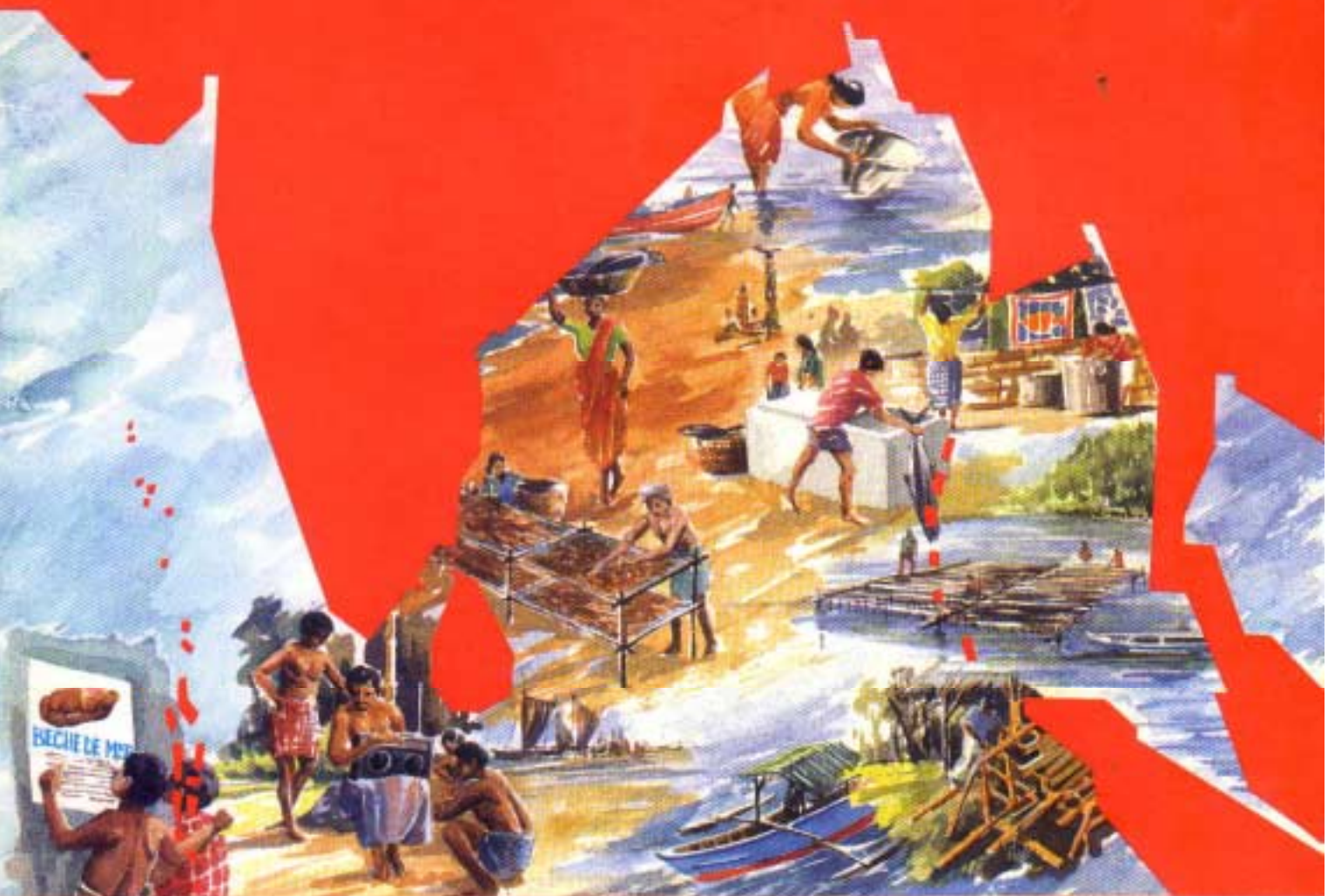


BOBP/REP/69

Report of the Eighteenth Meeting of the Advisory Committee



BOBP

For Fisheries Development

BAY OF BENGAL PROGRAMME

**REPORT OF THE EIGHTEENTH MEETING
OF THE ADVISORY COMMITTEE**

April 16-19, 1994
Furana Fushi, Maldives

This document records the recommendations of the 18th Meeting of the Advisory Committee of the Bay of Bengal Programme for Fisheries Development (BOBP), held 16-19 April 1994, in Furana Fushi, Maldives.

The document contains the annual reports (or status reports) of the projects in the Programme. These reports briefly recapitulate the objectives and status of the activities, describe the work and achievements during 1993 and assess the progress that was made. Work plans for 1994, where applicable, have been indicated. The reports were prepared at the end of 1993 and presented to the 18th Meeting of the Advisory Committee.

The Advisory Committee is composed of member countries, agencies funding BOBP projects, and the FAO. The Committee meets once a year in member-countries on a rotational basis.

The Bay of Bengal Programme (BOBP) is a multiagency regional fisheries programme which covers seven countries around the Bay of Bengal — Bangladesh, India, Indonesia, Malaysia, Maldives, Sri Lanka and Thailand. The Programme plays a catalytic and consultative role: it develops, demonstrates and promotes new technologies, methodologies and ideas to help improve the conditions of small-scale fisherfolk communities in member countries. The BOBP is sponsored by the governments of Denmark, Sweden and the United Kingdom, and also by UNDP (United Nations Development Programme). The main executing agency is the FAO (Food and Agriculture Organization of the United Nations).

May 1994

CONTENTS

Page

Report of the Eighteenth Meeting of the Advisory Committee

APPENDICES

A. List of Participants	4
B. Agenda	7
C. List of Documents	8
D. State of the Programme 1993	9
E. Small-scale Fisherfolk Communities (GCP/RAS/ 11 8/MUL, GCP/RAS/117/MUL) – Annual Report 1994	11
F. Bioeconomics of Small-scale Fisheries (RAS/91/006) – Annual Report 1993	28
G. Improvement of the Port Environment at Phuket Fishery Harbour – Project Report	35
H. Post-harvest Fisheries Project (ODA) – Annual Report 1993	37
Publications of the Bay of Bengal Programme	51

REPORT OF THE EIGHTEENTH MEETING OF THE ADVISORY COMMITTEE OF THE BAY OF BENGAL PROGRAMME FOR FISHERIES DEVELOPMENT

OPENING OF THE MEETING

1. The Advisory Committee of the Bay of Bengal Programme for Fisheries Development (BOBP) held its Eighteenth Meeting from 16 to 19 April 1994 in Furana Fushi, Maldives. A list of participants is given in Appendix A.
2. The Meeting was formally inaugurated on 16 April 1994 by the Honourable Ahmed Zahir, Minister of Transport and Communications, Government of Maldives.
3. The working session of the meeting was opened on 17 April 1994 by the outgoing Chairman from Bangladesh, Mr. Md. Masudur Rahman, Additional Director, Department of Fisheries.

ELECTION OF CHAIRMAN

4. The Advisory Committee unanimously elected Mr. Maizan Hassan Maniku, Director of Fisheries Research and Development, Ministry of Fisheries and Agriculture, Government of Maldives, as its Chairman to hold office until the beginning of its Nineteenth Meeting.

ADOPTION OF THE AGENDA

5. The Advisory Committee adopted the agenda shown in Appendix B. The documents placed before the Committee are listed in Appendix C.

STATE OF THE PROGRAMME

6. In noting the drastically reduced funding support for the Programme from 1994 onwards, it was suggested that the Global Environmental Facility, and UNDP, if their financial position improves, might be possible funding sources.

SMALL-SCALE FISHERFOLK COMMUNITIES

(DANIDA/SIDA/Member Governments)

7. In noting the progress during 1993 and the Learnings of the project as a whole, it was suggested that the integration of BOBP's information into other regional information systems be considered to ensure continued access.
8. With regard to the draft terminal report and the desirability of assessing the impacts of the project, the donor agencies that funded the project should look into the matter.

POST-HARVEST FISHERIES (ODA)

9. In view of the high relevance to Maldives of the post-harvest issues being addressed by the project, the possibilities of including Maldives in project activities should be explored.
10. Efforts to assist the set bagnet fisherfolk communities in Bangladesh should be continued.
11. In Sri Lanka, the project should expand its activities into areas of extension to cooperatives and marketing systems.
12. The fish marketing data base in the eastern coastal states of India should be reviewed to assess the sustainability of it.
13. In view of the interrelations between post-harvest issues and fishery harbour pollution, cooperation in this regard should be strengthened between the ODA and IMO projects.

BIOECONOMICS OF SMALL-SCALE FISHERIES (UNDP)

14. The progress during 1993, the last year of operation, and the overall results and recommendations, as given in the draft terminal report, were noted with satisfaction.

CLEANER FISHERY HARBOURS (IMO)

15. A video showing the contrast between a well-managed fishery harbour and a polluted one would serve as a tool in promoting cleaner fishery harbours in the region and its preparation should be considered.

16. Preparation for further activities in the field of cleaner fishery harbours, supported by IMO, should be undertaken in 1994 in Indonesia.

COASTAL FISHERIES MANAGEMENT (Denmark/Japan)

17. Noting that the new project has been approved by the governments of Denmark and Japan and of India, the host government, and that the project document was in the process of being approved by other member governments, the following issues and concerns were highlighted to assist the project in evolving appropriate priorities, emphases and approaches in implementation.

18. To provide clarity and direction to the project there is a need to evolve operational definitions of coastal area management, on a country basis, reflecting their particular contexts.

19. Within the context of coastal area management, coordination among, rather than integration of the sectors may prove useful in prioritization of problem areas.

20. Within the framework of coastal area management, the project should focus on coastal fisheries management and address it in a multidisciplinary manner.

21. Given the project's limited resources, a catalytic role was proposed, wherein the strategy of the project may be based on pilot efforts defined by geographical areas, target species or fishing methods.

22. Under Section B 2, 'Expected end of project situation', the last item should read as : "Strengthened cooperation between national institutions of the region".

23. There is a need for each member country to urgently identify a suitable national institution as implementing agency.

24. Further to nominating implementing agencies, coordinators within these institutions should also be nominated by the member countries.

25. The project may offer an opportunity for standardization of a regional data base, which needs to be considered.

26. Linkages between BOBP and other regional organizations engaged in subjects covered by the project should be established.

27. Indicators to verify achievement should be identified as soon as possible and agreed upon in the next (19th) Advisory Committee meeting to facilitate monitoring and evaluation of the project.

28. The fisheries management advice (Output 4) should be restricted to issues accorded high priority, as a result of the situation analyses in each country, in view of the budget constraints of the project.

29. It was also recognized that fisheries management advice is an important function of the project and, in order to expand its scope, additional funding should be sought.

30. With reference to undertaking situation analyses of marine fisheries in each member country, existing relevant information, including that available with BOBP, should be utilized in order to complete the output within the allotted time.

31. To facilitate uniformity of the situation analyses, BOBP should provide an annotated list of topics to serve as a format.

32. It was suggested that the start of the project should coincide with the entry on duty of the international staff.

SUBGROUP OF THE BAY OF BENGAL COMMITTEE FOR THE PREPARATION OF PROPOSALS FOR REGIONAL RESEARCH PROGRAMMES

33. The formation and the terms of reference of the Subgroup were endorsed.

34. The Subgroup should carefully take into consideration past and ongoing efforts of other organizations and initiatives related to fisheries and fisherfolk research and development, including those of the Strategy for International Fisheries Research (SIFR).

35. The Subgroup should communicate to the donor-gathering organized by SIFR in Paris their efforts, and, in particular, refer to the fisheries research priorities of the region, in order to support the consensus already developing out of other initiatives and, in turn, seek information about the procedures.

36. The Subgroup should not restrict itself to considering research but should also consider development-oriented efforts.

37. The Subgroup in addressing fishery research and development issues should clearly lay emphasis on the sustainable human development aspects.

38. The Subgroup, in considering short-term applied research and development proposals versus long-term basic efforts of strategic nature, should keep in mind the institution-building aspects.

39. The Subgroup should give consideration to proposals which address both national and regional concerns.

40. The Subgroup should not restrict itself to proposals dealing with small-scale fisheries but should consider all fishery-related issues of the region.

41. The Subgroup, in evolving proposals, should use the context of Agenda 21 in its entirety as its guiding principle.

42. The Subgroup, in formulating the proposals, should consider them in a programme framework.

OTHER MATTERS

43. By the next Advisory Committee meeting, participating governments should report on steps they have taken to establish the institutional base for carrying out activities of the Coastal Fisheries Management Project.

44. The Committee placed on record their sincere appreciation and gratitude for the services rendered by Mr. L.O. Engvall as Programme Director. His contribution to fisheries development in the region and his friendship they felt needed to be recognized. The Committee wished him the very best for the future and hoped that he would continue to contribute to the region's fisheries' development.

NEXT MEETING

45. In response to the kind offer of the Government of Indonesia to host the 19th Advisory Committee meeting, it should be held in Jakarta in early 1995, preferably in conjunction with the Ninth Session of the Committee for the Development and Management of Fisheries in the Bay of Bengal (BOBC).

ADOPTION OF THE REPORT

46. The report was adopted on 19 April 1994.

Appendix A

LIST OF PARTICIPANTS

Bangladesh

Md. Masudur Rahman

Additional Director
Department of Fisheries,
Dhaka.

Monowara Begum, (Ms)

Deputy Chief
Ministry of Fisheries & Livestock,
Dhaka.

Denmark

Thomas Gloerfelt-Tarp

Fisheries Adviser
Ministry of Foreign Affairs,
Copenhagen.

FAO

Yasuhisa Kato

Director
Operations Service,
Fisheries Department,
Rome.

Ulf N Wijkstrom

Chief
Fishery Development Planning Service,
Fisheries Department,
Rome.

IMO

Kent Blom

Special Adviser to the Secretary General,
International Maritime Organization,
London.

India

K Radhakrishna

Assistant Director General
Indian Council of Agriculture Research,
New Delhi.

Bimalendu Roy

Deputy Commissioner (Fisheries)
Department of Agriculture and Cooperation,
New Delhi.

Indonesia

Bambang Wahyudi

Chief
Subdirector of Production Development,
Directorate General of Fisheries,
Jakarta.

N Suseno

Chief
Programme and Project Section,
Directorate General of Fisheries,
Jakarta.

Malaysia

Haji Sulaiman Abu Bakar	Director of Fisheries, Kuching Sarawak.
Ahmad Adnan b Nuruddin	Fisheries Officer Fisheries Research Institute, Penang.
Md. Shaupi b Derahman	Head of Resource Management Section, Department of Fisheries, Kuala Lumpur .
Liong Pit Chong	Senior Fisheries Officer National Prawn Fry Production & Research Centre, Penang.

Maldives

Maizan Hassan Maniku	Director of Fisheries, Research & Development, Ministry of Fisheries & Agriculture, Male.
Hassan Shakeel	Fisheries Resources Officer, Marine Research Section, Ministry of Fisheries & Agriculture, Male.
Abdullah Naseer	Reef Ecologist, Marine Research Section, Ministry of Fisheries & Agriculture, Male.
Hussein Rasheed Hassan	Project Analyst Ministry of Fisheries & Agriculture, Male.
B Naseer	Director General Radio, Voice of Maldives, Male

SIDA

Magnus Torell	Senior Programme Officer Natural Resources Management Division, Stockholm.
---------------	--

Sri Lanka

Anton R Atapattu	Director Department of Fisheries and Aquatic Resources, Colombo
K M Sathyapala	District Fisheries Extension Officer, Tangalle.

Thailand

Udom Bhatiyasevee	Director Oceanic Fisheries Division, Department of Fisheries, Bangkok.
-------------------	---

Anant Saraya	Senior Fisheries Biologist, Brackishwater Fisheries Division, Department of Fisheries, Bangkok.
<i>UK (ODA)</i>	
Barry F Blake	Head Fisheries and Aquatic Resources Group, Natural Resources Institute, Chatham.
<i>UNDP</i>	
Mohammed Farashuddin	Resident Representative Male.
<i>SEAFDEC</i>	
Kachornsak Wetchagarun	Administrative Division Head Training Department, Bangkok.
<i>BOBP/Secretariat</i>	
L O Engvall	Programme Director, Madras.
D King	Post-harvest Fisheries Adviser, Madras.
S Muthiah	Information Officer, Madras.
R Ravikumar	Consultant, Madras.
R N Roy	Consultant, Madras.
K Sivasubramaniam	Consultant, Colombo.
M Ellis (Ms)	Secretary, Madras.
Shereen Nahida (Ms)	Senior Secretary, Male.

Appendix B

AGENDA

16 April

1. Opening of the meeting

17 April

2. Election of Chairman
3. Adoption of the agenda
4. State of the Programme
5. Small-scale Fisherfolk Communities (DANIDA/SIDA/Member Governments)
 - a. Progress during 1993
 - b. Terminal report
6. Post-harvest Fisheries (ODA)
7. Bioeconomics of Small-scale Fisheries (UNDP)
8. Cleaner Fishery Harbours (IMO)

18 April

9. Coastal Fisheries Management (Denmark/ Japan)

19 April

10. Subgroup of the Bay of Bengal Committee for the preparation of proposals for regional research programmes
11. Other matters
12. Next meeting
13. Adoption of the report

Appendix C

LIST OF DOCUMENTS

1. Agenda
2. List of documents
3. List of participants
4. State of the Programme 1993
- 5 a. Small-scale Fisherfolk Communities (GCP/RAS/1 18/MUL, GCP/RAS/1 17/MUL) – Annual Report 1993
- 5 b. Draft Terminal Report – Small-scale Fisherfolk Communities in the Bay of Bengal (GCP/RAS/1 18/MUL)
6. Post-harvest Fisheries – Annual report 1993
- 7 a. Bioeconomics of Small-scale Fisheries (RAS/91/006) – Annual Report 1993
- 7 b. Bioeconomics of Small-scale Fisheries (RAS/91/006) – Project findings and recommendations
- 8 a. Improvement of the Port Environment at Phuket Fishery Harbour – Project report
- 8 b. Project document – Awareness Building to Promote Cleaner Fishery Harbours in Maldives and Sri Lanka
9. Project Document - Coastal Fisheries Management
10. Project proposal for the establishment and support of a Subgroup of the Bay of Bengal Committee (BOBC) to prepare proposals for regional fisheries research programmes.

Appendix D

STATE OF THE PROGRAMME 1993

GENERAL

1. 1993 was the seventh and last year of BOBP's mother project 'Small-scale Fisherfolk Communities', GCP/RAS/118/MUL. The termination of it marks the end of the second phase of the Programme. The 'Bioeconomics' project, RAS/91/006, was also completed at the end of the year and the 'Environment Hazards' project came to an end early in the year as reported in the 17th Advisory Committee Meeting. There has, thus, been, a considerable reduction in size of the programme. The Post-harvest Fisheries project however has maintained its momentum and entered into a third phase of five years (1993-97). The main features of the projects are given below, while the progress, status and plans for individual projects are elaborated in separate reports.

SMALL-SCALE FISHERFOLK COMMUNITIES

2. 'Small-scale Fisherfolk Communities', GCP/RAS/118/MUL, funded by DANIDA and SIDA has had a duration of seven years (1987-93). The outlay amounted to about US\$ 10.6 million and the total budget is US\$ 11.1 million. During 1993, the project supported work in the disciplines of Extension and Brackishwater Culture throughout the year and in Fishing Technology during the first six months. Besides completing the remaining subprojects and activities, considerable effort has been devoted to reporting and preparation of manuals. As recommended by the Advisory Committee in its 17th Meeting, the project has been extended till April 1994 to enable finalization and issue of the remaining working papers, reports and manuals.

3. The member countries have continued to support BOBP's Information Service through cash contributions (about \$ 100,000 per year). The Information Service is formally attached to the mother project as a separate project, GCP/RAS/117/MUL, but services the entire Programme. This project has therefore also been extended till April 1994 by utilizing the remaining funds.

POST-HARVEST FISHERIES

4. The second largest project deals with Post-harvest Fisheries and is funded and executed by the ODA. Its third phase started in 1993 and has a duration of five years. The budget is about US \$ 2 million. The project is restricted to Bangladesh, India and Sri Lanka, with concentration on India. The objectives are to enhance the incomes of artisanal fishing communities and petty fish-traders, increase the diversity of fish products marketed by these communities and to strengthen the ability of NGOs to replicate and secure sustainable benefits from project activities.

BIOECONOMICS

5. 'Bioeconomics of Small-scale Fisheries', RAS/91/006, funded to the tune of US \$ 1 million by UNDP over a period of 2.6 years, was terminated on schedule at the end of the year. Case studies on biosocioeconomics of particular fisheries in all the participating countries were completed and analyzed and discussed in a regional workshop. Technical reports were drafted and will be finalized by the Information Service in the first quarter of 1994.

CLEANER FISHERY HARBOURS

6. In the series of 'Cleaner Fishery Harbours' projects, supported by IMO through its SIDA-sponsored Global Programme for the Protection of the Marine Environment, a pilot project was executed in Thailand entitled 'Improvement of the Port Environment at Phuket Fishery Harbour'. Late in the year, the fourth project in the series was initiated. The title is 'Awareness Building to Promote Cleaner Fishery Harbours in Maldives and Sri Lanka'. The budget of each of these projects is about \$ 90,000.

NA TIONAL PROJECTS

7. One remaining national project, implemented through BOBP, was completed in the second half of the year. It was 'Credit for Motorization of Chandi Boats' in Bangladesh funded by DANIDA.

PROJECT PROPOSALS

8. A proposal for a new mother project in the third phase of the programme was completed (document ACM/18/9) and submitted to the two funding agencies that had expressed interest in it, i.e. Denmark and Japan. The project will deal with 'Coastal Fisheries Management' and have a duration of five years. The budget, US \$ 3 million, was dictated by the availability of funds. It is hoped that it can start in May 1994 at the end of the ongoing project.

9. It is anticipated that the member countries will continue to provide cash contributions at a level of \$ 100,000 per year to support the Information Service, as during the second phase.

10. Another project proposal, for 'Sustainable Brackishwater Culture Development', endorsed by the Advisory Committee in its 17th Meeting is awaiting funding support. No donor agencies have as yet expressed interest in it.

11. The Bay of Bengal Committee (BOBC) recommended in its Eighth Session in 1993 to establish a subgroup for preparation of proposals for continued regional cooperation within the framework of Agenda 21 of UNCED. The Advisory Committee that met immediately after the BOBC meeting suggested that surplus funds available under GCP/RAS/118/MUL should be utilized to support the subgroup, subject to formal concurrence of the donor agencies. A consultation was held in February 1994 to define the scope of work and terms of reference of the subgroup. The report of the consultation constitutes a proposal for establishment of the group and is presented in document ACM/ 18/ 10.

Appendix E

SMALL-SCALE FISHERFOLK COMMUNITIES IN THE BAY OF BENGAL (GCP/RAS/118/MUL. GCP/RAS/117/MUL)

ANNUAL REPORT - 1994

INTRODUCTION

This report deals with the progress of work during 1993, the last year of BOBP's project 'Small-scale Fisherfolk Communities in the Bay of Bengal', GCP/RAS/118/MUL, funded by DANIDA and SIDA. The report also covers the GCP/RAS/117/MUL project which constitutes funding support, by the participating governments, to the project for the Information Service.

GCP/RAS/118/MUL has supported work in the disciplines of Extension and Brackishwater Culture throughout the year and in Fishing Technology during the first six months. GCP/RAS/117/MUL has provided services for all disciplines of BOBP.

As in previous years, this report contains a narrative summary for each discipline which highlights the year's work, problems, issues and future plans. The subprojects under each discipline are then discussed in a table format that gives information about objectives, targets, achievements, status and future plans.

EXTENSION

Most of the effort during the year was spent in completing subprojects in Bangladesh and the Maldives. It mainly consisted of reporting and consolidation and dissemination of learnings which could give direction to future efforts.

In the Maldives, given the interest of both fisherfolk and government to develop a model for participatory reef resource management, the focus was on writing and testing a handbook on the subject. The aim of the book was to build awareness, guide data collection and, in more general terms, provide a foundation upon which consultative processes could evolve management practices. The government has committed itself to continuing the effort. However, while the staff has developed its capacity, the logistics of the country, the shortage of manpower and various other difficulties relating to managing their tasks will continue to hamper its function in a participatory management process.

In Bangladesh, the activity focussed on the women's activities, which, through group formation, credit support, enterprise development and awareness building, tried to improve the lot of women in fishing communities. The activity basically showed that it was possible for a few trained women extension workers, with small support, to make a significant contribution to an important area of need. DOF's involvement in the activity was minimal, except for its participation in review meetings. It was hoped, that given the example, DOF will be motivated to replicate the activity with its own cadre of women staff. A review of the groups, undertaken by an NGO leader, found them cohesive and committed to carrying on the work they had begun. The awareness building had paid dividends in that the women had put into practice what they had learnt. However, it was felt that weaknesses still existed in the managerial capacity of the groups, which would affect their ability to sustain the effort beyond the project period.

Significant amongst the reports and publications was a manual on the use of rapid appraisal methods in coastal communities, a training manual for trainers to facilitate improved management of fisherfolk enterprises and a second comic book relating to fisheries management in Tamil and English.

Subproject: Extension General (EXT/GEN)

Targets 1993

Achievements

Completion of manuals on : The manual, revised to make it more user friendly, was printed and distributed (BOBP/MAG/6).

— Rapid Rural Appraisal

— Enterprise
Management

The manual for trainers to facilitate improved management of fisherfolk microenterprises was printed and distributed (BOBP/MAG/ 19).

Finalization and distribution of Comic Book II (Resource Management)	The comic book <i>Our Shrimp, Their Lives</i> was published in English and Tamil and distributed to fisherfolk, schools, adult education centres, fisherfolk cooperatives and NGOs along the Coromandel Coast of the State of Tamil Nadu in India (BOBP/MAG/11). See also <i>Bay of Bengal News No. 51</i> .
Extension workshop in Thailand for senior HQ and Provincial Fisheries Officers	A two-day senior officers' workshop brought together 40 policy-level and supervisory-level staff to think through and discuss the objectives, approaches, methods, manpower and organizational aspects of fisheries services in coastal provinces in the context of (a) the long-term fisheries development plans of DOF, and (b) the learnings of the BOBP Extension subproject in Ranong (<i>Bay of Bengal News No. 50</i>).
Extension guidelines in Thai	The guidelines based on the learnings of the extension subproject in Ranong, Thailand, were published and the Department of Fisheries has decided to distribute it to all provincial level fisheries staff along the coast of Thailand (BOBP/MAG/15).
Report on the Ranong subproject	Expected to be completed early in 1994 (BOBP/REP/68).
Impact assessment of group enterprises in Indonesia	The assessment of the impact of the project on the fisherfolk groups in Langkat District was carried out by a faculty member of the University of North Sumatera. The key findings were : <ul style="list-style-type: none"> — In terms of performance and management, four out of the six groups rated very good to good. — Savings and repayments were on schedule and the group members seem to understand the importance of paying back and doing so on time. — The enterprises (especially the nonfishery ones) were doing well. The activities have provided additional employment for 163 persons. — The training manual on group formation, savings mobilization and selection of enterprises has had a desirable impact on the groups. — More technical input in terms of information, extension and advice would have been useful and helped the groups to perform better.
Report on the Langkat subproject	Completed and printed (BOBP/REP/60).

Subproject: Fisheries Extension Services, Maldives (EXT/FES/MDV)

OBJECTIVES	Establishment of a fisheries extension unit and training its staff. The target groups of the subproject are fisherfolk communities in Meemu, Vaavu and Faafu atolls. A country-wide expansion in due course is envisaged.
STATUS 1992	The Ministry of Fisheries and Agriculture (MOFA) established an extension unit in 1989. Training in extension methodology, on-line and in other countries of the region, was given to the staff. Initially, selected fisherfolk were given training in various technical subjects and a BOBP-designed boat-hauling device was demonstrated.

A rapid appraisal of all 19 inhabited islands in the target area clearly showed that the priority problem areas did not fall within the mandate of MOFA. The consensus of the fisherfolk was that the project should focus on management of marine resources on reefs, the problems relating to reef openings, harbour silting and erosion, rat and bat infestation and improved access to health care and education. During 1991, training and activities in these areas were undertaken. Work was done through the Island Development Committees and it showed that much could be achieved by building their managerial and problem-solving capacities. A fisherfolk workshop at the end of 1991 suggested that the project's focus during the rest of the time should be on development of extension materials for the management of reef resources.

In 1992, a series of training sessions on sustainable management of the reef resources was conducted in the target area. The activity was helped by radio programmes and extension material developed by MOFA's Marine Research Section. An effort to evolve a handbook, which would take the fisherfolk through a learning process of better understanding the reef resources, was initiated. For the island schools, a colouring-cum-activity book was developed to build awareness among children, the future fisherfolk.

Targets 1993

Completion of the colouring-cum-activity book

Development of handbook to enable understanding and management of reefs at atoll/island levels

Study tour for three MOFA and Atolls Administration staff to the Philippines to study community-based fisheries management approaches

Training of Voice of Maldives and MOFA staff in the use of radio broadcasts in fisheries extension and development

Reporting

Achievements

The book (BOBP/MAG/20) was officially released by MOFA at the Fishermen's Day celebrations in December and will be distributed widely in island schools.

A first draft was modified after recommendations made from senior GOM officials and Island Development Committee members. The book is now awaiting pilot testing in the target area. MOFA has committed a budget and plans to test and refine the document during **1994 (Bay of Bengal News No. 52).**

A wide range of institutions, projects and programmes (both governmental and nongovernmental), aspiring to promote a stronger and more active role of the fishing communities in resource management, were visited. Meeting and discussions, as well as visits to project sites, proved useful, as they helped to provide a broader perspective of the activity in the Maldives. The formal lectures equipped the participants with a more theoretical foundation, which had previously been lacking. In general, the study tour functioned as a confidence booster and a source of inspiration.

Two producers from Voice of Maldives, four staff from MOFA's extension and marine research sections and four officials from the islands in the target area were trained by a consultant (M Pickstock). The training covered both theory and practice and included hands-on experience during a field recording trip. Back in the studio, the trainees put together radio programmes which were broadcast (**Bay of Bengal News No 51**).

The report of the subproject has been completed (BOBP/REP/62).

Assessment

The objectives of the subproject have been, by and large, achieved. This was facilitated by the fact that the content was not rigidly determined in advance, thus allowing for flexibility, creativity and sensitivity to changes and, in particular, to fisherfolk needs.

An island-based workshop, held in October 1993, bringing together Island Development Committee members and senior government officials confirmed that MOFA had been successful in its efforts to extend the message and increase awareness of the reef resources and the need for local participation in the management process. The informed and exceptionally lively discussions verified this point.

MOFA has committed itself to sustain the activity in 1994 and has the ambition to pilot test the Reef Management Handbook, in all inhabited islands in Meemu Atoll. The staff to be responsible for the implementation has already been selected.

A concern remains that, given the logistic difficulties of the country, the shortage of trained manpower and the shortcomings in the direction and managerial capacity within MOFA, the impact of participatory fisheries management may be limited unless it is able to better gear itself to the task.

Subproject: Fisheries Extension Development, Bangladesh (EXT/FED/BGD)

OBJECTIVES

Demonstration of extension support to fisherfolk communities through training, technology transfer and support of pilot extension schemes.

The immediate targets are the fisherfolk communities of the Patuakhali and Borguna Districts of Bangladesh. The subproject hopes to demonstrate that a trained cadre of Department of Fisheries (DOF) and NGO staff, functioning in a participative manner and with some logistic and project financing support, can address the needs and problems of fisherfolk communities.

STATUS 1992

The subproject began in July 1989. DOF staff from all thanas in the two target districts and staff from two NGOs received training in rapid rural appraisals, participatory needs analysis, and planning and project management in four separate sessions interspersed with 8-10 weeks of field work where learnings were put to test. The staff were also trained in group mobilization and management as well as savings and credit management.

Out of the training and field work emerged 36 project ideas, 18 of which were accepted for funding and implementation. The projects, implemented by the fisherfolk groups, undertook savings mobilization, revolving fund management and pilot activities in finfish hatcheries/nursery culture, poultry rearing, homestead forestry, credit schemes for boat and net repair, fish trading and salting of *hilsa*, as well as health and population education. Twelve of the pilot projects needed credit, and a revolving fund, based particularly on the fisherfolk's savings, was established. In December 1992, all pilot activities were terminated. The savings of the 342 fisherfolk participating in the activity stood at Tk 99,224 (US \$2,512), which was about 40 per cent of the total credit disbursed. The credit repayment was 100 per cent including interest at near commercial rates. Most groups expressed plans to pursue with meetings, savings and existing income-generating activities or even start new ones, in many cases with the support and encouragement of the DOF staff.

According to the group members, the activity created a new link between the fisherfolk and DOF staff. The enthusiasm, participation and the quality of work of the DOF staff have been of a high level. However, there was a need for constant supervision and support made available through regular review workshops and through placing a full-time trainer and two coordinators in the field. (*See Bay of Bengal News No. 50*).

With the cancellation of the main phase of a planned UNFPA project, some women's activities were incorporated into the subproject. In 1992, it was decided to extend this activity for another year in order to ensure sustainability. With the help of two coordinators, 15 women's groups were formed in ten villages. Ten group supervisors, young women from the villages, received training in group formation and management, nutrition, health, family planning, women's legal rights and savings and credit. They, in turn, trained the women with help from the coordinators and other resource persons. The groups decided to expand, with credit support from the subproject and their own savings, the paddy parboiling and husking enterprises that were already in operation.

Targets 1993

Consolidation of women's group activities through training and on-line support.

Achievements

The performance of the 15 groups was satisfactory. They received further training in nutrition, health, women's legal rights, poultry rearing and credit management. The trainers were the group supervisors.

The income-generating activities, primarily paddy-husking and small trading, functioned well. The repayment of credit was close to 100 per cent. The savings by September '93 amounted to close to 40 per cent of the revolving fund established by the subproject.

Reporting

The report of the subproject has been completed and is in print. It is expected to be distributed in early 1994 (BOBP/REP/65).

Assessment

The women's activity was evaluated by an NGO working with fisherfolk (CODEC), primarily to discuss the possibility of the groups' incorporation in CODEC-supported village development programmes. The groups were found to be enthusiastic and cohesive and with high awareness levels in the areas of health, nutrition and women's legal issues. It was pointed out that the sustainability would be considerably enhanced with specific training inputs on improved group saving and credit fund management.

The subproject has provided a grant to CODEC to provide additional training and support inputs over a period of three months. CODEC has, in principle, agreed to incorporate the groups into their activity, but will make the final decision in 1994.

While the activity has demonstrated a low-cost means of addressing the needs of women in fishing communities, the involvement of DOF staff was minimal. It is hoped that the example will motivate DOF to build up a cadre of women staff and replicate the activity.

BRACKISHWATER CULTURE

Of the three remaining subprojects, i.e. Shrimp and Prawn Seed in Bangladesh, Shrimp Seed Supply in India and Oyster Culture in Malaysia, the first one continued throughout the year, while the other two were completed in the middle of the year.

In Bangladesh, the demonstration of the brine-based freshwater prawn hatchery in Potiya continued. Several entrepreneurs and fishery officers, including four from India, were trained at the hatchery in a series of courses. A major project input was the support to establish four small-scale private sector hatcheries on the Potiya model. Three of them were completed during the year. One of them even went into production in July. A manual for Operating a Small-scale Recirculation Freshwater *Prawn Hatchery* (BOBP/MAG/13) was printed in English and Bengali. It has become very popular and requests for it are being received from many countries.

Further trials of nursery rearing of tiger shrimp in floating cages did not produce positive results. It was concluded that the technology is not viable under the prevailing conditions. The cage nursery rearing trials of tiger shrimp in West Bengal, India, were also disappointing. The scarcity of fry is the most serious problem.

The DOF tiger prawn hatchery at Digha continued to be inoperative. But, on the whole, the entire subproject in West Bengal has generated a lot of information on the shrimp seed supply and marketing, which has been documented. On the other hand, it appears that it has had very little or no direct impact.

In the Oyster Culture subproject in Malaysia, the effort was concentrated on remote setting of spat and marketing. The remote setting trials produced encouraging results, but need to be continued for a much longer period to refine the technology and establish suitable rearing protocols. The marketing activities in Perak, although limited, clearly indicated the possibilities of increasing the sales volume by more active promotion. There is probably a considerable latent demand for live oysters, but the trading channels are not yet established.

Subproject: General Services (BWC/GEN)

Targets 1993

Achievements

Summary of BOBP's experience of small-scale brackishwater culture development

Some of the experience related to hatcheries and nursery rearing of shrimp were presented in articles in the *Bay of Bengal News* Nos. 51 and 52.

Study tour of Maldivian officer to observe giant clam culture in Australia

Undertaken during four weeks at Fitzroy Island, Australia. The programme covered broodstock collection and holding, spawning, fertilization and hatching and larval rearing. The observations were summarized in an article in *Bay of Bengal News No. 50*.

Subproject: Shrimp and prawn seed, Bangladesh (BWC/SPS/BGD)

OBJECTIVES

Introduction of methods and techniques to increase the supply of shrimp/prawn seed and the income of seed collectors.

STATUS 1992

A freshwater prawn hatchery, with recirculation of brine-based rearing water and a capacity of four million fry per year, was constructed in 1990 at the Potiya Fish Seed Production Centre. Five DOF staff were trained in Bangladesh and Thailand, but as no one was available at the start of the operation, they had to be replaced by BOBP contract staff. The technical feasibility of the hatchery was demonstrated during the 1991 season. During the 1992 season, commercial levels of productivity were achieved in some of the trials but sustained overall economic viability had not yet been achieved. Eight DOF farm managers were trained at the hatchery and a manual for operation of the hatchery was drafted.

Four small-scale private sector entrepreneurs, including one NGO, were selected, out of 170 applicants, to receive assistance to establish their own hatcheries.

Attempts were made, with the assistance of an NGO, to rear freshwater prawn juveniles in cages in a canal near the hatchery.

These met with mixed results during the first two years (1990-91). The final trials in 1992 showed positive results for the rearing of fry collected in the wild. The survival of hatchery-produced fry was still too low.

Nursery-rearing of tiger shrimp in cages at Mognamapara in Chokaria Sundarbans was taken up in 1990 in cooperation with an NGO. But no positive results were obtained before the 1991 cyclone washed away all the cages. Further trials in 1992 were hampered by low fry abundance.

Targets 1993

Completion of hatchery manual

Establishment of four private freshwater prawn hatcheries

Trials of cage nursery rearing of tiger shrimp

Extension materials in Bengali for cage nursery rearing

Final reports on nursery rearing and hatchery development

Achievements

The manual was published both in English and Bengali (BOBP/MAG/13).

Done. The hatcheries are located at Guripur, Mymensingh; Jhodpur, Dhaka; Koittia, Dhaka; and Potiya, Chittagong. Three hatcheries were constructed by private companies, one by an NGO. BOBP provided all the imported equipment and *artemia* for one season on a grant basis, while the owners met all other investment costs and recurring expenses. The hatchery at Guripur went into production in July. Construction at Jhodpur and Koittia was completed by end 1993, but the Potiya facility was still under construction by year's end.

The incorporation of a transition pond for holding fry for 3-4 days improved survival to over 70 per cent. Nevertheless, the results indicated that nursery cage-rearing of tiger shrimp fry is not financially viable. The main reasons are the scarcity of fry at the project site and the narrow margin between fry-catcher and buyer.

Not done due to negative outcome of rearing trials.

Done. The nursery rearing results are being reported on in a working paper (BOBP/WP/92) and the hatchery development in a report (BOBP/REP/66) to be published in the first quarter of 1994.

Assessment

Direct assistance to the private sector for hatchery development was effective as a technology transfer tool. The hatchery operators may experience restricted access to technical assistance, needed to overcome the inevitable problems encountered during start up, as such know-how is scarce in the country.

Tiger shrimp cage nursery culture is not profitable in the current market situation in Bangladesh. The use of hatchery-produced PL 10-15 for stocking may become an option in the future, but at present there is only one commercial tiger shrimp hatchery and that is in limited operation. On the other hand, cage nursing of freshwater prawn fry, particularly wild fry, is profitable. The main problem with hatchery fry is low survival, which is probably related to overstocking and inadequate sorting. One or two more seasons would be required to refine rearing protocols, but the technology should be developed since it could have wide application in Bangladesh.

Subproject: Shrimp Seed Supply, India (BWC/SSS/IND)

OBJECTIVES

Introduction of methods and techniques to increase the supply of shrimp seed and the income of seed collectors in West Bengal.

STATUS 1992

Considerable efforts were made in 1988-90 to initiate demonstration of nursery-rearing of shrimp fry. A pond complex was constructed

in a village, Mognamapara, in South 24 Parganas District, and villagers were formed in groups and trained in the technology. However, the pond complex and further activities had to be abandoned because of a land dispute between the Departments of Forestry and Fisheries and interference by vested political interests in the village.

Cage nursery-rearing of shrimp fry was taken up in 1990, in Ramnagar, Medinipur District, with the assistance of an NGO to mobilize, organize and train the villagers. Trials during the 1990/91 season, involving ten family groups, indicated that such nursery-rearing might be feasible. Trials during the 1991/92 season were very sporadic, due to unusually low availability of shrimp fry, and were, therefore, not viable. In the beginning of the 1992/93 season the water depth in the canal became too low to carry out trials and, so, they had to be moved to another village and restarted with new participants.

Lurelines were tested in 1991 as a selective method for collection of shrimp fry, but without success.

A one-year study of the by-catch from shrimp fry-collection was undertaken by the Central Institute of Brackishwater Aquaculture (CIBA). It revealed that the ratio of target species to by-catch varied from 1 : 2 upstream to 1 : 160 near the sea.

A review was made of the market chain price structure and mode of operation of the major fry markets in West Bengal.

A small-scale modular tiger shrimp hatchery was set up in Digha, where basic facilities already existed, and staff were trained. The hatchery was completed in 1991, but did not become operational due to various minor technical and bureaucratic problems and a high turnover rate of staff.

In order to stimulate hatchery development through the private sector, eight small-scale entrepreneurs, selected from 250 applicants, underwent five weeks of training in Malaysia in tiger shrimp hatchery operation.

Targets 1993

Completion of technical papers

Further trials of cage nursery rearing

Training of two entrepreneurs in freshwater prawn hatchery operation

Final report on nursery rearing and hatchery development

Unscheduled

Achievements

The following working papers were completed :

- Nursery Rearing of Tiger Shrimp Fry in West Bengal (BOBP/WP/86).
- Market Study of Tiger Shrimp Fry in West Bengal (BOBP/WP/87).
- *The Shrimp Fry By-catch in West Bengal* (BOBP/WP/88).

Two trials were completed, one at Pichaburi, the other at Ramnagar. Tiger shrimp fry were too scarce to fully stock the cages. The survival was too low to achieve profitability at both sites.

One trainee from Orissa and one from West Bengal completed a 35-day training course at the BOBP/DOF demonstration hatchery in Potiya, Bangladesh.

The results of the rearing trials prior to 1992/93 were reported on in working paper BOBP/WP/86. The hatchery development was accounted for in report BOBP/REP/66.

Two officers of the Fisheries Department in Orissa were trained for ten days in freshwater prawn hatchery operation at the BOBP-supported hatchery in Potiya, Bangladesh.

Assessment

The trials of tiger shrimp-rearing in cages were not successful. The profitability was affected by scarcity of fry for stocking and by mediocre survival. The implementing NGO improved its organizational approach by supporting existing village groups and by involving village governing councils (panchayats) in participant selection and implementation.

Even though there is considerable interest in small-scale hatcheries in West Bengal, the DOF experienced considerable difficulties and could not put the BOBP-supported hatchery at Digha into production. Any further effort in hatchery development should be directly with the private sector and not through government.

The transfer of tiger shrimp hatchery technology to the private sector through training yielded a minimal result. However, the single trainee, a Madras businesswoman, who established a hatchery will be an exemplary model. More time may be required to evaluate the effectiveness of the activity.

The shrimp fry by-catch study was the first attempt to quantify the by-catch and evaluate possible effects on the fishery. The study will be a useful baseline for future work.

Subproject: Oyster Culture, Malaysia (B WC/OYS/MAL)

OBJECTIVES	Introduction of small-scale oyster farming as an income-generating activity for coastal fisherfolk on the west coast of Peninsular Malaysia.
STATUS 1992	<p>The subproject was initiated in 1988 with marketing studies that indicated that the oyster market was undersupplied, with spat-collection trials at several locations along the west and east coasts and with experimentation of culture techniques.</p> <p>Culture of flat oyster (<i>O. folium</i>) at Langkawi was demonstrated, but was discontinued because of problems with marketing, management by the fisherfolk and inadequate spat supply.</p> <p>Results of spat (<i>Crassostrea</i>)-collection trials led to the conclusion that commercial culture on the west coast cannot be sustained on the basis of wild spat. On the east coast, however, large quantities of <i>C. iredalei</i> are available. They were transplanted to the west coast and successfully reared there. Consequent to the trials in east coast estuaries, both spat-collection and culture of oyster had become commercial activities on the initiative of the fisherfolk themselves.</p> <p>A few farms were established on the west coast in Kedah and Perak, which cultured <i>C. iredalai</i> transplanted from the east. 'Half-shell' oysters were sold locally and to restaurants (in Penang). The culture technique employed is based on rafts and longlines. An economic assessment showed that oyster-farming can be a very profitable venture (<i>Bay of Bengal News No. 49</i>).</p> <p>About 70 potential oyster farmers and fisheries officers were trained in oyster culture in short training courses of 3-4 days (<i>Bay of Bengal News No. 50</i>). And an extension manual were drafted.</p> <p>Depuration units were introduced to ensure that sanitary standards were met before the oysters were marketed.</p> <p>Several promotion campaigns organized by the DOF increased the interest in, and consumption of oysters. But the supply of cultured oysters in Perak exceeded the demand and the farmers faced a serious marketing problem.</p> <p>The technical feasibility of remote setting using eyed larvae from the Fisheries Research Institute (FRI) hatchery was demonstrated in one trial.</p>

Targets 1993

Achievements

Completion of culture manual	The manual has been published both in Malay and English (BOBP/MAG/ 18).
Extension support to participating farmers	The effort was mainly directed at Perak farmers to encourage better maintenance of cultured oyster stocks. It ended in the middle of the year with the termination of the subproject.
Training of farmers in spat nursery rearing	Spat nursery-rearing, including remote setting, was attempted together with a cooperative oyster farmer in Kedah. The setting survival from the first trials was very limited, but the spats showed excellent growth and survival in nursery trays.
Marketing assistance to farmers in Perak	Arrangements were made to test market oysters in Melaka, employing one of the farmer participants as agent and using local transport. The results indicated good potential. Restaurants and hotels started to buy live oysters. However, the sales volume needs to be further increased to sustain all the farmers.
Final report	Published as BOBP/REP/63.

Assessment

While a marketing arrangement was set up in Perak, not enough time remained during the subproject to evaluate its effectiveness. With the withdrawal of BOBP support, the FRI may find it difficult to monitor the arrangement and provide back-up as their staff is limited.

No system had been put in place to monitor depuration. Ensuring proper depuration continued to be a problem. A verifiable and reliable system needs to be put in place.

Remote setting is still experimental, although it shows promise as an alternative to natural spat. Consequently, nursery operation will require several more seasons for refinement. The most critical period is from 0.5 to 15 mm; keeping predators out, especially crabs, and ensuring adequate water circulation are the main problems. The survival from the time of setting to reaching 1-2 cm is still too low for remote setting to be commercially viable.

FISHING TECHNOLOGY

Besides completing technical reports and manuals on activities conducted earlier, the two remaining subprojects, viz. 'Introduction of outrigger canoes in Indonesia' and 'Demonstration of offshore fishing for large pelagic species in India' continued till mid-1993.

In Indonesia, the demonstration of outrigger canoes in Nias island was concluded with good results, confirming the viability of the new craft. The canoes were subsequently auctioned to fishermen.

In India, the demonstration of offshore fisheries for large pelagic species continued from Madras but with disappointing results. Commercial viability was not attained; the catch rate would have to be about 30 per cent higher. The two project boats (SRL-15) were subsequently sold to an entrepreneur who is reportedly operating them off the west coast of India at Malpe with encouraging catches of shark on two-day trips.

Subproject: General Services (FIT/GEN)

Targets 1993

Achievements

Completion of reports :	
– Manual on outrigger canoe construction	Published as BOBP/MAG/12 in both English and Bahasa Indonesia.

- Large pelagic species in Sri Lanka and India The trials in Sri Lanka are included in the report on offshore fishing boat development in Sri Lanka (BOBP/REP/61) and the trials in South Indian waters are accounted for in a working paper (BOBP/WP/91).

- Safety guide for small offshore fishing boats Published as BOBP/MAG/16.

- Outrigger canoes in Indonesia and Sri Lanka Published as BOBP/REP/57 and BOBP/REP/59 respectively.

- Construction manual for the liftable propulsion device — the BOB Drive Published as BOBP/MAG/14.

- Manual on fuel economy for small craft Not done since it would largely duplicate what has already been published (BOBP/WP/27 - *Reducing the Fuel Costs of Small Fishing Boats*).

- Fishing trials with SRL-15 for large pelagics off Madras Trials were terminated in May, the results analyzed and the boats sold to a private entrepreneur. Commercial viability was not attained. The catch rates would have to be increased by about 30 per cent (*Bay of Bengal News No. 51*).

- Transfer of SRL-15 mould from Sri Lanka to India Transferred to the APFC boatyard in Kakinada, Andhra Pradesh.

- Demonstration of outrigger canoes in Indonesia Conducted till July with very good results, after which project canoes were sold to fishermen (*Bay of Bengal News No. 49*).

INFORMATION SERVICE

The *Bay of Bengal News*, BOBP's newsletter, continued uninterrupted publication during 1993. Four issues, totalling 124 pages, were released.

As many as 28 other publications were brought out during the year. There were nine reports, seven working papers and twelve manuals. Details are given in Table 1.

In addition, a report on an FAO study of the shark fisheries in the Maldives was edited and printed for the Ministry of Fisheries and Agriculture, Maldives, and two Post-harvest Fisheries pamphlets — *Permanent Ice Box: Construction Specifications* (Bengali) and *How to Make High Quality Dried Anchovies?* (Tamil) — were produced.

Four of the twelve manuals were issued in two languages. Among the manuals was a second 'comic book' dealing with the life cycle of shrimp and the effects of different catching methods. Another innovation in the manual series was a colouring book for children specially designed for the children of the Maldives in an attempt to improve their environment-consciousness.

A desk calendar for 1994 was produced. It featured colour illustrations by staff artists of various BOBP activities undertaken during the present (second) phase of the programme.

Two video films on the development and introduction of beachlanding craft in India and on trials of cage nursery culture of tiger shrimp in West Bengal were produced by contracting arrangements.

About four months in 1994 will be required to edit, print and distribute the remaining fourteen working papers and reports.

PROJECT INPUTS AND THEIR UTILIZATION

The total expenditure in 1993, according to FAO's financial statements, was one million US dollars against a budget of \$ 1.2 million.

<i>Project</i>	<i>Budget U S \$</i>	<i>Est. Exp. U S \$</i>
GCP/RAS/ 118/MUL	1,074,000	903,000
GCP/RAS/117/MUL	130,000	103,000
Total	1,204,000	1,006,000

Further details as per FAO's accounting codes are given in Table 2. The low expenditures for 'duty travel' under GCP/RAS/ 118/MUL (Table 2a) is not correct. It should be of the order of \$ 115,000 and the balance has probably been absorbed under 'personnel' by misrepresentation in the FAO HQ accounts. The high negative expenditure under 'equipment' is due to sale of items not required or being replaced.

The budget for 1994 is based on the recommendations in the 17th Advisory Committee Meeting to continue the project till the end of April 1994 to finalize all the reporting work, conduct the 18th AC meeting and support the subgroup under the Bay of Bengal Committee for preparation of proposals for regional research programmes. For the latter, an amount of \$ 145,000 has been earmarked.

The deposits and expenditures under GCP/RAS/1 17/MUL are shown in Table 2b. All contributions due for 1993 had not been received by the end of the year. There was about \$ 50,000 yet to come. The budget for 1994 is for the entire year, since the government cash contributions are to be continued under the same project symbol during the third phase.

Disciplinewise, Brackishwater Culture accounts for the highest portion of the expenditure, i.e. about 43 per cent during 1993. Extension accounts for 30 per cent, Fishing Technology 12 per cent and the Information Service 15 per cent.

During the entire project period (1987-93), the expenditure shares discipline-wise were : Brackishwater Culture 26 per cent, Extension 25 per cent, Fishing Technology 21 per cent, Development Support 10 per cent, Resources 6 per cent, Environment 1 per cent and Information Service 11 per cent.

All professional posts, except those for the Programme Director and Information Officer, were abolished during the year, as planned. Table 3 gives the details together with the consultancy inputs.

The contracts of the two remaining APOs, Economist and Socioeconomist, were terminated as planned in May and October respectively.

The supporting staff has been reduced in pace with the reduction of work and departure of professional staff (Table 4). The administrative programme offices in Colombo and Dhaka were closed as planned. The remaining staff, less one driver who is due for retirement, will probably be needed in the next project of the third phase. They are therefore being retained till the end of April 1994.

About half the expenditure under 'contracts' refers to engagement of NGOs for shrimp fry nursery activities and to printing of manuals. Most of the other half was spent on preparation and printing of manuals on Extension and Fishing Technology.

The bulk of the expenditure under 'materials' was for the hatchery operations in Bangladesh.

Video equipment and fishing craft were the major items in the inventory sold during the year, resulting in a substantial negative expenditure.

Most of the training activities were carried out under Extension and Brackishwater Culture. Details are given in Table 5. The expenditure in Table 2a also includes cost of non-staff travel, for instance, in connection with the Advisory Committee Meeting.

Table 1

LIST OF BOBP PUBLICATIONS ISSUED IN 1993

Reports

- BOBP/REP/54 : *Developing and Introducing a Beachlanding Craft (on the east coast of India).*
- BOBP/REP/55 : *A Sri Lanka Credit Project to Provide Banking Services to Fisherfolk.*
- BOBP/REP/56 : *A Study on Dolphin Catches in Sri Lanka.*
- BOBP/REP/57 : *Introduction of New Outrigger Canoes in Indonesia.*
- BOBP/REP/58 : *Report of the Seventeenth Meeting of the Advisory Committee.*
- BOBP/REP/59 : *Development of Canoes in Sri Lanka.*
- BOBP/REP/60 : *Increasing Fisherfolk Incomes through Group Formation and Enterprise Development in Indonesia.*
- BOBP/REP/61 : *Small Offshore Fishing Boats in Sri Lanka.*
- BOBP/REP/63 : *Small-scale Oyster Culture on the West Coast of Peninsular Malaysia.*

Working papers

- BOBP/WP/84 : *Flyingfish Fishing on the Coromandel Coast.*
- BOBP/WP/86 : *Nursery Rearing of Tiger Shrimp Post-larvae in West Bengal, India.*
- BOBP/WP/87 : *Market Study of Tiger Shrimp Fry in West Bengal, India.*
- BOBP/WP/88 : *The Shrimp Fry By-catch in West Bengal, India.*
- BOBP/WP/89 : *Studies of Interactive Marine Fisheries of Bangladesh.*
- BOBP/WP/90 : *Socioeconomic Conditions of Estuarine Set Bagnet Fisherfolk in Bangladesh.*
- BOBP/WP/91 : *Further Exploratory Fishing for Large Pelagic Species in South Indian Waters.*

Manuals

- BOBP/MAG/6 : *A Manual on Rapid Appraisal Methods for Coastal Communities.*
- BOBP/MAG/9 : *Guidelines on Fisheries Extension in the Bay of Bengal Region.*
- BOBP/MAG/11 : *Our Shrimp Their Lives. Comic Book II (In (1) English, (2) Tamil).*
- BOBP/MAG/12 : *How to Build a Timber Outrigger Canoe (In (1) English, (2) Bahasa Indonesia).*
- BOBP/MAG/13 : *A Manual for Operating a Small-scale Recirculation Freshwater Prawn Hatchery (In (1) English, (2) Bangla).*

BOBP/MAG/14	:	<i>Building a Lifiable Propulsion System for Small Fishing Craft – The BOB Drive.</i>
BOBP/MAG/15	:	<i>Guidelines for Fisheries Extension in the Coastal Provinces of Thailand (In Thai).</i>
BOBP/MAG/16	:	<i>Safety Guide for Small Offshore Fishing Boats.</i>
BOBP/MAG/17	:	<i>Guidelines for Cleaner Fishery Harbours.</i>
BOBP/MAG/ 1 8	:	<i>A Guide to Oyster Culture in Malaysia (In (1) English, (2) Malay).</i>
BOBP/MAG/19	:	<i>Management of Fisherfolk Microenterprises – A manual for training of trainers.</i>
BOBP/MAG/20	:	<i>Life on Our Reefs – A colouring book (In English and Dhivehi).</i>

Table 2 a
GCP/RAS/118/MUL - BUDGET AND EXPENDITURE (IN US \$)

<i>Code</i>	<i>Object of Exp.</i>	<i>Total 1987-94</i>	<i>Expenditure 1987-92</i>	<i>Expenditure 1993</i>	<i>Budget 1994</i>
10	Personnel	5,356,751	4,579,246	577,505	200,000
20	Duty Travel	1,062,963	997,293	25,670	40,000
30	Contracts	1,042,360	869,565	112,795	60,000
40	Gen. Op. Exp.	454,896	429,264	10,632	15,000
50	Materials	632,553	572,623	49,930	10,000
60	Equipment	514,755	488,302	(53,547)	80,000
80	Training	741,931	605,321	76,182	60,428
	Subtotal	9,806,209	8,541,614	799,167	465,428
90	Servicing cost	1,274,624	1,110,227	103,892	60,505
	Grand Total	11,080,833	9,651,841	903,059	525,933

Table 2 b
GCP/RAS/117/MUL - DEPOSITS AND EXPENDITURE (IN US \$)

<i>Code</i>	<i>Object of Exp.</i>	<i>Deposits 1987-93</i>	<i>Expenditure 1987-92</i>	<i>Expenditure 1993</i>	<i>Budget 1994</i>
10	Personnel	450,953	333,473	57,480	60,000
20	Duty Travel	9,305	4,305	0	5,000
30	Contracts	49,771	0	24,771	25,000
40	Gen. Op. Exp.	18,543	4,570	8,018	5,955
50	Materials	18,078	199	7,879	10,000
	Subtotal	546,650	342,547	98,148	105,955
90	Servicing cost	27,332	17,127	4,907	5,298
	Grand Total	573,982	359,674	103,055	111,253

Table 3**PROFESSIONAL STAFF - 1993 (GCP/RAS/118/MUL & GCP/RAS/117/MUL)***INTERNATIONAL OFFICERS*

	<i>Post</i>	<i>Name Of incumbent (country)</i>	<i>Date of (month/year)</i>	
			<i>Arr.</i>	<i>Dep.</i>
1.	Programme Director	Engvall, L O . (Sweden)	01/87	(04/94)
2.	Aquaculturist	Angell, C (USA)	01/87	12/93
3.	Fishing Technologist	Pajot, G (France)	01/87	07/93
4.	Extension Adviser	Roy, R N (India)	01/88	10/93
5.	Socioeconomist (Ass. Prof. Officer)	Haglund Heelas, (Ms) A M (Sweden)	10/90	10/93
6.	Economist (Ass. Prof. Officer)	Hall, R (Sweden)	05/91	05/93

INTERNATIONAL CONSULTANTS

	<i>Post</i>	<i>Name Of incumbent (country)</i>	<i>w/m</i>
1.	Information **	Muthiah, S (India)	6.0
2.	Fisherfolk Radio Programme (MDV)	Pickstock, M (U.K.)	.5
3.	Extension	Haglund Heelas, (Ms) A M (Sweden)	1.5
4.	Resources Management	Joseph, B D L (Sri Lanka)	2.5

** Costs covered by GCP/RAS/117/MUL

Table 4

SUPPORTING STAFF 1993 - (GCP/RAS/118/MUL & GCP/RAS/117/MUL)

ADMINISTRATION (Madras)

Scurville, (Ms) S	Sr. Admin. Assistant
Rajagopal, K (till Apr.)	Admin. Assistant (Accounts)
Britto, (Ms) J (till Jun.)	Receptionist
Shanmugam, T P	Sr. Driver
Sivashanmugam, P M	Sr. Driver
Rajendran, S	Driver

INFORMATION SERVICE (Madras) * *

Joseph, (Ms) C (till Dec.)	Documentalist
Amalore, E	Artist/Draughtsman
Jayaraj, S (till Dec.)	Artist
David, (Ms) C	Secretary

SECRETARIAL SERVICE (Madras)

Ellis, (Ms) M	Secretary
Jayakumar, (Ms) E (till Jun.)	Secretary
Mahalingam, (Ms) V (till Jun.)	Secretary
Verghese, (Ms) C	Secretary/Receptionist

NATIONAL OFFICE (Dhaka)

Kashem, A (till Oct.)	Programme Officer
Ekram, (Ms) Z (till Dec.)	Secretary
Syed, Nural H I (till Apr.)	Typist
Kabir, A Q (till Dec.)	Driver
Miah, Md. Majnu (till Apr.)	Driver

NATIONAL OFFICE (Colombo)

Kelaart, (Ms) C (till Apr.)	Admin. Assistant
Premaratne, A D (till Apr.)	Driver

** Costs covered by GCP/RAS/117/MUL

Table 5
TRAINING ACTIVITIES 1993 (GCP/RAS/118/MUL)

S. No.	Title	Duration (Days)	Venue	No. of participants						
				BGD	IND	INS	MAL	MDV	SRL	THA
SEMINARS/CONSULTATIONS/WORKSHOPS										
1.	Workshop of <i>chandi</i> boat motorization — for staff of DOF, FRI, NGO and fisherfolk beneficiaries	2	Bhola, Bangladesh	60						
2.	Review, evaluation and future planning of activities — for women's group supervisors	2	Patuakhali, Bangladesh	14						
3.	Review of activities — for women's group supervisors	1	Patuakhali, Bangladesh	8						
4.	Review of earnings of extension activities — for NGO trainers	2	Patuakhali, Bangladesh							
5.	Review of impact of subproject on fisherfolk groups — for PFS and BOBP staff	1	Medan, Indonesia			10				
6.	Seminar on dolphin catches in Sri Lanka — for staff of MOV, NOOs, media, etc.	1	Colombo						56	
7.	Seminar on fisherfolk credit — for MFAR, DFAR and Bank officials	1	Colombo						94	
8.	Review of fisheries extension approaches in coastal provinces — for senior DOF officers	2	Cha-am, Thailand							40
TRAINING COURSES										
1.	Family planning — for women's group supervisors	2	Patuakhali, Bangladesh	10						
2.	Problem-solving — for women's group supervisors	1	Patuakhali, Bangladesh	10						
3.	Vaccination of poultry — for women's group supervisors	1	Patuakhali, Bangladesh	10						
4.	Leadership and management — for women's group members	3	Patuakhali, Bangladesh	45						
5.	Post study tour discussions — for women's group supervisors	1	Patuakhali, Bangladesh	10						
6.	Freshwater prawn hatchery design and operation — for private entrepreneurs	30	Potiya, Bangladesh	3						
7.	Freshwater prawn hatchery design and operation — for private entrepreneurs	10	Potiya, Bangladesh							
8.	Freshwater prawn hatchery design and operation — for private entrepreneurs	30	Potiya, Bangladesh		2					
9.	Freshwater prawn hatchery design and operation — for fishery officers	10	Potiya, Bangladesh		2					
10.	Cage nursery culture — for women fry catchers	6	India		20					
11.	Cage nursery culture — for women fry catchers	5	India		14					
12.	Fisherfolk radio programming — for MOFA, VOM and Atolls staff	14	Maldives					10		
STUDY TOURS										
1.	Exposure to NGO development activities — for women's group supervisors	10	Dhaka region	10						
2.	Community based resource management — for Maldivian officials from MOFA and Atolls Administration	3	Philippines					3		
3.	Giant clam culture for MOFA officer	30	Cairns, Australia					1		

Appendix F

BIOECONOMICS OF SMALL-SCALE FISHERIES (RAS/91/006)

ANNUAL REPORT – 1993

INTRODUCTION

This regional project came to an end in December 1993 after 2.75 years of operation (since May '91). The budget was US\$ 1 million.

The main objectives were (1) to introduce new methodologies for assessment of the bioeconomics and socioeconomics of selected fisheries, and (2) to improve the understanding of the concerned fisherfolk, in order to enable them to participate in the rational utilization of resources and in the establishment and implementation of management measures.

During the year, five case studies were completed in Indonesia, Malaysia, Maldives, Sri Lanka and Thailand. A study in Bangladesh, sponsored by BOBP's mother project, GCP/RAS/1 18/MUL, had been completed in early 1992. All the studies were presented in a regional workshop in Phuket, Thailand, in October 1993, and the results discussed.

The shrimp fisheries study in Malaysia and the small pelagics study in Sri Lanka were quite conclusive. They produced relatively precise quantitative information on the state and benefits of the fisheries and this will be of importance in any future consideration. The set bagnet study in Bangladesh also produced much valuable information but this will probably be of less direct use in management because of the complexity of the fisheries and the institutional framework that prevail. The FAD study in the Maldives and the artificial reef study in Thailand both resulted in quantitative indications of their usefulness, and, in the case of the FAD, of its economic justification as well. However, both studies were hampered by inadequate staff inputs. The shrimp fisheries study in Indonesia was also much affected by inadequate staff inputs and the results were inconclusive.

The member countries felt that, in almost all the countries, the methodologies applied for the case studies were suitable and had enabled them to successfully achieve the objectives. The shortcomings, responsible for incomplete results in a few cases, were attributed to reasons other than the methodologies. Member countries expressed their commitment in various degrees to continuing the use of the methodologies in other fisheries of the same kind or in the same types of fisheries in different areas, perhaps with some variation and improvement in the arrangements for data collection. It was pointed out that, in some cases, the socioeconomic information had not been sufficiently linked to the bioeconomic information in the analysis. There is a need to look at fisheries management from the perspective of managing people rather than managing fish. New methods and, hence, new information would be required for this perspective.

The main features of the case studies (subprojects) and the progress of work during 1993 are given below :

Subproject : General Services (RES/GEN)

Targets 1993

Regional seminar

Achievements

It was held in Phuket, Thailand, October 7-13, 1993. Participants from the member countries presented draft reports on respective biosocioeconomic case studies. In most cases, the objectives had been met and participants had become familiar with the survey methodologies, analyses and interpretation. Some of the case studies produced excellent results, while others suffered from inadequate quantitative and qualitative staff inputs for collection and analysis of data.

Terminal report

Drafted in accordance with the FAO/UNDP requirements. Learnings and results of the project were also summarized in two articles in *Bay of Bengal News* Nos. 50 and 52.

Unscheduled The Senior Fishery Biologist and three participants in the Bioeconomics project, from Bangladesh, Malaysia and Maldives, attended the Symposium on Socioeconomic Issues in Fisheries Management and the SCORRAD meeting on the theme 'Bioeconomic modelling', organized by IPFC.

Subproject : Biosocioeconomic Impact of Fish Aggregating Devices in the Maldives (RES/FAD/MDV)

OBJECTIVES To assess the impact of FADs on productivity in small-scale fishing for tuna and on the living conditions of fisherfolk. To study the economics of utilizing FADs.

STATUS 1992 Two FADS had been installed, south of Male Atoll in May 1992 and between Vaavu and Meemu Atolls in October 1992. Data collection was in progress near and away from the FADs. Prior to the installation, the state of fisheries in the areas of the FADs had been assessed by analysis of catch, effort and species composition and by a socioeconomic baseline survey on eight islands. The required staff inputs were not available and this resulted in only sporadic observations of the fisheries at and around the FADs, postponement of the seasonal socioeconomic surveys and delays in the processing and analysis of data.

Targets 1993

Regular observation of fishing and catches at and around the FAD sites.

Seasonal socioeconomic surveys.

Collection and computerization of catch, effort and biological data.

Analysis and reporting

Achievements

Observations were made, but frequency was insufficient. Hence behavioural interpretations were limited and effective distance between two FADs could not be determined.

One survey was undertaken, but the sample size had to be reduced due to lack of personnel and time to execute it as originally planned.

Collection of data became sporadic or abandoned after some months. Consequently, the comparable period for pre- and post-installation became only about three months in most islands surveyed. The computerization too suffered from lack of suitable personnel for data processing and analysis. The biological data were inadequate for computerized analysis.

Based on the available data, various analyses were carried out and a report was prepared and presented at the Regional Workshop in Phuket in October 1993.

Assessment

The project activities continued to suffer from the limitations observed in 1992. However, very interesting results and some quantification of the impact was obtained. The results clearly indicated the FAD's favourable effects on catch rates, size composition, species composition and gross earnings as well as on the costs of the fishing units through lower fuel consumption, leading to higher income to owners and the crew. Impact of the benefits on the life of the fisherfolk was premature to assess from the survey conducted so soon after the installation. However, fisherfolk accepted that there was an increase in income and that this was utilized to improve the facilities and comforts in their houses.

Subproject : Biosocioeconomics of the Fisheries for Small Pelagics in Sri Lanka (RES/SPL/SRL)

OBJECTIVES Bioeconomic assessment of the exploitation of small pelagics by various fisheries from the viewpoint of income distribution and likely socioeconomic effects of different management regimes. In-service training/education of subproject staff and fisherfolk in the various aspects involved.

STATUS 1992

Observations of a one-year cycle of the fisheries were completed in November 1992, but the data-collection was extended into the early part of 1993 to cover a second peak season. The socioeconomic baseline survey, having been delayed, was combined with the first seasonal survey. The second and final seasonal survey was postponed to 1993. Several sporadic discussions prompted by fishermen were held, particularly consequent to the decision of the Ministry of Fisheries to ban purse seining for small pelagics. Computerization of data and analysis were in progress, with considerable delays in the case of socioeconomics.

Targets 1993

Achievements

Bioeconomic data collection.

Completed satisfactorily. It was significant that purse seining was absent in all strata except one, during the second peak season. This was due to the ban.

Second seasonal socioeconomic survey.

It was carried out mainly by the bioeconomics group, as they were better organized for this than the socioeconomics group.

Analysis

Due to delays in computerization, a considerable amount of data-entering and socioeconomic analysis was subcontracted. The analysis had to be done in a hurry and this did not permit the maximum extraction of information. But essential features became available.

Reporting

Consequent to the hasty analysis, the reporting also had shortcomings. However, the report was improved to some degree after the regional workshop in Phuket, where the draft report was presented.

Assessment

This is a good example of a case study with a biosocioeconomic approach. The results and outputs could have been even better if timely inputs and sufficient time for analysis, interpretation and reporting had been provided by the national institutions involved. The results indicated no serious damage to resources by the purse seine fishery. The interaction with other fisheries is negligible, as different fisheries seem to target entirely different small pelagic species. The conflict seems to be sociological. None of the fisherfolk studied seemed to be below the poverty line. There appears to be scope for expansion of the fisheries for small pelagics. The study analyzed the pros and cons of different scenarios with regard to various types of fishing gear.

Subproject : Biosocioeconomics of Small-scale Fisheries in an Artificial Reef Area in Thailand (RES/A R T/THA)

OBJECTIVES

1. Bioeconomic and socioeconomic assessment of the effects of artificial reefs. 2. Identification and demonstration of fishing methods suitable for small-scale fisheries near artificial reefs. 3. Strengthening the capabilities of national staff in conducting such assessments.

STATUS 1992

Surveys of three artificial reefs (AR) were initiated in 1992. Periodic observations, in February and November, indicated the reef's effect on sedimentation and the water mass. Visual underwater observations of the animal community and the growth of organisms were undertaken during the same periods. Only the southernmost reef could be studied because of the poor visibility at the other two sites. Observations during the summer months were not possible at all due to turbulent sea conditions. A socioeconomic baseline survey was carried out in six villages. There were indications of a migration of fisherfolk from the north to the southernmost AR to continue year-round squid trap fishing. The collection of catch,

effort and biological data didn't start until the second half of the year and was, thereafter, done only sporadically. There was a need for better coordination between the bioeconomics and socioeconomic work components. Some experimental fishing with bottom longline, trammelnet and whiting gillnet was carried out without any conclusive results.

Targets 1993

Bioeconomic and socioeconomic data-collection.

Periodic observation of the environmental conditions.

Visual underwater observations.

Underwater video of the artificial reefs.

Laboratory analysis of chemical/biological samples.

Analysis of collected data and information.

Reporting.

Achievements

All data-collection continued till May 1993, but with significant interruptions.

One more field trip was achieved, but the season was similar to the earlier coverage. Summer season coverage could not be achieved because of the sea conditions.

Same achievement as for the environmental studies. The turbidity of the water prevented investigations during the summer season.

Not carried out. Only some still photographs were taken.

Oceanographic samples and biological samples of organisms colonizing the artificial reef and associated with them were identified and analyzed.

Completed by the respective institutions and personnel assigned to each discipline.

The results and conclusions from each discipline studied were reported in separate sections. Synthesis of these results were presented only as a summary report.

Assessment

Activities continued to suffer from insufficient input by the bioeconomics group. Analysis of secondary data on resources and catch statistics for the period prior to the establishment of ARs was not undertaken. The data from trawl surveys systematically conducted at AR sites since 1988 also had been ill-designed for comparison of annual trends. The socioeconomic component was handled relatively well and contributed to better assessment of impact and effects on trawlers and some quantification of income changes. Fishing gear testing was not successful and was, perhaps, prematurely executed. The report on the findings by various disciplines and overall assessment was presented at the regional workshop in Phuket. Some fisheries, such as squid trap, whiting gillnet and trammelnet have increased significantly and the income is noticeably higher after the establishment of ARs. Location of some ARs and the system of installation require further attention. Migration of fishermen to areas close to the southernmost and most productive AR was noted. Though aggregation of resources are evident, enhancement of resources is not very significantly noticeable except for the settlement of some edible oysters on the hard surfaces. Trawling seems to have been reduced.

Subproject : Biosocioeconomics of a Shrimp Fishery in Malaysia (RES/SHR/MAL)

OBJECTIVES

To assess the bioeconomics of the fisheries exploiting the shrimp resources in the Larut District (Perak state) and to improve the capabilities of the national staff through on- the-job training in the methodologies introduced.

STATUS 1992

The collection of data on four shrimp fisheries, including information on biological characteristics, was in progress since the second quarter of 1992. The sampling programme was based on a preliminary survey of the fisheries, i.e. trawl, trammelnet, set bagnet and pushnet. The

socioeconomic aspects were covered by a frame survey and a baseline survey combined with a seasonal survey of income activities. The computerization and analysis of data was up-to-date. The progress of work was very satisfactory thanks to timely and efficient inputs from all national staff and good coordination between them.

Targets 1993

Completion of bioeconomic data collection.

Socioeconomic survey to be completed.

Compilation of supplementary data on fisheries and fisherfolk in the study area.

Analysis and reporting.

Achievements

Completed by May 1993.

Seasonal coverages of the households were completed by May.

Not carried out due to difficulties in accessing such data and nonavailability of personnel.

Completed in time to draft the report. The biologist and economist responsible for reporting worked jointly to produce the report, which was presented at the regional workshop held in Phuket.

Assessment

This was another of the good case studies and contained interesting and valuable results. However, due to insufficient time and personnel, the data on processing plants could not be analyzed to attempt analysis through the BEAM-IV package. The endeavour of the scientists, during the final stages of analysis and reporting, contributed significantly to the satisfactory report prepared.

No serious problems with shrimp resources were evident and the fisheries appeared to be in a reasonably stable status. No drastic management steps were considered necessary, but some increase in the production of shrimp and better use of by-catch from all shrimp fisheries were recommended. The pushnet, which has been banned, does not exhibit very serious damaging effects, but should be kept under control and monitored carefully.

Subproject : Bioeconomics of Shrimp Fisheries on the East Coast of North Sumatra, Indonesia (RES/SHR /INS)

OBJECTIVES

Assessment of bioeconomics and socioeconomics of the fisheries exploiting shrimp in a specified area, consideration of a preliminary management plan for shrimp fisheries and identification of fishing method(s) that may provide optimum economic and social benefits from shrimp resources. In the process, the fisheries officers and fisherfolk are expected to acquire a better understanding of the various aspects.

STATUS 1992

Based on a frame survey undertaken in 1991, seven samplers were trained and deployed at these locations in 1992 to cover five stations selected for sampling of the catches and to assist in the socioeconomic survey. The sampling was in progress from the second quarter. A socioeconomic baseline survey was attempted, but the results were not satisfactory due to several shortcomings. Instead, a new baseline survey, combined with a seasonal survey of income activities other than shrimp fisheries, was initiated towards the end of the year. All surveys, data collection, computerization and analysis were hampered by lack of suitably qualified personnel for the work.

Targets 1993

Continuation of bioeconomic sampling and computerization of data.

Socioeconomic baseline and seasonal surveys of incomes.

Compilation of data on shrimp fisheries outside the areas studied in the Langkat District.

Analysis

Reporting

Achievements

Sampling continued, but due to lack of skill, separation of species and sampling of length-frequencies suffered. The biologist left the project due to ill-health and the sampling continued under the supervision of one of the samplers.

Computerization was entrusted to the Census and Statistics Department in Medan.

Repetition of the baseline study was combined with a seasonal survey, the only one due to lack of time. The work was entrusted to field officers in the District Fisheries Office. Many of the questions had to be deleted from the questionnaires because of the short period within which the survey had to be carried out.

Information was compiled from the records in the District Fisheries Office only. It concerned shrimp fishing units using some gear-craft combinations but pertained to villages other than those sampled.

Suffered considerable delay due to lack of qualified personnel in Medan for the work. Assistance was provided by a biologist and socioeconomist from DGF, Jakarta, but the analysis could not be completed in time for the regional workshop.

A draft report was prepared by the two DGF staff and presented at the workshop. Subsequently, the Senior Fishery Biologist visited Jakarta to demonstrate the use of methodologies to complete the analysis. A revised report was prepared, but in view of the poor data base, the results are considered to be very preliminary in nature.

Assessment

The results of this case study suffered from severe deficiencies in input of suitably qualified national staff for sampling, analysis and general supervision. The data were poor and details insufficient, particularly for proper bioeconomic assessment. Species separation and inclusion of some of the commercially important penaeid species could not be achieved. Consequently, comparison of the situation with that on the other side of the Malacca Straits (the Malaysian case study on shrimps which included the trawl fishery) could not be made.

PROJECT INPUTS

The project budget of US \$ 1,014,554 has been utilized as shown in the table below :

<i>RAS/91/006 - Budget and Expenditure 1991-1993 (US \$)</i>					
<i>Line</i>	<i>Object of Exp.</i>	<i>Total 1991-93</i>	<i>Exp. 1991-92</i>	<i>Exp. 1993</i>	<i>Balance</i>
10	Personnel	486,146	304,642	181,504	
15	Duty travel	65,307	53,576	11,731	
20	Subcontracts	49,654	24,391	25,263	
30	Training	108,999	49,662	59,337	
40	Equipment	62,227	57,634	4,593	
50	Misc. Exp.	147,350	42,366	104,984	
	TOTAL	1,014,554	532,271	387,412	94,871

The figures for 1993 do not all reflect the actual expenditures because of misrepresentation in the FAO-HQ accounts. The actual cost of 'duty travel', for instance, is of the order \$ 50,000, while actual 'misc. exp' amount to only \$ 20,000. The cost of Project Manager (about \$ 25,000) has not yet been charged. In addition, about US \$ 30,000 of the balance is required for printing and distribution of technical reports on the case studies. There are also some unpaid commitments of about \$ 8,000. These charges will, therefore, reduce the balance to about \$ 32,000.

The project personnel during the year were (in work months) :

		1993	Total
Project Manager	Engvall, L O (Sweden)	2	5
Fishery Biologist	Sivasubramaniam, K (Sri Lanka)	12	32
Socioeconomist	Thompson, K T (India)	09	21
Secretary	Gordon, P (India)	12	32

The socioeconomist completed his assignment by September 1993 as planned. Specialized consultancy services of bioeconomist, socioeconomists and extension adviser were utilized during the workshop on biosocioeconomics, held in Phuket, Thailand, October 7-13, 1993.

Expenditures under 'subcontracts' were mainly for computerization and analysis of socioeconomic and bioeconomic data as well as for skilled personnel to support field work.

During 1993, most of the 'training' was in-service on analytical procedures, interpretation of results and reporting.

No 'equipment' was purchased during the year, except for materials for preparation of reports, such as stationery, photographs etc.

Appendix G

IMPROVEMENT OF THE PORT ENVIRONMENT AT PHUKET FISHERY HARBOUR

PROJECT REPORT

INTRODUCTION

The project to improve the port environment at Phuket Fishery Harbour commenced in October 1992. The primary objective was to upgrade reception facilities for garbage and oily waste at the FMO (Fish Market Organization) port. The secondary objective was to initiate an awareness campaign to promote a cleaner harbour environment and community participation to achieve it. Before the year end (1992), five participants from the FMO port and the private sector undertook a study tour of fishery harbours in Malaysia (Penang and Kuala Kedah) and the Port of Singapore to observe first hand how neighbouring countries addressed problems of fishery harbour pollution. The other inputs, as per the project document, were completed during 1993. A full report documenting project inputs, approach and activities is being issued in the BOBP Working Paper series (BOBP/WP/93). Features of the project and the enthusiastic response to it were highlighted in an article in Bay of Bengal News No. 5 1.

Progress of work

A working committee, comprising of officials from The Phuket Marine Biological Centre, FMO and the private sector, was formed to steer the project and review progress from time to time to ensure implementation of the following project inputs :

Reception facilities for garbage : The working group negotiated with the Rasda Subdistrict Authority (RSA) to collect the accumulated garbage and arranged for collection every two days. The RSA agreed to provide its own garbage trucks for this purpose.

Garbage bins made from old truck tyres, as used by the Phuket municipality, were considered the most appropriate for use in the harbour complex and a hundred were purchased and deployed at suitable locations in the FMO port, private jetties and attached residential areas. In addition, the working committee felt it worthwhile to promote the idea of separating garbage into wet waste and recyclable solid waste, such as glass and plastics. To this end, larger bins in sets of three, each marked for the type of waste, were also deployed at twenty locations. Sea gypsies (local islanders) in the vicinity of the fishery harbour were permitted to collect floating garbage from the harbour waters.

Reception and disposal of oily waste : Oil pollution of harbour waters is mainly caused by boats dumping in it used lubricating oil and discharging into it their oily bilge water. A mobile tanker with a pumping arrangement, to collect bilge water from boats moored in the harbour, and a fixed reception tank to permit oil-water separation were the main inputs to address this problem. Voluntary acceptance of quayside regulations prohibiting discharge of oily wastes was also encouraged. The working committee was skeptical of the practicability of bilge water collection, in view of the vast expanse of the harbour complex and the hesitation of boat-owners to use the equipment. It was argued that education to prevent pumping of oily bilge and used lubricating oil into harbour waters would be more useful. Nevertheless, it was decided to purchase a 1 Kl mobile tanker, with a vacuum pump and hoses, to serve the FMO jetty for demonstration. Two fixed reception tanks (repaired fuel tanks) were donated by private fishermen. If the system proves to be practical, a larger mobile tanker and fixed reception tanks would be included in the port improvement project planned by the DOF. Purchase of a portable oil skimmer was deferred.

Awareness campaign : It was recognized right at the beginning that creating awareness among harbour-users, to mitigate harbour pollution, and mobilization of community-action to take control over 'their' problem, were the key elements that would be needed to achieve a cleaner fishery harbour.

Two designs each of posters and stickers with messages designed to minimize oil and garbage pollution were printed. The posters were displayed at appropriate locations and the stickers distributed to boats. In addition, signboards have been put up and information leaflets distributed.

Community participation was sought through interpersonal communication, cooperation from the Phuket Fishermen's Association, village leaders and a local school. Though seasonal rains dampened some of the proposed activities during the timeframe of the project, group activities are scheduled beyond it.

A guideline booklet, on the various typical pollutants in fishery harbours and methods to mitigate pollution, has been produced for distribution in the Bay of Bengal region and elsewhere.

A video recording of the Phuket fishery harbour complex, the state of pollution, project inputs from time to time and interviews with various users is being edited and voiced in Thai, for use in other fishery harbours in Thailand.

Water and fish quality tests : Water quality tests conducted by the PMBC show that concentrations of faecal coliform bacteria are above acceptable levels. Testing of fish, squid and shrimp from the boats and after reaching the market revealed that while *E. coli* loading was absent in landed squid and shrimp, they were contaminated after handling, sometimes beyond acceptable limits.

Assessment

The scale and scope of the project limited most of the inputs to the government-controlled FMO port. Addressing the needs of the entire fishery harbour complex, which includes large residential areas, would need an integrated project to address various other environmental aspects. The project has, however, been successful in achieving the following :

- Cooperation between the FMO port and the RASDA subdistrict administration for garbage collection and disposal.
- Cooperation between the FMO port, important boat-owners and fish traders to collectively address matters relating to harbour pollution and prevent dumping of oily wastes into harbour waters.
- Cooperation between the FMO port, village leaders and the local school in mustering voluntary help from the community.
- The creation of awareness among FMO administrators to accord high priority to mitigating harbour pollution and to increasing their annual budget to cover costs of collection/disposal of solid and liquid wastes within the harbour complex.
- A DOF proposal for a comprehensive project to improve the fishery harbour complex, including provision of sewage treatment, freshwater supply and access roads.
- Plans to replicate the project at other FMO ports in Thailand.

Appendix H

POST-HARVEST FISHERIES PROJECT (ODA)

Annual Report 1993

INTRODUCTION

The Post-harvest Fisheries project, although separately funded by the Overseas Development Administration of the United Kingdom (ODA) and managed through the Natural Resources Institute (NRI), is an integral part of the Bay of Bengal Programme (BOBP). The project commenced in August 1987 and from September 1989 until April 1992 was in its second phase. The proposal for a five-year third phase was approved by the ODA early in 1993 and, with the approval of the respective host governments, the third phase commenced in April 1993. From May 1992 to March 1993, activities were continued on an interim basis.

Three BOBP member countries participate in this project: Bangladesh, India and Sri Lanka. The principal objectives of the project are :

- To enhance the incomes of artisanal fishing communities and petty fish traders in India, Bangladesh and Sri Lanka;
- To identify and develop the potential for increasing the diversity of fish products marketed by these communities; and
- To strengthen the ability of NGOs and fisherfolk associations to replicate and secure sustainable benefits from project activities.

SUMMARY OF MAIN ACTIVITIES

INDIA

Activities have focused upon four main areas comprising of six subprojects. The **anchovy drying and marketing** has continued to consolidate upon the activities undertaken during Phase Two, namely upgrading the traditional drying and marketing of anchovy in South India in order to optimize incomes.

At the beginning of Phase Three, a Memorandum of Understanding (MOU) was signed with the Kanniyakumari District Fishermen's Sanghams Federation (KDFSf). This covered several areas of fish marketing development in order to develop a commercial, community-level project that would be coordinated and managed initially through the KDFSf members. The project has also assisted the Federation in the renovation of its godown and related facilities in Mel Manakudy village, where the anchovy is to be processed (women's flake-making) and stored. This facility will eventually double up as a community training centre.

Eightynine drying racks have now been constructed and production units operated by the fishermen set up in three villages. 14.5 tonnes of dried anchovies were produced during the 1993 season. Production of anchovy flakes is now being carried out by women on a household basis, as opposed to centralised production centres previously envisaged. This has generated considerable employment for this marginalised sector of the community. Fisherwomen are also being employed in sorting anchovies into different categories and species.

Previous market trials had indicated that the domestic and export market potential for the value-added products ('flakes' and whole rack-dried anchovy) was good. However, it has been difficult to establish a market niche for the product and secure firm orders. This can only be achieved through rigorous and active promotion of the product. The project has played a very pro-active role in marketing and improving the brand of the product and will need to continue its support over several seasons until the project becomes well established.

An appropriate accounting system, easily operated by a small commercial enterprise, has been implemented. The project has continued to fund a Marketing Adviser post and four extension officers at KDFSf.

A potential new subproject was initiated when market studies indicated that traditional 'Maldivian' (*masmeen*) fish is in considerable demand in South India and Sri Lanka. In the latter, traditional processing has declined drastically in the face of increasing demand from the more lucrative market for fresh **tuna**. Tuna is recognized as a large underutilized resource in certain parts of India and adding value through village-based processing is seen as an appropriate development objective, provided the social and economic benefits are positive.

However, the activity planned for Tamil Nadu, was dropped due to the high prices being paid for tuna by traders from Kerala. Studies on tuna landings and the existing marketing pattern in Andhra Pradesh indicated an alternative site for locating and developing this activity in Kakinada. Data-collection on tuna landings and prices have been operational for six months and a MOU was signed at the start of Phase Three with a local NGO ('VJNNS') which has now established rapport with the community involved. Discussions have been held with the local field officer and a needs assessment survey, to determine the feasibility of undertaking this project, will be conducted immediately the tuna season starts in late 1993/94.

In the use of ice a new initiative has been undertaken, aimed at designing a simple ice box for shrimp caught by the large numbers of *kattumarum* fishermen. It was started in association with the Tamil Nadu Department of Fisheries (DOF) by holding a needs assessment workshop with a fishermen group from a village in South Arcot. An MOU has been drawn up with the Fisheries College, Tamil Nadu Veterinary and Animal Sciences University, to carry out the design work in full participation with the fishermen (learning from a similar experience with the cycle vendors' box in Sri Lanka).

The project has also assisted the Tamil Nadu DOF officials in the implementation of government schemes to supply insulated boxes to fishermen by facilitating inputs from various agencies. Workshops have been organized to disseminate results of trials to government officials and fishermen groups.

Fish marketing activities have continued to focus attention on the problems and needs of itinerant women fish vendors. A series of needs assessment workshops were carried out in various villages at the end of 1992. These indicated that an integrated approach would help address some of the problems and needs of these vulnerable groups and help them to develop socially and economically. The activities require the NGOs to become more involved at the village level in order that interventions could be effectively implemented.

Based on proposals received from the following NGOs, a series of activities were identified and agreements signed to implement them :

- * Rural Organization for Social Work (ROSA), Tranquebar;
- * Coastal Poor Development Action Network (COPDANET), Madras;
- * Shantidan, Kanniyakumari District, Tamil Nadu; and
- * Visakha JillaNava Nirmana Samiti (VJNNS) in Andhra Pradesh.

This pilot initiative is seen as being a cost-effective method of delivering support directly to grassroots organizations whose mandates are to provide assistance to women's groups.

A feasibility study on introducing a hired transport van at Inayam, Kanniyakumari District, and purchase of tricycles to facilitate easy access to markets by women's groups has been completed by an NRI Consultant. Currently, the four NGOs, with the active support of the project, are involved in identifying and accessing formal sources of credit, setting up suitable credit schemes with the support of local financial institutions and ensuring that these sources are aware of the unique credit needs and conditions of the fisherwomen.

A new data base has been established at project HQ in Madras and it is collating and reporting on prices of fish and fish products at key landings and at wholesale and retail points throughout South India. It was envisaged that this data would serve as a useful information service to the sector in general. Various funding strategies for this project have been considered and outside agencies such as MPEDA have been approached. However, though official bodies and local organizations have expressed enthusiasm for a fish marketing database and in using the outputs, no organization has indicated any willingness to take on the responsibility for data-collection, collation and dissemination. Currently, the data is proving to be a very useful management tool in project planning and monitoring, but the collection of data will need to be reviewed in the absence of any formal declaration of support from either the government or private sector.

A qualitative study was completed amongst several women's groups to ascertain the perceived attributes of the fish marketing container; it was believed this would help focus on any promotion effort. The study revealed good acceptance of the vessel, but its stated benefits related mainly to improved social status, official recognition and ability to access state funds, not on the user's ability to get fish to market through increasing admittance to buses going to market.

The project has continued to support the promotion effort by the Tamil Nadu DOF and to coordinate the activities between the DOF and the State Social Welfare Board (SSWB) in providing aluminium fish containers for fisherwomen members of cooperative societies (FWCS). Approximately 3,600 containers have been provided with financial assistance from the SSWB. In addition, 326 containers have been distributed at full cost among NGOs and 100 to members of the FWCS.

The training programme has built upon the experience of a workshop on Project Planning and Management conducted during Phase Two. This called for greater emphasis to address the specific needs of NGOs in Tamil Nadu, Andhra Pradesh, Orissa and West Bengal in order to strengthen their ability and to take up initiatives in post-harvest fisheries. Therefore, a two-year higher level training programme aimed at NGOs, official development agencies (such as banks and state DOFs) and fisherfolk has been proposed for the third phase. This focuses on planning and management issues such as project appraisal, cost benefit analysis and financing, at each respective 'needs level'. An intergral part of this programme is training in Participatory Rural Appraisal (PRA) techniques to be taught through a series of PRA workshops.

A series of one-day rural workshops are to be conducted in fishing villages. These are specifically for target groups from fishing communities and, are aimed at raising skills in handling the fish and in increasing the awareness of post-harvest issues, such as improved handling, processing and hygiene aspects. In a manner similar to that being developed in Bangladesh under the workshop training and income-generation programme, the project in India ultimately aims to identify strategies for improving incomes and living conditions in fishing communities.

Three training workshops have been successfully completed. The first was a PRA workshop held in the village of Alikuppam near Madras. A project planning and management course was held at Mangalore College of Fisheries from 16-27 November, with 12 participants from six NGOs. This workshop was unique in that it brought together resources from three ODA-funded post-harvest fisheries projects in India (the Central Institute of Fisheries Technology, the College of Fisheries, Mangalore and the ODA Post-harvest Fisheries project). The third workshop was held at CIFT on 'Quality Control and Handling of Fish'. This was principally targeted at members of the Kanniyakumari District Fishermen's Sangam Federation and was held in December.

Two more workshops, for target NGOs with whom ODA is currently working, will be conducted at the regional level, in the first quarter of 1994.

The British Council Division (BCD), Madras, has been contracted to administer much of this programme. Among the several benefits envisaged from this arrangement would be better value for money from the collaborating institutions (Mangalore College and CIFT), owing to their close connections with the BCD in the ODA Technical Cooperation programme, and the release of ODA consultancy staff from routine organizational activities, with increased time to contribute to the training and to carry out overall evaluation of the inputs.

BANGLADESH

The project's activities have concentrated upon supporting NGO's working with coastal fishing communities and in understanding the specific problems of set bagnet communities.

Under the control of insect infestation of dried fish, a short visit to Chittagong University was made by an NRI specialist to discuss the scope for initiating activities centred on replacement of DDT and other noxious compounds with safe alternatives. However, until the Government of Bangladesh is prepared to take action to enforce the ban on usage of DDT, any further work on safer alternatives would only be of academic value and, as a result, the project has not pursued the matter. This appears to be in line with ODA's wish to place priority on other issues.

A 14-month series of training workshops and follow-up meetings are being conducted to train selected NGOs and build up their capacity for promoting and supporting sustainable income enhancement in small-scale fishing communities. These activities are being implemented through fisheries' NGOs with a proven track record of community development over the last few years. The workshops and follow-ups aim to encourage the field staff of the NGOs in understanding, defining and prioritizing social and economic problems and needs in communities. The staff are being encouraged to formulate within their respective communities cost-effective strategies for income-generation activities using participatory techniques and, in the context of the training given, to present these in a format which will be acceptable for financing by an outside agency. The project is in the process of trying to identify possible financing sources to provide credit for some of the more promising proposals.

The first of these workshops is to be held at the headquarters of the Community Development Centre (CODEC), Chittagong, during the second week of May and will continue until late June 1994. Representatives of nine NGOs are expected to attend.

Set bagnet fishery activities have focused on the specific problems of set bagnet communities, as current feeling within government circles is that legislation against the use of certain types of bagnet (which are widely regarded as destructive and responsible for diminishing returns from several related fisheries) is likely to be introduced. These communities are, however, already extremely poor, marginalized, disenfranchised and vulnerable to change; no alternative strategies for livelihoods have been offered by any agency. Support has been limited to social (e.g. health care and nonformal education) activities through the concerned NGOs, which, although being extremely beneficial, does not tackle the root cause of growing poverty.

Therefore, a 14-month social and economic study of three of these communities — Delipara, a hamlet on the shores of North Selimpur village, Chittagong, Rakhainpara, a hamlet near Cox's Bazar, and Rahmatbazar a hamlet on the southeast coast of Hatiya island — has been planned with support from NRI's Social Science Group. A national socioeconomist has been recruited to carry out the work under NRI's supervision. The activities under this subproject are intended to assist development agencies in identifying, planning and delivering appropriate assistance (including income-generation schemes) to these communities.

SRI LANKA

The project's activities have centred on an appraisal of the problems of small-scale itinerant fish traders, who play an important role in fish marketing throughout the island, and on improving the quality of fish available for human consumption.

The work on the subproject **histamine in pelagic fish** was carried out through a short-term NRI input in a collaborative exercise with the National Aquatic Resources Agency (NARA), Colombo, and the Institute of Fundamental Studies (IFS), Kandy. It was already established that a 'problem' with histamine exists in popular species of pelagic fish, such as skipjack and yellowfin. How far this problem affects consumption patterns, or is of public health concern, is as yet uncertain due to the current lack of knowledge on both the toxicology of histamine after its consumption in fish and the epidemiology of scombrototoxicosis. The occurrence of histamine is, nevertheless, a good indicator of spoilage found in locally popular pelagic fish species, especially tunas, and a summary report of this data will be issued shortly by NRI.

As a result of this work and discussions with the two organizations, a joint research study is being considered to investigate the connection between scombrototoxicosis and histamine. This would possibly attract ODA research funding in collaboration with other UK institutes involved in this type of work. Although it falls outside the scope of the Post-harvest Fisheries project, the office could act in a local capacity, if required.

Activities with the cycle vendors was reviewed by the collaborating NGO, Innovations and Development Networks (IREN), Colombo, along with NRI. This led to recommendations on modifying the subproject to address better the original research needs, as much of the data of potential use to the project was ignored in favour of percentages and statistical significance. Efforts are now being made through IREN to redress this situation. IREN staff attended the PRA workshop held in India at the end of June and have been encouraged to put these methods into practical use in their work.

Significant outputs of the project's activities have been the participatory development of the insulated cycle carrier box, which meets the technical needs of the traders, and the formation of a fish marketing traders association that has received official recognition from the Ministry of Fisheries.

Focus group discussion sessions with consumers from several social and economic backgrounds were commissioned through the Lanka Market Research Bureau (LMRB). The objective of this research was to identify key factors affecting fish consumption, including consumers' perceptions of the role of petty traders in the overall market. This part of the study, now completed and reported upon, clearly demonstrates the importance of the target group (cycle vendors) in providing a dependable supply of fish to a wide range of consumers, especially in the low to middle income bracket. It also highlights the astuteness of the consumers' perception of quality, previously not considered to be of overriding importance in the country. The reaction of all groups to the trader box concept was very positive and the general feeling was that consumers would be prepared to pay more for quality. This increases the potential of the traders' ability to cover the investment cost of the box.

Internal Monitoring System (IMS)

The assessment of project impact carried out at the end of 1991 by Integrated Marine Management Limited highlighted the need to improve planning and monitoring of subprojects in order to improve the focus on the means of achieving measurable impact.

To meet this requirement, a consultant was recruited to organize and implement a system of internal monitoring to be established in Madras, the role of which was to advise project management in the appraisal, monitoring and evaluation of activities. Emphasis is placed on identifying practical means of verifying impact of project inputs, as well as assessing progress against set targets. The inputs from this system will become increasingly useful throughout the third phase of the project. The IMS has been involved in conducting studies in the following areas :

Training programme : A total of three training courses were conducted during this period and these were evaluated in terms of the participants' perception of the course (usefulness and confidence gained in implementing new skills acquired) and level of participation in the course using 'participant observation' techniques, questionnaires and in-depth interviews.

Improved Utilization of Anchovy : Monitoring was conducted using a repeat series of surveys. The data collected related to quantities landed and dried on racks, and prices and problems faced by the target group. On the basis of these reports, a perspective plan for the current season (July - December 1994) has been drawn up.

Ice boxes : A social and economic feasibility study of ice boxes for *kattumarams* is underway, using a census of the study area to collect physical data of the craft, gear and market access. Later, a target and control group will be monitored for a period of two months.

Further details of the subproject and related activities follow :

REGIONAL

Subproject : Overview Study (REG 1)

OBJECTIVES	To provide a planning framework for development interventions within the post-harvest fisheries sector and to raise the profile of post-harvest issues in the Bay of Bengal region.
STATUS 1992	Not operational.
<i>Targets 1993</i>	<i>Achievements</i>
Conduct post-harvest fisheries overview in Sri Lanka .	Study completed by IMM Limited and a study methodology developed. This will be further researched during the visit to India in early 1994, so that it can be adopted and implemented subsequently in Bangladesh.

Assessment

The overview provides an initial baseline of information concerning activities, institutions and constraints facing post-harvest fishery aspects. It is the first stage of an on-going process of understanding the sector which the activities of the project will contribute to and develop over the duration of the project.

Targets 1994

IMM Ltd to conduct and carry out studies in four states of India, namely, Tamil Nadu, Andhra Pradesh, Orissa and West Bengal.

National consultants to be identified in Bangladesh to carry out a similar study there.

Future

As more information is collated, the overviews will provide a concise and detailed document that should be widely disseminated to policy-makers, governmental and nongovernmental organizations, and private sector and international agencies to inform them of the problems and prospects within the post-harvest fisheries sector.

Subproject : Training and Support to NGOs (REG 2)

OBJECTIVES	To strengthen the effectiveness of NGOs and intermediary development institutions in supporting the development of target groups. To increase revenue of fishing communities through increasing their skills in and awareness of post-harvest fishing aspects and by getting them to take up alternative income-generation schemes.
STATUS 1992	Not operational

Targets 1993

Achievements

Staff of NGOs trained in project planning, management skills and fish-handling, processing and marketing.

Three workshops completed: one in project planning and management at Mangalore, one on fish quality control at Cochin and one PRA in Madras.

Target groups in fishing communities trained in basic fish-handling, processing and marketing.

A series of one-day rural training courses have been undertaken in Tamil Nadu.

Assessment

The training activities have been developed as a result of dialogues with the participating organization and fishing communities. In these early stages, there is still room for improvement in meeting the needs of the target groups. This is being achieved by evaluating the inputs of the courses and revising them accordingly.

Targets 1994

Review the current training programme in cooperation with target groups and partner NGO and assess the future needs of the fishing communities and NGOs in the medium- and long-term.

Future

The project aims to identify strategies for improving incomes and living conditions in fishing communities in India and to draw upon these experiences in Sri Lanka and Bangladesh.

INDIA

Subproject : Anchovy Drying and Marketing (IND 3A)

OBJECTIVES To assess the market potential for expanding the utilization of anchovies by identifying novel marketing strategies which would enhance their value both as fresh or processed fish, *i.e.* as value-added products.

STATUS 1992 Economic feasibility study for the anchovy-drying project completed. Drying racks constructed in three villages and production of 1.5 tonnes of high-quality product used in a trial marketing programme. Marketing Adviser to KDFSFS and four extension officers, funded by the project, have assisted the development and implementation of the anchovy-drying subproject.

Market research into consumer attitudes to dry fish and anchovy consumption commissioned with MARG.

Targets 1993

Maintain strong support to KDFSFS through provision of technical, economic and institutional advice, training and manpower inputs.

Achievements

A consultant economist provided advice on developing and implementing commercial production of rack-dried and value-added anchovies.

Local chartered accountant implemented an appropriate accounting system for the subproject.

KDFSFS staff attended training course in Cochin on fish quality control.

Increase pilot production towards fully commercial levels.

Production of 14.5 tonnes of dried anchovy achieved in 1993 season.

Continue with market promotion of anchovy products at home and overseas.

Promotion of product in the domestic market through advertisements and improved branding of the product. Attendance at the Bangalore Food Festival to promote the product.

Assessment

This is a very participatory project, involving village-level communities. The capabilities of the fisherfolk have developed to meet the demands of producing a high-quality product to suit the requirements of potential markets. The development benefits are high and involve employment of women, increased revenue to the fish processors and a raised awareness of post-harvest skills related to production and processing. The major constraint to the future success of the project is obtaining sufficient working capital necessary to procure anchovies at the beginning of the next season, which starts in July 1994.

Targets 1994

Business market and development plan to be prepared to support requests for funds to operate ADP on a commercial basis.

Establishment of improved anchovy-drying methodology and supporting marketing infrastructure in the subregion.

Gradual withdrawal of direct support to KDFSF as subproject development objectives are met.

Assistance in securing funds for operational needs for at least three years, by when ADP is likely to be self-sustaining.

Subproject : Tuna Processing (IND 3)

Unscheduled Tuna is an underutilized resource in India and market prices are very low compared to neighbouring Sri Lanka and the Maldives where *masmeen* is traditionally manufactured. Considerable scope appears to exist for developing cottage-level processing in areas of traditional tuna landings in Tamil Nadu and Andhra Pradesh.

Appraisal for new subproject activity on tuna utilization completed. The potential for introducing smoked-dried *masmeen* (Maldivian fish) processing to women fish-marketing groups in the South Arcot District of Tamil Nadu was investigated, but economic viability was doubtful due to high price of fresh tuna and, hence, the proposal was dropped. However, investigations at Kakinada in Andhra Pradesh indicate favourable scope for production of *masmeen* in the Uppada group of villages. Initial market studies have been completed. However, target groups are to be identified and skills training initiated. Socioeconomic baselines are to be completed. Collaborating NGO identified.

Assessment

The economic viability of smoked-dried *masmeen* (Maldivian fish) processing by women fish-marketing groups in the South Arcot District of Tamil Nadu proved to be doubtful due to the high price of fresh tuna. The prospects for this activity in the Uppada group of villages near Kakinada in Andhra Pradesh appeared more favourable and preliminary work has got underway.

Targets 1994

A needs assessment survey has been planned for the last week of February in Kakinada to determine the social and economic viability of this project.

Identification of processors to carry out training in *masmeen* production at the village level and skills level training are to be undertaken.

Future

Establishment of production and marketing of *masmeen*.

Subproject : Use of Ice in Fishing Communities (IND 4)

OBJECTIVES To improve the quality and value of fish landed by artisanal fishing craft through the promotion of the use of ice and insulated boxes made from low-cost materials.

STATUS 1992 Fishing trials were carried out to demonstrate cost-benefit of low-cost insulated ice boxes on nonmotorized craft. The significant quality

premium available as a result would allow payback for the ice boxes in 1-2 months. As a result of these trials 35 fishermen from the respective villages sought and received credit for new boxes through a DRDA scheme.

Targets 1993

Initiate needs-based activities aimed at development and promotion of simple icing systems for traditional, nonmotorized craft, especially kuttumarams, on the south and eastern coasts of India.

Provide advice to NGOs and State DOFs on the implementation of Permanent Ice Box (PIB) activities in fishing villages.

Achievements

An initiative aimed at designing a simple ice box participatively with a fishermen group and the DOF. An MOU was signed with the Fisheries College, Tuticorin, to carry out the design work in a collaborative exercise with the fishermen.

Study undertaken to investigate the implementation of a 'cool chain' with KDFSf.

Renovation of the PIB in Kanniyakumari that has been damaged by a cyclone.

Preparation of a promotional leaflet on the use of ice, targeted at the DOF and private sector.

Assessment

Wooden ice boxes were produced and tested on gillnetters. However, results were poor and the tests were discontinued. A commercial company has taken the initiative in producing HDPE boxes which are proving popular with fishermen. Initial reluctance to purchase the boxes without a government subsidy has, to a limited extent, been overcome.

The benefits of using ice are not immediately obvious in many traditional fisheries. Demonstration must, therefore, show technical and economic advantages and involve the community in improving awareness of the benefits of using ice in fish-handling.

Targets 1994

Complete design of a simple ice box for prawns for kattumaram fishermen and demonstration of the technical and economic advantages of the design.

Initiate other needs-based activities aimed at development and promotion of simple icing systems.

Continue to provide advice to NGOs and state DOFs on the use of ice in the handling of fish.

Subproject : Shark Leather Development (IND 5)

OBJECTIVES

To increase incomes of target groups through improved utilization of sharkskin for export leather production.

STATUS 1992

Consultancies in Phase Two did not completely overcome technical problems, although, in itself, this would not be considered a constraint to project success.

Investigations during Phase Three have indicated that supplies of skins in good condition are irregular and found widely dispersed among small communities.

Targets 1993

Investigate alternative sources of raw material (Andamans; west coast fisheries).

Terminate project by end of 1993.

Achievements

Quality problems with raw material due to the fact that shark of suitable size for skinning are mainly captured for their fins.

Watching brief on subproject only.

Assessment

Although there is no doubt an international market exists for a good quality product, this is dependent upon a regular supply of raw material. If this can be resolved, then this industry would be taken up by the private sector.

However, the benefits for small-scale fishermen remain very doubtful. The project will, therefore, restrict itself to providing informal advice and maintaining a watching brief on this subproject.

Subproject : Itinerant Women Fish Traders (IND 6)

OBJECTIVES

To increase the income of women fish trader groups through better transport links to market, reduced losses, improved products and better access to credit.

STATUS 1992

There were orders for 1700 aluminium containers of which 1360 were purchased with a 50 per cent subsidy provided by the State Social Welfare Board of Tamil Nadu.

A qualitative study was undertaken amongst several women's groups to ascertain the perceived attributes of the fish-marketing container. Whilst the container has increased access to fish markets, its greatest importance was mainly related to improved social status.

Targets 1993

Continue support to women's groups and petty traders in general in increasing access to markets. Improving transport links and credit access are among the key factors to reducing distress sales and losses.

Provide women with appropriate skills and awareness training; support and advise local intermediary development institutions and grassroots organizations in resolving community needs.

Achievements

Feasibility study carried out by NRI Consultant on various transport systems that might be introduced to improve access to markets by women fish traders.

Study carried out by NRI Consultant to investigate existing sources of credit, to study the strengths and weaknesses of the credit systems available to fisherwomen and to assess the role of credit in the livelihood of this group.

A series of one-day rural workshops organized and conducted specifically to increase skills in handling and processing of fish for target groups from fishing communities.

Higher level training conducted for NGOs in project planning and management and fish quality control.

Assessment

The strong and positive response of women traders to the fish containers demonstrates the need for supporting this initiative by continuing to act as a facilitator between the women's groups and the government.

The training programme has started to slowly build up the institutional capacity of NGOs and the skills and awareness of the women in fishing villages.

Targets 1994

To actively work with the DOF in its campaign to promote fish containers and to act as a facilitator between the various women's groups, government organizations and manufacturers of the containers.

To prepare a supportive extension leaflet, on the benefits of the fish containers, aimed at the DOF and other government organizations.

Review current training programmes in co-operation with partner NGOs.

Future

Continue to strengthen grassroots level organizations in fishing communities and increase capabilities of NGOs through training and follow-up courses. Screening of NGOs in other east coast states to assess their potential for becoming involved in the regional training programme.

Subproject : Development of Internal Marketing (IND 8)

OBJECTIVES To increase the incomes of the small-scale fish-marketing sector through provision of advice on infrastructure improvements and marketing strategies.

STATUS 1992 Database established in late 1992. Fish prices are currently being monitored in five centres of Tamil Nadu.

Qualitative study of consumer acceptance of dried anchovy carried out in Madras and Hyderabad by the Market Research Group (MARG). It showed a very positive and desirable acceptance for flakes, as they were perceived to be clean, hygienic and of good quality.

Market review of the potential of *masmeen* in Sri Lanka and India carried out.

Targets 1993

Carry out further research into anchovy consumption patterns

Achievements

MARG commissioned to undertake a quantitative study of anchovy consumption patterns. Completed in September 1993.

Continuation of data-collection for fish-marketing database.

The database has continued to provide information of prices and landing patterns in the project's area of work.

Regional seminar on internal fish-marketing.

Postponed pending a review.

Feasibility study for development of an internal marketing authority.

Not considered to be appropriate until support for such an organization is recognized.

Marketing support for KDFSF.

One Marketing Adviser and four extension officers supported by project funds. Expatriate advice provided through visit by a marketing economist.

Assessment

Funding strategies are being considered for continuing the fish market database and outside agencies have been approached. Although many of these organizations have been enthusiastic in their response to such a database and in using its output, no organization has come forward to support/fund this exercise. Until such a response is received, it does not seem appropriate to continue with the database or develop an internal marketing authority.

Effective marketing is essential if income-generating schemes are to be successful, so the entire strategy of marketing a small enterprise's products is of crucial importance. The importance of timely and reliable marketing information that reaches producers in an effective manner is important for fish-marketing systems. However, the provision of this type of information and the organizations that can undertake to do so needs to be critically reviewed.

Targets 1994

To review the collection of price data and the need for this information

To prioritize the formulation of the project's strategy for marketing.

BANGLADESH

Subproject : Insect Infestation Control in Dried Fish (BGD 9)

OBJECTIVES	To develop safe and environmentally appropriate methods to reduce loss of income due to insect damage.
STATUS 1992	Ad hoc sampling by mission revealed high DDT levels in 1991. Sampling programme postponed due to heavy dried fish losses in Chittagong during the cyclone.

Assessment

A short visit to Chittagong University was undertaken by an NRI Consultant to discuss possible initiatives on using on dried fish a safer alternative to DDT. A draft proposal was drawn up. However, as there is no evidence that the Government of Bangladesh is prepared to take action to enforce the use of safer alternatives to DDT, no further action has been taken.

Subproject : Use of ice and added value to fisheries products by artisanal communities (BGD 10)

OBJECTIVES	To increase the incomes of artisanal communities through loss reduction and addition of value.
STATUS 1992	This subproject leads on from the previous ODA component, 'support to NGOs', which included support to CODEC, a locally active fisheries NGO. A study team of CODEC staff visited India to discuss institutional aspects of NGO development.

Targets 1993

Achievements

Continue support to CODEC and other NGOs involved in fisheries development.

A programme for a series of workshops extending over 14 months was drawn up. These workshops targeted local organizations working with coastal fishing communities and aimed to build up and train NGOs in promoting sustainable income enhancement in small-scale fishing communities.

Review role of PIB constructed in Kanniyakumari in 1991.

Work on PIBs raised doubts about the viability of this activity, as problems with ownership and perceived value led to inconclusive results. No further activity was recommended by a recent ODA review mission.

Assessment

The NGOs involved in the workshops are being encouraged use techniques learnt in the workshops to formulate cost-effective projects for income-generation which could be presented for financing by outside agencies.

Targets 1994

Completion of workshops and presentation of proposals.

Subproject : Set Bagnet Fisheries (BGD 11)

OBJECTIVES Investigate means by which incomes of set bagnet fisherfolk may be protected in the face of proposed legislative changes affecting fishing practices.

STATUS 1992 Not operational. Postponed until Phase Three.

Targets 1993

Study to investigate the long-term social and economic activities related to set bagnet fishery.

Achievements

Visit by NRI Consultant undertaken and a 14-month social and economic study started with the identification of three target areas. Development of a methodology of study instruments initiated.

Assessments

Discussions with NGOs working with set bagnet communities reinforced the need that effective interventions would require a thorough knowledge of the social and economic aspects of these marginalized communities. Recommendations that any technical intervention be deferred until there is a greater understanding of the communities and their interaction with traders was acknowledged.

Targets 1994

Final phase of social and economic case studies completed; analysis, documentation and dissemination of results to be discussed.

Future

Any viable activities identified following the study will depend on establishing positive support from the communities.

SRI LANKA

Subproject : Histamine in Pelagic Fish (SRL 13)

OBJECTIVES To improve quality of fish by providing advice on how to prevent histamine-poisoning among consumers.

STATUS 1992 Project initiated only in 1993.

Targets 1993

To ensure the capability of National Aquatic Resources Agency (NARA) in screening histamine levels.

Achievements

Training in the use of local equipment and in histamine analysis provided by UK Consultants.

Assessment

Training has been given in the various analytical methods used for screening histamine. This activity has been completed and no further inputs are envisaged.

Subproject : Itinerant Fish Traders (SRL 14)

OBJECTIVES

To increase the revenue of small-scale fish traders through reduction of losses, improved handling and accessing available credit.

STATUS 1992

Continued support to IRED in the area of fish-marketing and processing. The importance of the role in fish-marketing played by cycle vendors was recognized by initiation of a social and economic baseline study and a needs assessment workshop. Improved cycle fish carrier was developed with inputs from traders and GRP manufacturer. Fifteen units tested in use over five months showed cost saving in ice use, improved customer attraction and value-addition.

Targets 1993

Review of on-going and potential activities in the area of itinerant fish traders and marketing.

Achievements

Review completed and recommendations made. These led to amending the activities to focus on the original research needs.

IRED staff to be trained in data collection.

Three staff attended the PRA workshop in India and were encouraged to use in their practical work the methods demonstrated.

Undertake a baseline study of retail fish traders in Sri Lanka.

Study of traders operating at the Negombo and Doddanduwa landing sites and in Kandy markets, to collect baseline information on the distribution patterns, their social and economic status and contribution to the post-harvest fisheries sector.

Identification of key factors affecting fish consumption and consumer attitudes to fish quality and marketing.

Study commissioned through the Lanka Market Research Bureau was completed and clearly demonstrates the importance of the target group (cycle vendors) in providing a dependable supply of fish to a wide range of customers.

Assessment

This activity has concentrated on understanding the operational characteristics of itinerant fish traders whilst introducing a new technology in the form of an insulated box for cycle traders. A significant output has been the formation of a fish marketing traders' association that has received official recognition from the Ministry of Fisheries and Aquatic Resources. If effective post-harvest intentions are to succeed, further information is required on the small-scale fish-marketing sector which is responsible for supplying the more traditional markets.

Targets 1994

Encourage manufacture of insulated boxes by local artisans.

Develop a strategy for wider dissemination of the insulated fish storage box.

Facilitate access to official credit schemes which are now becoming available to these traders.

PUBLICATIONS OF THE BAY OF BENGAL PROGRAMME (BOBP)

The BOBP brings out the following types of publications :

Reports (BOBP/REP/...) which describe and analyze completed activities such as seminars, annual meetings of BOBP's Advisory Committee, and subprojects in member-countries for which BOBP inputs have ended.

Working Papers (BOBP/WP/...) which are progress reports that discuss the findings of ongoing work.

Manuals and Guides (BOBP/MAG/...) which are instructional documents for specific audiences.

Information Documents (BOBP/INF/...) which are bibliographies and descriptive documents on the fisheries of member-countries in the region.

Newsletters (*Bay of Bengal News*/...) which are issued quarterly and which contain illustrated articles and features in nontechnical style on BOBP work and related subjects.

Other publications which include books and other miscellaneous reports.

Those marked with an asterisk (*) are out of stock but photocopies can be supplied.

Reports (BOBP/REP/...)

32. *Bank Credit for Artisanal Marine Fisherfolk of Orissa India*. U. Tietze. (Madras, 1987.)
33. *Nonformal Primary Education for Children of Marine Fisherfolk in Orissa, India*. U. Tietze, N. Ray. (Madras, 1987.)
34. *The Coastal Set Bagnet Fishery of Bangladesh – Fishing Trials and Investigations*. S.E. Akerman. (Madras, 1986.)
35. *Brackishwater Shrimp Culture Demonstration in Bangladesh*. M. Karim. (Madras, 1986.)
36. *Hilsa Investigations in Bangladesh*. (Colombo, 1987.)
37. *High-Opening Bottom Trawling in Tamil Nadu, Gujarat and Orissa India : A Summary of Effort and Impact*. (Madras, 1987.)
38. *Report of the Eleventh Meeting of the Advisory Committee*, Bangkok, Thailand, 26-28 March, 1987. (Madras, 1987.)
39. *Investigations on the Mackerel and scad Resources of the Malacca Straits*. (Colombo, 1987.)
40. *Tuna in the Andaman Sea*. (Colombo, 1987.)
41. *Studies of the Tuna Resource in the EEZs of Sri Lanka and Maldives*. (Colombo, 1988.)
42. *Report of the Twelfth Meeting of the Advisory Committee*. Bhubaneswar, India, 12-15 January 1988. (Madras, 1988.)
43. *Report of the Thirteenth Meeting of the Advisory Committee*. Penang, Malaysia, 26-28 January, 1989. (Madras, 1989.)
44. *Report of the Fourteenth Meeting of the Advisory Committee*. Medan, Indonesia, 22-25 January, 1990. (Madras, 1990.)
45. *Gracilaria Production and Utilization in the Bay of Bengal Region: Report of a seminar held in Songkhla, Thailand, 23-27 October 1989*. (Madras, 1990.)
46. *Exploratory Fishing for Large Pelagic Species in the Maldives*. R.C. Anderson, A. M'ahced, (Madras, 1990.)
47. *Exploratory Fishing for Large Pelagic Species in Sri Lanka*. R. Maldeniya, S. L. Suraweera. (Madras, 1991.)
48. *Report of the Fifteenth Meeting of the Advisory Committee*. Colombo, Sri Lanka, 28-30 January 1991. (Madras, 1991.)
49. *Introduction of New Small Fishing Craft in Kerala, India*. O. Gulbrandsen and M. R. Anderson. (Madras, 1992.)
50. *Report of the Sixteenth Meeting of the Advisory Committee*. Phuket, Thailand, 20-23 January 1992. (Madras, 1992.)
51. Report of the Seminar on the Mud Crab Culture and Trade in the Bay of Bengal Region, November 5-8, Surat Thani, Thailand. Ed by C.A. Angell. (Madras, 1992.)
52. *Feeds for Artisanal Shrimp Culture in India – Their development and evaluation*. J F Wood et al. (Madras, 1992.)
53. A Radio Programme for Fisherfolk in Sri Lanka. R N Roy. (Madras, 1992.)
54. Developing and Introducing a Beachlanding Craft on the East Coast of India. V L C Pietersz. (Madras, 1993.)
55. A Sri Lanka Credit Project to Provide Banking Services to Fisherfolk. C Fernandos D Attanayake. (Madras, 1992.)
56. A Study on Dolphin Catches in Sri Lanka. L Joseph. (Madras, 1993.)
57. Introduction of New Ourrigger Canoes in Indonesia. G Pajot, O. Gulbrandsen, (Madras, 1993.)
58. Report of the Seventeenth Meeting of the Advisory Committee, Dhaka, Bangladesh, 6-8 April 1993. (Madras, 1993.)
59. Report on Development of Canoes in Sri Lanka. G Pajot, O. Gulbrandsen. (Madras, 1993.)
60. Improving Fisherfolk Incomes through Group Formation and Enterprise Development in Indonesia. R N Roy. (Madras, 1993.)
61. Small Offshore Fishing Boats in Sri Lanka. G Pajot. (Madras, 1993.)
62. Fisheries Extension Services in the Maldives. A M H Heelas, (Madras, 1994.)
63. Small-scale Oyster Culture on the West Coast of Peninsular Malaysia. D Nair, R Hall, C Angell. (Madras, 1993.)
64. Chandi Boat Motorization Projects and Their impacts. R. Hall, A Kashem. (Madras, 1994.)
65. Learning by Doing in Bangladesh Extension Systems Development for Coastal and Estuarine Fisherfolk Communities. R N Roy. (Madras, 1994.)
66. Promotions of Small-scale Shrimp and Prawn Hatcheries in India and Bangladesh. C. Angell. (Madras, 1994.)
67. The Impact of the Environment on the Fisheries of the Bay of Bengal. Ed. by S Holmgren, Swedish Centre for Coastal for Coastal Development and Management of Aquatic Resources. SWEDMAR/BOBP. (Madras, 1994.)
69. Report of the Eighteenth Meeting of the Advisory Committee. Furana Fushi, Maldives, 16-19 April 1994. (Madras, 1994.)

Working Papers (BOBP/ W P/.)

49. *Pen Culture of Shrimp by Fisherfolk : The BOBP Experience in Killai, Tamil Nadu, India.* E. Drewes, G. Rajappan. (Madras, 1987.)
50. *Experiences with a Manually Operated Nef-Braiding Machine in Bangladesh.* B.C. Gillgren, A. Kashem. (Madras, 1986.)
51. *Hauling Devices for Beachlanding Craft.* A. Overa, P.A. Hemminghyth. (Madras, 1986.)
52. *Experimental Culture of Seaweeds (Gracilaria Sp.) in Penang, Malaysia.* (Based on a report by M. Doty and J. Fisher). (Madras, 1987.)
53. *Atlas of Deep Water Demersal Fishery Resources in the Bay of Bengal.* T. Nishida, K. Sivasubramaniam. (Colombo, 1986.)
54. *Experiences with Fish Aggregating Devices in Sri Lanka.* K.T. Weerasooriya. (Madras, 1987.)
55. *Study of Income, Indebtedness and Savings among Fisherfolk of Orissa, India.* T. Mammo. (Madras, 1987.)
56. *Fishing Trials with Beachlanding Craft at Uppada, Andhra Pradesh, India.* L. Nyberg. (Madras, 1987.)
57. *Identifying Extension Activities for Fisherwomen in Vishakhapatnam District, Andhra Pradesh, India.* D. Tempelman. (Madras, 1987.)
58. *Shrimp Fisheries in the Bay of Bengal.* M. Van der Knaap. (Madras, 1989.)
59. *Fishery Statistics in the Bay of Bengal.* T. Nishida. (Colombo, 1988.)
60. *Pen Culture of Shrimp in Chilaw, Sri Lanka.* D. Reyntjens. (Madras, 1989.)
61. *Development of Outrigger Canoes in Sri Lanka.* O. Gulbrandsen, (Madras, 1990.)
62. *Silvi-Pisciculture Project in Sunderbans, West Bengal : A Summary Report of BOBP's assistance.* C.L. Angell, J. Muir. (Madras, 1990.)
63. *Shrimp Seed Collectors of Bangladesh.* (Based on a study by UBINIG.) (Madras, 1990.)
64. *Reef Fish Resources Survey in the Maldives.* M. Van Der Knaap et al. (Madras, 1991.)
65. *Seaweed (Gracilaria Edulis) Farming in Vedalai and Chinnupalam, India.* I. Kalkman, I. Rajendran, C.L. Angell. (Madras, 1991.)
66. *Improving Marketing Conditions for Women Fish Vendors in Besant Nagar, Madras.* K. Menezes. (Madras, 1991.)
67. *Design and Trial of Ice Boxes for Use on Fishing Boats in Kakinada, India.* I.J. Clucas. (Madras, 1991.)
68. *The By-catch from Indian Shrimp Trawlers in the Bay of Bengal : The potential for its improved utilization.* A. Gordon. (Madras, 1991.)
69. *Agar and Alginate Production from Seaweed in India.* J.J.W. Coopen, P. Nambiar. (Madras, 1991.)
70. *The Kattumaram of Korhapatnam-Pallipalem, Andhra Pradesh, India – A survey of the fisheries and fisherfolk.* K. Sivasubramaniam. (Madras, 1991.)
71. *Manual Boar Hauling Devices in the Maldives.* (Madras, 1992.)
72. *Giant Clams in the Maldives – A stock assessment and study of their potential for culture.* J.R. Barker. (Madras, 1991.)
73. *Small-scale Culture of the Flat Oyster (Ostrea folium) in Pulau Lungkawi, Kedah, Malaysia.* D. Nair, B. Lindeblad. (Madras, 1991.)
74. *A Study of the Performance of Selected Small Fishing Craft on the East Coast of India.* G. El Gendy. (Madras, 1992.)
75. *Fishing Trials with Beachlanding Craft at Thirumullaivasal, Tamil Nadu, India 1989-1992.* G. Pajot (Madras, 1992.)
76. *A View from the Beach – Understanding the status and needs of fisherfolk in the Meemu, Vaavu and Faafu Atolls of the Republic of Maldives.* The Extension and Projects Section of the Ministry of Fisheries and Agriculture, The Republic of Maldives. (Madras, 1991.)
77. *Development of Canoe Fisheries in Sumatera, Indonesia.* O. Gulbrandsen, G. Pajot. (Madras, 1992.)
78. *The Fisheries and Fisherfolk of Nias Island, Indonesia. A description of the fisheries and a socioeconomic appraisal of the fisherfolk.* Based on reports by G. Pajot, P. Townsley. (Madras, 1991.)
79. *Review of the Beche De Mer (Sea Cucumber) Fishery in the Maldives.* L. Joseph. (Madras, 1992.)
80. *Reef Fish Resources Survey in the Maldives – Phase Two.* R.C. Anderson, Z. Waheed, A. Arif. (Madras, 1992.)
81. *Exploratory Fishing for Large Pelagic Species in South Indian Waters.* J. Gallene, R. Half. (Madras, 1992.)
82. *Cleaner Fishery Harbours in the Bay of Bengal.* Comp. by R. Ravi Kumar (Madras, 1992.)
83. *Survey of Fish Consumption in Madras.* Marketing and Research Group, Madras, India. (Madras, 1992.)
84. *Flyingfish Fishing on the Coromandel Coast.* G. Pajot, C. R. Prabhakaradu. (Madras, 1993.)
85. *The Processing and Marketing of Anchovy in the Kanniyakumari District of South India : Scope for Development.* T.W. Bostock, M.H. Kalavathy, R. Vijaynidhi. (Madras, 1992.)
86. *Nursery Rearing of Tiger Shrimp Post-larvae in West Bengal, India.* H. Nielsen, R. Hall, (Madras, 1993.)
87. *Marker Study of Tiger Shrimp Fry in West Bengal, India.* M. M. Raj, R. Hall. (Madras, 1993.)
88. *The Shrimp Fry By-catch in West Bengal.* B.K. Banerjee, H. Singh. (Madras, 1993.)
89. *Studies of Interactive Marine Fisheries of Bangladesh.* Management and Development Project, Department of Fisheries, Chittagong, Bangladesh. (Madras, 1993.)
90. *Socioeconomic Conditions of Estuarine Set Bagnet Fisherfolk in Bangladesh.* K.T. Thomson, Sk. Md. Dilbar Jahan, Md. Syed Hussian. (Madras, 1993.)
91. *Further Exploratory Fishing for Large Pelagic Species in South Indian Waters.* G. Pajot. (Madras, 1993.)
92. *Cage Nursery Rearing of Shrimp and Prawn Fry in Bangladesh.* C. Angell. (Madras, 1994.)
93. *Dealing with Fishery Harbour Pollution – The Phuket Experience.* R. Ravikumar. (Madras, 1994.)

3. *Fishery Statistics on the Microcomputer : A BASIC Version of Hasselblad's NORMSEP Program.* D. Pauly, N. David, J. Hertel-Wulff. (Colombo. 1986.)
4. *Separating Mixtures of Normal Distributions : Basic programs for Bhattacharya's Method and Their Application for Fish Population Analysis.* H. Goonetilleke, K. Sivasubramaniam. (Madras, 1987.)
5. *Bay of Bengal Fisheries Information System (BOBFINS) : User's Manual.* (Colombo, 1987.)
7. *Guidelines for Extension Workers in Group Management, Savings Promotion and Selection of Enterprise.* H. Setyawati, P. Limawan. Directorate General of Fisheries, Ministry of Agriculture. Government of Indonesia, Jakarta and Bay of Bengal Programme. (In Indonesian). (Madras, 1992).
8. *Extension Approaches to Coastal Fisherfolk Development in Bangladesh : Guidelines for Trainers and Field Level Fishery Extension Workers.* Department of Fisheries, Ministry of Fisheries and Livestock, Government of Bangladesh and Bay of Bengal Programme. (In Bangla). (Bangladesh, 1992.)
9. *Guidelines on Fisheries Extension in the Bay of Bengal Region.* I Jungeling. (Madras, 1993.)
10. *Our Fish, Our Wealth.* A guide to fisherfolk on resources management. — In 'comic book' style (English/Tamil/Telugu). K. Chandrakant with K. Sivasubramaniam, R. Roy. (Madras, 1991.)
12. *How to Build a Timber Outrigger Canoe.* O Gulbrandsen. (Madras, 1993.)
13. *A Manual for Operations a Small-scale Recirculation Freshwater Prawn Hatchery.* R. Chowdhury, H. Bhattacharjee. C. Angell. (Madras, 1993.)
14. *Building a Lifetable Propulsion System for Small Fishing Craft – The BOB Drive.* O.Gulbrandsen, M R Andersen. (Madras, 1993.)
15. *Guidelines for Fisheries Extension in the Coastal Provinces of Thailand.* Fisheries Extension Division, Department of Fisheries, Ministry of Agriculture and Cooperatives, Bangkok, Thailand and the Bay of Bengal Programme, (Thailand, 1993 .)
16. *Safety at Sea – A safety guide for small offshore fishing boats.* O. Gulbrandsen, G. Pajot. (Madras, 1993.)
17. *Guidelines for Cleaner Fishery Harbours.* R. Ravikumar. (Madras, 1993.)
18. *A Handbook of Oyster Culture.* H. Nawawi. (In English/Malay). (Madras, 1993.)
19. *Management of Fisherfolk Microenterprises - A manual for training of trainers.* V. Muthu, P.S.A. Kunchitha Padam, Bhatnagar. (Madras, 1993.)
20. *Life on Our Reefs - A colouring book.* Ministry of Fisheries and Agriculture, Male, Republic of Maldives and the Bay of Bengal Programme. (Madras, 1993.)

Information Documents (BOBP/INF/..)

10. *Bibliography on Gracilaria – Production and Utilization in the Bay of Bengal.* (Madras, 1990.)
11. *Marine Small-Scale Fisheries of West Bengal : An Introduction.* (Madras, 1990.)
12. *The Fisherfolk of Puttalam, Chilaw, Galle and Matara – A study of the economic status of the fisherfolk of four fisheries districts in Sri Lanka.* (Madras, 1991.)
13. *Bibliography on the Mud Crab Culture and Trade in the Bay of Bengal Region* (Madras, 1992.)

Newsletters (Bay of Bengal News)

Quarterly from 1981

Other Publications

1. *Helping Fisherfolk to Help Themselves : A Study in People's Participation,* (Madras, 1990.).
2. *The Shark Fisheries of the Maldives.* R C Andersen, H Ahmed. Ministry of Fisheries and Agriculture, Maldives, (Madras, 1993.)

NOTE : Apart from these publications, the BOBP has brought out several folders, leaflets, posters etc., as part of its extension activities. These include Post-Harvest Fisheries folders in English and in some South Indian Languages on anchovy drying, insulated fish boxes, fish containers, ice boxes, the use of ice etc. Several unpublished reports connected with BOBP's activities over the years are also available in its Library.

For further information contact :

The Bay of Bengal Programme, Post Bag No. 1054, Madras 600 018, India.

Cable : BAYFISH Telex : 41-8311 BOBP Fax : 044-836102.

Telephone : 836294, 836096, 836188.