 域	回	調 査 域	回	調 査 域	回
Anse la Raie	8	Ile aux Benitier	10	Harbour	5
Balaclava	10	Pointe aux Sable	9	Tombeau Bay	10
Bambous Virieux	9	Trou aux Biches	10	Bird Sanctuary	9
Bel Ombre	9	Trou d'eau Douce	9	Bell Eau river	11

2) バラショア調査：1998年5月末現在

バラショア名	回	バラショア名	回	バラショア名	回
Montague	6	Bocambo	1	Nozaic	1
Humbart	3	Leblank	1	Mahebourg	1
Beau Riverge	4	Virginia	1	St. Francois	1
Choisy	2	Roillard	1	Ile aux Chat	1
Butte a l'herbe	1	Melville	1	Belmont	1

3) 臨時調査・現場視察：1998年5月末現在

日 付	場 所	内 容
96.03.27	Baie des Dames	Water quality check
96.04.11	Providence etc.	Water quality check for mangrove propagation
96.05.16	Belle Mare	Inspection of pig farm to abate pollution problems
96.06.24	Tombeau Bay	Site meeting in connection with pollution of lagoon, dumping of solid waste on the beach
96.07.23	Flic en Flac	Fish mortality
96.08.07, 09	Grand Baie	Water quality check
96.12.05	Bel Ombre etc.	Site meeting connection with pollution of the lagoon
96.12.12	Tombeau Bay	Site meeting connection with coastal erosion, dumping waste on the beach and shore maintenance
97.02.25	Flic en Flac	Jelly fish brought ashore by wind and current
97.02.26	Pointe aux Sable	Fish mortality
97.03.25	Pointe aux Sable	Fish mortality
97.04.03	Trou aux Biches	Red tide
97.05.08	Goodland	Setting up of Doyal Tropical Park
97.06.06	St. Flix	Checking discharge of waste water from sand washing plant
97.06.25	Pereybere	Alleged pollution - water quality check
97.07.01	Pereybere	Alleged pollution - water quality check

日 付	場 所	内 容
97.07.25	Bois des Amourettes	Back-filling of the shore with soil materials and boulders
97.07.30	St. Flix, Riambel	Alleged pollution from sugar estate
97.08.08	Bois des Amourettes	Back-filling of the shore with soil materials and boulders
97.10.10	Bain des Dames	Fish mortality
97.11.20	Riviere des Creoles	Fish mortality
97.11.25	Beau Champ	Fish mortality
97.12.09	Berjaya Hotel	Algae on shore
97.12.15	Riambel	Fish mortality
97.12.25	Grand Gaube	Jelly fish brought ashore by wind and current
98.01.18	Popite Moyene	To check the influence of sand extraction
98.01.20	Popite Moyene	To check the influence of sand extraction
98.02.02	Bain des Dames	To check the influence of sand extraction on land
98.02.19	Saint Flix	To check the influence of sand extraction on land
98.03.18	Saint Flix	To check the influence of sand extraction
98.04.22	Mer Rouge/Port Franc	To check the influence of sand extraction
98.04.23	Roche Bois	To check the influence of sand extraction
98.04.27	Saint Flix	To check the influence of sand extraction on land
98.05.14	Saint Flix	To check the influence of sand extraction on land
98.05.22	Vieux Grand Port	To check the influence of dredging path for boat

4) 主要会議出席 (Guideline for coastal water quality held at at Department of Environment, Ministry of Local Government & Environment)

日 付	内 容
97.08.06	Duration on the format and information to be applied for the guideline
97.09.05	Preparation of the first draft proposal
97.10.01	First Technical meeting
97.11.21	Technical Committee
98.02.12	Technical committee: Discussion of bacteriological parameters and other parameters
98.04.09	Technical committee: Continuous discussion on analysis of comments from other institutions

5) 関連機関

- ① Ministry of Local Government & Environment
- National Environment Laboratory

- ② Ministry of Agriculture, Fisheries & Cooperatives (Agriculture Division)
 - Mauritius Sugar Industry Research Institute
 - Pesticides Control Board
- ③ Ministry of Industry
- ④ Ministry of Health & Quality of Life
- ⑤ Ministry of Industry
- ⑥ Ministry of Public Utilities
 - Waste Water Authority
 - Central Water Authority
 - Water Resource Unit
- ⑦ Ministry of Housing & Land Development
- ⑧ University of Mauritius

5) 関連委員会

- ① Environment Coordinating Committee
- ② Environment Advisory Council
- ③ Environment Liaison Officer Meeting
- ④ Environment Impact Assessment Committee
- ⑤ Industry Effluent Standards Committee
- ⑥ Public Beach Steering Committee
- ⑦ Shipwreck Steering Committee
- ⑧ Bird Sanctuary Steering Committee
- ⑨ Coastal Water Quality Guideline Committee

3 部門共同バラショア調査

資源増殖、沿岸環境調査および沿岸生態調査の3分野共同で、これまで十分な実態調査のなされていなかったモーリシャス島内の主要なバラショアの一般的な特性を明らかにするための概要調査と、養殖活動に利用されているバラショアについて水域環境の年変動と養殖の影響を見るためにほぼ3カ月おきに行う定期調査をそれぞれ実施している。なおこの共同調査は97年10月に終了して報告書を取り纏める予定である。これまでの調査実績は以下のとおりである。

年月日	バラショア名	調査目的
96.09.19	Montague	概要調査、1回目定期調査
96.11.26	Montague	2回目定期調査
96.10.15	Humbert	概要調査、1回目定期調査
96.12.17	Humbert	2回目定期調査
96.10.29	Coisy	概要調査
96.12.12	Nozaic	概要調査
97.01.14	Butte a l'herbe	概要調査
97.01.30	Montague	3回目定期調査
97.02.27	Beau Rivage	概要調査
97.03.04	Humbert	3回目定期調査
97.03.20	Bocambo	概要調査
97.04.10	Montague	4回目定期調査
97.07.17	Montague	5回目定期調査
97.08.14	Le Blanc	概要調査
97.09.04	Virginia	概要調査
97.09.19	Montague	6回目定期調査
97.10.09	Mahebourg	概要調査
97.11.13	Roillard	概要調査
97.12.04	Melville	概要調査
98.01.15	Beau Riverge	1回目定期調査
98.02.19	St. Francois	概要調査
98.03.19	Ile aux Chats	概要調査
98.04.16	Beau Riverge	2回目定期調査
98.05.28	Belmont	概要調査