BAY OF BENGAL PROGRAMME

BOBP / REP / 44

Report of the Fourteenth Meeting of the Advisory Committee

Medan, Indonesia
January 22-25, 1990

FOOD AND AGRICULTURE ORGANIZATION
OF THE UNITED NATIONS

REPORT OF THE FOURTEENTH MEETING OF THE ADVISORY COMMITTEE

January 22-25, 1990
Medan, Indonesia

Executing Agency :

Food and Agriculture Organization of the United Nations

Funding Agencies :

– Danish International Development Agency

Swedish International Development Authority

Executing and funding agency for the BOBP's post-harvest fisheries project is the Overseas Development Administration (U.K.)

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This document records the recommendations of the 14th meeting of the Advisory Committee of the Bay of Bengal Programme for Fisheries Development (BOBP), held 22-25 January at Medan, Indonesia.

This document includes the annual reports for 1989 of the project "Small-Scale Fisherfolk Communities in the Bay of Bengal," GCP/RAS/118/MUL, fun&d by DANIDA and SIDA the BOBP's Post Harvest Fisheries Project, funded and executed by the ODA (UK); and the project "Improving the living conditions of fisher-women and their families" (FPS/RAS/904/FPA), funded by the UNFPA (United Nations Population Fund).

The BOBP's 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.

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

1. The meeting was held from 22 to 25 January, 1990, at the Tiara Convention Centre, Medan, North Sumatra, Indonesia. A list of participants is given in Appendix A.

Opening of the Meeting

2. The Meeting was formally opened at a special inauguration ceremony on 22 ,January 1990 by the Secretary General of the Ministry of Agriculture of the Government of Indonesia.

Election of Chairman

3. The Advisory Committee unanimously elected Mr Untung Wahyono, Director of Production, Directorate General of Fisheries, Indonesia, as its Chairman to hold office until the beginning of its Fifteenth Meeting.

Adoption of the Agenda

4. The Committee adopted the agenda shown in Appendix 8. The documents placed before the Committee are listed in Appendix C.

STATE OF THE PROGRAMME

5. The present phase of the Programme which was originally scheduled to terminate at the end of 1991 needs to be extended until 1993 due to the delayed start of some activities and projects and the recent addition of new projects.

6. Efforts by FAO and the six countries concerned should continue to obtain UNDP approval of the "Bio-economics" project.

7. Arrangements for utilization of the additional resources being provided by SIDA to investigate the effects of pollution on fisheries should be expedited.

SMALL-SCALE FISHERFOLK COMMUNITIES (MID-TERM REVIEW OF RAS/118/MUL)

8. The Committee endorsed the report of the review mission and stressed the recommendations relating to environmental concerns, maintaining of the small-scale fisher-folk as the primary target group, and the need of continued donor support for an extension of the ongoing phase and for a new phase beyond it.

ANNUAL REPORT OF RAS/118/MUL, RAS/117/MUL & RAS/126/AGF

9. In accordance with the mid-term review recommendation, the projects (RAS/118/MUL, and RAS/117/MUL) should be extended by one or two years.

10. The learning from the Fisheries Extension Consultation may be consolidated and the recommendations implemented through dissemination of information and conduct of country level workshops for orientation/training of extension staff and administrators.

11. Methods and media need to be identified and developed to enable participative community-level approaches to resource management and environmental protection.

12. The use of mass media in fisher-folk development should be promoted.

13. Co-operation with non-governmental agencies should be undertaken in specific technical and extension subprojects.

14. Methods and techniques to assess costs and impact of extension systems and services need to be identified and developed.

15. Reasons for the disappointing outcome of the seaweed culture trials in South India should be analysed and alternative measures identified to help the communities concerned.

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16. The transfer of prawn cage culture technology from Thailand to Indonesia should be considered, subject however to assessment of economic feasibility.

17. Small-scale hatchery technology for P. monodn needs to be demonstrated also in Andhra Pradesh if successful in West Bengal.

18. In West Bengal and Bangladesh shrimp seed collection methods which are selective for the target species need to be introduced.

19. By-catch of shrimp seed collection and its implications in Bangladesh and India needs to be assessed and alternative uses of the live by-catch identified.

20. The marketing of Langkawi's oysters should be further investigated including their marketing in Thailand.

21. In order to ensure sustained fishing trials and demonstration of SRL-15, the boats may be put into operation as soon as possible in South India.

22. Fishing trials for flying fish in India should not be restricted to beachlanding craft but also carried out with traditional craft.

23. An economic appraisal of the operation of beachlanding craft in India, covering a large sample of commercial boats may be carried out at an early date.

24. Advisory services and training of trainers regarding safety of small fishing craft should be provided utilizing inputs from the FAO Regular Programme.

25. Advisory services in regard to FRP as an alternative boat building material for small craft may be provided to Bangladesh and Thailand.

26. The development of outrigger canoes in Sri Lanka should be continued.

27. The project proposal for development of small-scale offshore fisheries in the west coast of North Sumatra Province should be pursued.

28. Information should be exchanged in regard to squid fishing in the region.

29. Information should be exchanged on Fish Aggregating Devices (FAOs). Arrangements should also be made by the Programme for participation in the IPFC symposium on FAOs and Artificial Reefs scheduled to be held in Colombo in May 1990.

30. In connection with the study on set bagnet fisheries in Bangladesh the assistance of other fisheries programmes should be sought for the purpose of assessing the impact of the set bagnet fisheries on other marine fisheries.

31. A regional meeting should be held to identify high priority areas for activities in the field of bio-economics and to prepare a work programme.

32. Co-operation may be extended to the national programme in Thailand for constructing artificial reefs along the west coast.

33. In regard to training in project preparation the specific needs of each country should be ascertained and the subproject implemented accordingly.

34. The post of Development Adviser should be filled as soon as possible.

35. Video documentation of all major project activities should be continued and copies of the films distributed to member countries and sponsoring agencies.

36. The present large quantum of training effort should be maintained and preferably increased.

37. Approximate expenditures by country, in terms of the project's accounting should be made available to member countries on request.

POST-HARVEST FISHERIES (ODA)

38. The project should undertake more extension activities. Initially, an important task would be to produce information materials in order to keep extension services better informed of post-harvest issues.

39. Attention should be given to further improving on-board fiih handling during multi-day fishing in Sri Lanka.

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40. There should be an appraisal of the problems associated with insect infestation of dried fish in Bangladesh.

41. Further efforts should be made to improve utilization of shrimp trawler by-catch and of low value fish species in general, as food for human consumption and for other uses including feed for shrimp farming.

42. In the absence of suitable national consultants, the use of regional consultants should be considered.

43. Activities to improve the utilization of shark should be extended to Bangladesh.

IMPROVEMENT OF LIVING CONDITIONS OF WOMEN AND THEIR FAMILIES IN FISHING COMMUNITIES (FPA/RAS/904/FPA)

44. The project must be seen as having a catalytic role, and the target areas of coverage and the types/numbers of activities should be limited to ensure smooth implementation.

45. Existing governmental and non-governmental organizations and their programmes should be involved in order to provide such inputs as may be beyond the practice and mandate of fishery agencies.

46. Credit support for income generation should be made available, wherever possible, through existing financial institutions.

47. The fisher-folk family needs to be addressed as a whole; occupational health and population education of men should be kept in view in formulating the work plans.

NATIONAL PROJECTS IMPLEMENTED THROUGH BOBP

48. In implementing the reef fish survey in the Maldives, caution needs to be exercised so as not to use coral-destructive gears such as the "Muro Ami" nets used in the Philippines.

49. Further support should be requested from IMO to monitor and assess the usefulness of the facilities provided in the Visakhapatnam Fishing Harbour and to identify other harbours and landing places where there might be a need for similar and supplementary facilities and infrastructure.

50. Information about the progress of the development of prawn feed in India should be disseminated to the other participating countries.

COOPERATION WITH OTHER ORGANIZATIONS

51. The existing co-operation with other organizations in the region should be intensified and expanded wherever possible; co-operation should for instance be sought with the ASEAN Committee concerned with fisheries.

52. On a long term basis efforts should be made to establish links and co-operation with more international organizations such as UNEP, UNESCO and EEC.

BOBP BEYOND THE PRESENT PHASE

53. In view of the indisputably valuable work of the BOBP in the past and in order to continue and strengthen regional co-operation, high priority should be given to the preparation of a third phase of the Programme to start around 1993.

54. A working group, initially comprising all the member countries and Myanmar as a potential future member, and later with representation of the donor community, should be established to prepare a new phase. The working group may include persons or organizations not presently involved with the Programme. The proposal of the working group should be avilable to the member countries and supporting agencies well in advance of the next (15th) meeting of the Advisory Committee.

55. With regard to the contents of the future programme high priority must be given to sustainable and self-reliant development, i.e. resources management, environmental protection, and training and extension.

56. The special features of the Programme such as its built-in flexibility and the role of the Advisory Committee should be maintained.

57. BOBP should continue to be an umbrella organization and not a permanent institution. Its future role programme should be designed with due regard to the role of other organizations in the region.

OTHER MATTERS

58. The Committee noted with great appreciation the presence of Myanmar in an observer capacity. It is hoped that Myanmar would become a participant of the Programme at an early date and that FAO and the agencies would do their best to facilitate this outcome.

59. The Committee noted that reference to the work of the Programme were included in the documentation for the forthcoming FAO Regional Conference for Asia and the Pacific in April 1990, and hoped that the Programme would receive the support of FAO within its Programme of Work for the Asia Pacific region during the current biennium.

60. With reference to the Extension Consultation that preceded the Advisory Committee Meeting, it was suggested that, in the future also, adequate time should be provided for in-depth discussions of specific technical subjects in connection with Advisory Committee meetings.

NEXT MEETING

61. The Fifteenth Meeting of the Advisory Committee should be held in January 1991. The offer to host the Fifteenth meeting, together with the Seventh Session of the Committee for the Development and Management of Fisheries in the Bay of Bengal (BOBC), in Sri Lanka, subject to formal Government confirmation, was noted with appreciation.

ADOPTION OF THE REPORT

62. The report was adopted on 25th January 1990.

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Appendix A

LIST OF PARTICIPANTS

Bangladesh

Kabeer, Shamsul H	Jt. Secretary (Fisheries) Ministry of Fisheries & Livestock Dhaka
Ali, Shawkat Md	Chief Fisheries Extension Officer Dept. of Fisheries Dhaka
Hoque, Azizul K	Project Director Marine Fisheries Survey Management & Development Project Chittagong

DANIDA

Larsen, 0 F	Head of Section for Multibilateral Technical Assistance Ministry of Foreign Affairs Copenhagen
Jensen, J G	Fisheries Adviser, Technical Advisory Division Ministry of Foreign Affairs Copenhagen

FAO

Fitzpatrick, J	Chief, Fishing Technology Service Fisheries Department Rome
Doeff, M	Projects Operations Officer Fisheries Department Rome
Fogelgren, J-E	Projects Operations Officer Fisheries Department Rome
Pietersz, V L C	Regional Fishery Officer RAPA, Bangkok

India

Joseph, K M	Development Commissioner (Fisheries) Government of India New Delhi
Swaminathan, K	Commissioner of Fisheries Government of Andhra Pradesh Hyderabad
Mohapatra, P	Director of Fisheries Government of Orissa Cuttack

Indonesia

Wahyono, Untung	Director of Production Directorate General of Fisheries Jakarta

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Suseno	**Chief, Programme & Planning Preparation Section, Directorate General of Fisheries** **Jakarta**
Panjaithan, Buhauli	**Head of Fish Catch Division** **Directorate General of Fisheries** **Jakarta**
Sihite, R	**Head, Fisher-folk Institution** **Directorate General of Fisheries** **Jakarta**
Siagian, N	**Chief, Multilateral Division** **Bureau of International Relations** **Ministry of Agriculture** **Jakarta**
Boedi Soesilo	**Chief of Province Fisheries Service** **North Sumatra** **Medan**
Siregar, Z	**Chief of Fisheries Enterprise, PFS** **North Sumatra** **Medan**
Mala ysia	
Merican, Z O (Ms)	**Senior Fisheries Officer (Development)** **Department of Fisheries** **Kuala Lumpur**
Sabki Mahmood, A	**State Director of Fisheries** **Penang**
Maldives	
Hasan Didi, N T	**Director of Extension Services** **Ministry of Fisheries & Agriculture** **Male**
Hassan Maniku, M	**Director of Fisheries Research & Development** **Ministry of Fisheries & Agriculture** **Male**
Aminath Zahira (Ms)	**Senior Statistical Officer** **Ministry of Fisheries & Agriculture** **Male**
ODA	
Ames, G R	**Head of Fisheries Section** **Overseas Development Natural Resources Institute** **London**
Sri Lanka	
Leelaratne, T P G N	**State Secretary** **Ministry of Fisheries** **Colombo**
Subasinghe, S	**Director** **National Aquatic Resources Agency** **Colombo**
Piyasena, G	**Asst. Director (Planning & Programming)** **Ministry of Fisheries** **Colombo**

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SIDA

Torell, M	**Senior Programme Officer Agriculture Division Stockholm**
Larsson, S	**Head, Dev. Coop. Secretariate National Swedish Board of Fisheries Goteborg**

Thailand

Tookwinas, Sin	**Snr. Fishery Biologist Brackishwater Fisheries Division Department of Fisheries Bangkok**
Meenakarn, Samruay	**Head, Extension Planning Sub-division Department of Fisheries Bangkok**
Tandavanitj, Sanchal	**Senior Fishery Biologist Extension Services for Small-Scale Fisheries in Ranong Ranong**

OBSERVERS

Myanmar

Yee, Hla	**Additional Director Planning and Statistics Department Ministry of Livestock Breeding and Fisheries Yangon**
Win, Hla	**Assistant Director Ministry of Livestock Breeding and Fisheries Yangon**

ICLARM

Maclean, J L	**Acting Director General Metro Manila**

IMO

Blom, K	**Special Adviser to the Secretary-General on Marine Environment Protection London**

SEA FDEC

Inoue, Kazuo	**Deputy Secretary-General Bangkok**
Yonesaka, H	**Socio-economist Bangkok**

SPCA

Futsaeter. G	**Senior Executive Officer State Pollution Control Authority, Norway Oslo**

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BOBP – Secretariat

Engvall, L O	Programme Director
Angell, C	Senior Aquaculturist
Pajot, G	Senior Fishing Technologist
Roy, R N	Extension/Training Officer
Sivasubramaniam, K	Senior Fishery Biologist
Walker, D	Post-Harvest Fisheries Adviser
Scurville (Ms) S	Senior Secretary/Administrative Assistant

Appendix B

AGENDA

1. Opening of the meeting
2. Election of Chairman
3. Adoption of Agenda
4. State of the Programme
5. Small-Scale Fisherfolk Communities
   (a) Mid-term review of RAS/118/MUL
   (b) Annual Report of RAS/118/MUL, RAS/117/MUL and RAS/126/AGF
6. Post-Harvest Fisheries (ODA)
7. Improvement of Living Conditions of Women and their Families in Fishing Communities. (FPA/RAS/904/FPA)
8. National projects implemented through BOBP
9. Cooperation with other organizations
10. BOBP beyond the present phase
11. Other matters
12. Next meeting
13. Adoption of the report

Appendix C

LIST OF DOCUMENTS

1. List of Documents
2. Agenda
3. List of participants
4. State of the Programme – 1989.
5. Report of Mid-term review of GCP/RAS/118/MUL
6. GCP/RAS/118/MUL, GCP/RAS/117/MUL Et GCP/RAS/I26/AGF - Annual Report 1989
7. ODA Post Harvest Fisheries Project - Annual Report 1989
8. Improvement of Living Conditions of Women and their Families in Fishing Communities (FPA/RAS/904/FPA) - Annual Report 1989
9. Annual Report (1989) of national projects implemented through BOBP.
10. BOBP beyond the present phase.

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Appendix D

STATE OF THE PROGRAMME – 1989

STRUCTURE

1. At the end of 1989, which is the third year of the present phase of the BOBP, the Programme consisted of six regional projects. These projects, the disciplines they represent and the national projects implemented through BOBP are shown in the diagram "BOBP projects at a glance". They are not listed in order of size or importance but organized to facilitate a graphical presentation. This paper attempts an overview of the Programme; reports of the six projects follow in separate documents.

2. GCP/RAS/118/MUL continues to be the major project, the "mother project". It supports the disciplines of Brackishwater Culture, Fishing Technology, Development Support and Extension. It has also during the past three years been the major funding source for Fishery Resources pending the approval of the UNDP project for "Bio-economics of small-scale fisheries". The project was reviewed during the year by an independent DANIDA/SIDA mission organized by the FAO. The outcome of the review was on the whole quite positive and the report recommends that the project should be extended by up to 24 months and that it should be followed by another phase.

3. The UNFPA-funded project for "Improvement of Fisherwomen and their Families in Fishing Communities" considerably strengthens the work of BOBP in the field of Extension. The project has no international staff and is being implemented mainly through the infrastructure of GCP/RAS/118/MUL in cooperation with the other projects. The project's preparatory phase started mid-1989; it is scheduled to be completed early 1990. The main phase will then commence and last for four years.

4. The second largest project of the Programme deals with Post-Harvest Fisheries. It is funded and executed by the ODA of UK. The project was originally approved for about two years till the middle of 1989. During the year however an extension till end-1991 (to coincide with GCP/RAS/118/MUL) was granted and the budgetary provisions were increased.

5. The Bio-economics project, with UNDP as the potential funding agency, is not yet operational. It has been in the pipeline for about two years. One year ago the project was endorsed by five of the seven countries. It was further endorsed by the national aid-coordinators meeting in March 1989. In the middle of 1989, the sixth country endorsed the proposal and it was then hoped that the project would become operational from 1990. India has lately decided not to participate in the project but it is believed that they would have no objection to the project being located at the BOBP headquarters in Madras, India. The final approval from UNDP is awaited.

6. The project for "Training in Fisher-folk Communities" sponsored by AGFUND was also not operational during 1989. The project was approved as early as 1988, but AGFUND required individual endorsement from all participating countries. The last country to formally endorse it did so in the second half of 1989. The funds should still be there and it is hoped that the project will become fully operational from 1990.

7. The Information Service of BOBP is funded by the member countries through a Trust Fund arrangement with the FAO. It is treated as a separate project for administrative reasons. It is formally attached to the GCP/RAS/118/MUL but covers the entire Programme.

8. Of the national projects listed in the diagram, the one on "Credit for motorization of Chandi boats" in Bangladesh was not operational pending formal arrangements to be finalized between the Government of Bangladesh, DANIDA and BOBP. The "Radio for Fisherfolk" in Sri Lanka is a subproject of GCP/RAS/118/MUL but is co-sponsored by NORAD through its office in Colombo. The IMO/SIDA project attempting to make the Visakhapatnam Fishing Harbour cleaner has been completed during the year. The other three national projects will continue through 1990.

9. The contents of the programme are indicated by the disciplines (see the diagram). All of them, except "Training", form distinct organizational units; the training is undertaken under each of the other disciplines. The functional relationship and the staffing are shown in the attached organization chart.

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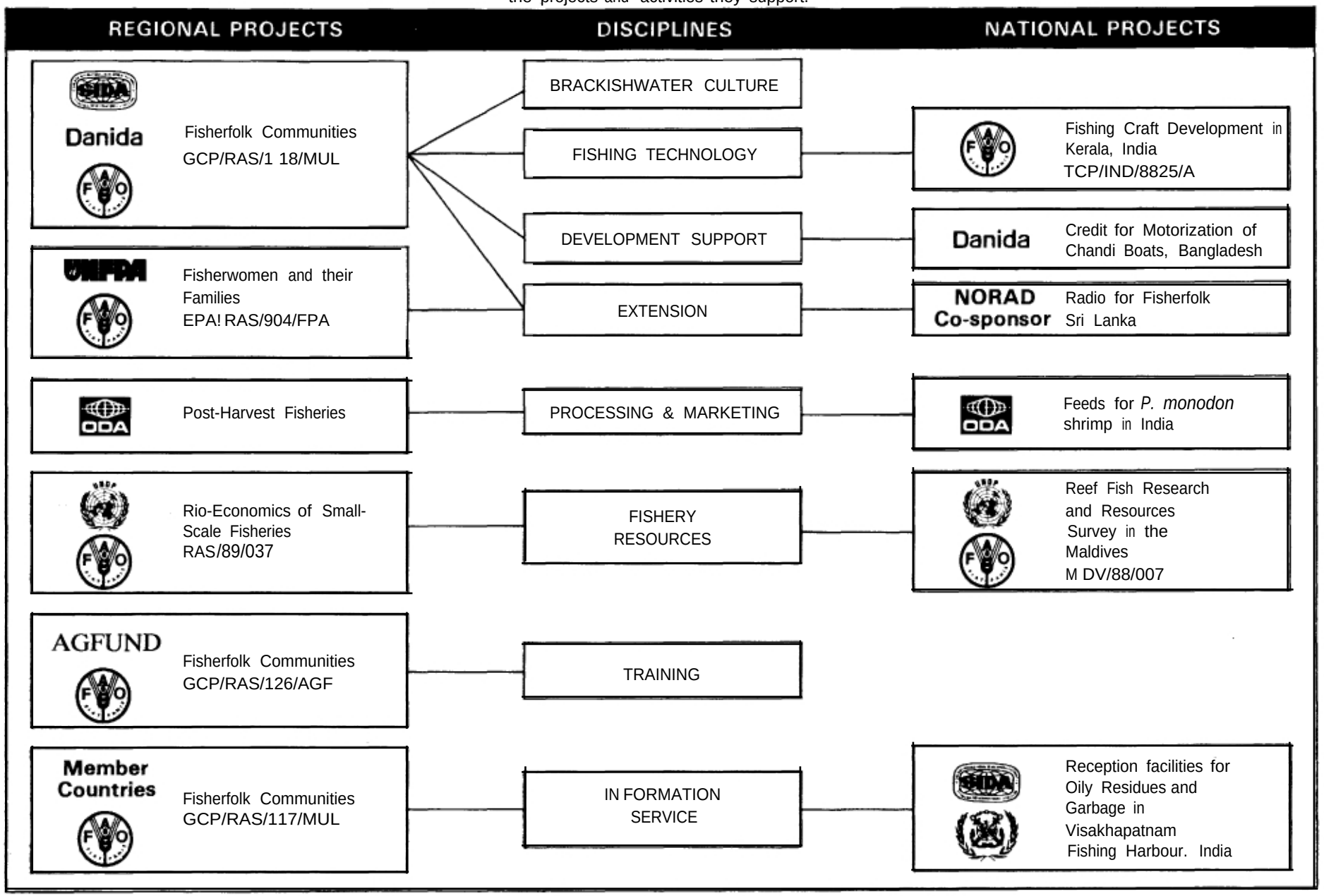
BOBP projects at a glance

Besides its main project "Small-Scale Fisherfolk Communities in the Bay of Bengal," which is funded by SIDA and DAN IDA, BOBP executes several regional (covering two more countries) and national projects sponsored by other agencies. This table gives an idea of all the sponsoring agencies concerned with BOBP work and the projects and activities they support.



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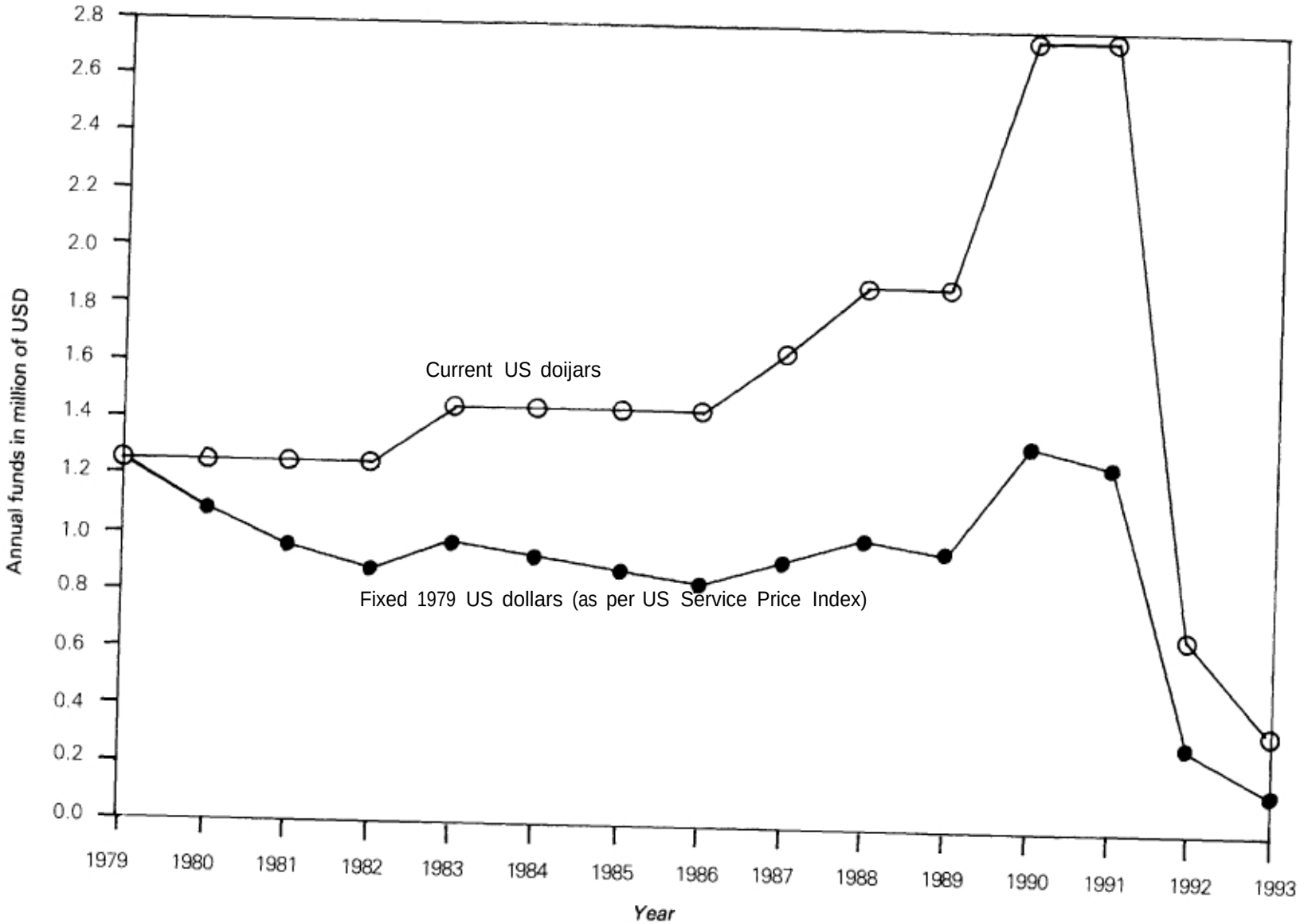
BOBP FUNDS OVER THE YEARS

The effect of inflation



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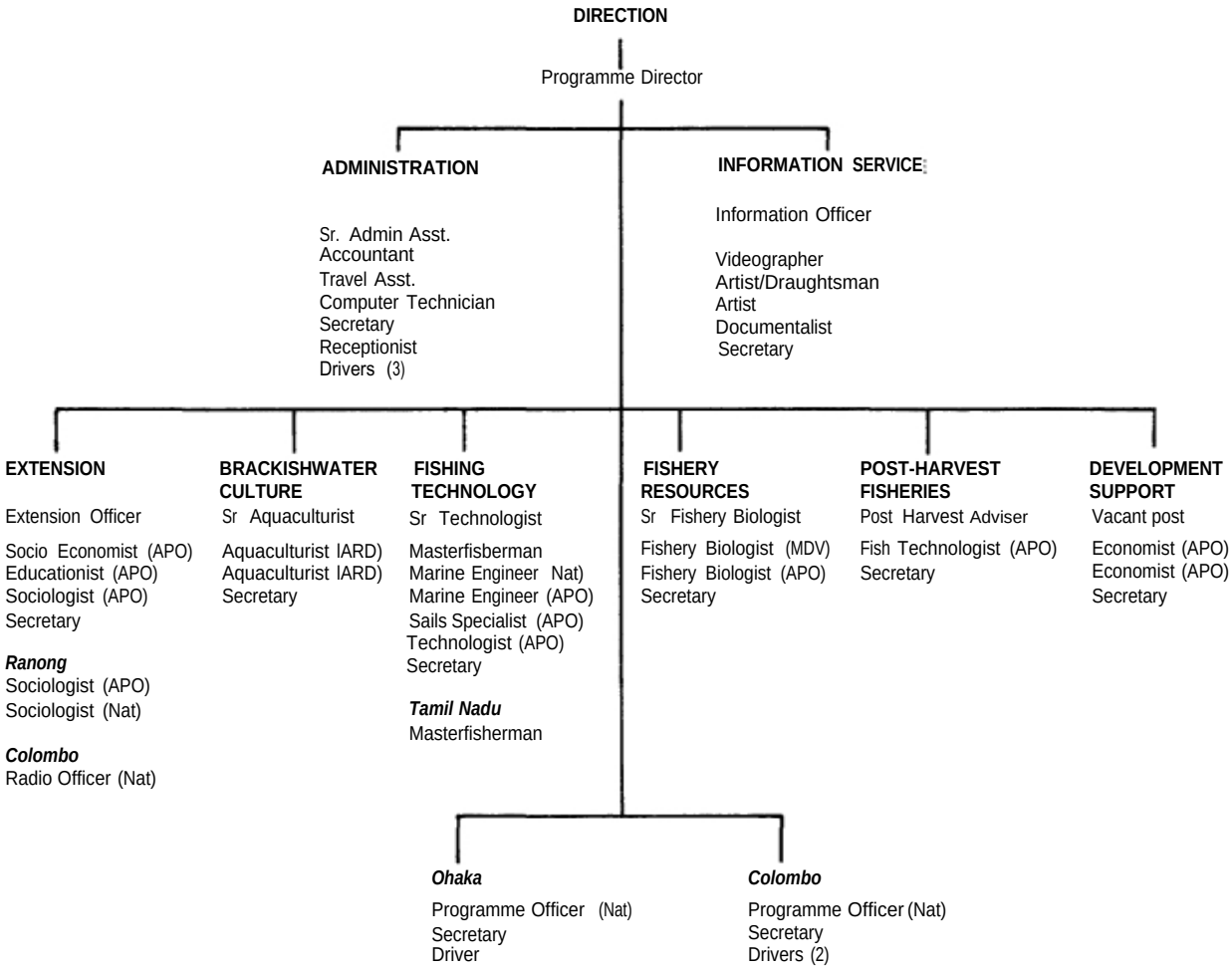
ORGANIZATION CHART



Location in Madras unless otherwise stated
Nat National Officer
APO Associate Professional Officer
MDV— Maldives

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FUNDS

10. The total budget of the regional projects is at present about US $ 12.3 million. The national projects account for about US $. 1.3 million. Details are given in the table below. The yearly budgets have for simplicity been derived by distributing each project budget equally over the project duration.

(Figures in dollars thousands)

Regional Projects	*1987*	1986	*1989*	*1980*	1991	1992	1993	TOTAL
GCP/RAS/118/MUL (DANIDA/SIDA)	1,600	1,600	1,600	1,600	1,600			8,000
Post-Harvest (ODA)		236	236	429	429			1330
FPA/RAS/904/FPA (UNFPA)			100	250	250	250	250	1,100
RAW391037 (UNDP)				300	300	300	100	1,000
GCP/RAS/117/MUL (Countries)	100	100	100	100	100			500
GCP/ RAS/126/AGF (AGFUND)				133	133	134		400
SUB TOTAL	1,700	1,936	2,036	2,812	2,812	684	350	12,330
National Projects								
Reef fisheries - MDV (UNDP)	95	95	180	180				550
Shrimp feed - IND (ODA)				158	158			316
Chandi Boats - BGD (DANIDA)				150	50			200
Fishing Craft - IND (FAO)			70	70				140
Oil pollution - IND (SIDA/IMO)		40	40					80
Radio programma - SRL (NORAD)			20	10				30
Sub total	95	135	310	568	208			1,316
Grand Total	1,795	2,071	2,346	3,386	3,020	664	350	13,646

11. The total annual budget of BOBP's regional projects during the first phase 197986 varied from US $ 1.25 to 1.45 million. The increase to $ 2.0 million in 1989 and the estimated level of $.2.8 million during 1990-91 can therefore be regarded as satisfactory in terms of current dollars. Considering the time value of money however, the increase in funds barely compensates for inflation. (See attached graph). It is also noteworthy that the inputs are more thinly spread. There are two more countries fully participating in the Programme and there is one more subject, Post-Harvest Fisheries.

ISSUES

12. A major issue is the duration of the present phase of the programme. The mother project GCP/RAS/118/MUL is scheduled to terminate in 1991, while some of the others have been sanctioned recently or delayed in its implementation and therefore continue into 1993. The review of GCP/RAS/118/MUL recommended an extension of the project for 12 - 24 months in order to complete what was envisaged but not possible to achieve due to initial delays in some of the countries. Such an extension would therefore not only be beneficial to this project itself but to the Programme as a whole. It therefore seems that this phase of the programme would come to a logical end in 1993. The period between now and then would also be sufficient to formulate and process new projects for a follow-up phase starting in 1994.

13. Another major issue is the continuous postponement of the approval of the "Bio-economics" project. It is particularly disappointing that the project has not yet materialised since it would deal

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with the most important issues for fisheries development and management in the future. The Fishery Resources discipline has been funded largely by GCP/RAS/118/MUL for about 2.5 years. This has to a certain extent cut into the resources available for the other disciplines. However, the Fishery Resources component is considered essential. It has a very extensive interaction with all other Programme disciplines. A continuation of temporary arrangements would however lead to inefficient use of the professional staff concerned. If the UNDP approval is not ready at the time of the Advisory Committee Meeting in January 1990, consideration should be given to include the Fishery Resources component in GCP/RAS/118/MUL.

14. In the 13th meeting of the Advisory Committee and in the Sixth Session of the IOFC Committee for the Development and Management of Fisheries in the Bay of Bengal held in January 1989, it was recommended that the Programme should prepare a proposal for a project to investigate the effects of pollution on fisheries, and also enlist support for the project. This was done and the proposal is entitled "Assessment of Pollution Hazards". The Scandinavian agencies assign a high priority to such activities, but have unfortunately not been able to sanction a project because of the current restrictions under the Trust Fund arrangements with FAO. Investigations are in progress to find alternative ways and means of implementing such a project under the BOBP umbrella.

15. Another proposal discussed in the 13th Meeting was "Communication Support for Fisherfolk Development". An outline proposal has been informally submitted to BOBP's majordonor agencies. But for the same reason as for the pollution hazards project, the matter has not been pursued. If the current phase of the programme is extended till 1893 renewed efforts could be made to secure support for such a project, A third proposal discussed in the 13th meeting was about strengthening nutritional aspects of fisheries development. This proposal wasforwarded to the agency concerned but was rejected. It has since not been pursued since reservations were expressed in the 13th meeting with regard to the needs and modalities for implementation of the project.

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Appendix E

ANNUAL REPORT – 1999

Introduction

The major project of the Bay of Bengal Programme (BOBP) during 1989 continued to be "Small-Scale Fisher-folk Communities", GCP/RAS/118/MUL, funded by DANIDA and SIDA. The initial duration of the project is five years from 1987 to 1991. The budget is about US $ 8 million. The work of the project is organized into five units of different disciplines, i.e. Extension, Brackishwater Culture, Fishing Technology, Fishery Resources and Development Support.

The project is supplemented by cash contributions of about US $0.5 million from the participating governments (Bangladesh, India, Indonesia, Malaysia, Maldives, Sri Lanka, Thailand). This contribution is intended for the Information Service which covers all projects of the BOBP. It is treated as a separate project, GCP/RAS/117/MUL, for administrative purposes.

Another project GCP/RAS/126/AGF, which offers training support to Small-Scale Fisherfolk Communities, is funded by the Arab Gulf Fund for United Nations Organizations (AGFUND). Approval in principle was given by the AGFUND in 1988 but procedural delays in endorsing the project by some countries prevented implementation in 1989. Now, with all member governments having endorsed the project, it is anticipated that it will start early 1990. It has a contribution of US $ 0.4 million over three years.

Other regional projects under the BOBP umbrella are "Post-Harvest Fisheries" funded and executed by the ODA of UK, "Women and their Families in Fishing Communities" – UNFPA/FAO and "Bio-economics of Small-Scale Fisheries" – UNDP/FAO. There are also a few national projects implemented through the BOBP which are funded by FAO, IMO, ODA and UNDP. An overall picture is given in a separate report, "State of the Programme 1989". The regional projects in operation are reported on separately and all the national projects are reported on together in one document.

This report covers RAS/118/MUL, RAS/117/MUL and RAS/126/AGF but, as mentioned above, no activities were undertaken under the latter project.

The report contains a narrative summary for each discipline which highlights the year's work, problems and issues and future plans. The subprojects under each discipline are then discussed in a table that gives information about objectives (and how they link with BOBP's overall objectives), targets, achievements and future plans. This reporting format is based on the recommendation made in the 12th Advisory Committee meeting.

A mid-term review of the RAS/118/MUL was conducted during the year, the report of which is presented in a separate document. It contains several opportune findings and useful recommendations that may help the project to further improve its performance and better achieve objectives. They have been incorporated in the work plans wherever it was found practicable considering the remaining duration of the project. Other recommendations could and should be considered once a decision is taken to extend the project which was recommended by the review mission.

EXTENSION

During 1989 the integrated fisheries extension subproject in Ranong, Thailand reached a stage in its development when it became useful for the staff to sit down and reflect on what they had learned, in terms of extension approaches and methods. The two other extension development projects in the Maldives and Bangladesh got off the ground, the latter more later than the former, and are progressing well with fisheries officers beginning through training and studies to understand the needs of fisher-folk in order to better design extension responses. The credit subproject in Sri Lanka is on-line again after several unavoidable delays, and we may have the credit programme and its supportive structures designed by end-1999 In Indonesia the subproject on increased incomes for fisher-folk has moved beyond group formation and choosing of enterprise options by fisherfolk and is moving into enterprise management. The radio programme in Sri Lanka is popular, and with feedback from the listeners is attempting to change and be more responsive to fisherfolk needs. In India, BOBP's efforts to channel and amplify extension to fisherfolk have clearly indicated that the best way to help NGOs to help fisher-folk is through the different technical and extension subprojects rather than through an omnibus NGO activity. The reasons are the diversity of levels of understanding among NGOs of fisheries and fisherfolk development and the diversity of needs.

The issues in extension continue to range from the need for open-ended projects to meet fisherfolk needs, to meeting non-fishery needs, and the concern that development of this sort is time-consuming and rarely fits shorter project schedules. However, with the current phase of BOBP nearing its end, there is a need to focus on certain crucial factors. With delayed starts and delayed processes the extension projects in at least three countries will not reach a stage by the end of 1991 where the countries can benefit from the learning and the experience. With more than half the project period behind us, it is also time to stop and reflect on what has been learnt. Extension tends to generate ideas and methods which if not carefully documented tends to get lost. The ways of extracting such learning and making it a part of the fishery agency's mainstream is another concern that is now being addressed. These and other questions will be raised and discussed, and even some directions may emerge, from the fisheries extension consultation planned for January 1980.

In the coming year (1990) emphasis will be given to push ahead with the subprojects that are behind schedule in Bangladesh, Maldives and Sri Lanka (credits). It will also be a year where one should spend more time in reflecting on the learning and the means of capturing and internalizing it. This concerns particularly the subprojects in Thailand and Indonesia and the general work on People's Participation and Rapid Rural Appraisal.

An area in which the existing thrust will be considerably strengthened is that of working with women in fisher-folk communities. The new UNFPA project, reported on separately, will assist with income generation, enabling and strengthening organization for their social benefit, and making available health and population education on a pilot basis in all the seven member countries.

Details of the status of the subprojects and of future targets are given in the project descriptions that follow.

Subproject	General Services, (EXT/ G EN)
Targets 1989	**Achievements**
Completion of manual/guidelines for participative project identification, planning and implementation	Not done. The draft manual on Rapid Rural Appraisal (RRA) and Participatory Planning will be used in a full scale test of RRA to understand the pros and cons of the approach. This exercise has been postponed to March '90 to fit the availability of the international consultant who will lead it.
Review of fisheries extension approaches in BOBP countries	The counterpart fishery agencies in all BOBP countries are preparing papers describing their experiences with fisheries extension, focussing on problems and issues. They will be discussed in the Fisheries Extension Consultation in January 1990.
Organisation of a regional consultation on fisheries extension	Done. It will be held 18-20 January 1990 in Medan, Indonesia.
Review of women link worker scheme in Tamil Nadu	Done by a team of two consultants and an officer of the DOF. Their draft report, presently being discussed with the DOF, is positive about the developmental role that the link worker scheme can play in fishing communities but cautions that the success of the scheme would depend on improved selection of link workers, better and more task focussed training and intensive and regular support and backstopping from the DOF.
Participation in DANIDA - sponsored NFAE project in Tamil Nadu	BOBP is represented in the Project's Advisory Committee and helped in the selection of staff for the facilitation team which will help the project in training, planning and monitoring.
Review of methods and media for better management practices of fisher-folk	In cooperation with the Resources Unit an attempt is under way to evolve learning materials (comic books) to aid fisher-folk in understanding fishery resources and the

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	impact of fishing on it in order to steer fisherfolk towards participatory management.
Identification of specific extension measures aiming at women and children	Not specifically undertaken under this project since it will be done under the UNFPA-supported project "Improvement of Living Conditions of Women and their Families in Fishing Communities".
Support to other subprojects	BWC/OYS/MAL – people's participation FIT/BCI/IND – socio-economic impact study assessment of socio-economics and dynamics of communities RES/KAT/IND – socio-economic survey RES/SBD/BGD – preparation of socio-economic study
Unplanned	Further help has been extended to women fish vendors in Madras in their effort to get their own fish market. It is nearing completion. The women have had a series of training sessions in group formation, management and in forming their own organisation, in anticipation of moving in and running the market. See Bay *of Bengal News No. 35.*

Targets 1990

Regional Consultation on Fisheries Extension.

Participation in DANIDA-sponsored NFAE project in Tamil Nadu.

Assistance to GOTN in establishing bilateral support for the women link worker scheme.

Completion of manual/guidelines for Rapid Rural Appraisals of fisheries/fishing communities.

Developing organisational/management skills of fish vendor women in Madras.

Promotion of fishetfolk NGOs through catalytic efforts with NGO funding agencies.

Promotion of fiiherfolk-fisheries agency dialogue/discussion.

Support to other subprojects.

Future

Ad hoc services and support to other subprojects will continue throughout the project.

Subproject	*Fisheries Extension Services, Maldives* (EXT/ FES/ MDV)
Objective	Establishment of a fisheries extension unit and training its staff. The unit will help fisherfolk communities to increase their earnings and improve the quality of life, through (a) training and demonstration of new and improved technologies in fishing, post-harvest technndogy and other development. (b) facilitating infrastructural development and (c) improving communication and organisation of fisherfolk by establishing a network of link fishermen'. The targets of the subproject are fisherfdk communities in Meemu, Vaavu and Faafu Atolls. MinFish envisages a countrywide expansion in due course.
Status 1988	A subproject to establish a pilot fisheries extension service had been agreed upon. Three prototypes of manual hauling devices for boats were developed and shipped to Male.

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Targets 1989	Achievements"
Staffinq of Extension Unit (4 officers), supply of equipment and logistic support	The extension unit has been established in the Ministry of Fisheries & Agriculture (MOFA) and one senior and three junior officers have been assigned to it. A deep-water echo sounder to be used for deployment of Fish Aggregating Devices has been supplied from the BOBP stock. The equipment needs for the next year have been identified. An analysis of logistics suggests that hiring boats for extension work in the near future will work out cheaper than acquiring a purpose-built boat given the costs and crew situation.
Officers' training in extension, project planning, management and people's participation	Two sessions of on-line training in needs analysis, people's participation and extension have been conducted with the three junior extension officers. One junior officer was trained in Post-Harvest Technology in CIFT, India (sponsored by ODAI, and two junior officers were trained in operation and demonstration of beach hauling devices. Specific training needs of the extension staff have been identified.
Network of 'link fishermen'in important fishing islands to aid communication with, and organisation of. fisher-folk	Discussions have been held with fisherfolk, island and atoll officials and shortlists of potential link fishermen made for all the sixteen target islands. Three link fisher-men, one from each atoll, have been appointed and briefed.
Demonstration of manual boat hauling devices	Four different boat hauling devices have been demons-trated in three islands of two atolls and are being used and monitored by fisherfdk. Needs analysis has identified islands where the need for hauling devices is felt. Moni-toring studies have identified the preferred boat hauling devices and their costs.
Identification of other infrastructural needs in important fishing islands	Completed as part of needs analysis.
Inventory of potential trainers in fisheries and fisherfolk development, and identification of their training needs	Not much has been done due to time constraints but a post-harvest fisheries consultant (ODA) recommends after a visit to the target area, that the extension staff receive training to promote improvement in quality of cured fish destined for export.
Unplanned	Extension staff undertook rapid appraisals of all sixteen target islands to compile islandwise information on the fisherfolk community and its activities, its needs and concerns and the factors that would aid or hinder development. The results are being documented.

Assessment

The subproject got off to a good start with good participation of the assigned officers. One of the problems encountered has been that staff while being trained are unavailable for day-to-day work and in a small organisation this can create problems. With MOFA playing a catalytic role in some areas success would depend on MOFA's ability to develop cooperative links with other government agencies.

Targets 1990

Report on demonstration of boat hauling devices,
Supply of required equipment.
MOFA extension officers trained in selected extension and technical areas.

• Investigative field work in the target atolls was undertaken during December 1989. Details ware not available at the time of preparation of this report.

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Improved technologies in post harvest technology extended through training and other inputs.
Provision of infrastructural facilities in selected islands through catalytic role of MOFA.
Inventory of trainers and their training needs identified.
Training of trainers in selected areas based on needs and priority.

Future

Training of MOFA staff and staff of related agencies.
Training of trainers.
Provision of infrastructural facilities.
Extension of new and improved technologies.
Methods, training and media to enable extension and fisherfolk development.
Plans/programmes for expansion of extension services to the whole country.

Subproject	*Fisherfolk Radio, Sri Lanka* **(EXT/RDO/SRL)** (This subproject is partly sponsored by NORAD through its Colombo Office)
Objective	Introduction of a radio programme as a communication and extension tod to help fisher-folk in their development. It is hoped that the radio programme, through participative programming, will give fisher-folk a voice.
Status 1988	A programme strategy was developed. Needs and interests of the fisher-folk audience were identified. A Radio Programme Unit (RPU) was established in the Minfish. it comprised of five staff trained in radio production and broadcasting headed by a professional broadcaster. Sample programmes were prepared and tested. Arrangements were made to organize weather forecast and fish price inputs. A high level steering committee to guide the RPU and protect its independence in programming was convened.
Targets 1989	**Achievements**
Regular broadcasts aimed at the pilot area of the southwest coast from Puttalam to Galle	The fisherfolk radio programme 'went on the air 2.1.89 with daily five-minute broadcasts (Man-Sat) between 1825 and 1830 on the Sinhala commercial service. From 15.1.89 a 15-minute weekly programme went on the air on Sundays between 1130 and 1145. Despite disturbed conditions in the country the radio programme has been on the air without interruption. Special 1/2 hour programmes were broadcast on New Year, Wesak, and World Food Day.
Evaluation of audience responses and adjustment of programmes as appropriate	The RPU staff seek audience responses during their field visits for programme development. A non-governmental organization in Colombo, IRED, has been contracted to undertake regular informal feedback/monitoring studies. The key findings are that the programme should simplify its language, should provide programming for the entire family and not just fishermen, should broadcast prices of dried fish and of fishing gear in addition to fish prices, should increase the accuracy of the weather forecasts, and focus its features on laws and regulations of fisheries and on details of new schemes and programmes aimed at aiding fisherfolk. The RPU and the steering committee have taken steps to modify the programming to suit the fishermen's needs.

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Evaluation of the fisherfolk radio programme by an international consultant	Not undertaken. it was planned for Nov. '89 but has been postponed till early/mid 1990.
Phasing in of commercial programme sponsorship	Not undertaken. Considered premature given the weakened economic situation in the country and the disturbed conditions.
Unplanned	Supplementary training of RPU staff in (a) the use of their field recording equipment by SLBC and (b) story development and broadcast writing by the Social Communication Centre in Colombo.

Assessment

The RPU staff did a commendable job keeping the programme on the air given the conditions in the country. With the help of audience response/feedback, efforts are under way to modify the programming to better suit listener needs. A probiem has been the low level of fisherfolk participation in the programming as field visits and recording have been severely constrained. Moving the programme towards commercial sponsorship will require a committed and enthusiastic RPU team to develop a programme eagerly sought after by fisher-folk and therefore by commercial sponsors. This needed level of commitment and excellence may be difficult to achieve given the Minfish restrictions on compensation to RPU staff. One may have to consider creating a RPU outside the Ministry, manned by outsiders who are not restricted by government regulations and yet under the guidance of Minfish.

Targets 1990

Evaluation of fiiherfolk radio programme by an international consultant.

Training RPU staff based on recommendations of the evaluation.

increased fisherfolk participation in programming.

Better coverage of technical subjects.

More comprehensive price information on fish and fishery inputs.

Monitoring of audience responses and appropriate adjustment in programming.

Initiation of commercial programme sponsorship.

Mid-term report.

Future

Pilot radio programming for fisher-folk in Tamil speaking areas, if conditions allow it.

All-island fisher-folk radio programming.

Sponsorship of the radio programme to enable Minfish take over of programming responsibility.

Subproject	*fisherfolk Credit, Sri Lanka* **(EXT/FFC/SRL)**
Objective	Introduction of a non-subsidised credit scheme under the bank's normal lending programmes for small-scale fishery, fishery-related activities and other economic activities in order to increase the income of fisher-folk and their families. The target of the sub-project is small-scale fisher-folk, particularly owner/operators of small crafts, labourers and women from the fisherfolk communities in the districts of Puttalam, Gale, and Matara who have no or limited access to credits
Status 1988	Inventory and socioeconomic study of fiiheries, fisheries related and non-fishery economic activities were

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designed, pilot testing of questionnaires undertaken and final questionnaires produced. Minfish, Bank and NGO staff trained to undertake the field work and studies. Field work not continued due to disturbed situation in target areas.

Targets 1999	Achievements
Inventory of socio-economic data of fisherfolk communities	After further delays due to disturbed conditions in the target areas it was decided to reduce the scale of the study from a total coverage to a 25% sample of villages selected on the basis of a stratification to ensure representation of population size and fishing types. The field work has been completed, the questionnaires post coded and analysis of the survey is on-line. Results are expected early in 1990. (The change in survey design required modification of the output tables and the non- functioning of universities required a change of processing and software facilities to the private sector.)
Cost and earnings analysis of fisheries, fisheries-related and non-fisheries economic activities of fisher-folk	Not undertaken. Will follow inventory and socio-economic study which will identify the economic activities to be studied.
Minfish and bank staff to be trained in various aspects of activities of coastal fisher-folk; economic and financial analysis of enterprises; rural banking	Not undertaken. will evolve out of the studies and training workshops to consolidate and share the information collected
Study of successful credit schemes abroad by selected Minfish and bank staff	Not undertaken. Was considered premature considering the delayed status of the subproject.

Assessment

There have been severe delays and the subproject is still in its preparatory phase to evolve viable credit schemes. But without serious setbacks in the future it should be possible to complete preparation well before the end of 1990. Thereafter banks need a certain time to process and clear the proposals that may emerge. With a bit of luck some credit packages could possibly be released during 1991. In order to test the packages, to tune them and obtain feedback, an extension of the subproject by a couple of years would be required.

Targets 1990

Inventory of existing fisher-folk-oriented credit schemes and their status.

Inventory of socio-economic data of fisherfolk communities (completion including reports).

MinFish and bank staff trained in economic and financial analysis of enterprises.

Costs and earnings and economic analysis of economic activities of fisher-folk.

Training needs analysis of bank branch staff and HQ staff to facilitate motivation and efficient management.

Credit schemes, credit flow strategy, banking plan and monitoring mechanism.

Future

Loan disbursement.

On-line refinement of scheme based on monitoring.

Deposit mobilisation.

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Subproject	*Extension Support through NGOs, India* (EXT/ NGO/IND)
Objective	Strengthened extension efforts to fisher-folk communities through training of, technology transfer to, and support for extension schemes of non-governmental organisations working with fisherfolk. The ultimate targets of this activity are small and artisanal fisher-folk in selected locations along the east coast of India *through* the more immediate targets, non-governmental and voluntary groups working with and for fisherfolk.
Status 1388	Through discussions and visits of multi-disciplinary teams from BOBP the training and technology needs of six NGOs, three each in Andhra Pradesh and Tamil Nadu, were identified and efforts were under way to evolve co-operation with the groups.
Targets 1989	**Achievements**
Identify specific fisheries extension-training needs for selected NGOs in Orissa and West Bengal	In two three-day workshops with multi-disciplinary teams from BOBP and seven NGOs in West Bengal and five NGOs in Orissa, some areas were identified for training needs, and they were in the fieids of Fishing Technology (engine use and maintenance; extension approach for crafts and gear), Brackishwater Culture (nursery management of shrimp fry; development of small shrimp hatcheries), Resources (resource assessment), Post-Harvest Technology (drying and processing of fish) and Extension (appraisal and development of non-formal education, insurance, credit and disaster preparedness schemes). The other needs identified were for information regarding fisheries and fisherfolk development and help with design of surveys in extension, marketing and resources.
Sensitize senior staff of selected NGOs to technical and economic aspects of small-scale fisheries in a workshop	Specific workshops further to the ones mentioned above were not held.
Development of training package for NGO field personnel together with the senior NGO staff.	Not undertaken as the levels of understanding of fisheries and fisherfolk and the social and fishery situation in which the NGOs function were found to vary so much that anything short of custom-designed training for each group would not serve the purpose.
Direct support in training and technology development to NGOs in areas already identified	Support has been provided through the post-harvest fisheries project (ODA) in Tamil Nadu concerning fish container for headloading and bus transport, fish marketing and handling/processing of bulk landings of anchovy during the monsoon.

Assessment

There are essentially two types of NGOs (see *Bay of Bengal* News No. 34 for detailed analysis) :

(a) A very few, who have a good understanding of fisheries and fisher-folk and their problems, who have a good idea of what they want and have the absorption and managerial capacity to turn inputs into extension for fisher-folk. Their needs are quite specific, often technical in nature and need particular responses. There might be several areas of mutual interest e.g. prawn seed supply in West Bengal and beachcraft introduction in which fruitful cooperation could be established between BOBP/State Governments and NGOs.

(b) A large majority, who would need considerable input to build up their awareness and competence, particularly in technical and managerial aspects, before they could absorb and

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translate the inputs to fisherfoik as extension. Given the wide variety of background levels of understanding and concerns a training effort would have to be custom designed. This questions the idea using NGOs as a channel for extension services to fisher-folk as the channel itself has to be developed. This is something that needs to be done and perhaps BOBP could play a catalytic role in it but the primary responsibility would lie with the NGOs themselves and with agencies that fund and support NGOs.

In view of this assessment it is proposed that the separate subproject for NGOs be terminated and NGO cooperation be deployed to specific technical and extension subprojects with facilitation built into General Services of Extension (EXT/GEN).

Subproject	*Fisheries Extension Development, Bangladesh* (EXT/FED/BGD)
Objective	Demonstration of extension support to fisher-folk communities through training, technology transfer and support of pilot extension schemes. The immediate targets are the fisherfolk communities of Patuakali and Barguna districts of Bangladesh. The coastal fisherfolk have little or no extension services because marine fisheries have had low priority in fresh water predominant Bangladesh. The subproject hopes to demonstrate that a trained cadre of DOF extension and NGO staff, with some logistic support, project financing support and functioning in a participative manner, can address the needs and problems of fisherfolk communities.
Status 1988	No activity except some preparatory field visits by BOBP staff were undertaken as the subprojects in Bangladesh awaited government clearance.
Targets 1989	**Achievements**
Logistic support to DOF staff in Barguna and Patuakhali through provision of vehicles and boats	Based on assessment of transportation needs at Uppazilla and district levels in Patuakhali and Barguna, eight motorcycles and two workboats with OBMs have been ordered.
DOF field staff and HQs staff and personnel of selected NGOs trained to undertake socio-economic and needs analysis	DOF staff (23) of district level and the Uppazillas (11) and NGO personnel (3) of Barguna and Patuakhali were trained during a five-day training programme in July, monthly 2-day review workshops during the field work and a 4-day consolidation training workshop at the end of the 3-month data collection and analysis period.
Understanding of fisheries, socio-economic, occupational and community aspects of coastal fisher-folk through studies in selected villages by DOF and NGO staff	Participating DOF and NGO staff undertook 3 months of field work to gather information about their Uppazillas to get an understanding of fisherfdk, the dynamics of their communities, their occupations and needs.
Training of DOF staff and NGO personnel in participatory project identification, planning and implementation and in technical aspects of fisheries as required.	DOF staff (21) of district level and the Uppazillas and NGO personnel (2) of Patuakhali and Barguna were trained in participatory project identification and planning at a 3-day training held in Patuakhali in Nov. '89. The subsequent field work and the training in participatory implementation has begun and will be completed early in 1990. One technical training workshop was held, in cooperation with ODA, in December in Barguna where DOF staff and NGO personnel were trained in post-harvest handling, processing and technology of fish in theartisanal sector.

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At least one extension activity designed and planned for in each Uppazilla	Not undertaken. Will follow the trainings and field work later in 1990.

Assessment

A further delay in receiving clearance lost another six months in a project already delayed by two years. Once started, progress has been very satisfactory thanks to the participation, interest and dedication of the DOF field staff. The field work was difficult and time-consuming because the staff had to carry a full complement of their duties in addition to the subproject activity. However, the analysis and the presentation of it in well-documented reports suggests that given the right support the officers have the potential to do an excellent job. In view of the demonstrated ability to handle the activity, it is proposed that the extra extension staff planned for need not be hired. It will be difficult to implement the subproject, planned as a 5-year activity, and learn from it in the short time left (2 years).

Targets 1990

DOF staff and NGO personnel trained in participatory project implementation.

Orientation workshops for DOF staff and NGO personnel in inland pond aquaculture and fisheries resource management.

Identification, planning for and implementation by Uppazilla officers and NGOs of at least one extension activity in each Uppazilla.

Development of training manuals in socio-economic and needs analysis and participatory planning for DOF officers.

Future

Implementation of extension activities/services in each Uppazilla.

Methods, training materials and media for improved extension services.

Subproject	*Extension Services for Small-Scale Fisheries in Ranong, Thailand* (EXT/ESR/THA)
Objective	Development and testing of a model for an improved extension service to enable integrated fisher-folk development. The subproject is aimed at small and artisanal fisherfolk in the province of Ranong, Thailand. It will generate improved knowledge on the problems, needs and aspirations of fisher-folk, and identify the means and services to satisfy these needs and aspirations. It will identify specific fishery and fishery-related activities which would lead to improved incomes amongst fisherfolk. It is hoped that the subproject would serve as a model for integrated fisheries and fisher-folk extension services in the coastal provinces.
Status 1989	On the basis of credit needs and cost and earnings studies loan proposals for cage culture and gear renewal were prepared and submitted to banks from two villages. Women in four villages were trained in cooking and nutrition. Problem census undertaken in three villages formed the basis for the formulation of pilot schemes in health, education and enterprise development in cooperation with the concerned government departments. Some fisherfolk were exposed to and trained in crab fattening. Demonstration and extension of new crab traps

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	and oyster culture faced several problems and these were being studied. In fish cage culture fisherfolk were helped with the management of fish disease in the cages. Shrimp cage culture was found to have potential and its promotion was prepared. A review of the subproject recommended its continuation with more emphasis on the socio-economic aspects and on the development of extension methodology.
Targets 1989	**Achievements**
Credit schemes functioning in at least two villages	Banks refused credit without collateral security. A revolving fund scheme was set up under the guidance of a provincial level committee chaired by the Governor. Seventy five fisherfolk residing in 12 villages have received loans to help with crab traps and crab fattening. Repayments will be used to set up village level funds administered by village committees.
Understanding of fisher-folk needs, concerns and aspirations and of community dynamics through participatory studies and dialogues in selected communities	Extension activities were routinely followed up by staff to understand the socio-economic implications of the activities and the impact of beneficiaries. Problem census and needs analysis were further elaborated through group sessions with fisher-folk. The possible extension of new technical activities and planning for it was discussed with fisher-folk using teams of staff. Economic analysis of shrimp paste, food processing, fish drying in ovens and fish sauce activities was undertaken to determine their feasibility as income activities.
Establishment of social services in non-formal education, enterprise development and health in three villages in cooperation with NFC, CDD and Health Department	In cooperation with the NFC village information centre, reading rooms were set up in two villages. The NFC implemented a training course for women in sewing in one village. Several training courses requested by women could not be held by the NFC because it was not possible to meet the quorum required of 15 trainees in the small fishing communities. In cooperation with the Health Department mobile health services have been extended to two villages and is under establishment in one village to offer primary and preventive medical care, health and sanitation education and family planning education and services on a regular basis.
Assessment of culture viability by harvesting and marketing oysters from the initial grow out trials	Where grow out succeeded the prices received for the oysters suggest viability provided spat available locally or at reasonable cost. Of the three groups undertaking trials two are functioning well but one has failed due to group conflict. The oyster activity to date was reviewed, the problem areas identified and new directions proposed. The key concern that needs to be addressed is spat cdlection locally.
Assessment of feasibility of crab fattening by trials in selected villages	Not undertaken as sufficient number of culture cycles could not be gone through due to delays in start up caused by insufficient funding and seesonality of the crab fattening season.
Assessment of feasibility of shrimp cage culture by trials in selected villages	Twenty of the thirty eight fisher-folk who were trained in shrimp cage culture have started cultureactivities which were delayed due to the difficulty in getting cage building materials. The sudden and drastic drop in shrimp prices

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	in Thailand not only acted as a deterrent for fisher-folk in taking up culture but also to undertaking feasibility trials.
Introduction of fishery resources management aspects in interactions with fisherfolk concerned with fish cage culture and squid trap fishing	Only very preliminary discussions have been held.
Understanding the failure of crab traps	The reasons to ensure success were identified as better selection of beneficiaries to ensure committed and interested fisher-folk, environmentally appropriate site selection, improved training and closer and intensive follow-up by extension staff. The activity written off as a failure turned around dramatically, 61 fisher-folk having taken up crab traps. There are indications of fisherfolk-to-fisherfolk transfer of the technology. An indication of interest is that 41 of the fisherfolk trained demanded the training after seeing the performance of the 20 who were initially trained. See Bay of *Bengal News No 35.*
Project staff, PFO, CDD, NFC and Health Department staff trained in extension methodology and technical aspects of project activity	Project and PFO staff were trained in extension methodology and in setting project objectives/goals. Two of the project staff were sponsored by DOF to attend SEAFDEC's training in extension methodology. The project staff undertook a training visit to the east coast of Thailand to study marine fishery development options. Technical training in crab traps, food technology, oyster culture and disease management were organised for project staff by DOF subject specialists.
Study of other extension projects abroad by selected project staff.	Not undertaken. Visits planned to Malaysia to study oyster culture and Indonesia (Sumatra) to study extension development early in 1990.
Unplanned	Culture trials of green mussel were started in three locations in order to prepare for possible extension. Training in food technology given to women in four additional villages on request. Training in handicrafts to women's groups in four villages on request.

Assessment

The subproject is progressing towards both, its immediate objective of enabling integrated development of fisher-folk through extension and its primary objective of developing and testing models of extension. The performance in technical areas is good but the problems being faced in extending techndogies raise the issue of determining the "readiness" of a fishery technology for extension. This needs consideration. Socio-economics,inter-departmental cooperation, and development of extension methodology are being given more emphasis. These need continual reflection and priority in order to achieve the objectives. The difficulty of not finding institutional credit to support extension continues to be a problem.

Targets 1990

Documentation work, problems and achievements during the first three years (1987-89).

Improved understanding of fisher-folk needs, concerns, aspirations and reactions and of community dynamics.

Existing revolving fund credit schemes consolidated and developed.

Enhanced social services in non-formal education, enterprise development and health in cooperation with NFC, CDD and Health Department.

Identification of areas for and fisherfolk training in spat collection, and efforts to overcome oyster growout problems.

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Crab fattening trials in selected villages

Green mussels culture trials in selected villages.

Study of fishing systems for sustainable exploitation of artificial reefs.

Ranong 'project and PFO staff trained in extension methodology.

Study tours abroad by selected project staff of oyster culture in Malaysia and extension in Indonesia.

Future

Similar work is envisaged to continue throughout the project period.

Development of guidelines for smalkcale fisheries and fisherfolk development in coastal provinces.

Subproject	*Improved Earnings of Small-Scale Coastal Fisherfolk, Indonesia* (EXT/IEF/INS)
Objective	To improve the earnings and socio-economic status of fisherfolk in coastal communities through improving their managerial capacity with emphasis on group action. The target groups are small- scale fisher-folk in the coastal village of Langkat District of North Sumatera Province.
Status 1988	Basic socio-economic and community dynamics data was collected in 34 coastal communities. Samples of all the economic enterprises of fisherfolk were studied. An in-depth study of informal credit and marketing systems suggested that the existing systems satisfy fisherfolk credit needs and may affect the viability of an institutional credit system. The focus of the activity was therefore shifted to assist fisherfolk in organising themselves, better utilising their resources, analysing the feasibility of new enterprises, improving the existing enterprises through training, media development and support.
Targets 1989	Achievements
Groups of fisher-folk formed in three villages for self-help and for the establishment, management and operation of small enterprises.	Five men's groups and three women's groups involving 94 men and 88 women in three villages evolved out of the mobilisation efforts. This was initiated by small enterprise consultants from an NGO (Bina Swadaya). Fisherfolk group members trained in group organisation and administration, savings mobilisation, selection and feasibility analysis of new enterprises. Six fisheries and six extension services staff trained in methods and media for group mobilisation, feasibility analysis of small enterprises and enterprise development. Methods, training materials and media for group mobilisation/ management and feasibility analysis of small enterprises developed and preliminary documentation produced and field tested.
Establishment of a few viable small enterprises managed and operated by fisherfolk, individually or in groups in the villages	One of the women's groups has established and is running a poultry rearing enterprise. The other groups are in the process of determining the feasibility of enterprises they are interested in establishing.
Fisherfolk group members trained in improved management of small enterprises.	Training will be taken up as and when groups begin entrepreneurial activities.

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Study of other extension projects abroad by selected project staff	Two project staff undertook a study visit to BOBP's extension services subproject in Ranong, Thailand.

Assessment

The process of group mobilisation, particularly allowing groups to evolve according to their own criteria and at their own pace is a difficult and time consuming task. However, the time is well invested,as the year's experience suggests that once formed (and well formed),groups tend to accelerate in the next stage of enterprise development. The evolution of eight groups, two of whom came up by demonstration, and the fact that they are functioning is cause for optimism. Interestingly, some of the groups, on their own initiative, have taken on catalytic roles in village self-help activities along traditional lines.

The Fisheries and Extension Services staff in implementing the project, particularly after the consultants had left, showed their capability in continuing such activity on their own. However, to continue to do so there will be a need for more and better cooperation between agencies at the provincial level and sustained support to undertake activities that demand flexibility and innovation. It is hoped that intensification of training and support will enable the project staff to accelerate and improve the effort of group formation and enterprise development.

Targets 1990

Inventory of enterprise options with description and feasibility analysis by PFS and cooperating agencies.

Methods, training materials and media by which improved management of small enterprises can be demonstrated.

Fisheries and Extension Services staff trained in methods and media for group mobilisation and demonstrating and enabling management of fisher-folk enterprises.

Continued support to the fisherfolk and their enterprises particularly through training in management and in utilization of credit.

Replication of extension methodology in existing target villages in Langkat District, if requested by fisherfolk.

Future

Replication of extension methodology in other selected villagesin Langkat district.

BRACKISHWATER CULTURE

During 1989, activities concentrated on seaweed farming in India and Sri Lanka and oyster culture in Malaysia. Prawn fry projects in West Bengal and Bangladesh were hampered by land disputes and seasonal factors in the former and procedural delays in the latter. A workshop on Artemia propagation was held in Madras which highlighted some of the problems involved in developing the technologies. The highlights were :

Songkhla, Thailand was the venue for a very successful seminar dealing with culture, processing, marketing and natural resource management of agar- producing seaweeds. The farming trials in India on the other hand give no reasons for optimism. It seems that open-water culture of *Gracilaria edulis* is not possible because of the grazing problems. It is therefore proposed to terminate the subproject in India. There was also very little encouragement from the trials in Sri Lanka, but there the unsettled situation interefered with technical work.

Commercially viable methods for oyster spat collection were developed in Malaysia. Profitability of one culture system was established and another is under development. Test marketing of frozen oyster meats was successful.

Feasiblity studies of "backyard hatcheries" in West Bengal for tiger prawn and in Bangladesh for fresh water prawn have been completed and plans made for them to be constructed in 1990. Plans to assist prawn fry collectors are also well under way in West Bengal.

Besides the disappointing outcome of seaweed subprojects, the other setbacks during the year have been the land dispute in West Bengal delaying the completion of a nursery pond complex and

the procedural delay with Bangladesh activities. However the problems seem to have been overcome.

Therefore, in the coming year (1990) priority will be given to the implementation of the two prawn fry subprojects in the upper Bay of Bengal. In this context consideration will be given to outpost brackishwater culture staff to Bangladesh to facilitate a concentrated and cost-efficient effort.

An important goal in the coming year will also be the development of commercial growout systems for oysters in Malaysia and further refinement of spatfall predicting capability. Greater involvement of fisherfolk communities in the vicinity of ovster culture activities will be encouraged if and when profitability of farming *Crassostrea* species is established.

Subproject	General Services (BWC/ GEN)
Targets 1989	**Achievements**
A technical assessment of Artemia culture potential in Tamil Nadu and Andhra Pradesh salterns	Completed with help from an expert consultancy and a workshop (in Madras) involving government, university and private sector experts in salt production and Artemia culture. The field study and the discussion in the workshop revealed many problems in small-scale salt production technology. Most importantly, the BOBP target group is nowhere involved in salt production. An article in the Bay of *Bengal* News No 34 summarized the results of the assessment.
Project proposal for Artemia culture pilot project	Not done for reasons given above.
Report on pen culture of shrimp in Sri Lanka	Done. Published as BOBP/WP/60. See also Bay *of* Bengal News No 33.
	Financial support to continue shrimp pen culture was given to the Merawela SDO, Sri Lanka. By the end of five months of growout, heavy losses had been sustained. Only 23% of stocked prawns had been harvested. No further pen culture trials are planned.
Support to other subprojects	Review of oyster culture trials in Ranong (EXT/ESR/THA) and participation in meetings with NGOs in West Bengal (EXT/NGO/IND).
Unplanned	Technical advice and information is given to actual and potential shrimp farmers and feed manufacturers on an *ad* hoc basis. BWC/GEN serves as a conduit for information to a variety of acquaculture projects/experts.
	A minor field study of the economics of small-scale *monodon* hatcheries in Thailand was undertaken by two post graduate students from Sweden.

Targets 1990

Study tour by Indian officials to observe trends in brackishwater culture research in Thailand/ Philippines.

Cage culture of shrimps in Sri Lanka under TCDC arrangements.

Regional study of crab fattening practices,

Support to other subprojects.

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Subproject	*Seaweed (Graciliaria) Seminar* **(BWC/SWD/SEM)** (In cooperation with the ODA post-harvest project)
Objective	Assessment of the state of Gracilaria production and utilization in the region and identification of major constraints and ideas for new development activities.
Status 1988	Subprojects on seaweed culture in progress in Sri Lanka and India.
Targets 1989	**Achievements**
Preparation of a regional workshop	In order to get the highest possible feedback and the widest possible exposure of the seaweed subprojects in progress, a larger seminar rather than a small workshop was decided upon.
Conduct of the seminar	Some 80 participants from 14 countries. attended the seminar in Songkhla, Thailand, 23-27 October. In a nut-shell the conclusions were : Good demand for agar in most BOBP countries should provide the stimulus for development. The most likely production technology is pond culture, but more experimental work needs to be done with open water methods. Village level agar extraction technology needs more development before sufficient agar quality can be achieved. Market information, particularly for international trade is sparse. Very little is being done to manage natural stocks of agarophytes.
Reporting	The seminar is featured in *Bay of Bengal News No. 36.* A full report will be published in 1990.

Assessment

It was a successful seminar which brought together technical and commercial expertise to give a good picture of the regional status of agarophyte farming, processing, marketing and resource management.

Subproject	*Seaweed (Gracilaria) Farming, Sri Lanka* **(BWC/SWD/SRL)**
Objective	Assessment and demonstration of the technical, economic and social viability of small-scale seaweed culture through community participation among the fisher-folk exploiting the Puttalam lagoon.
Status 1988	One spore-setting facility set up by NARA with one successful trial. One village farm module set up with NGO collaboration.
Targets 1989	**Achievements**
One year's spore setting trials and evaluation of the technology	Not achieved due to unsettled working conditions. Some trials were carried out but results are inconclusive.
Vegatative propagation in two participating villages by shramadanas	Carried out in one village. Grazing by rabbit fish and high salinity are the main problems faced.
Assessment of grazing control methods.	Fish net and extruded plastic mesh were evaluated for grazing control. Fish net decays within 6 months and is not feasible. Trials with extruded plastic mesh are ongoing.
Partial harvesting and test marketing	Not achieved due to inadequate production.
Research to identify environmental factors affecting spore setting and vegetative growth (by NARA)	Nutrients, temperature, salinity monitored. Nutrient data incomplete. Salinity above 40 ppt during main part of the year.
Field sampling of wild stocks of commercially important seaweed (by NARA)	Only irregular sampling possible.

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Cooperation with ODA in post-harvest handling and marketing	Achieved. Described under ODA/P1/SRL.
Regional Gracilaria workshop in co-operation with ODA and AGFUND projects	Achieved. See separate subproject BWC/SWD/SEM.

Assessment

There are indications that spore setting could be viable. Grazing is an insurmountable problem for growout unless low cost fencing can be employed. There may be too much seasonal variation in growth for profitable culture. Unfortunately, the domestic situation has severely hampered all aspects of the field work.

Targets 1990

Spore setting trials with particular attention to the influence of salinity and nutrient concentration on spore development.

Growout work within the fenced unit at one village site with vegetative cuttings on ropes and loose seaweed scattered on the bottom.

Assess the varieties and distribution pattern of dominant species along the west coast of Sri Lanka.

Future

Completion of research component (NARA).

Demonstration and extension programmes depending on outcome of ongoing trials.

Subproject	*Seaweed (Gracilaria) farming, India* (BWC/SWD/IND)
Objective	Assessment and demonstration of the technical, economic and social viability of small-scale seaweed culture through community participation among fisherfolk of coastal villages of Ramnad district, Tamil Nadu, with a tradition of seaweed collection.
Status 1988	Forty five farm modules set up in two villages. Spore setting facilities operated on regular basis in both villages without success. Outplanting of vegetative cuttings attached to ropes started the fourth quarter, which resulted in a small harvest at the end of the year.
Targets 1989	**Achievements**
Evaluation of technical viability of spore setting	Found not to be viable on commercial scale. Lack of mature seed stock and unsuitable environmental conditions for spore development were the main constraints.
Preliminary assessment of economic viability of seaweed farming	Not viable unless grazers can be exduded. To cover the cost of a fence a large amount of seaweed has to be produced, which seems diicult to achieve. By year's end seaweed had stopped growing and showed signs of stress.
Complete out-planting of 45 modules by vegetative cuttings	Achieved. Ninety km of lines with vegetative cuttings were outplanted. Production very low due to grazing and seasonal growth variations.
Test marketing through different channels	Not accomplished.
Co-operation with ODA in handling, storing and processing	Achieved. Described under ODA/P2/IND.

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Regional Gracilaria workshop in co-operation with ODA and AGFUND projects	Achieved. See separate subproject BWC/SWD/SEM
Unplanned	A video film on the farming and processing of sea-weed has been produced and a paper on it was presented in the seaweed seminar. See also Bay *of Bengal News No.* 36.

Assessment

The present location of pilot farm is too exposed to grazing. There is no evidence that sufficient seaweed can be grown to cover the cost of fencing. The subproject should therefore be terminated.

Targets 1990

Reporting and winding up.

Subproject	*Prawn Seed Supply, India* (BWC/PSS/IND)
Objective	Introduction of methods and techniques to increase the supply of prawn seed and the income of seed collectors, and to improve the utilization of fry by-catches in West Bengal. Landless peasants engaged in shrimp seed collection in the semi-saline zone of West Bengal constitute the primary target group. The increase of seed supply and better utilization of by-catches are of general state interest and are likely to mainly benefit small-scale operators due to the geographical and socio-political conditions in West Bengal.
Status 1988	The tndian Institute of Management, Calcutta, conducted a rapid rural assessment of 664 households in 29 coastal villages in 24 South Parganas and Midnapur districts. The report described the socio-economic conditions of fry catchers, identified major problem areas and provided background information for site selection. An expert consultant implemented a study of fry catching methods and demonstrated improved methods of shrimp fry catching to government staff and shrimp fry collectors in two districts. A proposal was made to construct nursery ponds in one village to improve nursery rearing of shrimp fry. Selection of suitable villages and NGOs to implement an extension programme among villages had started.
Targets 1989	**Achievements**
Assessment of composition of by-catch	Not yet done. Central Institute for Brackishwater Aquacutture (CIBA) has agreed to conduct the shrimp by-catch study at three sites in three different districts during 1990.
Trained government extension staff and NGOs in improved seed catching and nursery rearing	Not accomplished due to delay in completion of nursery pond construction.
Launching of an extension programme for seed collection, transport, nursery rearing	Construction of a twenty unit nursery pond complex was started at Moynapara, West Bengal, with a total pond area of 4000 m^3. All construction work was done by Moynapara villagers. See *Bay of Bengal News No. 34.*

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	To prepare women fry catchers for project implementation, a leadership and group formation training course was conducted by an NGO near Moynapara for 35 women.
	Ramnagar was identified as a second site for an extension programme on nursery cage rearing of prawn fry. A local consultant conducted a planning survey for leadership training and group formation among fry catchers.
Study tour to Thailand to observe backyard hatchery technology	Study tour of two weeks for six government officials and one fish farmer completed in September.
Economic and technical feasibility study of small-scale penaeid shrimp hatchery technology	Field work completed in early November by Thai consulting team. Final report due in December. The hatchery will be technically and economically feasible if brine is used to make up rearing water. Constraints include incomplete knowledge of spawner availability, shortage of trained personnel in the DOF, no infrastructure support such as exists in Thailand. Such facilities will have to be incorporated in the hatchery design.
One model small-scale hatchery to be completed	Not yet started.

Assessment

Construction of the nursery ponds at the Moynapara site was delayed due to a land dispute so that it was not possible to start trials on shrimp nursing. Floating nursery cages and lure lines show promise for increasing fry catcher income. NGO collaboration has bean effective in leadership training and technology transfer.

Targets 1990

Complete nursery pond construction.

Train NGO and DOF staff at Moynapara in pond nursery rearing.

Train NGOs and DOF staff in cage nursery rearing and use of lure line for collection of seed

Construct small model penaeid hatchery at Ramnagar, Midnapur.

Train DOF staff and private sector in hatchery operation.

Undertake shrimp fry by-catch study.

Evaluate economic and social feasibility of lure lines and nursery cages and nursery ponds.

Future

Expand training for women's groups in improved fry catching and nursing technologies.

Expand hatchery training programme if small-scale penaeid shrimp hatchery technology is feasible.

Subproject	Fish and Prawn Seed, Bangladesh (BWC/FPS/BGD)
Objective	Introduction of methods and techniques to increase the supply of prawn seed and the income of seed collectors and to improve the utilization of by-catches.
Status 1988	The primary target groupsare the many landless peasant families engaged in shrimp seed catching in the semisaline zone. An important secondary concern is the national interest of best utilization of the country's resources.
Status 1988	No work carried out due to delay in GOB clearance.
Targets 1989	**Achievements**
Description and analysis of fresh-water prawn fry market	Study completed by NGO in Patuakhali and Chittagong districts. Seasonality, price structure, product

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	specifications and market structure described including role of middlemen and identification of fisher-folk groups engaged in fry catching.
Feasibility study of small-scale hatchery technology transfer from Thailand	Completed in September; the study analysed the economics of small-scale brine-based freshwater prawn hatcheries in Bangladesh. Projected internal rates of return were high over a wide range of production and price conditions.
Study tour to Thailand	Postponed until next year due to seasonal factors.
Establishment of one demonstration hatchery	Delayed until January-March 1990.
DOF staff trained in hatchery technology	Not yet started.
Assessment of the species of composition of seed collection	It has been included in the set bagnet subproject (RES/SBN/BGD)
Identification of suitable activities for seed collectors	Floating nursery cages and lure lines for fry catching identified as activities which could be carried out through NGOs.

Assessment

Work has proceeded slowly due to procedural delays. Market and technical studies indicate freshwater prawn hatcheries will be profitable. However a nursery phase will be required to market a product acceptable to farmers.

Targets 1990

Complete construction of small-scale Macrobrachium hatchery.

DOF staff and private sector trained in small-scale hatchery operation.

Study tour to Thailand to observe freshwater prawn hatchery technology.

Trials of floating nursery cages for freshwater and penaid prawn fry.

Demonstrate lure lines as a method of catching tiger prawn fry.

Future

Continue and expand hatchery training.

Village level training in prawn nursery culture through NGO participation.

Subproject	*Oyster culture, Malaysia* (BWC/OYS/MAL)
Objective	Introduction of small-scale oyster farming as an income generating activity for coastal fisherfolk households of peninsular Malaysia (west coast).
Status 1988	Spatfall was evaluated at six sites on Peninsular Malaysia. Two sites were dropped, Penang and Sungai Linggi, due to biofouling or lack of spatfall. Three cultch materials were evaluated in terms of cost and effectiveness.
Targets 1989	Achievements
Sufficient spat for commercial grow out trials	Commercially adequate spat supplies of C. *iredalei* found at two locations in Trengganu (east coast) but might be of no value to growout on the west coast. The spats transferred so far have had poor growth and high mortality. Potential sources of C. belcheri spat located at Batu Lintang, Kedah and Telga Nanas, Perak. O. folium spat sufficient for year round culture on Langkawi Island.

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Growout trials at four locations by four methods	Raft culture of O. folium using net panels produces about 1 kg per year of shucked meat per panel; 128 net panels are suspended from one raft. There are 5 pilot rafts. Continuous growout and frequent harvesting is possible due to year-round spatfall. Tray culture using single spat is being evaluated at Telaga Nanas, Perak and Batu Lintang, Kedah. Nursery culture of single spat has been successful at Telaga Nanas. Initial trials of tray culture have shown growth and survival of at least 85% after 7 months of growout. The cement pole growout method transferred from Thailand does not work. Likewise, Philippines stake culture does not appear technically viable.
Preliminary economic analysis of oyster culture methods	O. *folium* culture is profitable, with present technology. Methods for other species not yet sufficiently developed for analysis. Spat production costs were determined for several methods including coconut shell, oyster shell and netlon tubes. Netlon tube-produced spat were the cheapest.
Study tour for potential oyster farmers	Cancelled. Thai methods tried in Malaysia were not successful.
Test marketing	Market tests done in Per-rang with O. folium frozen meats from Pulau Langkawi and at Pulau Pangkor with fresh shucked C. *iredalei.* Marketing frozen meats in Penang is technically and economically viable. The profitability of O. *folium* raft culture is based on utilizing this market. C. *iredalei* fetched a good price, but production was too limited to adequately evaluate the market.
Bacteriological water and product quality sampling	Limited testing done with O. *folium* on Langkawi indicates that MPN for Coliform bacteria meets international shellfish sanitation standards.
Unplanned	Collaboration with IDRC-supported oyster hatchery project at University Sains Malaysia by sharing facilities and information. Spat collection activities by BOBP led to an *oyster* culture project by the Trengganu State Fisheries Department. Several fishermen have taken up oyster culture adjacent to BOBP sites using their own resources but assisted by BOBP field biologists.

Assessment

Ostrea folium culture is economically viable and an appropriate extension mechanism should be developed. Reducing raft costs would make financing easier for fisherfolk. Intertidal rack culture and floating tray culture show promise, but at least another year of scaled-up testing will be required for an economic evaluation before extension could be undertaken.

Targets 1990

Reduction of costs of *O. folium* rafts at Langkawi.

Techno-economic report on culture of *O. folium.*

Extension of *O. folium* culture to fisher-folk.

Evaluated economics of bag and tray culture.

Extension of spat collection techniques to fisher-folk.

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Marketing trials to cover major consumption centres.

Expand bacteriological monitoring to all culture sites.

National seminar on oyster culture in co-operation with IDRC.

Training workshop on oyster culture for fisheries agents (Extension Division).

Future

Training and demonstration of spat collection, nursery rearing and tray culture in West Coast fishing villages.

Develop routine sanitation programme for both bacteria and red tide monitoring at all culture sites.

FISHING TECHNOLOGY

During 1989, as in the previous year, most of the effort has been devoted to implementation of subprojects on development and demonstration of outrigger canoes in Sri Lanka and Indonesia and on beachlanding craft introduction in India.

The technical and economic feasibility of new outrigger canoes has been demonstrated in Sri Lanka. The fisherfolk of Doddanduwa, where the demonstration took place, have expressed interest in acquiring the new types of canoes instead of the traditional dugout type. In Indonesia three different types of outrigger canoes have been constructured, tested and later put into commercial fishing. Positive results of fiihing are yet to come.

The economic feasibility of beachlanding craft (BLC) has been demonstrated in Thanjavur district of Tamil Nadu. The beachlanding craft have thus been successfully introduced in three states : Orissa, Andhra Pradesh and Tamil Nadu. This means that the objective of the subproject has been fully met.

The two new subprojects in India for large pelagic species and flying fish were both hampered by non-availability of fishing craft. The latter also suffered from lack of master-fisherman inputs; priority was given to the BLC demonstration.

Besides implementation of these five subprojects services have been provided on a reimbursable basis to the FAO/TCP Project TCP/IND/8852(A) for development of small fishing craft in Kerala, India. The main inputs were in design, construction, testing and demonstration of new plywood canoes. This is reported on separately.

The main features of the proposed work plan for 1990 are exploitation of some of the known less utilized resources (large pelagic species and flying fish) in India and Indonesia and reduction of running cost of small craft in general and in Sri Lanka in particular. No new subproject has been proposed, and activities of the subproject for promotion of power and emergency sails for small fishing craft have been incorporated in the existing subprojects, notably BLC introduction.

Further services on reimbursable basis to the TCP/IND/8852(A) project will continue till the end of 1990.

Subproject	General Services (FIT/GEN)
Targets 1989	**Achievements**
Promotion of tuna fishing in Sumatra	A draft project proposal for development of small-scale tuna fishing on the west coast of North Sumatra has been prepared by the Provincial Fisheries Service, Medan. It might be forwarded to FAO for TCP funding.
Reimbursable services to national projects	In the field of fishing technology for "Fishing Craft Development" in Kerala, India (FAO/TCP).
Support to other BOBP subprojects	Demonstration and evaluation of the manual boat hauling devices (EXT/FES/MDV).
	Backstopping for conduct of fishing trials in Kothapatnam (RES/KAT/IND) and for preparation of projects in West Bengal (DEV/WEB/IND).
	Participation in NGO seminars in West Bengal and Orissa (EXT/NGO/IND).

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Unplanned	**Assistance to ODA mission on appraisal of BOBP-proposed project for demonstration of small-scale** offshore pelagic fisheries along the east coast of India. This is related to **FIT/LPS/IND.** *Ad hoc* advice to private sector, particularly in the field of trawling, fishing craft design and construction.

Targets 1990

Study of small-scale squid fishing.

Observation of pole and line fishing in the Maldives by three Sri Lankan fisheries officials and fishermen **(TCDC).**

Technical support for preparation of Inventory of Fishing Gear in Sri Lanka **(MINFISH).**

Reimbursable services to national projects :

- Fishing Craft Development in Kerala, IND **(FAO/TCP)**
- Development of ferrocement craft (FAO).

Support to other BOBP subprojects

Ad hoc advice to private sector and national institutions.

Subproject	Power and Emergency *Sails* (FIT/PES)
Objective	**Demonstration and promotion of suitable sails for** different motorized fishing craft to improve fuel economy and safety.
Status 1988	Over the years, all BOBP prototype boats have been equipped with sails and their use has been promoted during technical trials and fishing operations. A sail consultation was organized (Madras 1983) to establish the qualities of different rigs. A systematic programme of demonstration and training is needed to achieve an impact on fuel saving and safety. A sail specialist (APO) was under recruitment, expected to join early 1989.
Targets 1989	**Achievements**
Establishment of priority areas as to craft and type of rigs	The demonstration of sail (dipping lug) in connection with fishing operation of beachlanding craft IND-20 in Tamil Nadu and to a lesser extent of SRL-15 in Sri Lanka has led to acceptance of sail for safety and for fuel saving by the fishermen. From an acceptance point of view, single sail (dipping lug) will be given **priority.** Fishing craft **operating in more offshore areas** (BLC **in India and** offshore boat in Sri Lanka) are the ones to benefit most in safety and fuel saving by use of sail.
Identification of suitable channels and means for demonstration, training and promotion.	Sail demonstrations carried out with BLCs in India and offshore boats in Sri Lanka suggest that direct training of fishermen during commercial fishing operations would be the most appropriate way to meet the objectives. The trainers/motivators would have to be recruited from the fishermen themselves.
Preparation of action programme	No separate programme has been prepared but activities have been incorporated under other subprojects. See below.

Assessment

Priority areas for sail demonstration/training and ways of going about it have been identified. Considering these, the activities constitute integral parts of the boat development subprojects rather than a separate subproject.

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Subproject	*Fishing Boat Development, Sri Lanka* **(FIT/FBD/SRL)**
Objective	**Development and demonstration of new alternative craft to the conventional ones to increase earnings of fisherfolk by reducing costs and improving efficiency and comfort of operations.**
	The smaller craft (ORU) are common along the south and southwest coast, are beach-based, fish in the inshore waters and are operated by the crew on share basis, sometimes together with the owner. The operational area of the larger craft could be island-wide with bases at the major landing centres; they fish offshore (35-120 n miles) and are usually operated by a crew on share basis with owner as shore manager.
Status 1988	**The feasibility of a small multiday offshore fishing boat (SRL-15) had been established. The construction of the final version of SRL-15 was undertaken by a private boat-yard for a local fisherman/boat owner.**
	The beachlanding craft SRL-14 had been successfully demonstrated from beaches and in shallow waters but it was concluded that under the present circumstances SRL-14 had no potential use in Sri Lanka.
	The construction of two prototype planked outrigger canoes SRL-18 and SRL-19 were completed. SRL-18 was undergoing demonstration and performance monitoring in a beach-based fishing village.
Targets 1989	**Achievements**
Video film on small scale offshore fisheries to promote SRL-15 features supplemented by pamphlets and newspaper articles	**Completed by Worldview International Foundation as subcontractor.**
	A newspaper article on small-scale offshore fisheries has been prepared by a free lance journalist for publication in local English and Sinhalese newspapers in connection with a planned offshore fisheries seminar.
Recommendations on improved boat construction standards, safety equipment measures and training of fishermen for improved safety at sea	**A paper (lecture notes) has been prepared for presentation at the information seminar on offshore fisheries in Sri Lanka. It will be published in the proceedings of the seminar. See also** *Bay of Bengal News No. 33.*
Final report on small offshore fishing boat development	**Has been prepared and will be published in 1990.**
Information seminars	**Have been postponed till local conditions become more conducive.**
Installation and testing of longtail engine in SRL-19	**Done. The speed generated by the L60 engine (5.5 hp) did not compare favourably with the 7 hp OBM commonly used by this type of canoe. To match this, the Yanmar diesel L90 (7.5 hp) engine featuring a built-in camshaft of 2:1 reduction has been identified for further trials.**
Demonstration of SRL-19 during the monsoon period	**As the prototype longtail unit was not found powerful enough to safely operate during the monsoon, the operation of SRL-19 was continued with OBM. The demonstration of the L60 longtail diesel engine resumed after the monsoon, late October.**

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Performance monitoring of SRL-18 and SRL-19 till the end of the monsoon	It was continued till end of the year.
Evaluation of SRL-18 and SRL-19 with recommendation for follow-up	Has been carried out. They were found suitable for year-round beach-based fishing operation under moderate surf conditions. The economic performance has been very good and the feasibility of the two canoes seems well established. Design and method of construction of SRL-18 is simple and suitable for plank-built canoe at vilage level while the design of SRL-19 is more suitable for FRP construction. Final drawings have been prepared of planked and FRP built outrigger canoes taking into account minor improvements. A suitable follow-up action would be to assist interested fishermen to acquire canoes of the new designs in materials of their choice (different types of wood or FRP).
Reporting on outrigger canoe development	Has been prepared and will be published in 1990.
Training of carpenters in construction of plank built canoes	Not done. Awaiting response and interest from the fishermen.
Unplanned	The design of outrigger canoes for plank and FRP construction for credit and subsidy schemes have been approved by the Ministry of Fisheries. Minor Field Study on the outrigger canoe fisheries of Sri Lanka was carried out by two Swedish graduates in economics. It provides an updated overall knowledge of the small-scale fisheries of the area in which further introduction of outrigger canoes might be pursued. A draft report was prepared and final version expected soon.

Assessment

Despite good performance and the establishment of the feasibility of the SRL- 15, construction of this class of offshore boat has not yet been taken up in a large commercial scale. Fishermen/boat owners who have means to aquire new boats seem to have a preference for larger multi-day boats.

As the small-scale offshore fishing sector is still expanding through introduction of more multi-day boats, there is an urgent need to upgrade the construction standards and safety of fishing boats, train the fishermen, introduce regulatory measures and improve the search and rescue capabilities.

The feasibility of the prototype outrigger canoes has been demonstrated in Doddanduwa. The co-operating fishermen/users seem to be convinced of the suitability of the new canoes as alternatives to the traditional ones. In order to stimulate the interest for the new canoes there is a need for more demonstration of plank and FRP-built outrigger canoes.

The fishermen users of SRL-19 have shown interest in the use of the diesel longtail L60 engine. Low running cost was appreciated. There is a need to try a more powerful longtail diesel engine.

Targets 1990

Information seminar on small-scale offshore fisheries in Sri Lanka.

Construction of one FRP outrigger canoe (SRL-19A) and demonstration at Doddanduwa.

Technical and financial support in construction of the SRL-18A and SRL-19A to interested fishermen.

Assess suitability of longtail L90 diesel engine in outrigger canoe (SRL-19).

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Video film and pamphlet on outrigger canoe development.

Recommendations for further development and extension.

Future

Depends on the recommendations.

Subprojects	*Beachlanding Craft Introduction, India* (FIT/BCI/IND)
Objective	Introduction of beachlanding craft to increase incomes of fisherfolk and fish production. The primary target groups of this subproject are the fisher-folk who operate from open beaches without access to harbours or sheltered anchorages and who are therefore unable to use conventional craft. New beachlanding craft enable them to increase productivity and to tap resources beyond the range of the traditional craft (mostly kattumararns).
Status 1988	The introduction of beachlanding craft (BLC), under various financing schemes is ongoing in Orissa, Andhra Pradesh, Tamil Nadu and Kerala. More than 200 BLCs have been introduced, mainly in Andhra Pradesh and Orissa. The IND-25 (open-type) has been phased out and only IND-20 type will be introduced in future. The quality of construction of BLCs is reported to be maintained to an acceptable standard by most boatyards. The feasibility of the VST freshwater-cooled engine with reduction gearbox has been established and this engine is slowly replacing the air-cooled VST engine. The Kirloskar and Lombardini water cooled engines were being developed for beachlanding craft. The viability of beachlanding craft in Tamil Nadu had not yet been established.
Targets 1989	**Achievements**
Demonstration of BLC in West Bengal	Demonstrated. Staff of Fisheries Department were trained in the use and maintenance of BLCs. The feasibility of BLCs is still to be established.
Demonstration of viable BLC operations in Tamil Nadu	Commercially oriented demonstrations of IND-20 ongoing since February show good results. It seems that economic viability will be established in Thanjavur district. The good fishing results have generated interest among local fisherfolk in the use of BLC and newfishing methods for more offshore fisheries. See *Bay of Bengal News No. 35.*
Training of 10 trainers and 100 fishermen operators of BLC in operation and maintenance of propulsion units	Training was conducted in four fishing centres of the states of Tamil Nadu, Andhra Pradesh and Orissa for 12 technical fisheries officers (trainers) and 130 fishermen/BLC operators. Additional training materials were developed and prepared.
Study of the socio-economic impact of BLC introduction	In progress in one fishing centre each in the states of Tamil Nadu, Andhra Pradesh and Orissa. Data are collected during a full year cycle. The study will be completed in the first quarter of 1990.

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Establishment of monitoring system	The states have shown no interest and the need for a separate system for BLC is questionable.
Impact evaluation and reporting	Purposely delayed till the socioeconomic study of the introduction of BLCs is completed.
Unplanned	In connection with operation of BLCs in Tamil Nadu, demonstration of manual hauling devices (capstan) was carried out in moderate surf conditions.
	The demonstration of sail (dipping lug) in connection with fishing operation of IND-20 and the engine maintenance training programme in Tamil Nadu has led to good acceptance of sail for fuel saving and safety by local fisher-folk.
	Minor Field Study on strategies for development and introduction of engines for small fishing craft in India was carried out by two Swedish graduates in business administration in close cooperation with companies which have been involved in development of propulsion systems in India.
	It leads to a better understanding of various factors affecting companies' decision to introduce new modified products in small-scale fisheries. A report of the study will be ready in the first quarter of 1990.

Assessment

Judging from the results of the first 10 months of fishing in Tamil Nadu, the feasibility of BLCs in Thanjavur district will be demonstrated. The main objective of the subproject has therefore been achieved and some more work in demonstration, extension and training would facilitate further introduction of BLC.

With the introduction of water cooled VST engine, most of the technical problems with engines have been solved. But the after-sales service could be better. If the manufacturers succeed to introduce new water cooled engines (Kirloskar and Lombardini) the competition might lead to improved after-sales service to the benefit of the users.

The small-scale fisherfolk do benefit directly or indirectly from the introduction of BLCs. The socio-economic study indicates a significant increase in net earnings where the BLCs are working well.

There are still areas for improvement in the fields of :

(a) training in operation and maintenance of propulsion units.

(b) training in use of sail for fuel saving and safety.

(c) diversification of fishing to aim at less exploited resources.

Targets 1990

Completion of socio-economic study.

Impact evaluation and reporting of BLC development and introduction.

Demonstration of BLC operation in Tamil Nadu for one more year and technical support for introduction of new craft.

Training of 10 trainers and 150 fishermen operators of BLCs in operation and maintenance of BLCs in the states of Tamil Nadu, Andhra Pradesh and Orissa.

Training of 2 sail makers in making new sails (dipping lug).

Training of about 3 trainers and 150 fishermen operators of beachlanding craft in use and maintenance of sail for fuel saving and safety.

Preparation of training material in use and maintenance of sail rigs.

Future

To be determined on the basis of the outcome of the evaluation.

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Subproject	Large Pelagic Species (FIT/LPS/IND)
Objective	Demonstration of fishing for large pelagic species through use of driftnets and longlines. Intended beneficiaries are fisher-folk who operate BLC and similar or larger harbour-based boats. Successful implementation would lead to higher earnings and increased fish production from under-exploited resources.
Status 1988	BOBP's fishing trials with BLC along the east coast of India and other observations indicate a high availability of large pelagic species such as shark, tuna and billfishes which are under-exploited. Considerable experience from exploitation of such resources by small-scale fisheries is available in Sri Lanka and in BOBP through the Fishing Boat Development work and the Exploratory Tuna Fishing there.
Targets 1989	**Achievements**
Study tour of Sri Lanka	Planned but postponed till the local conditions become more conducive.
Repair, modification and transfer of boat (SRL-15 to India	The transfer materialized early August, which was a few months later than anticipated.
Commercial fishing trials/demonstration from one centre for about 8 months	The fishing operations commenced from Chinnamuttom in Tamil Nadu, early September. Technical problems with the engine and non-availability of spare parts have affected the operation. Only a few fishing trips have been carried out.
Unplanned	In order to ensure sustained fishing trialsand demonstration one more boat of the SR L-I 5 type has been ordered at the request of tha Government of Tamil Nadu.

Assessment

The technical problem with the engine was a setback and led to some reservation concerning the use of only one boat for pilot fishing trials and demonstration.

Targets 1990

Delivery of a second boat (SRL-15).

Study tour of offshore fisheries in Sri Lanka.

Commercial fishing trials to complete one full year's cycle.

Evaluation of trials and recommendations for follow-up.

Future

The follow-up will depend on the outcome of the trials and the recommendations.

Subproject	*Flying Fish Fisheries,* India (FIT/FFF/IND)
Objective	Demonstration of flying fish fishing with gillnets. The fisherfolk likely to benefit from the subproject are those operating larger kattumarams, motorized traditional craft, BLC and similar craft. Higher earnings and increased fish production from an underexploited resource would be the end result.
Status 1988	Flying fish are traditionally caught seasonally by scoopnet and small gillnet in connection with brushpile aggregation

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and drift longline from large kattumarams along the Coromandei coast. During fishing trials with BLC from Madras, flying fish was observed in large quantities, larger than normal, and was successfully caught by gillnets. The season of abundance appears to be longer than belived at present. This flying fish may therefore constitute a significant and largely underexploited resource.

Targets 1989	Achievements
Assessment of the feasibility through commercial fishing trials March – August	Not done due to non-availability of proper fishing craft and lack of manpower. Only limited fishing trials with large mesh gillnets were conducted, which confirmed the availability of large flying fish species.
	The use of small mesh gillnet combined with the use of brushpile for capture of small flying fish species has been demonstrated in connection with operation of IND-20 in Thanjavur district. But this species is already being exploited. See Bay of Bengal News No. 36.

Targets 1990

Commercial fishing trials for large flying fish species.
Evaluation and recommendation for follow up.

Future

Depends on outcome during 1990.

Subproject	*Outrigger Canoes, Indonesia* **(FIT/ORC/INS)**
Objective	Development and demonstration of plank-built outrigger canoes as alternatives to traditional fishing craft to increase incomes of fisherfolk and production of underexploited resources.
	The target group are the fisher-folk of Nias island, almost all of whom are small-scale operators employing small traditional craft of limited capacity and range of operation.
Status 1988	A study of the small-scale fisheries in Nias Island indicated scope for development of small-scale inshore and offshore fisheries. A brief description of the fisheries of Nias appeared in Bay of Bengal News No. 35.
	For increased earnings of fisherfolk, further development of the outrigger canoe fisheries seem to be the obvious step. A subproject was prepared and three prototype outrigger canoes of sizes ranging from 6.5m to 9.5m were designed.

Targets 1989	Achievements
Construction and technical trials of three outrigger canoes	The plank-built motorized canoes have been constructed. Technical trials were carried out and the performance was found satisfactory to commence fishing trials.
On the job-training of local boat builders	Six carpenters/boatbuilders were trained by a boatbuilder consultant during eight weeks.
Commercial fishing trials and demonstration with the three canoes for about 8 months	The trials are ongoing from fishing villages of the north east coast of Nias Island. They have been restricted to mainly inshore areas and have not been economical but there has been a gradual improvement.

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	The longtail propulsion unit of the small outrigger canoe (6.5m) did not perform as expected and was not acceptable to local fisherfolk. As an alternative, the same petrol engine has been installed inboard.
	The 8.0m outrigger canoe petformed well technically and was accepted by the fisher-folk.
	The 9.5m outrigger canoes performed well but mainly because of low speed were not well accepted by fisherfolk who are used to faster monohull craft for offshore fishing.
	In order to extend endurance of the canoes at sea and improve preservation of the catch on board and ashore, insulated ice boxes were made. Of late, they have been accepted by fishermen users for more extended fishing trips.
Socio-economic profile of the fisherfolk communities	Has been completed for three villages of the north east coast of Nias island.
	The socio-economic profile of fisherfolk communities of the south and south west area is still to be completed.
Assessment of the market for increased and diversified fish production (ODA)	Not yet done pending request from DGF to BOBP's ODA project.

Assessment

The targets for construction and testing of canoes have been fully met. There are however two matters of concern. The standard of construction was very good which has led to high costs of the hulls; it remains to be seen if an extended service life will compensate for the additional costs. Secondly, the power of the engines has been kept low to economize on fishing operations, but it might have been exaggerated. Too low a speed or overload of engines are potential problems.

The fishing trials are behind schedule. It took longer than anticipated to solve technical teething problems and to organize fishing operations and train the people involved. They have also for logistic reasons been limited to the north east area while the canoes are primarily designed for the less exploited areas of the west coast.

Targets 1990

Report on design, construction and testing of the canoes.

Complete one year or commercial fishing trials.

Completion of socio-economic profile of selected fisherfolk communities.

Evaluation and recommendations for follow-up.

Dissemination of positive results.

Preparation of an extension phase if appropriate.

Future

The follow-up will depend on the outcome of the fishing trials.

FISHERY RESOURCES

The work programme covered subprojects on Kattumaram Fisheries in India and Set Bagnet Fisheries in Bangladesh and ad hoc services to the Reef Fish Resources project in the Maldives and other subprojects of the BOBP.

In the subproject on kattumaram fisheries in Kothapatnam, Andhra Pradesh, the investigations on resources, fishing technology, socio-economics and post-harvest technology were completed. Some technological improvements may be possible which could contribute to small increases in income but a significant improvement in income, even through motorization, does not seem possible in this area. It is believed that the only way for kattumarams to be more viable is to prevent trawlers from operating in their area and thereby catch more of the high-priced prawns. Because of limited natural

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resources in the village, opportunities for other income generating activities, other than agriculture, are not easily available.

The survey of set bagnets in Bangladesh started very late in the year but is since then in full swing at six stations. The socio-economic assessment is yet to start.

Reimbursible services have been extended to the 2nd phase of the FAO/UNDP Reef Fish project (MDV/88/007) in the Maldives which commenced this year. Reported on elsewhere.

Among the ad hoc services, major inputs were made to by-catch of shrimp trawlers in India; development of communication media (comics) on fisheries resources and management; shrimp and finfish seed collection in Bangladesh.

It is anticipated that the FAO/UNDP project on "Bio-economics of small-scale fisheries" will become operational from 1990. The fishery resources aspect of the Programme will then be covered under that project. Failing this, consideration should be given to maintain fishery resources under RAS/118/MUL and take up some of the high priority issues of bio-economics during the remaining period of the project.

Subproject	*General Services* **(RES/GEN)**
Targets 1989	**Achievements**
Revision of bio-economics project document	Done in consultation with FAO/HQ. It was then submitted by FAO to UNDP.
Preparation of new project for "environment protection"	A project document was prepared in consultation with relevant sections of FAO/HQ.
Study on trawler by-catch	Available information on shrimp trawling and by-catch in India was compiled. A one-month field study of the shrimp trawler landings in Madras, Kakinada, Visakhapatnam and Paradeep was undertaken. Available reports on experiments to reduce by-catches in shrimp trawls were reviewed. Report not yet finalized.
Reports on Exploratory Tuna Fishing projects (TCP/MDV/665) and TCP/SRL/6653)	Terminal Reports of both projects were prepared and submitted to FAO. Joint meeting of the biologists and technologists from the Maldives and Sri Lanka was held in the Maldives to discuss project findings. Technical reports were edited for publication.
Proposals for resources studies in Sri Lanka and Malaysia	In Sri Lanka, assistance was provided to define requirements for resources surveys and assessment. In Malaysia, discussions have led to a fact-finding study of the resources and utilization of the Carpet Clam (Paphia) which will be undertaken in 1990 under Development Support (DEV/GEN).
Reimbursible support to other projects	Completed as planned for the FAO/UNDP "Reef Fish Research and Resources Survey" – phase II in the Maldives (MDV/88/007)
Internal BOBP co-operation	Extensive interaction with all other disciplines of BOBP in matters such as – flying fish resources and flying fish eggs (India) – large pelagic resources, and particularly shark and its utilization (India) – seaweed – shrimp and finfish seed (Bangladesh) – resources potential (West Bengal, Nias) – crab resources assessment – people's participation in resources assessment/ management.

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Targets 1990

Reimbursible support to other projects

– Reef Fisheries, Maldives (FAO/UNDP)

Support to other BOBP subprojects

Identification and initiation of bio-socio-economic activities

Subproject	**Kattumaram Fisheries, India (RES/ KAT/ IND)**
Objective	**Assessment of the bio-socio-economics of an existing kattumaram fishery; identification of problems and difficulties of the fisherfolk; identification of ways to raise incomes by better utilization of available resources, through innovation of fishing methods, improved marketing practices and other income-generating activities.**
Status 1988	**Surveys/investigations in Kothapatnam, Andhra Pradesh, in respect of biological, technological, marketing and socioeconomic aspects were in progress since August 1988. Data were processed by computer and monitored continuously.**
Targets 1989	**Achievements**
Completion of one year of data collection	**Completed by August for fish landings and marketing. The data collection in the village was satisfactory with good cooperation from fiiherfolk. Only limited resources data from published materials was available and data from past resources surveys in that area were not available from national institutions.**
A socio-economic survey of Kattumaram fisher-folk has been undertaken	**Nearly 59% of the households are involved in fishing activities,primarily kattumaram fishery. Of these about 59% own crafts and gear. Sources and level of income in the community were assessed. The role of fisheries vis-a-vis other income generating activities was also examined.**
Discussing the results and information and findings with the kattumaram fisherfolk and obtaining their feedback.	**A field day was organized in January in Kothapatnam to exchange facts, views and ideas with the fisher-folk to jointly improve our understanding of the bio-socio-economic situation and to facilitate continued cooperation during the study. Some 200 fisherfolk participated. See Bay of Bengal News No 33. Discussion on various aspects of the fisherfolk's life has continued through the year between visiting BOBP staff and groups and individuals of fisher-folk. To what extent this has benefitted the fisherfolk is difficult to assess, while it has been of crucial value for the study.**
Periodic meetings with fisher-folk to exchange ideas and assist in measures for improving living standards and incomes.	**investigations were conducted by an international masterfisherman together with a national counterpart from Kakinada during 4.5 months to explore ways of improving the catches. The outcome gives little encouragement for improvement in the technological aspects of kattumarams but higher incomes may be achieved through increased fishing days per month which are presently very low. Motorization of kattumaram appears to be unlikely to make significant improvement to the catch rate. Improvements could probably be achieved by keeping BLCs and navas away from kattumaram fishing areas and the trawlers away from all the other fishing crafts.**

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	Investigations have also been made to identify income generating activities other than fishing. Due primarily to the existing land tenure system, no significant options for improved agricultural practices were identified. Raising buffaloes for milk and weaving designed mats were two activities deemed as technically feasible and economically viable, if implemented by an NGO with adequate experience in training and informal credit systems.
Reporting of the one-year study	Commenced but not yet completed.

Assessment

Prospects to raise incomes are not bright but could possibly be achieved by using BLC in outer areas – to harvest underexploited resources and not compete with the kattumaram inshore – and by preventing trawlers from fishing in the kattumaram area.

The marketing system is considered to be reasonably satisfactory for the level of production in the village.

There is also very limited scope for income-generating activities outside the fisheries sector.

Targets 1990

Completion of Reports

Presentation of results to fisherfolk in the village and to Government authorities.

Subproject	*Set bagnet fisheries, Bangladesh* (RES/SBN/BGD)
Objective	Better understanding of the functional mechanism of the gear with reference to the biological and socio-economic aspects of the fishery, vis-a-vis other interactive fisheries. The set bagnet fisheries account for about 30% of the marine/brackishwater catch. Preliminary investigations indicate that set bagnet fisherfolk are extremely poor and that the fishery leads to heavy exploitation of juvenile fish and prawns. *See Bay of Bengal News No 29.*
Status 1988	Preliminary survey completed fin 1987) and main survey planned and prepared.
Targets 1989	**Achievements**
Recruitment of field staff by BOBP, training of field staff and procurement of equipment.	All staff required to undertake the biological survey at six different locations during a one-year period have been provided by the DOF and have been trained. **The field staff will travel by hired vehicles and the** equipment (boats/engines) is therefore not needed.
Sampling of set bagnet and other interactive fisheries	**The biological sampling programme commenced late October. The catch sampling of trammelnets and** push/dragnets started in November.
Assessment of the socio-economic conditions of set bagnet fisher-folk	A study is under preparation to be started early 1990.

Assessment

The work was considerably delayed, awaiting Government clearance. Having commenced, it is expected to progress satisfactorily.

Targets 1990

Continuous catch sampling of set bagnets, trammelnets and push/dragnets until November/December 1990.

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Compilation of information on trawl catches of relevant species, from past surveys and commercial catch records.

Compilation of data on export of cultured shrimp.

Assessment of the socio-economic importance of the set bagnet fisheries.

Continuous data processing and analysis

Future

Completion of reports

Presentation of results to GOB authorities, other agencies and fisher-folk

Follow-up to be determined.

DEVELOPMENT SUPPORT

The two main areas of work during the year have been economic analyses of BOBP activities and identification and preparation of projects in West Bengal, India. Thirdly, an outline proposal has been prepared for an investment project in small-scale offshore fishing in Tamil Nadu, India. The planned training in project preparation was not implemented for reasons given below.

Economic models have been established for most of the technical activities. The analyses undertaken and the continuous updating of information helps considerably to put the technical work in a proper perspective.

The work in West Bengal was hampered by the departure of the Development Adviser in the middle of the year. The field work was completed and draft reports prepared. However these require considerable elaboration.

During the coming year priority will be given to monitoring of economic performance of technical subprojects, preparation and promotion of projects already started upon, Other activities may include specific studies and on request, assistance to Governments in preparing plans and programmes.

Sobproject	*Preparation and promotion of small-scale fisheries projects and ad hoc services* **(DEV/GEN)**
Targets 1989	**Achievements**
Preparation of investment project for small-scale offshore fishing, India	An outline proposal has been completed and submitted to the authorities concerned. It provides for 100 nos of IO-11 m FRP boats to operate offshore on trips of 2-5 days duration for large pelagic species. It is envisaged that the boats would operate from 4-6 different fishery harbours in Tamil Nadu for which the project also would provide inputs for necessary upgrading of the infra-structural facilities. The proposal is based on experiences from Sri Lanka and is related to the'ongoing fishing demonstrations in India (FIT/LPS/IND).
Analysis of reasons for non-materialization of national follow-up projects based on results of BOBP activities and examination of procedures for processing project proposals by member governments and donor agencies.	The main reason appears to be that the proposals were too small to receive sufficient attention – at both the receiving and giving end; they ware mostly "expansions" of BOBP activities. In some cases the proposals fell between two stools, e.g. "non-formal education" between "fisheries" and "education." More active participation by the administrations during the preparation might have facilitated further processing of the proposals. The different bureaucratic procedures of the governments and the agencies combined with frequent changes of staff on both sides make the decision-making process a very slow one.

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Promotion of a credit project in the east coast states of India.	The original idea was to promote a project based on the positive experience of BOBP's credit scheme in Orissa but covering all four east coast states and different types of credit needs. But there was no strong support forthcoming for such an effort. Instead the attention has been diverted to a real need which is credit for beach-landing craft (BLC). An inventory of possible credit sources has been made and information material has been prepared. A seminar for potential creditors and senior fisheries administrators will be organized in Tamil Nadu in January 1990.
Promotion of NFPE projects in India.	The experience of the proposed NFPE (non-formal primary education) project in Orissa for NORAD funding was that a few basic issues would have to be resolved before such NFPE projects could materialize. They were : (i) the respective roles of the fisheries and education administrations (ii) remuneration of teachers and (iii) physical requirements for education centres Andhra Pradesh has confirmed her interest in a NFPE project for fisher-folk and consultations with the different parties concerned have been initiated.
Monitoring of performance of motorized Chandi boats in BGD.	Being done. The performance is very satisfactory. The twenty engines and nets issued to fishermen in 1987 and 1988 have been repaid almost in full.
Economic analyses of BOBP activities	Economic models have been established for Oyster Culture in Malaysia, Seaweed Culture in India and for fishing craft in India and Sri Lanka. They are being continuously updated (see further under respective subprojects).

Assessment

Nearly full achievement of targets; lessons have been learned to produce and handle project proposals; technical activities have been put in a better perspective by the economic analyses; there is hope of further positive development with regard to small-scale offshore fisheries and non-formal primary education.

Targets 1990

Elaboration of project proposals for West Bengal

Follow-up of proposal for small-scale offshore fishing, Tamil Nadu

Fact-finding study on resources and utilization of carpet clam in Malaysia.

Promotion of credit for beachlanding craft, India.

General descriptions of fisheries (assistance to Government).

Proposal for non-formal primary education in Andhra Pradesh.

Study on effects of shrimp trawling on small-scale fisheries.

Economic analyses of BOBP activities.

Reimbursible support to other projects - sector study, MDV.

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Subproject	*Project identification and preparation in West Bengal, India* (DEV/WEB/IND)
Objective	Preparation of project proposals for the development of small-scale marine and brackishwater capture fisheries
Status 1988	Basic information collected from familiarization visits

Targets 1989	Achievements
An inventory of the marine including brackishwater fisheries	Completed and compiled in a General Description of the marine fisheries which will be published in 1990 in the BOBP/INF series.
Identification of suitable measures to come to grips with problems and issues hampering development	An identification mission consisting of Economist, Fishing Technologist and Socioeconomist visited the State in Feb/Mar and suggested : exploitation of deep water resources and sharks to increase production. – increase of West Bengal's share of by shrimp trawler landings. – better utilization of low-value fish. – provision of infrastructure
Proposals for new projects for investment and technical assistance	The mission prepared outline proposals for (a) experimental fishing for deep water resources, (b) shark longlining, (c) fish drying (d) promotion of the use of bases in West Bengal by trawlers.

Assessment

The work has resulted in a better information base and a few ideas about measures to increase landings and raise the value of products. However the outline proposals need to be further elaborated before they can be considered for implementation. For promotion of West Bengal bases for trawler operations, improvement of the present infrastructure is needed something beyond the scope of BOBP.

Future

Follow-up of outline proposals under DEV/GEN.

Subproject	*Training in Project Preparation* (DEV/TPP)
Objective	Training of middle-level planning officers to prepare project documents for small-scale fisheries development as required for financing by donor agencies. The training programme would cover all seven countries if they are interested.

Targets 1989	Achievements
Preparation of training material and Conduct the training in two courses spaces by a couple of months	Not implemented for several reasons; doubts about the usefulness of such training; the departure of the Development Adviser in the middle of the year; and budget restrictions caused by the delayed start of 'the AGFUND project.

Assessment

During discussions with national cooperating agencies it became evident that the proposed training was not considered to be of great importance; the effect ofisolated courses would be marginal; the main problem with regard to creation of new projects is also not the staff capability. In view of this and the fact that FAO, in cooperation with SEAFDEC, is planning similar activities in the region under other funding arrangements it is proposed to delete this training from the work programme.

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INFORMATION SERVICE

It was another busy year for the information Service. The Newsletter, *Bay of Bengal News,* continued to be the Programme's flagship, its main tool of information dissemination. But the distinctive feature of the year was the systematic use of video: three films and three video clips were made. Up-to-date video editing equipment was acquired. Three of the video clips/films were made with the new equipment. Considering that a single staffer looks after video (with support from the rest of the information staff and a minimum of contract assistance), and that several BOBP activities require shooting stints over different seasons and activity periods, the video output is satisfactory. BOBP's work on video may help demonstrate the potential and the pitfalls of video as a tool of information support for fisheries development in the region.

A colour brochure on "Small-scale fisherfolk and the BOBP" was brought out. A landmark, since it is the first four-colour publication after a decade of existence.

A package of information activities in support of the IMO/SIDA project on combating oil pollution at the Vizag fisheries harbour was an offbeat venture. A video film, anti-pollution stickers on harbour boats, wall-painting of slogans, a brochure – these will hopefully heighten awareness of pollution and help inculcate a cleanliness ethic among harbour users.

Information support to the technical units expanded during the year, and included drawings, maps sketches and posters besides photography and library services. Such services are likely to expand as BOBP work touches bigger and wider fisher-folk audiences. In 1989, two video films (on engine maintenance and on pollution) were aimed mainly at fisherfolk; so also were the two manuals on engine maintenance, prepared in Telugu.

Printed materials are sent to a computerized mailing list that is continually updated. As for video tapes, a single tape containing films made in 1989 will be distributed to all agencies and governments attending the AC meeting. Specific requests for video films made during the course of the year have been met. Films are now produced on good-quality U-matic tape, and copies should be satisfactory unlike those copied from the VHS tapes used before mid-1989.

During 1990 the video documentation of BOBP activities will be continued; a heavy workload of reports and working papers expected since many of the ongoing subprojects have reached various reporting stages; other regular work with the newsletter, library, etc, will continue as usual.

Targets 1989	Achievements
Newsletter – four issues, Reports.	Done, totalling 92 pages. The *Bay of Bengal News* continues to be extremely popular within and outside the region.
	BOBP/WP/59 : Review of Shrimp Fisheries in the Bay of Bengal.
	BOBP/WP/60 : Pen Culture of Shrimp in Chilaw, Sri Lanka.
	BOBP/REP/43 : Report of the Thirteenth Meeting of the Advisory Committee.
	Instruction manuals on engine maintenance (in Telugu) – for water-cooled and air-cooled engines.
Colour brochure	Completed.
New audio-visual on BOBP	Postponed to next year.
Video films and clips on BOBP activities	Three films including one on contract, and three clips were made during the year.
	Films : Use of ice with Navas in Kakinada, "Cleaner the harbour, happier the fisher-folk" (About oil pollution at the Vizag fisheries harbour), Offshore fishery in Sri Lanka.
	Clips : Seaweed culture in Mandapam, Beach hauling devices in the Maldives, Engine maintenance (Tamil)

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Desk calendar for 1990	Completed.
Pamphlet on pension and social security schemes for fishermen in Sri Lanka	Draft text and layout given to the Ministry of Fisheries
Computerization of library holdings	Not done yet; a new librarian has taken over, and the need for computerization is being reconsidered.
Unplanned	Two fisheries extension officials of Malaysia secured training in video for six weeks at SEAFDEC, Thailand.

Targets 1990

Newsletter	–	Four issues
Reports	–	About 15 working papers and reports
Video films	–	About six films on various activities New audio-visual on BOBP Some extension brochures and manuals

PROJECT INPUTS AND THEIR UTILIZATION

The funds made available for RAS/118/MUL during 1989, in consultation with the donor agencies were US $1,99 million. The actual expenditures are estimated at US $1,86 million. The main reason for less than anticipated expenditures is the delayed implementation of project activities in Bangladesh. The outlays under RAS/117/MUL were US $0.13 million during the year. Details of budgets and expenditures for these two projects are given in Table 1. Funds from the RAS/126/AGF project were also anticipated to be available to the tune of US $0.1 million. However, as mentioned above the final approval of the project was delayed and no funds were therefore utilized.

Extension accounts for about 25% of the expenditures, Brackishwater Culture26%, Fishing Technology 23%, Fishery Resources 13%, Development Support 7%, and the Information Service 6%.

Of the international professional staff the Development Adviser and the Socio-Economist departed in the middle of the year after short stays with the project : twelve and eight months respectively. A suitable replacement Development Adviser candidate was located in August and offered the post, which he eventually could not accept due to family reasons.

Four new APOs (Sail Specialist-Denmark, Bidlogist-Denmark, two Economists- Denmark & Sweden) joined the project while one APO departed (Socio-economist- Netherlands). Several of the APO posts have remained vacant during the year i.e. the Aquaculturist in Penang, Sociologist in Medan, and the new ones established during the year, Socio-economists in Male, Colombo and Dhaka.

Details of professional staff, international and national, and consultants are given in Table 2. The supporting staff employed at the end of 1989 are listed in Table 3.

Major expenditures under subcontracts were incurred for field workers on the oyster subproject in Malaysia; construction of the shrimp seed ponds in West Bengal; broadcasting services for the fisher-folk radio programme in Sri Lanka; for printing reports and working papers, and for temporary assistance to the Information Service. The less than anticipated outlays under this heading is because several national consultants under short-term contracts have been debited to the "personnel" component while they were budgeted for under "subcontracts".

Major expenditures incurred in materials were stationery and other office supplies; oyster culture material in Malaysia; construction material in West Bengal for the shrimp seed ponds; and photographs/audio visual, and books for the library.

Major expenditures by way of equipment were the purchase of vehicles and computers; broadcasting equipment for Sri Lanka and video editing equipment for the Information Service.

The input for Training amounts to about US $0.12 million. Details of the orginized training activities are given in Table 4. Most of the courses and other gatherings have been of short duration with direct participation of the target groups. The total training time is in the order of 20 man-years.

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Table 1a

GCP/RAS/118/MUL – Budget and Expenditures (In US $)

Code	Object of Exp.	Budget 1987-91	Act. Exp. 1987-88	Budget 1989	Est Exp. 1989	Balance 1990-91
10	Personnel	1 953 941	1122437	809 000	831504	
20	Duty Travel	405 914	195 009	195 450	210 905	
30	Contracts	448898	287 215	283 325	161 683	
40	Ope. exp	211 975	128434	102 025	83 541	
50	Materials	272 228	140 521	124 500	131 707	
60	Equipment	343 271	232 647	119 750	110 624	
80	Training	243458	123880	131 200	119 578	
	Sub-Total	3 879 685	2230 143	1765250	1649 542	
90	Servicing Cost	504359	289 919	229482	214 440	
	Sub Total	4384044	2 520 062	1 994 732	1863982	
	Unspecified	3 393 181				3,393,181
	Grand Total	7777225	2520062	1 994 732	1863982	3 393 181

Table Ib

GCP/RAS/117/MUL – Deposits and Expenditures

Code	Object of Exp	Deposits 1987-89	Actual exp 1987-88	Estimated exp 1989	Balance 1990-91
10	Personnel	–	36 370	126 305	–
20	Duty Travel	–	263	–	–
40	Ope. exp	–	353	(334)	–
	Sub Total	–	36 986	125 971	
90	Servicing cost	–	1849	6299	
	Grand Total	237 731	38835	132 270	66 626

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Table 2

GCP/RAS/118/MUL – Professional Staff - 1999

International Officers

Post	Name of Incumbent (nationality)	Date of (month/year) Arr.	Dep.
1. Programme Director	Engvall, L O (Sweden)	01/87	
2. Development Adviser	de Mautort (Ms) A (France)	06/88	07/89
3. Aquaculturist	Angell, C (USA)	01 /87	
4. Fishing Technologist	Pajot, G (France)	01 /87	
5. Extension Officer	Roy, R N (India)	01 /88	
6. Socio-Economist	Canter Visscher (Ms) D (Netherlands)	10/88	06/89
7. Information Officer"*	Madhu, S R (India)	01 /87	
8. Fishery Biologist	Sivasubramaniam, K (Sri Lanka)	05/87	
9. Masterfisherman	Gallene, J (France)	03/88	
10. Sail Specialist (Ass. Prof. Officer)	Andersen, M (Denmark)	04/89	
11. Fishery Biologist (Ass. Prof. Officer)	Degel, H (Denmark)	06/89	
12. Training Officer (Ass. Prof. Officer)	El Gendy (Ms) G (Netherlands)	03/88	
13. Economist (Ass. Prof. Officer)	Jepsen, F (Denmark)	03/89	
14. Aquaculturist (Ass. Prof. Officer)	Kalkman (Ms) B (Netherlands)	03/88	
15. Marine Engineer (Ass. Prof. Officer)	Karlsson, R (Sweden)	02/88	
16. Sociologist (Ass. Prof. Officer)	Kristensen (Ms) H (Denmark)	10/88	
17. Fish Technologist (Ass. Prof. Officer)	Kristensen (Ms) H (Denmark)	02/89	
18. Economist (Ass. Prof. Officer)	Lindeblad, B (Sweden)	03/88	
19. Socio-Economist (Ass. Prof. Officer)	Lundqvist (Ms) C (Sweden)	03/88	
20. Aquaculturist (Ass. Prof. Officer)	Nielsen, H B (Denmark)	10/88	
21. Fishing Technologist (Ass. Prof. Officer)	Nystrom, U (Sweden)	11/88	
22. Socio-Economist (Ass. Prof. Officer)	Poiesz (Ms) A (Netherlands)	03/88	06/89
23. Sociologist (Ass. Prof. Officer)	Townsley, P G (Canada)	08/87	

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National Officers

Post	Name of Incumbent (nationality)	Date of (month/year) Arr.	Dep.
1. Credit Officer	Fernando, C (Sri Lanka)	08/88	08/89
2. Programme Officer	Joseph, L (Sri Lanka)	07/87	
3. Programme Officer	Kashem, A (Bangladesh)	01/87	
4. Radio Officer	Nelson Jayaweera, H (Sri Lanka)	11/88	
5. Marine Engineer	Ramesh, V (India)	02/88	
6. Sociologist	Ratsuvom Pidapayon (Thailand)	11/89	
7. Programme Officer	Ravikumar R (India)	02/89	12/89
International Consultants		m/m	
1. Mid-term review	Bage, H (Sweden)	1.50	
2. Information Service	Bengston, S (Sweden)	1.25	
3. Nursery pond construction/demonstration (IND)	Chavez, M J (Philipines)	3.00	
4. Hatchery Technology (IND)	Chotiyaputta, S (Thailand)	1.00	
5. Boat design, construction (IND, INS, SRL)	Gulbrandsen, O (Norway)	2.25	
6. Fishing trials (IND)	Jurangpathy, M N (Sri Lanka)	8.00	
7. Hatchery Technology (IND)	Kungvankij, P (Thailand)	1.00	
8. Fishing trials (IND)	Nyberg, L (Sweden)	4.25	
9. Artemia feasibility study (IND)	Pador, E (Phillipines)	1.25	
10. Aquaculture	Reyntjens, D (Belgium)	1.06	
11. Project identification (IND)	Roullet, J (FAO/France)	1.25	
12. Construction outrigger canoes (INS)	Savins, M (Australia)	2.00	
13. Hatchery Technology (IND)	Srisuwantach, V (Thailand)	2.00	
14. Shrimp by-catch survey (IND)	Van der Knaap, M (FAO/Netherlands)	1.00	
15. Mid-term review	Westlund, (Ms) L (Sweden)	1.50	

** Costs covered by government cash contributions (GCP/RAS/117/MUL)

Table 3

GCP/RAS/118/MUL – Supporting Staff – 31.12.89

Management and Administration (Madras)

Scurville (Ms) S	Sr. Admin Assistant
Rajagopal, K	Admin Assistant (Accounts)
Ashwene, H	Computer Technician
Abraham (Ms) I	Typist
Iyapillai (Ms) A	Travel Assistant
Shanmugam, T P	Senior Driver
Sivashanmugam, P M	Senior Driver
Rajendran, S	Driver
Farrar, R	Messenger

Information Service (Madras)""

Vijayakumar, K	Videographer/Photographer
Joseph (Ms) C	Documentalist
Amalore, E	Artist/Draughtsman
Jayaraj, S	Artist
Gordon (Ms) P	Secretary

Secretarial Service (Madras)

Baptist (Ms) J	Secretary
D'Costa (Ms) G	Secretary
Jayakumar (Ms) E	Secretary
Narcis (Ms) P	Secretary
Paul (Ms) M	Secretary

National Office (Dhaka)

Syed, Nural H I	Typist
Kakir, A Q	Driver

National Office (Colombo)

Kelaart (Ms) C	Secretary
Premaratne, A D	Driver
Rohana Pieris, P	Driver
Ranjith, A D	Messenger

** The costs of staff of the Information Service are covered by GCP/RAS/117/MUL.

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Table 4

GCP/RAS/118/MUL – Training Activities – 1989

S.No.	Title	Duration (days)	Venue	Number of Participants						
				BGD	IND	INS	MAL	MDV	SRL	THA
1.	**Consultations/Seminars/Workshops**									
1.1	Constraints to development of Artemia production – for scientists and administrators	2	Madras		26		1		1	2
1.2	Gracilaria production & utilization in the Bay of Bengal – for administrators, scientists & the commercial sector	5	Songkhia, Thailand	1	3	1	3	1	3	5
1.3	Review of Rapid Appraisals – for DOF field staff & NGO staff	2	Patuakhali	26						
1.4	Consolidation of RRA Information – for DOF staff and NGOs	4	Patuakhali	23						
1.5	Cooperation with NGOs – for extension staff, fisher-folk & NGO staff	2	W. Bengal, Orissa		24					
1.6	A field day – for fisher-folk	1	Kotha-patnam		200					
1.7	Oyster culture problems and prospects – for fisher-folk	1	Langkawi				36			
1.8	Problems of intensive culture of prawn – for fisher-folk	1	Ranong							62
1.9	Brackishwater culture – for fish farmers	2	Ranong							30
1.10	Internal staff review of extension project in Ranong	3	Ranong							12

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S.No.	Title	Duration (days)	Venue	Number of Participants						
				BGD	IND	INS	MAL	M D V	SRL	THA
2.	**Training Courses**									
2.1	Rapid appraisal for community and needs, analysis – for DOF,field staff and NGO	5	Bangla-desh	26						
2.2	Rural assessment, community analysis, participatory research and development approaches – for DOF officials and NGO personnel	10	Patukhali and Barguna	25						
2.3	Manual operation of net making machines – for technical apprentices	60	Bombay	2						
2.4	Set bagnet fishery investigation – for biologists	3	Cox's Bazar	8						
2.5	Management of fish markets and group thinking – for fisherwomen	5	Madras		21					
2.6	Awareness and group leadership training – for village women	7	W. Bengal		33					
2.7	Formation, organisation and administration of suitable legal body to undertake fish marketing – for fisherwomen and NGO staff	1	Madras		3					
2.8	Use and maintenance of beach landing craft and propulsion units – for fishermen and technical staff of fisheries department	5	Madras		21					
2.9	Operation and maintenance of fishing craft and gear – for national masterfishermen	90	T'Nadu		2					
2.10	Maintenance and use of BLCs in Tamil Nadu – for trainers and fishermen	7	T'Vasal		22					
2.11	Maintenance and use of BLCs – for fishermen	6	Orissa		43					

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S.No.	Title	Duration (days)	Venue	Number of Participants						
				BGD	IND	INS	MAL	MDV	SRL	THA
2.12	Maintenance and use of propulsion unit on BLC – for officers and fishermen	6	Kakinada		40					
2.13	Maintenance and use of propulsion unit on BLC – for officers and fishermen	6	M'Patnam (A.P.)		23					
2.14	Identification of BOBP pilot activities for group enterprises – for field staff	9	Langkat			12				
2.15	Extension methods and media – for fisheries and extension service staff	10	Langkat			12				
2.16	Group organization and administration – for trainers	2	Langkat			9				
2.17	Group organization and administration – for fisherwomen and fishermen	2	Langkat			111				
2.18	Basic course on group organization and administration and small enterprise selection – for fisherfolk	3	Langkat			109				
2.19	On the job construction of plank built outrigger canoes – for local carpenters	60	Nias Islands			6				
2.20	Maintenance and use of inboard engine for outrigger canoe – for fishermen	1	Nias Islands			6				
2.21	Video production – for fisheries officers	28	Thailand				2			
2.22	Rapid Rural Appraisal methods for needs analysis, fisher-folk community analysis – for extension staff	2	Maldives					3		
2.23	Rapid Rural Appraisal methods on line during pilot study of islands – for extension staff	3	Maldives					3		
2.24	Socioeconomic survey methodology – for Fishery inspectors	1	Sri Lanka						86	

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S.No.	Title	Duration (days)	Venue	Number of Participants						
				BGD	IND	INS	MAL	MDV	SRL	THA
2.25	Use of field recording equipment for Radio Programme Unit Staff	2	Colombo						3	
2.26	Field coding of questionnaire – for field staff of Minfish and banks	1	Sri Lanka						65	
2.27	Rectification of questionnaires for socio-economic surveys – for fishery inspectors and district fisheries extension officers	4	Colombo						52	
2.28	Post coding of questionnaries for socio-economic survey – for Fisheries Inspectors	3	Colombo						10	
2.29	Programme design and script development – for Radio Programme Unit Staff	15	Colombo						3	
2.30	Establishment and running of retail stores, manufacture and storing of shrimp paste and fish sauce – for fisherwomen	8	Ranong							104
2.31	Fish cage culture : diseases, feed and cage construction – for fish farmers	2	Ranong							35
2.32	Mid-wifery – for women from two villages	5	Ranong							2
2.33	Demonstration and training in food processing – for fisher-women	4	Ranong							92
2.34	Trap making and fund raising – for fiiherfolk and project officers	5	Ranong							32
2.35	Extension methodology for Project Officer of DOF and PFO	2	Ranong							19
2.36	Brackishwater culture – for fisherfolk	3	Ranong							30

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S.No.	Title	Duration (days)	venue	Number of Participants BGD	IND	INS	MAL	MDV	SRL	THA
	3. Study Tours									
3.1	Orientation on BOBP activities for Government officials	7	India		7					
3.2	Shrimp hatchery technology – for Fisheries Officers	15	Thailand			6				
3.3	Integrated development of fisher-folk – for staff members of PFS	8	Malaysia, Thailand			2				
3.4	Gracilaria culture for Research Officers	14	Sri Lanka, India							
3.5	Extension activities – for Director of Welfare	5	Orissa Madras						1	
3.6	Cage culture and backyard hatcheries – for Fisheries Officers	10	Thailand						1	
3.7	Economics and management of oyster culture – for DOF Fishery Economist	10	Malaysia							1
3.8	Small-scale fisheries development activities – for project officers of DOF and PFO	4	Thailand							20
3.9	Aquaculture sites – for fisherfolk	3	Phang Nga							30
3.10	Shrimp cage culture – for fisherfolk and project officers	3	Chachoeng-sao Thailand							50

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Appendix F

ODA POST-HARVEST FISHERIES PROJECT – ANNUAL REPORT 1989

Summary and Work Programme Proposal

Introduction

The first phase of the post-harvest project finished in August after a duration of two years. Activities had been undertaken in India, Maldives and Sri Lanka. The second phase commenced in September for a period of two years and four months until December 1991. Subprojects have commenced under the second phase in Bangladesh and India; formal clearance is still awaited from Sri Lanka.

It was a very busy year for the project with a few sub-projects reaching completion, many more being consolidated, and several new ones initiated.

The attachment of an APO to the project was of great assistance. The support of Denmark and FAO in this respect is gratefully acknowledged.

Highlights

Preliminary investigations on the potential for domestic production of nutritionally balanced prawn feed in India gave rise, in September, to a national project which will operate until late 1991. The essence of this project is to manufacture and field test an indigenous grow-out feed tailor-made to local requirements.

Progress has been made in adapting known industrial methods of extracting agar from seaweed to a technology which can be employed at village level in India. However, there still remain two technical constraints which need to be resolved. The BOBP seminar on Gracilaria seaweed held in Thailand was an important landmark in this activity and gave rise to several new ideas.

Investigations undertaken in Sri Lanka by the National Aquatic Resources Agency indicate potential for a domestic seaweed processing industry.

Technical trials on the use of insulated ice boxes in traditional craft (navas) at Kakinada, Andhra Pradesh, were satisfactorily completed. Survey of landing prices clearly indicates that quality fish iced at sea command a price premium which more than covers the cost of icing. Arrangements have been made to launch an extension campaign early in 1990 to promote use of ice boxes for quality fish.

A baseline study of the fish marketing systems was conducted in Tamil Nadu. Studies such as this are proving extremely beneficial as support for more highly targetted and focussed activities such as for example quantifying the market for tuna in southern India.

In response to continued requests from NGOs for assistance with fish marketing a study was made with a selected NGO in Tamil Nadu. The outcome indicates that while there is some potential for such organisations to play a greater role in marketing the difficulties may well outweigh the advantages in all but a few instances.

As part of the BOBP extension activity a brief assessment was made of the quality of cured reef fish in the Maldives. Recommendations were made to establish a basic quality control laboratory and provide additional training.

Extension support in Bangladesh was provided by means of a brief training and orientation course in post-harvest technology for field staff of the Department of Fisheries and NGOs in Barguna and Patuakhali Districts.

A new activity was under-taken during the year. This was to determine the potential for greater utilisation of shark, and in particular to ascertain the possibilities of increasing financial return to the fishing community by developing a trade in shark skin. Test samples of shark leather were produced in collaboration with the Central Leather Research Institute. Madras.

Problem Areas

As reported previously there are still problems in locating suitable national consultants with expertise in post-harvest technology. The technical requirements of the project were met by use of international consultants. However, in the long term it is necessary to develop national capabilities.

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One means by which this deficiency is being overcome in India is by greater involvement with central institutes. The Central Leather Research Institute has been mentioned in connection with shark leather, the Central Institute of Fish Technology is collaborating on improving the utilisation of low value fish, and the Indian Institute of Technology, Industrial Design Centre, is engaged in designing an improved fish basket for rural use.

Collaboration with NGOs was best achieved by involving them whenever possible in on-going activities. The separate sub-project on NGO collaboration proved inappropriate and will be terminated.

Expenditure

Estimated expenditure in 1989 : £ 156,000 (U.S. $ 241,000)

Main thrust for 1990

Within the region almost all fish is made use of in some way. However, there is presently gross underutilisation in some sectors. A major focus of the work programme will be to improve the utilisation of low value fish.

Subproject	*Utilisation of* low-value *fish in India* (ODA/P1/IND)
Objectives	Improve utilisatjon of fish and fish products so as to increase financial return to fisherfolk. Target groups are fishermen who land low-value fish which cannot find a market for human food, and prawn farmers who do not have adequate supplies of prawn feed. Presently large quantities of spoilt fish are used as agricultural manure. Utilizing it as a component of manufactured prawn feed would result in a higher economic return to the supplier. Benefits to prawn farmers would be substantial because lack of readily available manufactured feed is a major constraint.
Status – 1988	Inventory of available raw materials completed. Domestic feed industry commercially feasible if shortage of fishmeal can be overcome. Demand for pelleted feed forecast at 35,000 tonnes in 1995.
Targets – 1989	**Achievements**
Increase utilisation of low-value fish by formulating feed from local ingredients. (In collaboration with Indian Council for Agricultural Research)	National project entitled "The development of water stable feeds for the shrimp *P.monodon* grown in artisanal culture systems in India" became operational September 1989. A major outcome of this is expected to be an improved market for low-value fish as fishmeal.
Training course to instruct fisherwomen in processing value-added products from low-value fish	Nil because of difficulties in locating suitable counterpart agency.

Assessment

Efforts concentrated on the conversion of lowvalue fish into prawn feed almost to the exclusion of other activities which should be taken up under this sub-project.

Targets - 1990

Evaluate potential for reducing problems experienced with drying anchovies in the wet season in Kanyakumari in association with the NGO - Kanyakumari District Fishermen's Sangams Federation and the Central Institute of Fisheries Technology.

Improve quality and thereby utilisation of sundried/salted fish in selected locations by demonstrating adaptations of traditional methods.

Future

This is a difficult but very important sub-project. It should remain a major focus of the project.

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Subproject	*Marketing and processing of seaweed in India* **(ODA/P2/IND)**
Objectives	**Strategy for marketing seaweed. Potential for artisanal storage or processing.**
	Ensure that the target group of small-scale collectors and potential farmers of seaweed receive maximum financial returns for their activities. Efficient marketing or processing strategy for cultivated seaweed will be necessary to offset production costs.
Status - 1988	**Indian domestic market is undersupplied for agar and agarophyte seaweeds. Market for dried seaweed not prepared to pay premium for quality product. Potential for raising financial returns to collectors restricted to processing or part-processing seaweed at village level.**
Targets - 1989	**Achievements**
Adapt Thai agar extraction procedure to Indian conditions and train counterpart staff	**Field laboratory and technical assistant operational at Mandapam, Tamil Nadu. Very good progress made but technical constraints with filtering and dewatering agar remain.**
Extend village agar extraction technology at two sites in Tamil Nadu	**Not undertaken. Awaiting resolution of technical difficulties.**
Identify specific market channels for cultured Gracilaria and crude agar	**Japan is main importer of dried Gracilaria. Crude agar produced in village suitable only for domestic market in India.**
Determine main criteria for safe storage of dried Gracilaria	**Moisture content of 14% to 18% appears to be main requirement.**

Assessment

Good progress made in adapting known technology to village level but technical difficulties not yet resolved. Technical development continues but no extension can be undertaken until totally suitable and acceptable technology developed.

Targets - 1990

Complete technical adaptation of agar extraction procedure suitable for fishing village in Tamil Nadu.

Test-market crude agar produced by this method.

Extend technology in two villages.

Future

To be determined on basis of progress during 1990.

Subproject	*Use of ice at sea in artisanal fishing boats on east coast of India* **(ODA/P3/IND)**
Objectives	**Improve the quality of fish landed by boats, such as navas and beach landing crafts (BLCs), by demonstrating that fish can be maintained in good condition in ice in such craft and hence have the potential to sell for an increased price.**
	Fish iced on-board will be suitable for re-icing and onward transport to distant urban markets most of which are currently undersupplied.

Status - 1988	Three prototype insulated boxes installed on commercial motorised navas at Kakinada, Andhra Pradesh. System established to monitor technical performance and financial returns.

Targets - 1989	**Achievements**
Demonstrate use of insulated fish/ice boxes at sea	Six prototype boxes have been in use on privately owned navas for most of the year. Social acceptance and technical performance have been excellent.
Demonstrate economic viability of icing fish on-board navas	Confirmed. Established that better quality high value fish such as seer fish will command higher sale price. Cost of box can be recovered in less than two years.
Initiate similar activities at other landings on east coast of India	Appraisals of two candidate areas (northern Orissa, and southern Tamil Nadu) indicate that these areas may benefit from use of ice after further development of appropriate insulated boxes with the Orissa dinghy and the growth of off-shore fishing in Tamil Nadu.

Assessment

Motorised navas at Kakinada can benefit greatly from the use of insulated fish/ice boxes for high value fish. A good indication is that present users have agreed to purchase the prototype boxes.

Targets - 1990

Initiate state subsidy to popularise boxes.

Facilitate a commercial supply of boxes.

Conduct extension campaign to promote substantial uptake by nava operators.

Future

Navas in Andhra Pradesh will remain the focus of this work for the near future. The potential for similar activities at other landings should continue to be monitored.

Subproject	**Collaboration** *with selected non-government organisations in the east coast states of India* **(ODA/P4/IND)**
Objectives	Assist NGOs to improve the handling, processing and marketing of fish at remote landings. Target groups are small-scale fisherfolk in isolated villages and landings which may best be reached through the activities and extension programmes of established NGOs.
Status - 1988	Several technical subject areas identified as suitable for collaborative activities with NGOs.

Targets - 1989	**Achievements**
Assist selected NGO to determine limitations of traditional fish basket and develop improved container	Field survey undertaken in Kanyakumari for Kanyakumari District Federation of Fishermen's Sangams. Indian Institute of Technology (Industrial Design Centre, Bombay, India) engaged to design improved container.
Determine potential for improving fish curing practices and implementing extension programme	Central Institute of Fisheries Technology (Cochin) has prepared proposals for reducing the problems of drying anchovies in Kanyakumari.
Make contact with suitable NGOs in West Bengal and Orissa	Meeting held with selected NGOs in Orissa showed little potential for collaboration.

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Conduct post-harvest training courses for staff and village operatives of NGOs in Andhra Pradesh and Tamil Nadu	Nil because of very limited demand by NGOs and lack of capacity of Project.

Assessment

Limited number of NGOs are working with fishing communities. Staff have little technical knowledge, consequently they are unable to identify, plan, and execute worthwhile activities.

All of the above activities could have been undertaken under subprojects ODA/P1/IND and ODA/P6/IND.

Targets - 1990

Terminate subproject; activities transferred to other subprojects, but continue to work with NGOs whenever possible.

Subproject	*Shrimp trawler by-catch on east coast of India* (ODA/P5/IND)
Objectives	Methodology for economic appraisal and assessment of volume and composition of by-catch. Evaluation of options for landing and use of by-catch. If economic means can be found to land the by-catch it could be utilised in the national interest as food for people or animals.
Status - 1988	Trawler by-catch discarded at sea off east coast of India estimated at 130,000 tonnes per annum.
Targets - 1999	**Achievements**
Monitor landings of fish by double rig shrimp trawlers	Regular monitoring at Visakhapatnam indicates that most large trawlers return to port with some selected fish but normally there is hold space for far larger quantities, Clearly more fish could be landed.
Monitor trawler by-catch landed in small carrier boats by West Bengal fishermen	Very limited, and often conflicting, information has been obtained.
Conduct feasibility study of potential for landing and marketing increased volumes of by-catch in West Bengal	Nil. Target was too optimistic,

Assessment

Technical constraints to increased landings do not generally appear to be binding; the main reasons for discarding fish relate to low value relative to shrimp, and poorly developed marketing infrastructure. Recommendations cover areas for public sector action (selectively addressing marketing constraints, regulating by-catch landings, regulating information provided by trawlers, and the possible development of a short ranged trawler fleet based in Orissa and West Bengal), and potential for increased transfer at sea, cold storage of fish, use of selective trawl gear, and development of value added products.

Targets - 1990

Finalise report and terminate sub-project.

Subproject	*Fish marketing in east coast states of India* (ODA/P6/IND)
Objective	Propose technical improvements to marketing to ensure fishermen achieve greatest financial return for their catch.

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	Target groups are small-scale fishermen who sell their catch at numerous beach landings along the east coast. Improvements to marketing may also result in improved distribution of fish to consumers in the hinterland, and a reduction in post-harvest losses.
Status - 1988	Baseline surveys completed in West Bengal and Andhra Pradesh. Field investigator monitoring handling, processing and marketing at Kothapatnam.
Targets - 1989	**Achievements**
Undertake baseline surveys in Tamil Nadu and Orissa	Survey in Tamil Nadu completed, report being finalised. Pre-operational study undertaken on economic feasibility of utilising van to transport fish to market in Pondicherry and Tindivanam. Orissa state baseline survey re-scheduled to January 1990.
Identify major technical deficiencies in market systems	Preliminary analysis of Kothapatnam data indicates that market distribution system is effective in transporting fish from remote landings to distant urban areas. Major deficiency appears to be the low unit fish prices paid to operators of small craft. Larger craft operators receive a higher unit price. In-depth study of market channels for fish landed in Kanyakurnari indicates some limited potential for further NGO involvement in marketing. Study of shrimp processing industry indicates that there is no requirement for BOBP involvement.

Assessment

Baseline surveys behind schedule because of difficulties in locating suitably qualified and experienced national consultants. Major conclusions on the east coast systems cannot be made until completion of the Orissa study but the information gathered so far is proving immensely useful as data source relevant to wide range of post-harvest activities.

Targets - 1990

Undertake baseline survey of Orissa in association with selected NGO.

Comprehensive assessment of present fish marketing systems along entire east coast of India.

Complete analysis of Kothapatnam data.

Evaluate role of the railways in fish marketing on the east coast.

Support and assist NGO - Kanyakumari District Fishermens Sangams Federation in undertaking initial pilot marketing activities.

Future

Dependent on findings and response of relevant authorities.

Subproject	Utilisation of Sharks in India (ODA/P7/IND)
Objective	Increased income from improved utilisation of shark. Target group are fishermen who land shark.
Status - 1988	Nil.
	Achievements Preliminary estimates made of quantity and species landed in Tamil Nadu.

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	Local fish processors have proved capable of removing skin from sharks.
	Trial batches of shark skins processed in collaboration with Central Leather Research Institute, Madras.
	Initial contacts made with international trade in shark leather.

Assessment

Indications show there is potential for utilisation of shark skin. Greater use may also be made of other parts of sharks viz. liver oil.

Targets - 1990

Complete investigation on species and quantity of shark landed in the east coast states of India.

Determine market potential for shark skin as either finished leather or as raw cured on domestic and international markets,

Determine domestic market potential for skinless shark meat.

Future

Hopefully, be catalytic in establishing trade in shark skin, and more fully utilising resources of shark liver oil.

S&project	**Utilisation of waste products of seafood** *processing industries in Sri Lanka* (**ODA/P1/SRL**)
Objectives	**Reduce wastage from seafood processing plants by utilising by-products which are presently discarded.**
Status - 1988	**Preliminary surveys initiated**
Targets - 1989	**Achievements**
Determine quantity, type, seasonality and availability of waste products	**Visits to plants and replies to questionnaires indicate 1000 tonnes of prawn waste. In Colombo area half is not utilised – just buried. No waste products from cuttlefish or lobster processing.**
Ascertain present utilisation	**In Colombo area, some waste is now converted to dried meal and sold for inclusion in commercial prawn feed.**
Determine present and future market potential	**Nil. Awaiting completion of above targets.**
Recommend means of achieving potential	**Nil. Awaiting completion of above targets.**

Assessment

There is potential to greatly improve utilisation but progress has been slow.

Targets - 1990

Determine present and future market potential.

Recommend means of achieving potential.

Future

This study will conclude in 1990 but because of substantial regional importance the subject may warrant further investigation.

Subproject	*Processing and marketing of seaweed in Sri Lanka* **(ODA/P2/SRL)**
Objectives	**Improved processing, and development of domestic and international marketing.**

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	Target groups are small-scale seaweed collectors or cultivators. Introduction of small-scale processing or improvements in marketing will increase financial returns.
Status - 1988	Nil

Targets - 1989	Achievements
Determine constraints, limiting factors, and future potential of seaweed industry	Comprehensive study undertaken on seaweed industry. Gracilaria exported dry unprocessed. Limited small-scale domestic utilisation of Gracilaria. Stocks of Sargassum not exploited.
Determine potential for national processing	Potential for large-scale processing of Sargassum, and either large or small-scale processing of Gracilaria. Main potential for import substitution.
Identify specific domestic and export markets	Dried Gracilaria currently goes to Japan. Domestic market exists for agar and alginate.
Initiate development of villagelevel processing	Nil because of technical problems experienced with parallel activity in India.

Assessment

Available Gracilaria is underutilised, stocks of Sargassum not utilised. Strong domestic markets for products of both seaweeds.

Targets - 1990

Assist with development of seaweed processing industry.

Future

Proposals to initiate processing or additional exploitation of Sri Lanka's seaweed resources must incorporate stock assessment and resource management.

Subproject	*Fisheries Extension Development (Post-Harvest) in Bangladesh* **(ODA/P1/BGD)**
Objectives	Improved utilisation of fish, and greater financial return to fisher-folk communities.
	Target groups are small-scale fisherfolk involved in catching and processing fish in Patuakhali and Barguna districts. Objectives will be achieved by providing basic training to extension staff.
Status 1988	Project proposal submitted to Government of Bangladesh.

Targets - 1989	Achievements
Provide basic training in small-scale post-harvest technology for extension staff of Department of Fisheries and NGOs in Barguna and Patuakhali Districts	Three-day training course for 21 DOF staff and 2 NGO staff held at Barguna. Topics covered included nature of fish spoilage, handling and processing methods, use of ice, and role of extension officers.

Assessment

Training was appropriate and clearly met a real need, but will require follow-up and consolidation

Targets - 1990

Issue basic handbook in Bengali to supplement and support formal training.

Support post-harvest field extension activities which arise from training.

Conduct further training as necessary.

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Future

The awareness and interest arising from the training is expected to stimulate pilot-scale post-harvest field activities.

Subproject	*Post-harvest aspects of motorisation of Chandi Boats in Bangladesh* **(ODA/P2/BGD)**
Objectives	**Improved marketing and thus greater financial returns from operation of motorised Chandi boats.** **Target groups are owners and operators of newly motorised Chandi boats in Bhola district. Improved marketing will also benefit consumers.**
Status - 1988	**Project proposal submitted to Government of Bangladesh**
Targets - 1989	**Achievements**
Appraise marketing and advise as necessary	**Nil**
Advise staff of Department of Fisheries in collection of market data	**Nil**

Assessment

Subproject clearance received too late to implement field activities.

Targets - 1990

Appraise marketing and advise as necessary.

Advise staff of Department of Fisheries in collection of market data.

Future

Modifications, changes, or intervention in existing marketing arrangements are dependent on the outcome of the initial appraisals.

Staff – Post-Harvest Fisheries Project - 1989

Post	*Name of Incumbent (Nationality)*	*Date of Arrival*
Core Staff		
Post-Harvest Fisheries, Adviser	**Walker D.J. (U.K.)**	**August 1987**
Consultants		
1. Shrimp trawler by-catch, India	**Seetharamaswami, A. (India)**	**12.0**
2. Fish marketing, prawn feed manufacture, and seaweed processing, India	**Rajendran, A.D.I. (India)**	**10.0**
3. Use of ice at sea, India	**Clucas, I.J. (U.K.)**	**2.5**
4. Fish marketing, India	**Nambiar, K. (India)**	**2.0**
5. NGO fish marketing, India	**Gordon, A. (U.K.)**	**1.5**
6. Seaweed processing, India	**Coppen, J.J.W. (U.K.)**	**1.5**
7. Fish marketing, India	**Rao, C.V. (India)**	**1.5**
8. Seaweed processing, India	**Bone R.T. (U.K.)**	**1.5**
9. Post-harvest extension, Bangladesh	**King, D. (U.K.)**	**1.0**
10. Post-harvest extension, Maldives	**Wood, C.D. (U.K.)**	**1.0**
11. Manufacture of prawn feed, India	**Wood, J.F. (U.K.)**	**1.0**
12. Prawn quality assurance, India	**Reilly, P.J.A. (U.K.)**	**1.0**
13. Manufacture of prawn feed, India	**Brown, J.H. (U.K.)**	**0.5**
Supporting staff (Madras)		
Secretary	**Emmanuel, P.**	

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Appendix G

IMPROVEMENT OF LIVING CONDITIONS OF WOMEN AND THEIR FAMILIES IN FISHING COMMUNITIES (FPA/RAS/904/FPA)

Annual Report

The 1984 World Conference on Fisheries Management and Development pointed out the importance of designing strategies for fisheries management and development in which emphasis is put on meeting the economic as well as the social needs of small fishing and fish farming communities. Further, it was stressed that fisheries development programmes should recognise the important economic role of women in fishery-related activities and that provision should be made for enhancing that role.

To give substance to these basic ideas, the FAO Population Programme in cdlaboration with the FAO Department of Fisheries fielded a mission to Asia in 1988 to identify ways of incorporating women-oriented activities into FAO fisheries projects which in the long run might influence the population behaviour of the communities.

A project proposal, "Improvement of Living Conditions of Women and their Families in Fishing Communities", evolved out of the mission as an integral part of the Bay of Bengal Programme which aims at integrated development of coastal small-scale fisherfolk communities. The UNFPA reacted favourably to the proposal and agreed in mid-l 989 to sponsor a four-year project. Funds were sanctioned for a preparatory phase of six months.

The preparatory phase objectives were to identify possibilities of women-oriented activities in three of the BDBP member countries which had not been visited by the 1988 mission, and to formulate a more elaborate project document and work plans for the implementation phase. Pilot activities will as far as possible be integrated into existing BOBP subprojects and activities which already involve and address various needs of fisher-folk communities.

During the preparatory phase in 1989, missions were mounted to Bangladesh, Malaysia and the Maldives by staff of FAO's Population Programme and BOBP. The situation of women in fisherfolk communities was studied. A few country project ideas evolved.

Thereafter an inter-agency meeting was called in September in Madras. It was attended by representatives of BOBP member countries, FAO's Population Programme, UNFPA and BOBP. The meeting, agreeing with the project's long- term objectives, made some changes in the immediate objectives to better address the region's needs. It also discussed preparations for the project's main phase. It was agreed that either assigned staff from the fishery agencies and/or national consultants engaged by BOBP would undertake detailed appraisal needs and prepare work plans. These efforts would be guided by a multi-disciplinary Project Advisory Group to be convened by the fishery agencies in each country. The meeting also gave each country the opportunity to discuss and modify their country ideas with concerned BOBP staff. The meeting emphasized the pilot nature of the activity and the need for evolving, testing and demonstrating innovative approaches. It suggested that expected outcomes of activities should be specified and mechanisms and means of monitoring the outcomes should be devised.

The immediate project objectives are to develop and demonstrate strategies to :

- improve the incomes of women in fisher-folk communities;
- enhance awareness, and motivate and educate fisher-folk families;
- promote and strengthen collective action by women in fisher-folk communities to enhance their social and economic status, strength and bargaining power; and
- enable access to health, nutrition and population education, and where necessary facilitate access to health and family welfare services.

Subsequent to the inter-agency meeting, preparatory activities have begun in most countries. Staff assignments are being worked out, consultants are being identified and hired, guidelines to appraise needs are being prepared, Project Advisory Groups are being convened. It is expected that the actual analysis of needs and preparation of work plans will begin early 1990. Detailed country work plans and budgets are expected late March 1990 : these will mark the end of the preparatory phase.

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In the meantime, the project document is being adjusted on the basis of the outcome of the inter-agency meeting. It is hoped that the revised document will be approved by UNFPA before the end of the preparatory phase, so that the main phase can start in April 1990. It will have a duration of 3.5 years and a budget of just under US$ 1 .O million. Most of the funds are earmarked for training activities, revolving funds, and national staff /consultants and travel.

1989 expenditures have been limited to identification missions for Bangladesh, Malaysia and the Maldives, and the inter-agency meeting. Total amount : about US $ 13 000

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Appendix H

ANNUAL REPORT (1989) OF NATIONAL PROJECTS IMPLEMENTED THROUGH BOBP

Besides the activities carried out under the regional projects, BOBP implemented during 1989 four national projects with separate funding arrangements in member countries on behalf of various donors. The projects were :

1. *Reef Fish Research and Resources Survey Survey in the Maldives* – Phase II (MDV/88/007) – This UNDP-funded project attempts to assess the reef fishery resources and assist in increased production and utilization of the resources. It is the second phase of an earlier project (MDV/85/003). Because of several problems the project work came to a near standstill for the major part of the year. The future, one year to go, will be determined in a tripartite review in January and a drastic rephasing of the project might be considered.

2. *Fishing Craft Development, Kerala* (FAP/TCP/IND/8852(A)) – aims at introducing new cost-efficient motorised canoes. It is funded by FAO. There has been good progress during the year. Several prototype canoes have been built; one of them has been accepted by fishermen users and its construction has been taken up by private boatyards. The project component dealing with fishing trials has been less successful. The catch rates, particularly in the outer and offshore areas, have been disappointing. The work will continue during 1990.

3. *Pilot project on reception facilities for oily residues and garbage in the Visakhapatnam Fishing Harbour* (IMO/SIDA/FIT/IND/87/001) – This project, funded by SIDA through IMO, aims at improving the water quality in the Visakhapatnam Fishery Harbour by reducing discharge of pollutants from fishing vessels. The project has provided a mobile tanker with pumping facilities to collect oily bilge water, and 25 garbage skips to receive wastes. A video film, a brochure, stickers and wall-paintings have been organized and handed over. These serve as educational material to promote the cleanliness ethic among harbour users. All inputs have been provided but there are doubts about the frequency of utilization of the inputs.

4. *Development of water-stable feeds for the shrimp* Penaeus monodon, *grown in artisanal aquaculture* systems *in India.* – This is an ODA project which will evaluate the potential of local raw materials for small-scale manufacturers of shrimp feed and the role of fertiliser in conjunction with these feeds. The project started at the end of the year, and inputs consisting of components of feed mill machinery and feed ingredients have been prepared. Pilot production of test feed by a commercial company IS about to commence. Feed trials will be undertaken together with research institutes and the private sector. The project is scheduled to go on till at least September, 1991.

Further details of the projects follow.

Title	*Reef Fish Research and Resources Survey in the Maldives – Phase* II (MDV/88/007)
Duration	24 months, Jan 89 - Dec 90
Inputs	US $388,000 from UNDP
Objectives	Enabling the MOFA to assess the reef fish resources and the status of the existing reef fish fisheries. Assistance for improved reef fish product development, and assistance for assessment of the development potential in the reef fish fisheries (a pm-investment study).
Status 1988	The first phase (MDV/85/003) of the survey covering only the Male Atoll was completed (1987-88). The bottom longline and handline proved to be more efficient than traps. Growth parameters and exploitation rates were estimated through length-based methods. Density distributions of a few major species by area and season were projected and reef fish production in the Atoll approximated. Preliminary assessment of the economics, markets

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	and development prospects for reef fish indicates some limited opportunities for small-scale operations, with the right type of incentives, encouragement and marketing arrangements. See *Bay of Bengal News No 33 & 34.*
Targets	**Achievements**
Finalization of reports on Phase I	Draft terminal report on Phase I completed. Technical report on reef survey in Male Atoll prepared and will be published as a Working Paper. Report on Remote Sensory Survey conducted by ESCAP Regional Remote Sensing Project (RAS/86/141), with East China Normal University as sub-contractors, not yet received.
Conducting exploratory fishing in three other atolls	Due to unexpected delay in receiving the replacement engine of higher horsepower,replacement of damaged components of the engine,repairs to hull and recruitment of crew,the exploratory fishing commenced systematically only in December, though sporadic cruises were executed during the year.
Investigating possible means of procuring or collecting bait fish	Commenced in December.
Biological,environmental catch effort, and costs and earnings data collection	Commenced in December
Sampling commercial reef fish fishery	Not commenced. Awaiting recruitment of field officers.
Reef fish marketing study	A consultant undertook the study in November/December and he concludes that the prospects for increased export of reef fish are poor. Reasons are competitive markets, high freight rates, multi-species/size catch composition, small quantities from scattered locations, etc.
In-service training of scientific and technical staff 8 field officers.	Very limited because of the delayed survey programme.
Overseas training	Fishing technologist completed. his 3-month fellowship on reef fish fishing gear and fishing trials in Darwin, Australia. Fellowship for biologist postponed to early part of next year.

Assessment

Progress has not been satisfactory. With the vessel, crew and gear now in good shape,the exploratory fishery programme is expected to proceed satisfactorily in 1990. Time available will permit only two coverages of the survey areas, provided no major failures occur.

Execution of the programme for investigation of commercial reef fishery will depend on the success in recruiting field staff. It may be necessary to consider extension of the project by a few months into 1991 for analysis of data and preparation of technical and terminal reports. In view of the slow implementation to date and the poor prospects for increased export of reef fish, a major rephasing of the project should perhaps be considered.

Targets 1990

- Completion of two exploratory fishing coverages of the selected 3 atolls
- Assessment of availability and cost of baitfish
- Completion of overseas training of biologists
- Sampling of commercial reef fishery

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- Continuous processing of data
- Preparation of proposals for follow-up activities

Future : Reporting

Title	*Fishing Craft* **Development, Kerala (FAO/TCP/IND/8852(A))**
Duration	**18 months, Oct. 1988 - March 1990**
Inputs	**US $ 139,000 from FAO**
Objectives	**Introduction of new types of cost-effective motorized fishing craft in Kerala and training of local fishermen in their use. (The original project document states wrongly that the objective is " to increase the production of motorized fishing craft -")**
Status 1988	**The specific needs for further development of fishing craft had been identified. Preparatory work for construction of prototype canoes, modification of IND-20 (BLC) and construction of boat hauling devices were undertaken.**

Targets 1989	**Achievements**
Construction of box for water cooled engine for IND-20 and a boat hauling winch.	**Completed in Madras. Besides the engine driven winch a manual capstan was also constructed.**
Installation and trial of WC engine in IND-20	**Completed in Quilon.**
Design of two prototype plywood canoes	**Completed by Naval Architect Consultant in January/ February. The main particulars are :**

	IND-26	IND-27
Length	8.50 m	9.50 m
Beam	1.55 m	1.90 m
Depth	0.78 m	0.86 m
Cubic Number	10.3 m^3	15.4 m^3
Engine	7 Hp OBM	10 Hp Diesel IBM

Construction and technical trials of two prototype plywood canoes.	**Construction and testing of IND-26 and IND-27 were completed in April and July respectively.**
Training of local boat builders	**About six carpenters of Dasan Boatyard of Vizhinjam were given on-the-job training in new methods of plywood canoe construction.**
Fishing trials and demonstration of IND-20 and prototype canoes	**Started in June for IND-20 and IND-26 and in July for IND-27 from a fishing centre, Poonthura, and will continue until a one-year cycle has been completed for all the craft.**
Testing and demonstration of sail for BLCs and prototype plywood canoes	**Completed. All the crafts demonstrated are equipped with sail for emergency and fuel saving.**
Unplanned	**The boatyards of Dasan in Vizhinjam and SIFFS, Trivandrum, have constructed two IND-26 canoes each on a commercial basis.**
	Construction of a new prototype IND-28, at the Dasan boatyard. It is similar to IND-26 but designed for a retractable propulsion system. The system was assembled in

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Madras. For water tightness between the stern tube of the liftable propulsion unit and the hull, a rubber bellow of large enough diameter will be tried out. It is a less costly alternative than the engine box for retractable propulsion system.

Assessment

The fishermen operating the prototype canoe IND-26 are satisfied with the strength and stability of the craft. The general acceptance of it is also demonstrated by the fact that four canoes have been built on a commercial basis. Fishermen have suggested certain modifications which should be accommodated in new prototypes.

The demonstration of the larger plywood canoe IND-27 built for propulsion with diesel propulsion units as alternative to OBM is plagued by engine and gearbox problems.

The demonstration of the two BLCs (IND-20) in offshore fishing has not yet produced positive results. It has been hampered by frequent engine breakdowns and non-availability of spares and the catch rates have been low.

There is a need to extend the fishing trials and demonstration phase to cover at least a one-year cycle. The project which was scheduled to terminate in March 1990 should be extended for about eight months. No additional funds are required.

Targets 1990

- Completion of a one-year cycle of fishing trials and demonstration of BLCs (IND-20) propelled by WC diesel engine and plywood canoes.
- Construction, testing and demonstration of three canoes (IND- 26A, IND-29 and IND-28).
- Training of fishermen in use and maintenance of diesel engine propulsion system of BLCs.
- Fishing trials and demonstration of BLCs and IND-27 in the offshore zone.
- Demonstration of boat hauling devices for BLCs and plywood canoes.
- Training and demonstration in use of sail of fishermen/users of BLCs and new canoes.
- As and when required, preparation of leaflets and a video film for dissemination of positive information.
- Evaluation and reporting of technical and economic feasibility and recommendations for follow up.

Title	*Pilot project on reception facilities for oily residues and garbage in the Visakhapatnam Fishing Harbour* **(IMO/SIDA/FIT/IND/87/001)**
Duration	**One year, 1988-89**
Inputs	**US $ 70,000 - IMO/SIDA**
Objectives	**To improve water quality in Visakhapatnam Fishing Harbour by eliminating discharge of pollutants from fishing vessels and shore support facilities.**
Status 1988	**Baseline information in the harbour was collected through photographs and video filming sessions. 25 garbage skips were deployed at suitable locations. Specifications for mobile tanker with pumping facilities to collect oily bilge water from boats using the harbour were finalized. The chassis for the mobile tanker was procured.**
Targets 1989	**Achievements**
Commissioning of mobile tank trailer with pump and hose	**Commissioned in August after considerable delays in locating indigenous equipment.**

Procurement of a portable oil skimmer for collection of surface oil in the harbour waters	Procured in July. It is not being used at present as VPT has yet to put together a few minor accessories to make it fully operational.
Completion of video programme	Completed. It shows the effects of pollution and how the harbour can be kept clean by using the hardware provided by the project. A VCR has been procured.
Education programme for fishermen and other users of the harbour.	No separate education programme was deemed necessary after discussions with VPT officials and the Fisheries department. The video programme and various print materials will be put to use.
Printing of permanent notices and information leaflets.	A brochure on keeping the harbour clean was prepared, printed and handed over. Multi-lingual slogan stickers promoting the cleanliness ethic were handed over for display on boats. Similar slogans were also painted on walls at select harbour locations.
Periodic evaluation on levels of utilization of the reception facilities.	VPT is not yet monitoring the use of the garbage skips and the mobile tanker. Parameters for monitoring yet to be worked out by VPT.

Assessment

Garbage skips are being put to use but they are being emptied only weekly. The frequency has to be increased to improve hygiene and avoid foul smell. The effectiveness of the mobile tanker cannot be evaluated due to its late commissioning and also because VPT seemed to have problems in assigning a regular crew to operate it.

All the inputs provided for in the project document have been delivered. What remains to be done is monitoring the effectiveness of the equipment after fixing appropriate parameters. In order to achieve long-lasting effects the VPT must prepare and enforce fishing harbour regulations and continuously educate the users about the need to keep the harbour clean.

The city's storm water drainage into the harbour has not yet been diverted and continues to be an important issue to be addressed.

Title	*Development of water-stable feeds for the shrimp* Penaeus monodon, *grown in artisanal aquaculture systems in India*
Duration	24 months, October, 1989 - September 1991
Inputs	US $ 288,000 - U.K.
Objectives	Evaluate potential of local raw materials for small-scale manufacture of nutritionally balanced shrimp grow-out feeds, Evaluate role of fertiliser in conjunction with these feeds to further optimise economic pond productivity.
Status 1988	Nil.
Targets 1989	Achievements
Development studies on formulation and manufacture using raw materials indigenous to India	Samples of raw materials evaluated for nutritional and physical properties.

Assessment

The initial target was met. The project addresses a major need of the prawn culture industry throughout the region.

Targets 1990

Pilot production of test feed by commercial company.

Establish baseline prawn feeding data through trials with Central Institute of Brackishwater Aquaculture in West Bengal.

Conduct trials on farm scale with the Department of Fisheries, Andhra Pradesh.

Future

Trials are likely to continue in 1991. Other activities will depend on the progress and outcome of the trials.

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Publications of the Bay of Bengal Programme (BOBP)

The BOBP brings out six types of publications.

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

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

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

Miscelleneous Papers **(BOBP/MIS/) concern work not originated by BOBP – but which is relevant to the Programme's objectives.**

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

Newsletters (Bay of Bengal **News), issued quarterly, contain illustrated articles and features in nor-technical style on BOBP work and related subjects.**

A list of available publications follows.
(Missing numbers in the six series are those of publications not any more available.)

Reports *(BOBP/REP/.)*

1. **Report of the First Meeting of the Advisory Committee. Colombo, Sri Lanka, 28-29 October 1976. (Published as Appendix 1 of IOFC/DEV/78/44.1, Rome, 1978)**

2. **Report of the Second Meeting of the Advisory Committee. Madras, India, 29-30 June 1977. (Published as Appendix 2 of IOFC/DEV/78/44.1, FAO, Rome, 1978)**

3. **Report of the Third Meeting of the Advisory Committee. Chittagong, Bangladesh, 1-10 November 1978 Colombo, Sri Lanka, 1978. (Reissued Madras, India, September 1980)**

5. **Report of the Workshop on Social Feasibility in Small-Scale Fisheries Development. Madras, India, 8-12 October 1979. Madras, India, April 1980.**

7. **Report of the Fourth Meeting of the Advisory Committee. Phuket, Thailand, 27-30 November 1979. Madras, India, February 1980.**

8. **Pre-Feasibility Study of a Floating Fish Receiving and Distribution Unit for Dubla Char, Bangladesh, G. Eddie, M.T. Nathan. Madras, India, April 1980.**

10.1 **Report of the Consulation on Stock Assessment for Small-Scale Fisheries in the Bay of Bengal. Chittagong, Bangladesh, 16-21 June 1980. Volume 1 : Proceedings. Madras, India, September 1980.**

11. **Report of the Fifth Meeting of the Advisory Committee. Penang, Malaysia, 4-7 November 1980. Madras, India, January 1981.**

12. **Report of the Training Course for Fish Marketing Personnel of Andhra Pradesh. Hyderabad, India, 11-26 November 1980. Madras, India, September 1981.**

13. **Report of the Sixth Meeting of the Advisory Committee. Colombo, Sri Lanka, 1-5 December 1981. Madras, India, February 1981.**

14. **Report of the First Phase of the "Aquaculture Demonstration for Small-Scale Fisheries Development Project" in Phang Nga Province, Thailand. Madras, India, March 1982.**

15. **Report of the Consultation-cum-Workshop on Development of Activities for Improvement of Coastal Fishing Families. Dacca, Bangladesh, October 27-November 6, 1981. Madras, India, May 1982.**

16. **Report of the Seventh Meeting of the Advisory Committee. New Delhi, India, January 17-21, 1983. Madras, India, March 1983.**

17. **Report of Investigations to Improve the Kattumaram of India's East Coast. Madras, India, July 1984.**

18. **Motorization of Country Craft, Bangladesh. Madras, India, July 1984.**

19. **Report of the Eighth Meeting of the Advisory Committee. Dhaka, Bangladesh, January 16-19, 1984. Madras, India, May 1984.**

20. **Coastal Aquaculture Project for Shrimp and Finfish in Ban Merbok. Kedah, Malaysia. Madras, India, December 1984.**

21. **Income-Earning Activities for Women from Fishing Communities in Sri Lanka. E. Drewes. Madras, India, September 1985.**

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22. Report of the Ninth Meeting of the Advisory Committee. Bangkok, Thailand, February 25-26, 1985. Madras, India, May 1985.

23. Summary Report of BOBP Fishing Trials and Oemersal Resources Studies in Sri Lanka. Madras, India, March 1986.

24. Fisherwomen's Activities in Bangladesh: A Participatory Approach to Development. P. Natpracha, Madras, India, May 1986.

25. Attempts to Stimulate Development Activities in Fishing Communities of Adirampattinam, India. P. Natpracha, V.L.C. Pietersz. Madras, India, May 1986.

26. Report of the Tenth Meeting of the Advisory Committee. Male, Maldives. 17-18 February 1986. Madras, India, April 1986.

27. Activating Fisherwomen for Development through Trained Link Workers in Tamil Nadu, India. E. Drewes. Madras, India, May 1986.

28. Small-Scale Aquaculture Development Project in South Thailand : Results and Impact. E. Drewes. Madras, India, May 1986.

29. Towards Shared Learning: An Approach to Non-formal Adult Education for Marine Fisherfolk of Tamil Nadu, India. L.S. Saraswathi and P. Natpracha. Madras, India, July 1986.

30. Summary Report of Fishing Trials with Large-Mesh Driftnets in Bangladesh. Madras, India, May 1986.

31. In-Service Training Programme for Marine Fisheries Extension Officers of Orissa, India. U. Tietze. Madras, India, August 1986.

32. Bank Credit for Artisanal Marine Fisherfolk of Orissa, India. U. Tietze. Madras, India, May 1987.

33. Non-formal Primary Education for Children of Marine Fisherfolk in Orissa, India. U. Tietze, Namita Ray. Madras, India, December 1987.

34. The Coastal Set Bagnet Fishery of Bangladesh – Fishing Trials and Investigations. S.E. Akerman. Madras, India, November 1986.

35. Brackishwater Shrimp Culture Demonstration in Bangladesh. M. Karim. Madras, India, January 1987.

36. Hilsa Investigations in Bangladesh. Colombo, Sri Lanka, June 1987.

37. High-opening Bottom Trawling in Tamil Nadu, Gujarat and Orissa, India : A Summary of Effort and Impact. Madras, India, February 1987.

38. Report of the Eleventh Meeting of the Advisory Committee. Bangkok, Thailand, March 26-29, 1987. Madras, India, June 1987.

39. Investigations on the Mackerel and Scad Resources of the Malacca Straits. Madras, India, December 1987.

40. Tuna in the Andaman Sea. Colombo, Sri Lanka, December 1987.

41. Studies of the Tuna Resource in the EEZs of Maldives Et Sri Lanka. Madras, India, April 1988

42. Report of the Twelfth Meeting of the Advisory Committee. Bhubaneswar, India, 15-18 January 1988. Madras, India, April 1988.

43. Report of the Thirteenth Meeting of the Advisory Committee. Penang, Malaysia, 26-29 January, 1989. Madras, India, April 1989.

44. Report of the Fourteenth Meeting of the Advisory Committee. Medan, Indonesia, 22-25 January, 1990. Madras, India, April 1990.

Working Papers (BOBP/WP/.)

5. Improvement of Large-Mesh Driftnets for Small-Scale Fisheries in Bangladesh. G. Pajot. Madras, India, September 1980.

6. Fishing Trials with Bottom-Set Longlines in Sri Lanka. G. Pajot, K.T. Weerasooriya. Madras, India, September 1980.

7. Technical Trials of Beachcraft Prototypes in India. 0. Gulbrandsen, G.P. Gowing, R. Ravikumar. Madras, India, October 1980.

8. Current Knowledge of Fisheries Resources in the Shelf Area of the Bay of Bengal B.T.A. Raja. Madras, India, September 1980.

9. Boatbuilding Materials for Small-Scale Fisheries in India. Madras, India, October 1980.

10. Fishing Trials with High-Opening Bottom Trawls in Tamil Nadu, India. G. Pajot, J. Crockett. Madras, India, October 1980.

11. The Possibilities for Technical Cooperation between Developing Countries (TCDC) in Fisheries. E.H. Nichols. Madras, India, August 1981.

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12. Trials in Bangladesh of Large-Mesh Driftnets of Light Construction.
G. Pajot, T.K. Das. Madras, India. October 1981.

13. Trials of Two-Boat Bottom Trawling in Bangladesh. G. Pajot, J. Crockett. Madras, India, October 1982

24. Traditional Marine Fishing Craft and Gear of Orissa. P. Mohapatra. Madras, India, April 1986

25. Fishing Craft Development in Kerala : Evaluation Report. O. Gulbrandsen. Madras, India, June 1984.

27. Reducing Fuel Costs of Small Fishing Boats. 0. Gulbrandsen. Madras, India, July 1986

28. Fishing Trials with Small-Mesh Driftnets in Bangladesh.
G. Pajot and T.K. Das. Madras, India, March 1984.

30. Mackerels in the Malacca Straits. Colombo, Sri Lanka, February 1985

31. Tuna Fishery in the EEZs of India, Maldives and Sri Lanka. Colombo, Sri Lanka, February 1985.

32. Pen Culture of Shrimp in the Backwaters of Killai, Tamil Nadu : A Study of Techno-economic and Social Feasibility. R.N. Roy, Madras, India, January 1985.

34. Pilot Survey of Set Bagnet Fisheries of Bangladesh. Abul Kashem. Madras, India, August 1985.

35. Pen Culture of Shrimp in the Backwaters of Killai, Tamil Nadu. M. Karim and S. Victor Chandra Bose Madras, India, May 1985.

36. Marine Fishery Resources of the Bay of Bengal. K. Sivasubramaniam. Colombo, Sri Lanka, October 1985.

37. A Review of the Biology and Fisheries of Hilsa ilisha in the Upper Bay of Bengal. B.T.A. Raja. Colombo, Sri Lanka, October 1985.

38. Credit for Fisherfolk : The Experience in Adirampattinam, Tamil Nadu, India.
R.S. Anbarasan and O. Fernandez. Madras, India. March 1986.

39. The Organization of Fish Marketing in Madras Fishing Harbour. M.H. Kalavathy
Madras, India, September 1985.

40. Promotion of Bottom Set Longlining in Sri Lanka. K.T. Weerasooriya, S.S.C. Pieris, M. Fonseka.
Madras, India, August 1985.

41. The Demersal Fisheries of Sri Lanka. K. Sivasubramaniam and R. Maldeniya.
Madras, India, December 1985.

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Newsletters *(Bay* of Bengal News):

37 issues quarterly from January 1981 to March 1990.

Published by the Bay of Bengal Programme, FAO, 91, St. Mary's Road, Abhiramapuram, Madras 600 018, India. Printed at Nagaraj Co., Madras 600 041.

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