

BAY OF BENGAL PROGRAMME

Development of Small-Scale Fisheries

BOBP/REP/22

(GCP/RAS/040/SWE)

Report of the Ninth Meeting of the Advisory Committee

Bangkok, Thailand
February 25-26, 1985



SWEDISH INTERNATIONAL DEVELOPMENT AUTHORITY



FOOD AND AGRICULTURE ORGANIZATION
OF THE UNITED NATIONS

REPORT OF
THE NINTH MEETING
OF THE
ADVISORY COMMITTEE

February 26-26, 1985
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PREFACE

This document is the report of the ninth meeting of the Advisory Committee of the Project for Small-Scale Fisheries Development of the Bay of Bengal Programme (BOBP). The meeting was hosted by the Government of Thailand and was held in Bangkok, February 25-26, 1985.

The meeting constituted a session of the third meeting of the Committee for the Development and Management of Fisheries in the Bay of Bengal (briefly Bay of Bengal Committee or BOBC) held from February 25 to March 1. This report is therefore an extract of the proceedings of the BOBC meeting. (The full report of the BOBC meeting is being published under the FAO fisheries report series by the FAO headquarters.)

The report records the deliberations and conclusions of the Advisory Committee meeting. It includes a description and analysis of progress made by the project in 1984, the sixth year of operation. It may therefore serve as a source of reference to officials of fisheries agencies of member countries and to donor agencies. It may also interest other institutions and individuals engaged in small-scale fisheries development, particularly in the Bay of Bengal region.

"Development of Small-Scale Fisheries in the Bay of Bengal," GCP/RAS/040/SWE, is funded by the Swedish International Development Authority (SIDA) and executed by the Food and Agriculture Organization of the United Nations (FAO). Five countries are members — Bangladesh, India, Malaysia, Sri Lanka and Thailand. Its aims are to develop, demonstrate and promote appropriate technologies and methodologies to improve the conditions of small-scale fisherfolk and to increase the supply of fish from the small sector in the member countries.

The Advisory Committee is composed of representatives of the five member-countries plus representatives of FAO and SIDA. The committee meets once a year. Earlier meetings were held in Colombo (1976), Madras (1977), Chittagong (1978), Phuket (1979), Penang (1980), Colombo (1981), New Delhi (1983) and Dhaka (1984).

OPENING OF THE SESSIONS

The ninth meeting of the Advisory Committee of the project "Development of Small-Scale Fisheries in the Bay of Bengal" was held in conjunction with the third session of the Indian Ocean Fishery Commission's Committee for the Development and Management of Fisheries in the Bay of Bengal (referred to in brief as the Bay of Bengal Committee or BOBC).

The BOBC meeting was held 25 February - 1 March at the Ambassador Hotel, Bangkok, Thailand. It began with an opening ceremony chaired by Dr P V Dehadrai, Commissioner of Fisheries, India, and chairman of the second session. The session was declared open by Mr Borom Tanthien, Deputy Minister, Ministry of Agriculture and Cooperatives, Thailand.

The Advisory Committee meeting of the small-scale fisheries project, which constituted a session of the BOBC meeting, was held 25-26 February after the opening ceremony mentioned above.

The Advisory Committee meeting was attended by representatives of Bangladesh, India, Malaysia, Sri Lanka and Thailand, the FAO and SIDA (Swedish International Development Authority). There were observers from UNDP (United Nations Development Programme), from Indonesia and Maldives; from Norway, Netherlands, DANIDA (Danish International Development Authority), ODA (Overseas Development Administration, U.K.), ESCAP (U.N. Economic and Social Commission for Asia and the Pacific) and SEAFDEC (Southeast Asian Fisheries Development Centre). A list of participants is found in Appendix A.

Thailand and Malaysia were by unanimous consent elected chairman and vice-chairman of the BOBC and of the Advisory Committee meeting.

What follows is an extract from the proceedings of the BOBC meeting relating to the Advisory Committee meeting of the small-scale fisheries project and to the future of the Bay of Bengal Programme beyond 1985.

REPORT OF THE NINTH MEETING OF THE ADVISORY COMMITTEE OF GCP/RAS/040/SWE - "Development of Small-Scale Fisheries in the Bay of Bengal."

Introduction

8. The Progress Report of the project GCP/RAS/040/SWE - Development of Small-Scale Fisheries in the Bay of Bengal, for 1984 (Document IOFC : DM/BB/85/10) was submitted for the consideration of the Advisory Committee. (It is found on Appendix B.) An audio-visual on the project's work entitled "Helping small-scale fisher-folk : the BOBP experience" was screened. The discussion was then initiated with an introductory session dealing with general matters common to all the disciplines of the project.

9. In the Secretariat's presentation, attention was drawn to the increasing cooperation with other organizations and projects, some of it on a reimbursable basis; the expenditures by discipline, i.e. Coastal Aquaculture 27%, Extension 28%, Fishing Gear and Methods 20%, Fishing Craft 16% and Information Service 9%, the substantial extra-budgetary support received through associate expert services, and the high training component. The work of the Information Service was also highlighted.

10. In the discussion, several delegates stressed the need for conservation of fishery resources as against the project's efforts to increase production and productivity.

11. The importance of coastal aquaculture was reiterated and some delegates suggested that more prominence should be given to this subject. Others, however, while not disagreeing with the potential of coastal aquaculture, pointed out that marine capture fisheries would continue to be the most important sector and that continuous technology development work in this field was required.

12. With reference to the ultimate objectives of the project i.e. "improved socio-economic conditions of fisher-folk" the relatively high input for family-oriented extension activities was noted with satisfaction.

13. The quality of the project's Information Service was commended. It was proposed that the skill and facilities available should be effectively utilized to prepare manuals, guidelines or similar materials on successful activities and lessons learned to the benefit of others not directly concerned with the activities. This could also include different types of audio-visuals. The importance of such documentation work would increase as many of the activities reached the final stages. Acknowledging the importance of this, the project requested the assistance of the Committee for assigning priorities and identifying the most appropriate media to be used for the purpose.

14. Regarding the Progress Report itself, some delegates felt that without intimate knowledge about the project's work it was difficult to see the link between the technology development and anticipated benefits to the target groups, particularly in respect of the subjects of Fishing Gear and Methods and Fishing Craft. It was therefore suggested that the specific purpose should be stated under each activity in future reports.

Coastal Aquaculture

15. In presenting the progress in this area, the Secretariat highlighted the current status of the main activities : the culture trials at Satkhira continued to show poor production results: the results in Polekurru were much better but not entirely promising; those at Killai pointed to commercial viability but needed to be tested with local community participation; the demonstrations in Thailand showed continued success; the hatchery training in Sri Lanka made good progress. A new cockle activity in Malaysia had just been started.

16. The consultation on the social feasibility of coastal aquaculture was considered to be important in view of the apparent difficulties in achieving social feasibility in pond culture, for instance, which requires large capital inputs and effective organization and management.

17. Bangladesh stated that the Satkhira project had demonstrated new approaches and ideas which were being adopted by local shrimp farmers. It was also proposed that biological, chemical and socio-economic aspects should be investigated to identify the causes for the initial failures, before evaluating the usefulness of the work.

18. In regard to the Killai project, India suggested that the seed and feed problem required attention. There should also be a mechanism for just distribution of benefits from culture activities among the fishermen and farmers of all levels or strata. For this purpose criteria worked out at the BOBP consultation on the social feasibility of aquaculture should be followed. It was also proposed that some degree of uniformity in the indicators to be used in surveys for identification of sites suitable for aquaculture should be worked out on a regional basis.

19. A video recording of the aquaculture demonstration project in Thailand was shown. Although this project was successful, Thailand pointed out that the success had been attained not without problems. Many useful lessons had been learnt which were found to be of value in the implementation of other development activities. Dynamism in the development, which required close contact with an understanding of the target population was emphasized. Other problems encountered were those of seed and feed supply. Recent progress in spawning and nursing of groupers was a hopeful sign that the demand for seed could be met, while the limited supply of feed would in the long term limit the expansion of cage culture.

20. SEAFDEC and NACA briefly informed the Committee about their activities of relevance to BOBP and offered their cooperation.

21. In concluding the discussion, donor agencies referred to their criteria for development support which concern socio-economic betterment of the poorer sections of the population. It was, therefore, essential that development work be directed towards this target group rather than to the technology itself or others outside the target group.

Fishing Gear and Methods

22. In presenting this item of the Progress Report, the secretariat highlighted the following : High-opening bottom trawling had been successfully introduced in Orissa, India and in Sri Lanka. Results from the FAD trials in Sri Lanka had so far not been very encouraging, but final conclusions could not yet be drawn. Set bagnet trials in Bangladesh produced better quantitative information than during previous years, indicating a significantly higher production by the modified net as against

the traditional one which however was still a preliminary conclusion. The need for supervision and good management in the use of hand-operated net braiding machines seemed to preclude their use on a cottage industry scale, and even if satisfactory operational arrangements could be made, their chances of survival in competition with automatic machines appeared to be slim.

23. In the discussion which followed, several countries referred to management issues that may arise from the successful introduction of the high-opening bottom trawls and the improved set bagnets. Bangladesh stressed the need for qualitative study of the catch composition of set bagnets to find out possible damage to the juveniles of commercially important shrimp and finfish. It was suggested that in undertaking fishing gear development, due consideration should be given not only to the production aspect but also to the aspect of conservation in view of the possible effect of fishing pressure on the resources. The encouraging progress of trials with larger mesh sizes in trawls was endorsed as a very positive development.

24. Many participants felt that technical trials with fish aggregating devices should not be discontinued particularly in view of positive experiences with these devices in Malaysia, Philippines and in other parts of the world.

25. In regard to the hand-operated net braiding machines, some countries were of the view that both hand-operated and automatic machines might well have a place, catering to different target groups and requirements. This might be achieved by government regulation, as in the case of the textile industry in some countries, provided there was a clear acceptance that the matter should **not be** decided only on the basis of economic criteria.

26. The Committee noted that the activities in the area of fishing gear and methods during 1984 were very relevant **to** the target group of the project in that they sought to improve the productivity and thereby the incomes of small-scale fishermen.

Fishing Craft

27. The presentation of this item of the Progress Report was illustrated by some slides which emphasized the good progress of beachlanding craft development in India. Several craft were undergoing commercial trials with promising results and the production of craft in commercial boat-yards had been started. Reference was also made to motorization of country craft in Tamil Nadu and Orissa (the latter under a NORAD project), good results of fishing trials with a 34-footer in Sri Lanka; problems of cost in making ORUs out of FRP and resistance among fishermen to the use of sails also in Sri Lanka.

28. ODA – U.K. complimented the project on the quality of work and appreciated the cooperation initiated between the project and ODA in the field of fishing craft development. ODA also informed the Committee of plans for support of large-scale introduction of new craft in Sri Lanka.

29. The Committee endorsed the work performed together with the activities under Fishing Gear and Methods as being of vital importance. The two subjects were very closely interrelated and the activities should be continued.

30. During the introduction of new more sophisticated craft additional services were required, for instance for repair and maintenance of engines. These aspects were often not adequately considered. This was also confirmed by the experience of the project. Much more attention than envisaged would therefore have to be given to the training of mechanics, organization of spare part supplies, training in boatbuilding, etc.

31. With regard to promotion of sail power, it was stated that if benefits accrued to owners of boats instead of to fishermen operating the boats, there would be a disinclination to use sails even if the boats were so equipped. It was also suggested that if more cost efficient methods of mechanical propulsion were available, promotion of sails would not be possible.

Extension

32. The presentation showed that activities in 1984 in the area of extension concerned non-formal education for adults and children, fisheries credit, income earning activities for women, fisherwomen extension training and trials with video as an extension medium. Among the highlights were the good

response by the State Government of Orissa to non-formal primary education of fisherfolk children which had led to the opening of 40 schools and to funding the printing of learning materials; preparation of a joint State Government-BOBP proposal in Tamil Nadu for external funding in regard to expansion of the fisherwomen extension service, a study to determine the scope for improving the living standards of fisherwomen in Andhra Pradesh and good progress with the fisheries credit scheme in Orissa, involving the sanctioning of Rs. 5.4 m by a national refinance institution for disbursement up to mid-1986, and the achievement of a repayment rate of 81% for Rs. 2.1 m disbursed upto end 1984. The Advisory Committee was also shown a video film on pen culture of shrimp in Tamil Nadu which had been prepared to test the suitability of this medium for extension work.

33. A lively discussion ensued in regard to the fisheries credit project in Orissa. The question was raised as to why the repayment rate was considerably higher than in other fisheries credit schemes. The reasons adduced were : proper appraisal of loan applications with the help of special formats, a short time-span between loan application and loan disbursement, appropriate repayment schedules and regular joint field visits by fisheries extension and bank staff.

34. While appreciating the progress achieved by the fisheries credit project, some countries pointed out that fisheries credit schemes could be successful if direct links were established between banks and borrowers, and proper supervision was exercised. Though the cost of supervision could be high, it could nevertheless be reduced by the involvement of voluntary agencies at the village level.

35. India, while expressing appreciation at the success of the women extension training activity in Tamil Nadu, stated its interest in extending the activity to other districts of the State, provided adequate external funding was forthcoming, since the project, though having a high social benefit-cost ratio, was not expected to yield any direct short-term economic returns.

36. Regarding the income earning and community development activities in Bangladesh, the view was expressed that the activities had sufficiently demonstrated the various possibilities and methodologies and should therefore be terminated.

Work Programme – 1985

37. The major features of the work programme as proposed by the Secretariat were as follows : (i) no drastic changes in scope and orientation during the year, pending phasing out or transition into a new programme in 1986, (ii) consolidation of ongoing work and utilization of results for follow-up activities, and (iii) organization of work in fictive modules in line with the proposal for a new BOBP. The funds available would amount to about US \$ 1.5 million (less exchange rate losses of about 10%).

38. In the discussion of Coastal Aquaculture there was general agreement with the proposed programme. Bangladesh requested further assistance in seed prospecting and hatchery techniques in connection with the Sathkira project which however the project would find difficult to accommodate within the present budget.

39. In the field of Fishing Technology (now combining Fishing Gear and Methods and Fishing Craft) great interest was displayed in artificial reefs. It was revealed however, that the proposed seminar might duplicate efforts already planned under the aegis of IPFC. The Committee felt instead that it would be more productive to undertake a limited study in the Bay of Bengal region and support ongoing work primarily in Malaysia and Thailand. The multipurpose nature of artificial reefs — as a sanctuary and resource rehabilitation area, protective barrier, aggregating device or trawl obstacle — was discussed. Further clarification of the effectiveness and potential beneficiaries of different purposes was called for before embarking on new physical trials.

40. With regard to other Fishing Technology activities strong support was given to continue work with FADs in India and Sri Lanka.

41. The discussion on Extension activities centred on the degree of BOBP engagement in non-fishery matters such as education and nutrition. Many other agencies were dealing with such subjects and were perhaps better equipped for such work. It would also disperse BOBP resources too thinly over too wide an area. The consensus was that the project should be restrictive in continuing and embarking on non-fishery work.

42. The high priority for Development Support activities in the coming year(s) was endorsed by the Committee with emphasis on preparation of follow-up projects on successful BOBP results.

43. Before concluding the 9th Advisory Committee Meeting some concern was expressed about the ability of the project to meet all the wishes and requests of the members. An attempt to do so would further dilute the available resources which were already heavily committed. The Committee therefore requested the project to exercise its own judgement and discretion in the allocation of resources to different activities giving due consideration to the views expressed by the members of the Committee.

FUTURE OF THE BAY OF BENGAL PROGRAMME BEYOND 1985

79. In a brief introduction of this agenda item, FAO gave the background of the document placed before the Committee. The proposal for a future programme was prepared by a working group of the member countries of the Committee which had been preceded by a mission that consulted the member countries about needs and priorities.

80. The proposal was fully endorsed by the Committee; the contents i.e., the project modules, represented common problems in the region. The priorities however vary from one country to another and therefore the actual participation in specific activities of modules would also vary by country. On a specific query about the interest in the Extension module, for instance, all countries expressed interest but envisaged different degrees of participation from no involvement to full unconditional engagement.

81. The need for integration between the modules under the programme was stressed by several delegates. The division of the Programme into modules should only be seen as an arrangement to facilitate funding support by different agencies.

82. The proposal for cash contributions to cover local common costs of the programme was endorsed by all countries. India, Maldives and Sri Lanka confirmed agreement in respect of their contributions. The other four countries expected a favourable response from authorities above the Fisheries Administration in the respective countries to which the matter had been referred for decision.

83. In announcing their interest in and possibilities for supporting the Programme,

- SIDA stated that its prime interest would be in Coastal Aquaculture, Development Support and Extension with a tentative planning frame from 1987 at about the same level to the current project.
- Norway was interested in funding Fishing Technology at about the level indicated in the proposal but it should contain related elements in extension and support women's activities. Norway's eventual contribution would be subject to an official submission by FAO.
- DANIDA confirmed that, in principle, it was interested in the Extension module but would consider the matter further before its funding could be confirmed.
- ODA reaffirmed its support to regional cooperation and hoped that the module for Post Harvest Fish Technology already sanctioned would soon materialize and function within the programme though bilaterally executed. ODA was also operating several bilateral projects in the region which could be linked with the programme.
- UNDP's continued support in the next programming cycle starting 1987 would depend on the priority given to the subject during the UNDP's planning process through the mechanism of National Aid Coordinators. The member governments were urged to give this project high priority during its process. Subject to continued successful implementation and to the extent of regional character there would probably be good prospects for future support.

84. It was stressed that the new programme, like the present one, would be of a catalytic and innovative nature, tackling important issues, problems and opportunities. Subject to this, the programme's role as a link and as support to bilateral projects of saturation type was emphasized. SIDA also stated that specific experiences of the programme would, as in the past, be useful to its bilateral cooperation activities in the region and elsewhere.

85. Some of the funding agencies emphasized that their main criteria for development cooperation was concerned with improvement of socio-economic conditions for the poorer sections of the population. Technology development and other activities should be clearly designed to achieve those objectives. Participation of the target group in the development work and the role of women were other factors that were of significance to these agencies in their allocation of resources for development cooperation.

86. There was a lively discussion on evaluation. The consensus was that an evaluation system should be built into the programme but further thought would have to be given to identification of a suitable mechanism. Since the programme covered a wide area of disciplines, a meaningful evaluation would probably be very costly. A case study approach might be a satisfactory solution. It was also suggested that there should be a process of periodic auto evaluation by the Programme itself and by the participating countries, the results of which could be taken up for discussion by the Committee. Attention was also drawn to the need for clear objectives of the evaluation itself, to the problems of long time-periods often required to achieve results and to the influence of factors external to the Programme's work.

87. The Committee and the interested donor agencies reiterated the recommendation of the working group that the new programme should preferably operate from one main base, for reasons of effectiveness and costs. Efforts should be made to identify a suitable site during the coming year for endorsement at the 4th session of the Committee early 1986.

Appendix A

BAY OF BENGAL PROGRAMME

AC9/5

Development of Small-Scale Fisheries

(GCP/RAS/040/SWE)

9th Advisory Committee Meeting, 25-26 February, 1985, Bangkok, Thailand.

LIST OF PARTICIPANTS

Bangladesh

Mr M M Siddique Ullah	Joint Secretary Fisheries & Livestock Division Ministry of Agriculture
Mr A Q Chowdhury	Director of Fisheries Department of Fisheries

India

Or P V Oehadrai	Fisheries Development Commissioner Fisheries Division Ministry of Agriculture
Mr S W Tenzing	Deputy Secretary Department of Agriculture and Cooperation Ministry of Agriculture and Rural Development
Mr J M Girhani	Director of Fisheries Government of Andhra Pradesh
Mr S A Subramani	Secretary of Fisheries Government of Tamil Nadu
Mr B C Sarma	Secretary of Fisheries Government of West Bengal

Malaysia

Mr Shahrom bin Haji Abdul Amjid	Deputy Director-General Fisheries Department Ministry of Agriculture
Mr Lui Yean Pong	Senior Fisheries Officer Fisheries Research Institute, Penang

Sri Lanka

Mr B W Perera	Fisheries Adviser Ministry of Fisheries
Mr P S M Muthukude	Asst. Director Planning & Programming Ministry of Fisheries

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Or Plodprasop Suraswadi	Deputy Director-General Department of Fisheries
Mr Samran Ritragasa	Director Marine Fisheries Division Department of Fisheries
Mr Pairoj Brohmanonda	Director Brackishwater Fisheries Division Department of Fisheries
Mr Boonlert Phasuk	Director Phuket Marine Biological Center Department of Fisheries
Or Kitjar Jaiyen	Acting Director Fisheries Policy and Planning Division Department of Fisheries

Mr Manu Potaros	Senior Fishery Biologist Brackishwater Fisheries Division Fisheries Department
Mr Udom Bhatia	Senior Marine Fishery Biologist Phuket Marine Fisheries Station Marine Fisheries Division
Mr Kachornsak Wetchagarun	Chief Foreign Fishing Cooperation Sub-Division Fisheries Policy and Planning Division Department of Fisheries
Mr Somsak Chullasorn	Senior Marine Fishery Biologist Marine Fisheries Division Department of Fisheries
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Mr N Kojima	Director Operations Service Fisheries Department, Rome
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Mr I Csavas	Regional Aquaculture Officer RAPA, Bangkok
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Observers	
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<i>Indonesia</i>	
Mr Dikdik Sodikin	Chief Sub-Directorate of Fishery Resources Identification Directorate General of Fisheries
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Senior Fishery Development Officer
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ODA - UK

Mr John Stoneman

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Secretary General
Information/Program Officer and
Project Leader of the SEAFIS

BOBP (Secretariat)

Mr L O Engvall

Dr K Sivasubramaniam

Dr U Tietze

Mr Duang Tejakomol

Ms S Scurville

Programme Director, Madras
Sr. Fishery Biologist, Colombo
Training & Extension Officer, Madras
Project Officer, Phuket
Sr. Secretary, Madras

Host Government

Mrs Sumalee Yuktanonda

Liaison Officer & Chief Foreign Relations
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Ms Suwanna Maneeindra

Ms Supaporn Ariyasajsisakul

Mrs Thanittha Chongpipien

Mr Wanlope Koomsupa

Mr Banchoed Silamuk

Ms Urai Akkapoo

Mrs Pornthip Uttavisit

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Appendix B

BAY OF BENGAL PROGRAMME

AC9/1

Development of Small-Scale Fisheries

(GCP/RAS/040/SWE)

9th Advisory Committee Meeting, 25 — 26 February, 1985, Bangkok, Thailand.

PROGRESS REPORT-1984

by Lars O Engvall, Programme Director.

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Introduction

Project Inputs

Project Activities

Coastal Aquaculture

Fishing Gear and Methods

Fishing Craft

Extension

Work Programme for 1985

Introduction

1. The SIDA-funded project for Development of Small-Scale Fisheries in the Bay of Bengal (GCP/RAS/040/SWE) became operational in 1979. The first phase of five years was thus completed in 1983. A three year extension as final phase of the project was granted by SIDA but funds were sanctioned only for 1.5 years till mid-1985.

2. The report that follows summarizes and comments on the major activities undertaken in 1984. The intention is not to produce a full account of project work but more to highlight the major achievements, problems and issues so as to facilitate discussions in the 9th Advisory Committee Meeting. Details are found in the quarterly progress reports, in the published technical reports and working papers, and in the Bay of Bengal News.

3. The report also contains a section on the proposed work programme for 1985. (In previous years the work programme was presented in separate documents for discussion in the Advisory Committee meetings.)

4. The report of the 8th Advisory Committee Meeting and particularly the section on "Work Programme 1984/85" has guided the scope of the work. Most of it has been concerned with activities agreed upon in earlier years. Very little new work has been taken up -since the ongoing activities absorbed the bulk of the available resource input, also because of the uncertainty about funding and the short remaining duration of the project.

5. The directions from the Advisory Committee have been followed closely; a few deviations are mentioned below in the description and discussion of project activities. Since it became more and more evident during the year that more funds for extension beyond June 1985 would be forthcoming, the planned cut-off date for some of the activities has been relaxed. One of the activities, namely the Consultation on Social Feasibility in Coastal Aquaculture, which was proposed in the 1984 work programme as desirable if funds permitted, was conducted with extra budgetary support from the National Swedish Board of Fisheries (NSBF).

6. Staff of the project have in a few cases been engaged by other organizations/projects (NORAD, Swedish Cooperative Centre and FAO) on a reimbursable basis. The tasks performed have been directly related to small-scale fisheries development in the Bay of Bengal region, but were of course not included in the work programme.

7. The transfer of some project staff from Madras to Colombo was effected between February and May. Therefore the project has since then operated from two bases,

8. Management, administration and information services have, as in the previous years, been shared on a pro rata basis with the other project under the Bay of Bengal Programme (BOBP) i.e. Marine Fishery Resources Management (RAS/81/051) funded by UNDP. The two projects also cooperate in technical matters and the strongest interface concerns Fishing Gear and Methods.

The proposed ODA (UK) project for assistance in post-harvest technology did not commence during the year as anticipated at the time of the 8th Advisory Committee meeting.

Project Inputs

9. Early in the year, at the time of the 8th Advisory Committee Meeting, it was estimated that US \$ 1.9 million would be available out of the \$ 2 million granted by SIDA for 1.5 years till the middle of 1985, a sum of \$ 100,000 representing over-expenditure in 1983. The final accounts for 1983 however showed a deficit of \$280,000 composed of over-expenditures and continuing losses on exchange rate between SKr and USS. (SIDA's commitments are made in SKr.) The total amount available was therefore US \$ 1.72 million of which \$ 1.44 million would be needed for implementation of the 1984 work programme. The meagre balance of \$280,000 for the first half of 1985 was considered only "academic" since it was almost certain that further funds would be forthcoming for the second half of 1985 and 1986.

10. The estimated actual expenditures during 1984 are \$ 1.45 million. A breakdown of the budget and expenditures is given in Table 1 and comments by code of expenditure follow below.

The actual expenditures by major subject matters are very near to what was envisaged in the work programme i.e. Coastal Aquaculture 27% (30), Extension 28% (25), Fishing Gear and Methods 20% (18), Fishing Craft 16% (18), Information Service 9% (9).

11. The core staff of the project was reduced during the year by one post in Naval Architecture. The Development Adviser post was vacant during the second half of the year. Pending advice from SIDA about further extension, no effort was made to fill it. Details of the international staffing are given in Table 2.

The project has continued to benefit substantially by the services of associate experts from the Netherlands (3), Norway (2) and Sweden (1). See Table 2. Three more associate experts from Sweden – Socio-Economist, Aquaculturist and Programme Officer (Economist) – are under recruitment and may join early in 1985.

International short-term consultants have been used to a very limited extent. The core staff meets most of the technical input requirements and it is only in a few cases of high specialization or need for longer presence at a project site that such consultants have been engaged (Table 2).

12. The major portion of expenditures under "Duty Travel" refers to travel by international staff and consultants. Each Associate Expert has a yearly travel allowance from the associate expert fund; the amount is usually not sufficient. Travel over and above that allowance is therefore charged to this code. It also includes the costs of occasional non-staff travel e.g. in connection with the Advisory Committee meetings.

13. The major expenditures for contractual services have been incurred in connection with extension activities under which several national professional consultants have been engaged on a contract basis. Other major objects are fishing craft construction, aquaculture work, printing of reports and the newsletter and short-term supporting staff.

14. Materials and supplies have been primarily acquired for aquaculture activities, fishing trials and boat construction.

15. Office vehicles, copying machines, typewriters, etc for the Colombo office, and a micro computer and video equipment are the major components under equipment.

16. The training input, although not very large in monetary terms, has produced over 970 man-weeks i.e. more than 18 man years of training. The low cost is because the training was imparted locally and for fairly low-level grades. Details in Table 3. .

17. The counterpart input has essentially been in terms of staff in all the countries. Other major inputs are office facilities and services in India and Sri Lanka.

Project Activities

18. The major activities of the project are narrated and discussed under four major headings, i.e. Coastal Aquaculture, Fishing Gear and Methods, Fishing Craft and Extension. About 86% of the expenditure was incurred in these disciplines; Information Service (9%) and Development Support (5%) accounted for the remaining portion. Development Support has been limited to BOBP technical activities; project preparation and social feasibility studies thereof are therefore described under the four major headings as appropriate. The major features of the Information Service and other common work which are shared with the RAS/81/051 project are outlined below.

19. The 8th Advisory Committee meeting was held in Dhaka, Bangladesh 16 – 19 January, 1984. All the participating countries were represented as usual. Observers from ADB, DANIDA, ICLARM, NORAD, ODA and UNDP also attended the meeting. The report of the meeting has been published as BOBP/REP/19.

20. The Advisory Committee proposed that a working group be established to identify project modules and outline a programme structure for a future BOBP since SIDA's and UNDP's support is scheduled to be terminated in 1986. FAO undertook to organise and finance the working group. A two-member consultancy mission first visited the participating countries to obtain their individual needs, priorities and views for further discussion in the working group. The group met in Bangkok in September and prepared an outline of essential features of the structure and content of a future BOBP beyond 1985. The two BOBP projects and particularly RAS/040/SWE provided support to the consultancy mission, prepared discussion documents based on the mission report and participated in the working group meeting. The report was finalised by FAO and submitted to the member countries and donor agencies and will be discussed in the third session of the Bay of Bengal Committee (BOBC).

21. Most of the capacity of the Information Service has been devoted to the publication of the quarterly newsletter and information documents and to the preparation of reports and working papers on BOBP activities. The list of the documents issued during the year is given in Table 4. The newsletter is now printed in 2,000 copies and regularly mailed to 1,270 recipients. The backlog of reports and working papers reported earlier is being cleared, but a new set of papers is piling up. The worldwide response to these papers is excellent and several papers are out of print. The library has continued to serve project staff, counterparts and others. Two unpublished annotated bibliographies have been prepared, one on non-formal education and the other on small-scale fisheries development in India.

22. In the field of publicity a Swedish writer-cum-artist was engaged to visit some of the project sites in the region to prepare information material for BOBP publications but also for the press in Scandinavia from where the major support to BOBP is received. Assistance was also given to an international film producer engaged by FAO to prepare a film on world food. Beachlanding craft, high-opening bottom trawling, pen culture of shrimp and women extension activities were filmed at the sites of BOBP activities. (The film was unfortunately not produced apparently because of some technical errors in the processing.) In connection with the World Fisheries Conference, a freelance radio producer visited a few BOBP sites and interviewed technical specialists and counterpart staff. Some of his recordings were used by BBC in their Asia transmissions.

On the regional scene, BOBP pictures and a beachcraft model were displayed at the Tamil Nadu Tourist Trade Fair in Madras, and a small photo display was arranged for the FAO office in Dhaka. A large number of visitors from far and near were received and briefed on BOBP through audio-visuals, printed material, and visits to project sites near Madras.

23. In connection with the computerization of data processing under the RAS/81/051 project, the use of computers for other BOBP activities has commenced. An Apple IIe has been acquired for the Madras office. Several applications have been initiated. These include data processing of socio-economic surveys and fishing trials. Administrative applications include the accounting

system and the mailing list for BOBP publications. The computer is also being used as a word processor. It was only at the end of the reporting period that these programmes started to function. If the experience continues to be positive, one more unit of the same type should be acquired.

Coastal Aquaculture

24. One of the major activities in the work programme was discontinued early in the year – Seaweed Culture in Malaysia. After analysis of the performance of the pilot farm near Penang, the authorities concerned drew the conclusion that seaweed culture is unlikely to become sufficiently viable for commercial farming. The work was therefore discontinued and the effort was shifted to cockles which are of high commercial importance in Malaysia and a crucial issue as far as suitable management measures are concerned. There were no other changes in the work programme.

25. About 30 aquaculturists, social scientists, fish farmers, bankers, administrators and representatives of international development and funding agencies participated in a six-day Consultation on Social feasibility of Coastal Aquaculture held in Madras during the last week of November. It was sponsored by the National Swedish Board of Fisheries and conducted in cooperation with BOBP. The Consultation centred on four case studies; three of them related to BOBP activities (Killai, Satkhira, and Phang Nga). Most of the discussions took place in working groups before a final plenary session in which an attempt was made to work out recommendations and guidelines for planning and implementing projects to achieve social feasibility. The consultation agreed that the distribution of benefits is the main criterion in determining social feasibility. A very large number of issues was debated and since situations differ from one type of culture to another and from one location to another, it was not possible to agree on a common approach. But the checklist that was produced of factors that influence social feasibility will probably be a useful contribution to further work in this field and for the ultimate achievement of higher social feasibility.

26. **Satkhira Aquaculture project (SAP/BGD)** : The first culture trials during 1993 ended with very poor production results. Several shortcomings in the design and construction of the pond complex also surfaced during that period; most of them were rectified during the dry-out period late 1993 and early 1994.

New trials were started in February 1984. All the ponds and the agro-aquaculture field were stocked with *P. monodon*; seeds were purchased from traders in the area. Normal growth was observed by sampling during the first months of the culture and partial harvest of shrimps larger than 120 mm was undertaken from end April. The quantities were small.

In early June, the Satkhira area was exposed to unusually heavy rain and the salinity in the supply canal dropped from about 17 ppt to almost zero. In order to maintain the salinity in the ponds the exchange of water was restricted. After sometime a retardation in the growth of shrimp was noticed as well as softness in the shells. In an attempt to rectify this, liming of the ponds was undertaken, and supplementary mixed feed enriched with calcium lactate was given. The problem of soft shells disappeared but growth continued to be very slow.

At the end of July, which usually marks the end of the *P. monodon* season, only 250 kg shrimps of exportable size had been produced in the entire farm. The remaining stock of small shrimps (less than 120 mm) was kept and partial harvesting continued until December when the ponds were emptied. The total yield increased during this period by only 100 kg.

Disappointing production results were also experienced with carp. Different varieties were released in two of the ponds and in the agro-aquaculture field in the beginning of August when the salinity had reached a sufficiently low level. The initial growth was considered satisfactory but very little remained at the time of harvest.

Salt-resistant Aman paddy was cultivated in an effective area of about 3.5 ha in the agro-aquaculture field. The yield was about 2 tonnes.

The data from the 1994 culture season have not yet been analysed but it is clear that the farm complex is not functioning well as far as production is concerned. No specific reason for the low growth and yield has been identified.

Despite the change in design of the catch basin and the supply-cum-drainage area, heavy siltation occurred this year also. It was aggravated by the fact that only two low-level sluice gates were used for both supply and drainage of water. During the dry-out period at the end of the year two new sluice gates at a higher level are being installed. These will be used for supply and the lower ones for drainage. It is hoped that this will reduce the siltation problem.

Several minor improvements and supplements have been added to the farm complex during the year. A generator has been installed and a log house to facilitate watch and ward and five temporary sheds – for watchmen and equipment – have been constructed. Bamboo bridges have been constructed over the feeder canals. Bushes and trees have been planted on the banks of the ponds. Goat rearing was taken up as a supplementary activity on a trial basis along with agro-aquaculture.

In an attempt to investigate the social feasibility of intensive shrimp culture in the project area, an around-the-year observation study of 31 shrimp farmers was completed under a sub-contract with a Bangladesh consultant group. The report had not been received before the end of the year.

The project, has now completed two years of trials with a production result which is far below expectations. But the general opinion among authorities and among people in the area is that ideas and practices brought in under the project have been useful and adapted by local shrimp farmers.

27. Polekurru Aquaculture project (AAP/IND) : A small farm of about five ha was constructed in 1982/83 at Polekurru, south of Kakinada. There are five ponds of which four are tidal-fed and one is pump-fed. The ponds have different configurations and the purpose of the activity is to test the production in different types of ponds. The first stocking was undertaken at the end of last year. The project was featured in *Bay of Bengal News No. 14*.

The first harvest of three tidal-fed ponds early in 1984 produced a yield of about 300 kg/ha of *P. monodon*. Considering that the ponds are new and that this was the first harvest the yield was satisfactory. In the fourth tidal-fed pond and in the second crop of the tidal ponds the yield varied between 150 and 400 kg/ha.

A second pump fed pond was added to the farm during the year. The yield in the pump fed ponds varied, in two crops, between 160 and 200 kg/ha.

The growth has been observed to be very slow despite the supplementary feeding with high value protein such as cockles. Reasons are the low tidal amplitude in the beginning of the year restricting the exchange of water and the high salinity during May and later a sudden drop at the beginning of the rainy season. The long grow-out periods mean that only two crops can be obtained in a year. Each crop therefore has to be high-yielding to make the pond farming economically viable. The trials will continue and after completion of four crops in July 1985, a detailed analysis will be undertaken of biological, technical, economic and social variables as they apply to the project area.

A laboratory building has been constructed on the site. The building also provides shelter for the watchman and serves as staff dormitory during overnight stay.

28. Pen Culture in Killai (TAP/IND) : Three crops of shrimps had been harvested during 1982-83 which had yielded between 300 and 600 kg/ha. The total pen area was about two hectares, divided into 9 pens of different sizes. The techniques of erecting the pens, reinforcements against crab cuts and the use of appropriate mesh sizes were also quite well established at the end of 1983.

The fourth crop, early in 1984, yielded about 400 kg/ha.

The first setback to the trials was experienced at the time of harvest of the fifth crop in May. Only 90 kg of shrimps were produced in an area of 1.4 ha. The probable reason is the heavy rainfall that occurred early March. The salinity dropped from 30 ppt to 4 ppt in four days and then, a week later, shot up again to 26 ppt. The sampling between March and May had not been properly performed. The portion of the fifth crop which was stocked after the rains produced 350 kg./ha, as also later a sixth crop in a small pen area.

Under a SIDA-sponsored fellowship, a post-graduate student from Sweden undertook a feeding experiment. The aim was to compare growth of shrimps fed with animal protein only, vegetable feed only and no supplementary feed. The experiments were conducted in three 0.2 ha pens. The protein feed produced the best growth while there was no difference between the vegetable feed and no supplementary feed. Another observation was the quick recovery of the shrimp from soft shells after a drastic salinity drop when fed on protein feed.

A training course was organised for fishery officials and scientists from Keraia, Andhra Pradesh and Tamil Nadu. The 16 trainees practised all aspects of pen culture including water area survey, seed collection, pen construction and erection, feed processing, pest removal, pen checking for crab cuts, harvesting, etc. Several (23) background papers on different subjects had been prepared and distributed to the trainees. The lectures also included socio-economic feasibility and extension of pen culture.

Along with the technical experiments and fishing trials, investigations have been conducted on how to best utilise the results for the benefit of the local community. (See Bay of Bengal News No. 14.) A proposal to this effect was submitted to the Government early in the year. After delays in sanctioning and some modifications, it is only at the end of the year that the plan was finalised. This demonstration phase of the project will start in 1985. The project will provide the required capital to set up and operate 8 small shrimp pens for a one year culture period by eight local fishing families under project guidance. The results of these demonstrations will hopefully give clear enough indications on how and to what extent this type of pen culture could be extended in the area. Two working papers (BOBP/WP/32 and BOBP/WP/35) will be issued early 1985.

29. *Development and Management of Cockle Culture (DMC/MAL)* : This is a new activity which was started during the year in replacement of seaweed culture. To prepare a working document, the project sought assistance from ICLARM, and a two-member mission visited Malaysia to identify, together with the Department of Fisheries, the work to be done and BOBP's input. It was observed that even very basic scientific information on the biology of cockle is lacking. It was therefore agreed that certain aspects of cockle biology should first be investigated by studying the animal's life history and its behaviour in laboratory and natural conditions. The work programme agreed upon consists of :

- (i) information acquisition,
- (ii) field surveys to monitor spatfall areas, study growth, evaluate current culture practices, study maturation and spawning at culture sites and assess potential culture areas,
- (iii) induced spawning and larval rearing,
- (iv) age and growth studies by examination of the shells, and
- (v) economic studies.

The work was started in October and information acquisition was more or less completed before the end of the year.

30. *Shrimp Hatchery and Pen Culture (SHP/SRL)* : The work was taken up in 1984 and very good progress was made during the year.

A hatchery consultant visited Sri Lanka in April and made recommendations on structural changes and additional equipment required for converting the Pitipana station into a suitable hatchery. The structural changes, including remodelling of tanks and provision of transparent roof for the hatchery building, were undertaken by the Ministry of Fisheries. The project arranged for the import of collapsible circular pools, air blower and water pump. The hatchery was ready in September.

The consultant then returned for two months of hatchery work. During the period about 300,000 post larvae were produced and the staff of the station learned the technique sufficiently well to continue the hatchery work after the consultant's departure. The spawners are collected from fishing boats in Negombo and other places further north. There is still a lot to do to improve the survival rate of the shrimps during the PL stages but the basic technology has been introduced for the first time in Sri Lanka.

Simultaneously with the hatchery work, pen culture activities were conducted. Counterpart staff of the Pitipana station visited the BOBP project at Killai to get an idea of the technology. This was followed by selection of a suitable site in the Negombo lagoon, which eventually led to the erection of two small 0.1 ha pens close to the hatchery and also not far from the opening of the lagoon to minimize the risks of low-salinity water. The first stocking was made with seeds from

the wild collected in the lagoon. The culture trial was, however, a failure – the reason probably being that a portion of the pen wall was torn open by heavy current. The second stocking was done with seeds produced by the hatchery. This crop is due for harvest early in 1985. A small training course in hatchery techniques has been planned for staff of the Ministry, NARA, universities and the private sector to be conducted in January 1985.

31. *Aquaculture Demonstration (ACD/THA)*: The successful cage culture of seabass and grouper continues to expand on the west coast of Thailand. The technique was taken up in many villages without any project input. It is therefore difficult to estimate the total number of cages in use. At the end of the year it might be in the order 3000. The yearly production would therefore amount to about 600 tonnes at a farm gate value of over US \$ 2 million. Cage culture has also spread to the east coast of Thailand and there are nearly 1000 cages in use in 9 villages. It also seems that the benefit from the culture reaches the small-scale farmers. The ownership is spread over a large number of people.

The project work during the year has concentrated on the setting up of new demonstration units in Phuket and Ranong, two provinces in which no previous work was done, and in Satul and Phang Nga.

Last year it was reported that limited supply of feed might hinder a further expansion of cage culture. The problem, however, has been less severe than expected. On the other hand, problems of supply of fingerlings of seabass and grouper are emerging. To satisfy the demand for fingerlings, more effort has been put into breeding aspects by the Phuket and Satul brackishwater stations. Initially, groupers have given low reproduction results but this is steadily improving and at the end of the year the Phuket station succeeded in rearing fry in large numbers. Private hatcheries are also supplying fingerlings of seabass. The collection of wild juvenile groupers by means of small traps has expanded to a large activity and should perhaps be examined from both the economic and biological standpoints.

The grouper is preferred for culture, because it grows faster, requires less feed and fetches about the same price on the market as seabass. There are also problems in nursing of seabass fry which have frequently led to high mortality rates. The project has made special efforts to train farmers in nursing practices and also to promote the establishment of specialised nursery farms. Some disease problems have also been identified in a couple of villages. The matter is under study by specialists in Thailand with assistance from Japanese experts.

The expansion of *cockle culture* in the project area has more or less stopped. The project has also not undertaken any activities in this field. The main reason for no further development is probably the difficulty in obtaining cockle seeds which have been imported from Malaysia. Restrictions have been imposed on the export of cockle spat from that country.

The culture of *green mussels* using rafts with strings and bamboo poles as substrata was successfully demonstrated in Phuket and also initiated in villages in Satul and Ranong. After five months of growth the production was about 11 tonnes from a seed input of 3 tonnes. The farm gate price was 6-8 Bht/kg and the gross revenue was about five times higher than the cost of the seeds. The good result generated private investment in seeds for a second crop.

The culture of *oyster* has not become a great economic success, although demonstrations have been going on since the beginning of the project. However, oyster production continues in a small way in several villages, and the project has set up new demonstration units in villages in Ranong, Phang Nga and Krabi.

In the southern provinces, all culture trials are supplemented by special *extension activities among women*. Some women groups also take active part in the culture of cockles, mussels and finfish. But work focuses on fish processing. The production of fish sauce, shrimp paste, etc. has been very successful and women groups of the project collected top prizes at a large trade fair in Trang in December. Supplementary to the economic activities, the women are also given training in subjects like health and hygiene. In two villages in Satul, demonstrations and support have been provided for the construction of one tonne concrete jars for storage of fresh water.

A video *recording of project* activities has been made with the assistance of the Teacher Training College of Phuket. Some video programmes for training purposes (eg. nursing of fish fry, green mussel culture etc.) have also been produced. Project displays (photographs, product models) have been organised at trade fairs in Phang Nga and Trang.

On the whole, the activity has continued to show very good progress. This is attributed to the planning, knowledge and dedication of the national project staff. An important element of the activity, which probably contributes significantly to the success, is training; many training and demonstration exercises have been organised.

Fishing Gear and Methods

32. There have been a few minor deviations in the work programme from what was envisaged in the 8th Advisory Committee meeting. Fishing trials with longlines in Sri Lanka were not pursued for reasons of low priority after consultation with the cooperating agency. Similarly, the longline trials in Cox's Bazar, Bangladesh, were not taken up since it was agreed with the cooperating agency that BOBP would restrict its input in Fishing Gear and Methods to the set bagnet fishery; other gear technology activities would be undertaken by a national FAO/UNDP project. Trials with fish aggregating devices in India were not taken up. The main reason was lack of capacity. Another reason was that progress in Sri Lanka was not so spectacular. Lessons were being learned that could be useful to trials elsewhere. Fishing trials with high-opening bottom trawls were taken up in a small way in Orissa – not envisaged in the original work – on request from the State Government.

33. *Line and Net Haulers* (LNH) : In addition to the manually operated line hauler with a vertical sheave tested earlier, two new haulers with horizontal sheaves were constructed. The testing of the three haulers has however not been extensive enough to draw any conclusions about their suitability. The trials have been limited because of lower priority assigned to this activity. While initial tests indicated that the haulers are useful, particularly for deep water longlining, the actual need for them appears to be more limited than anticipated when the work was first started. It is now planned to undertake conclusive testing during the first quarter of 1985 so that the activity can be terminated.

34. *Cottage Industry Net-making* (CIN) : The overall status of this activity at the end of 1983 was that the two hand-operated braiding machines could manufacture webbing of acceptable quality but that strict supervision was required during manufacture, that capital was required for stocking twine and that an efficient market channel was needed for disposal of the nets. All these aspects require good management. This pointed to the need for entrepreneurs – for use of the machines – rather than cooperatives or similar groups or organisations.

A comparative study of nets braided by hand, by manually operated machines and automatic machines, had earlier indicated that the second method would be the most economic one and have many other advantages. Further analysis of costs revealed though, that the automatic machine is a little more economic. Automatic machines are also now to a larger extent than before being imported to Bangladesh. These factors have made it difficult to find entrepreneurs interested in testing the manually operated machines. Scrapping of the machines and termination of the work seemed to be the inevitable solution until the very end of the reporting year when an entrepreneur was found willing to cooperate in commercial trials. These have just started.

Even if these trials prove to be successful and establish that the hand-operated machines can be economically operated under certain conditions, the prospect of such equipment becoming adaptable on a larger scale is very slim. The automatic machines offer, besides economy, quality and flexibility. The first conclusions arrived at during early BOBP work (in Sri Lanka) that manual net making has no chance to survive when automatic machines are introduced, might also well be the final one.

35. *Set Bagnets* (SBN/BGD): After inconclusive fishing trials during the 1982/83 fishing season, the early trials of the following season (1983/84) indicated that the larger experimental set bagnets were catching twice as much as fish as the traditional ones. But numerous problems encountered during the trials made it difficult to collect reliable information.

At the end of the 1983/84 season, the relationship between size of net and catch rate had not yet been established. Several practical problems in the handling of the nets had affected the trials and the number of larger nets that could be operated by a fishing unit had not, therefore, been established.

The fishing season 1984/85, which is still in progress, has produced better quantitative information, and the preliminary result is that the larger modified nets catch about 40% more than the traditional nets. It also seems that one fishing unit can handle as many new nets as the traditional ones. But this is not firmly established. At the closure of the 1984/85 season in February 1985, it might be possible to draw some preliminary conclusions on a suitable mix of size and number of nets. The fishing trials at Sonadia in Bangladesh were featured in Bay of Bengal News, No. 13.

Matters other than the net size which might be worthwhile to study are twine thickness and mesh size. The experts engaged in the work believe that the thickness of twine is excessive and could be reduced, thereby reducing the weight and making handling of the gear easier. The mesh size is very small and the nets catch considerable quantities of small shrimp and fish which might be damaging to the fishery resources. These matters will be looked into during the 1985/86 fishing season.

An assessment of the overall progress is that some improvements in productivity will be achieved but the main benefit of the work might well be the information and data gathered during the work which can be used for management measures in the future. The set bagnet fishery in Bangladesh is, as reported before, a very important sector and has increased threefold since 1967/68 (latest fisheries census) in terms of number of nets from 5,000 to 15,000. The report of the pilot survey completed in 1983 is being published (BOBP/WP/34).

The first target of BOBP under this activity was to demonstrate the use of HDPE twine instead of nylon as a lighter and cheaper material. This was quite well accepted by the fishermen but could not be utilised because of non-availability of twine in Bangladesh. The project planned to undertake a prefeasibility study of manufacturing units for HDPE but it was learned that the Bangladesh Fisheries Development Corporation is already in the process of acquiring such units.

36. High-Opening Bottom Trawling (HBT) : The situation in the beginning of the year was that work in India had just been completed and that it had been taken up a few months earlier in Sri Lanka.

The work in India was resumed in the middle of the year after repeated requests from Orissa as a delayed follow-up of training given to inspectors and fishermen of Orissa in Tamil Nadu in 1982. The idea was to work for a short while through CIFNET, which afterwards would continue on its own as required. The contribution from CIFNET did not materialise and the project continued to be engaged in the work until the end of the year. During this period a fish-cum-shrimp trawl was successfully introduced and trials were ongoing at the end of the reporting year of shrimp-cum-fish trawls of two different designs. The main features of the trawls are large size, light twine and large mesh sizes, also in the cod end.

Most of the work under this activity was undertaken in Sri Lanka from Pesalai on the north-west coast and concerned small trawlers (28 ft) with only 30 hp engines. A new shrimp-cum-fish trawl was universally adapted in Pesalai. An interesting feature of these trawls is also that they have a mesh size in the cod end of 35 mm against 20 mm in the traditional trawls.

A net-maker was engaged from Madras to train fishermen and net makers at Pesalai. In-service training was also given to the mechanical workshops and fishermen in the manufacture of otter-boards, sinks, split links, etc., required for the trawl gear.

Webbing made of HDPE has not been available in Sri Lanka till now, and most of the material used for traditional trawls was earlier smuggled from India. At the project's initiative, one of CEYNOR's net factories fabricated netting on a trial basis with twine imported by the project. After successful trials, CEYNOR now intends to import necessary material for regular manufacturing.

The activity in Pesalai is interesting because it led to the introduction of a complete package of small-scale trawling techniques including the local manufacture and rigging of all the material required for it. The work was featured in Bay of Bengal News No. 16.

An effort of this activity in Kalpitiya concerned somewhat larger trawlers (38 ft and 65 hp). This work was done in cooperation with owners of the fishing craft, who reimbursed project costs for supply of materials and the net maker's services. While the owners of the fishing craft are not small-scale operators, the crew on board the vessels are working on a share system and substantially improve their income when using the new trawls.

Another positive aspect of the work in Sri Lanka is the in-service training of counterparts. The officers assigned to the activity already had some experience of trawling; at the end of the work they are well conversant with all aspects of trawling techniques, and can undertake extension work in other areas.

37. Fish Aggregating Devices (FAD) : Disappointing experience of fishing trials with oceanic type FADs during 1982/83 led to a preliminary conclusion that under Sri Lankan conditions, this type of FAD might not be a feasible proposition. New experiments with low-cost FADs near to the shore were therefore decided on.

In the first attempt, three bamboo-type FADs were manufactured and anchored a few miles outside the coast, south of Colombo. All three disappeared shortly after their deployment. Anchoring as well as floatation capacity had probably been inadequate. A second type, larger and stronger, was then launched and was monitored for a couple of months until the onset of the monsoon. A certain level of aggregation of fish in the vicinity of the FAD was observed; good catches were also reported from fishermen.

After the monsoon, three new FADs of different designs were put out and three more have been prepared for deployment early 1985. The feedback from the three first FADs is not too encouraging but the monitoring will continue until the next monsoon in May before any conclusions are drawn.

The difficulty in monitoring FAD operations lies in the acquisition of data. The fishermen may, for different reasons, supply inaccurate information about the composition and quantity of catch and about the location and time of capture. Furthermore, at low levels of aggregation, it is difficult to evaluate the benefit of the FADs without a good monitoring of fishing effort both around the FAD and away from the FAD in the same fishing area.

38. Other Matters (FGM) : During a visit to *Burma* in January, by the Programme Director and the Senior Fisheries Biologist of RAS/81/051, the Burmese authorities expressed interest in learning about the BOBP's experiences with large-mesh driftnetting and small-scale trawling. Arrangements were therefore made for the Fishing Technologist to pay a short visit to Burma during which two projects, which might qualify for FAO/TCP funding, were prepared. They were for high-opening bottom trawling and small-scale inshore fishing. In anticipation of the approval of these projects assistance was given in fabricating necessary fishing gear in Colombo for the trawling project.

Designs of small-scale fishing gear which have proved to be successful in the Bay of Bengal region have been submitted to the FAO Headquarters to be included in the FAO small-scale fishing gear catalogue.

The Fishing Technologist has assisted the *RAS/81/051* project in the specification of gear and operational requirement for the proposed exploratory fishing operation for Tuna jointly by the Maldives and Sri Lanka. He has also assisted in the specification and fabrication of experimental gillnets for Hilsa investigations in Bangladesh. The nets were manufactured in Colombo.

Fishing Craft

39. The work programme envisaged at the 8th Advisory Committee meeting has been followed without any deviations, but the work under sail improvement has been limited to provision of sails for the craft built by the project. A request for assistance in sails was received from Thailand and will be attended to early 1985.

In the transfer of the core staff to Colombo, the project's activities at the Royapuram boatyard in Madras were terminated. In any case, the boatyard would not have been needed much longer, though it was an almost essential feature in earlier technical development work. Remaining boat construction work is being carried out on a contract basis at established boatyards in Tamil Nadu and Sri Lanka.

40. *Beachlanding Craft* (BLC) : The major features of the development of beachlanding craft during the year have been (a) finalization and testing two new prototype craft IND-25 and SRL-14, (b) improvement of engine installations, (c) commercial trials to assess economic viability and social feasibility, and (d) support to the construction and introduction of craft. At the end of the reporting period, three types of beachlanding craft have proved to be technically feasible and fully accepted by fishermen. They are the IND-20 and IND-25 in India and the SRL-14 in Sri Lanka.

The interest of the government authorities concerned has increased considerably during the year. Requests for assistance in different forms have been received from all the east coast states in India. The Government of India has sanctioned a scheme for introducing 90 beachlanding craft on the east coast. To support such an introduction, the project has arranged demonstrations of different prototypes for officials and fishermen in Uppada, Andhra Pradesh, and in Injambakkam, Tamil Nadu. At the very end of the reporting period work was started to assist the corporation yard in Kakinada to construct IND-20 and to obtain a mould of IND-25 for future construction. On the different types of craft, the following summarizes the status at the end of 1984 :

IND-20 : Six units of this craft are operated in Andhra Pradesh – two each in Srikakulam, Uppada and Machilipatnam. The mould for the construction of this craft is available with the corporation boatyard in Kakinada.

IND-21 : Two craft of this type are operated (in Gopalpur, Orissa, and in Injambakkam, Tamil Nadu). The boats are undergoing commercial trials and will be used as long as they are technically fit. But it has been decided during the year not to recommend this type of craft for construction any more. On inspection of five IND-21 hulls built for Injambakkam under the Tamil Nadu Government scheme, serious defects in workmanship and timber quality were found. It is believed that it will not be possible to acquire good quality wood and ensure good quality construction by local boatyards for this type of craft. Following this recommendation, the earlier scheme for introducing 30 **IND-21** beachcraft at Injambakkam has been suspended; another type of craft, namely, IND-25, may replace IND-21 under a revised scheme.

IND-23/24 : The aluminium material of which IND-23 and IND-24 were made continued to crack and the two first prototypes have been scrapped. A new prototype of IND-24 was built by a private company with new sheets of aluminium supplied by the manufacturer free of charge. While the quality of the material seems to be satisfactory, the craft faces the problem of water leakage. While crossing the surf a couple of capsize have occurred. It is suspected, though, that this is due to the negligence of the crew.

IND-25 : This type which is made of FRP and not completely decked as the other prototypes, was launched in the middle of the year and became very popular among the fishermen. It has performed well in rough surf and is most likely to be introduced in Tamil Nadu in place of IND-21. The first prototype has been operated from Injambakkam. A second boat has been constructed by a private boatyard ordered by a DANIDA-supported project in Tranquebar, Tamil Nadu. The BOBP mould has been lent to the private boatyard for this purpose.

In Sri Lanka, the SRL-11, a very successful craft, has been taken out of operation. The engine suffered several breakdowns because of overheating. The two craft of the SRL-12 type were taken out of commission early in the year after several leaks in the hulls. All these craft had served their purpose as preliminaries to the final design of a beachable craft for Sri Lanka : the *SRL -14*. (See Bay of Bengal News, No. 16.) The first boat was launched in the middle of the year. During initial trials it performed to expectations under power and sail. Technical trials with different propellers show excellent results of speed and thrust considering that the engine power is only 15 hp. Thanks to the lines of the hull and the high reduction gear, the SRL-14 – whose engine is only half as powerful as that of the 3.5 tonners of Sri Lanka – gives the same speed and thrust as the 3.5 tonners at half the fuel consumption.

The engine installation is of the pivoting type, but the engine is water cooled; all previous beachlanding craft have had air-cooled engines. It is a closed cooling system mounted in the bottom of the engine box. The boat is easily beachable thanks to the pivoting box arrangement which also facilitates good sail performance and enables navigation in shallow waters (across sand bars in rivers or lagoon openings). For day-to-day beaching, however, the craft is probably too large and heavy, especially under rougher conditions.

The fishing trials in India were plagued by engine problems. Several improvements were made during the year and significant improvement in reliability was noticed. The main problem was overheating, which was overcome by using smaller propellers; another problem was the shaft coupling, yet another was the intrusion of sand into the engine through the oil filling hole which therefore had to be raised. A description of the engine installation is provided in *Bay of Bengal News*, No. 16.

A new VST prototype engine of 10 hp with water cooling and a gear box, is ready for testing with the project. The first engine will be installed in an IND-20 which will be built at the Kakinada boatyard.

Altogether 10 craft have been undergoing commercial trials in India during most of the year. One in Orissa, six from three villages in Andhra Pradesh and three units in Injambakkam. Data collectors have been appointed in all the villages and have been given necessary instructions and training in order to obtain reliable feedback of data and information from the operation of the craft. A first analysis of their performance was made in April 1984 and the outcome was not very encouraging. While the catch per trip was satisfactory, the number of trips was inadequate. The reason was the engine deficiencies mentioned above and also the problem of keeping the engine running through proper routine maintenance. Another reason for poor performance was the inadequate supply of gear available for some of the craft. These deficiencies have been rectified to some extent during the year and preliminary results of a new analysis indicate that the boats, at least in some places, have potential for economic viability without subsidies. The close monitoring will continue also in the next year and the programme of support in the field of fishing technology and engine maintenance/repair will be intensified.

41. *Beach Hauling Devices (BHD)* : The winch, equipped with a 8 hp VST engine (the same as for the beachlanding craft) developed and tested in the previous year, has proven to be satisfactory. Three winches were delivered on request to Andhra Pradesh. While they are being used in Uppada, the fishermen of Srikakulam and Machilipatnam felt that it would be of no use because of the flat long beaches.

In Sri Lanka beachlanding trials with SRL-14 showed that the pulling power of the winch was not sufficient because of the steep beach and the heavy boat. The winch was therefore fitted with one of the old 12 hp engines used in SRL-12 and a higher reduction ratio. Trials will also be conducted to haul the boat backwards up the beach in order to launch it forward.

This may ease the biggest problem in a beachlanding operation, that of getting the boat off the beach. An example is Gopalpur where a winch was installed recently. While the fishermen appreciate the mechanical help in getting the boat up on the beach, some 15 people are required to launch it. The launching is made much easier if the inflatable fenders are used as rollers. These fenders have a short life, however; they probably do not represent the final solution.

42. *Motorization of Country Craft (MCC)* : The 43 ft vallam operated from a long shallow canal at Adirampattinam, Tamil Nadu and equipped with a beachlanding craft type of engine installation, was buried in the mud in cyclonic weather in December 1983. While the trial data had shown benefits from motorization, a cheaper installation is desirable which can be fitted to existing boats without major structural changes. Plans were therefore made to install an engine of the "long-tail" type using an 8 hp VST engine. Problems with the engine itself and with a bend in the shaft and lower priority on this work in favour of the beachlanding craft delayed the testing of the unit : it was not started before the end of the year.

The project was requested by NORAD and the Fisheries Directorate of Orissa to assist in the motorization of traditional craft (dinghis) in Balasore district under a NORAD-supported project. The 8 hp VST engine, which has been successfully used to motorize vallams in Tamil Nadu and canoes in Karnataka and Goa, was selected for this purpose. One installation was completed and tested before the end of the year. During commercial trials it was discovered that the boats very often ran over gillnets in the water – and the gillnets would be damaged if the propeller could not be stopped. The fishermen therefore suggested that the boat be equipped with a gearbox. This will considerably increase costs; the installation of a simple cone clutch should be considered. BOBP has been requested to complete the installation in four boats and monitor the trials during a one year period.

43. fishing Boat Development (FBD/SRL) : Fishing trials with a 34-footer equipped with a 22 hp engine have aimed at testing the maximum capacity of this type of craft. It was acquired by the project in 1982, and is equipped with an insulated fish hold and a shelter for the crew. This enables the boat to make longer-than-one-day fishing trips. This advantage is additional to that of good fuel economy; at the same speed, it consumes only about two-thirds as much fuel as the 28-footers. During the last months of the year the boat was operating 50 large-mesh driftnets — considered to be the maximum for manual hauling. In addition, it was equipped with shark longlines and the boat was regularly making two day trips with very positive results. This type of boat has a higher capacity than the 28-footer at approximately the same initial cost and lower running cost, and is as effective as larger boats recently introduced for offshore fishing.

The SRL-15, which is a harbour based version of SRL-14 and a fuel efficient potential replacement of the 28-footers, reached the construction stage at the very end of the reporting period. The plug and mould were manufactured in Madras and the mould was later shipped to Colombo. The boat might be ready in the first quarter of 1985.

44. ORU Replacement (ORU/SRL) : The scheme agreed upon in the previous year to issue six FRP outrigger canoes (ORU) with 50% subsidy from BOBP, did not materialise. Two boats were already completed and are continuing commercial fishing while the other four hulls still await commissioning at the boatyard. The bank concerned found serious problems in selecting the beneficiaries, obtaining the down payment, arranging repayments, etc. The basic problem behind this is the high price of the craft. The market is flooded by cheap subsidised ORUs and other craft and a more expensive product is difficult to sell, even if it is technically superior. The deadlock was resolved by an agreement to offer the boats at lower price which would approach that of other subsidised craft. It was also agreed to include in the scheme the large ORU used during the Madras sail consultation. That craft has also been engaged in commercial fishing (trawling) from Negombo. Trials with driftnets were not performed as planned. The response from fishermen was poor.

While the use of a sailing ORU has many attractions, particularly that of low energy costs (being equipped only with an auxiliary outboard engine), the practical aspects and comfort seem to rule out this alternative. Is the sail promotion done by BOBP and others idealistic rather than practical? This concerns not only the sailing ORU, but sail applications in general.

The trials with SRL-17 (a 26-footer outrigger canoe) lead to the same reflection. The craft has been tested very successfully from Negombo with large mesh driftnets and shark longlines, and there is no doubt about the utility and seaworthiness of the craft.

The main advantage of this craft is its superior sailing qualities as compared with the common 18-footers are similar craft. But during the fishing trials, sails were conspicuously absent; the use of the outboard engine pushed up operational costs. This craft has no advantage over the 18-footer if engine power is used; it is only as a sailing craft it can compete. To test it further, the boat will be transferred to another location and tested together with ORUs of similar capacity.

Extension

45. There have been no changes in the work programme for extension activities during the year but for a few inevitable adjustments of time schedule. The Extension Training officer was requested to undertake two missions for other organizations on a reimbursable basis. He participated in a 10-day mission to Sri Lanka to assist the Swedish Cooperative Centre in preparing a project proposal for support to fishery cooperatives. The other mission (one month) concerned manpower planning in the Maldives for the FAO EEZ programme.

Six officers from BOBP and member countries were invited to participate in *SIDA-sponsored seminars on BOBP's extension activities* — covering nutrition in fisheries development, non-formal education and social anthropology — held at different places in Sweden during one week. The seminars were organised by the National Swedish Board of Fisheries to familiarize Swedish participants (from SIDA and universities) with BOBP work. Before the seminar, BOBP staff prepared case studies on women activities in Sri Lanka, fisherwomen's extension training in Tamil Nadu, fisherwomen activities in Bangladesh and coastal village development in Adirampattinam, which were presented and issued at the seminars together with other BOBP material on non-formal education.

Since nutrition emerged as a major action programme in the World Fisheries Conference, the project has started to look into it. A desk study is under preparation. Further work in this field will depend on the outcome of the study and also on the financial support that may be obtained from the FAO programme on nutrition or other sources.

46. Fisherwomen Activities in Bangladesh (FWA/BGD) : At the end of last year 120 women organized in 10 groups were cooperating in several income earning activities. Most significant was hand braiding of large-mesh driftnets. The others were fish culture in ponds, rearing of goats, ducks and chicken, and marketing of fish. See also Bay of Bengal News, No. 14.

All these activities have continued during the reporting year. Towards the end of it, the women groups had grown to 178 members. Of those, 120 were engaged in net-making, and all the women were engaged in two or more activities. Average income from their work was in the order of 100 Taka per month. Observations by activity are as follows :

Net-making continues to be the most important activity. A serious problem in the way of sustained benefit is the supply of twine. Until now, BOBP has arranged for all the twine and also helped the women in selling their ready-made nets. Efforts to establish contacts between the women groups and traders in Chittagong have been abortive and there is no opening in sight in the near future.

The rearing of fish in two village ponds turned out to be uneconomic for unknown reasons : the harvest was far below expectations. But the rearing of goats, ducks and chicken is proceeding satisfactorily. On the other hand, the marketing of fish — for which loans have been provided — has been sporadic: loan repayment has been slow.

In cooperation with the Institute of Nutrition and Food Science of the Dhaka University, training was given to 22 trainers in the subject of supplementary and weaning food. As a follow-up measure, project personnel, link workers and voluntary leaders assisted the trainers in training the village women. The training emphasised the preparation of supplementary feed from local foodstuffs. Anthropometric measurements have been taken on children under five years of age — indicating severe malnutrition among the village children.

A community hall has been constructed with BOBP funds on a piece of land donated by one of the village leaders. The hall is being used for training activities, group discussions, etc.

There has been no tangible response from the Government on the proposal to include women activities and make provisions for women extension staff in the Government plan. In agreement with the cooperating agency, it has been decided to phase out BOBP work in the villages during the first half of 1985 and to identify future extension activities on subjects like education or credit in a larger geographical area — a district or a upazila (a part of a district).

Discussions have been held with voluntary agencies on carrying forward and even expanding BOBP's work. The response seems encouraging.

47. Non-Formal Education (NFE/IND) : The curriculum and training material initiated during the previous year were completed during 1984. The final product consists of a trainer's manual, an animator's guide, a literacy primer, a literacy work book, a numeracy primer and an animator's edition of the numeracy primer, and supplementary reading material. Drafts of the material have been circulated among specialists in India and abroad, and very favourable comments have been received.

The material has been prepared and processed by a panel of experts in education, fisheries, health, sociology, etc. Field surveys have been undertaken to gain a better understanding of the economic, social, cultural, educational and health conditions of the fisherfolk in different coastal regions of Tamil Nadu, and to check the materials concerning words and illustrations used in the NFE package. The material has also been discussed in workshops and small meetings and tested in the field.

The authorities concerned in Tamil Nadu continue to show a great interest in the work and are providing strong support to it by printing all the material.

All the material is available in the Tamil language, but the Trainer's Manual and Animator's Guide are also available in English and will be issued as BOBP publications.

It is hoped that the entire material will be ready within the first half of 1985. Then support will be given to an implementation phase in Tamil Nadu, during which the work will be transferred to Government and to bilateral funding agencies.

In response to the draft material, some national and international agencies expressed interest and enquired about adaptation of the material in other states and countries. To provide more information and to facilitate adaptation of the package elsewhere, preparations have been made for a two-day seminar in Madras in March 1985.

48. Women Extension Training in Tamil Nadu (WET/IND) : Day-to-day support continues to be provided to the Fisherwomen Extension Service (FWES) in its work in Chingleput district. The work consists of multi-disciplinary support to fisherwomen through the link workers. The concept was tested by training a group of link workers in 1982.

Observations during the year show good results by way of easier access to bank credit for fisherwomen, practising of institutional savings habits, better health services for women and children, and improved working conditions for women fish traders through government-subsidized motorized bicycle rickshaws. Another important impact of the work is that through the training of link workers, female leadership among fisherwomen has been built up and led to more interest by women in matters of common concern which were handled so far entirely by male village elders and by fishermen cooperative society leaders.

To help make link worker training a regular, locally organised exercise, a training programme on community organisation and fisherwomen cooperatives society management has been prepared in collaboration with the Department of Fisheries and the Artisan Cooperative Training College in Madras. The duration of the theoretical training is three weeks. This is followed by two-week practical sessions during which the trainees will practise skills acquired in the theoretical course. The training package was tested in the last quarter of the year : 15 fisherwomen participated. Institutional arrangements have also been made between the college and the Department of Fisheries, under which training of fisherwomen link workers can be offered on a regular basis.

The report of the one-year observation study of factors determining the role and status of women in fishing villages is under print (BOBP/WP/33). The study revealed that the status of fisherwomen and their role in family decision-making is determined to a great extent by the level of their involvement in productive activities such as fish handling and trade. This results often in men handling the income and deciding upon the expenditure pattern, which often means comparatively less money for food and more for men's own expenses. The importance of women's role as income-earners (fish marketers, fish processors, net makers, etc.) in improving family living conditions should be kept in mind when introducing new technologies. A profile of one of the fisherwomen featured in the report appeared in *Bay of Bengal News*, No. 15.

Since women play an important role in fish marketing mainly in distributing fish to rural areas, to some extent also to city retail markets – a study was carried out to identify the scope for improved fish marketing and transport facilities to markets. The result of the study confirms earlier findings that the prospects for improvement are very slim and that motorized transport is not viable without subsidies -- or higher fish prices, which would not be in the interest of low-income consumers.

49. Fisherwomen Activities in Andhra Pradesh (WOM/AP) : This is a new activity which was taken up with the objective of identifying the potential for increased economic activities among fisherwomen. The study was from the outset limited to Visakhapatnam district in Andhra Pradesh. About 25 villages in the district were investigated before a detailed study was made, centering on four villages north of Visakhapatnam.

In these villages, a detailed socio-economic household survey was undertaken in collaboration with the Institute for Coastal and Offshore Research (INCOR). The analysis of the survey is not yet complete but it is clear that the prime interest of the fisherwomen is to increase their working capital so as to improve their fish marketing business. The Department of Fisheries has displayed great interest in making credits of small amounts available to the fisherwomen through local banks. It is hoped that the outcome of the survey will lead to pilot activities in some of the villages during 1985.

50. Institutional Credits, Orissa (COR/IND) : This activity is an offspring of the in-service training scheme for extension officers in Orissa under which it was reported last year. Banks started to issue loans by the end of 1983. The main features of the pilot project are decentralised identification of credit needs, direct finance to individuals without subsidy and financing of diversified items and activities. A very important aspect is also the linkage between the fisherfolk and the bank officials brought about by the extension officers.

The first round of loan disbursement was completed in the middle of the year, under which about Rs. 800,000 worth of craft, gear, bicycles etc. were provided to about 360 fisherfolk households. The pilot scheme also attracted the interest of a major refinancing institution, NABARD, which eventually agreed to refinance loans up to a total amount of Rs. 5.4 million under the BOBP artisanal marine fisheries scheme. Six commercial banks and two regional rural banks in Orissa are participating. The scheme is described in *Ray of Bengal News*, No. 13.

The first million was disbursed by the third quarter and the accumulated repayment position of all bank branches was 93% of the scheduled amount. Preparations were completed before the end of the year for a second round of loan disbursements involving another 300 fisherfolk households and about Rs. 1 million worth of credit. Some of the loans were also disbursed during the last quarter but the rate slowed down because of the parliamentary elections in December.

An important aspect of this credit scheme is the very close monitoring of all steps in the chain of procedures. Workshops and review meetings are frequently held to discuss and improve the identification of loanees, appraisal procedures, disbursement, repayment schedules, collection of instalments, action against defaulters, etc. All concerned i.e. the representatives of fisherfolk, extension officers, bank officials at village and branch level and NABARD personnel — are participating in these reviews.

As a supplement to the credit scheme, an audio-visual on bank savings by fisherfolk has been prepared for use by bank personnel and fishery extension officers.

51. Non-Formal Primary Education in Orissa (EOR/IND) : This is another offspring of the extension training scheme in Orissa. The aim is to develop a suitable non-formal education package for children in fishing villages. By the end of last year 20 centres in different fishing villages had been set up and teachers had started using newly developed material.

BOBP is developing the teaching material with the help of national experts in Orissa. The fishery input to the material is provided by the fishery extension officers who earlier took part in an in-service training scheme.

By the end of 1984 about half of the material for a two-year curriculum had been prepared and it is expected that the total package will be ready by early 1986. BOBP has also assisted in setting up the centres by providing simple teaching aids and basic furniture. Other inputs such as halls or roofs of sheds where classes are conducted have been provided by the communities themselves.

The SCERT (State Council for Educational Research and Training) reviews the teaching material and finances its printing. It also pays for the facilitators (teachers).

Each centre caters to 20-30 children Very good progress has been noted in attendance at the centres and in the teaching performance. This has prompted SCERT to open another 20 schools. These were commissioned before the end of the year.

As in the case of the credit activity, an important feature of the NFE work is the ver'y close monitoring. During the year three seminars, each with 50-60 participants, were conducted in Orissa. The participants are the facilitators, representatives of the teachers' training institutes, the SCERT, the NCERT and the Fisheries Directorate including the extension officers. The purpose of the seminars is to impart training to the facilitators and to review the experience of the teaching material, to discuss new components of the teaching material and in general to review and rectify as appropriate the operational aspects of the centres. In addition, teacher educators of the concerned teachers' training institutes are making regular visits to the centres to supervise and assist the facilitators. The work was featured in the *Bay of Bengal News*, No. 16.

52. *Video (VID)* : Work on the use of video for extension and training purposes was not started until the very end of the year. Because of the relatively high cost of the equipment required and the uncertainty about future funding the decision to acquire the necessary equipment was delayed. A short film on the Killai pen culture project has been prepared for showing at the 9th Advisory Committee meeting. It is not proposed to continue producing this type of programmes; it is meant to be an example of the quality that can be attained without using professional equipment. Future work will be determined after the Advisory Committee meeting.

WORK PROGRAMME – 1985

53. SIDA has granted a further extension of the project from mid-1985 till the end of 1986 and will make available additional funds equivalent to about US \$ 1.7 million for this period. The balance available at the end of 1984 is in the order of US \$0.3 million bringing the budget ceiling for 1985-86 to about US \$ 2 million (subject to exchange rate losses).

54. SIDA has explicitly stated that the project will not be extended beyond 1986. All work, including reporting and various administrative termination activities, should therefore be completed before the end of 1986. About one year would be needed as a phasing-out period.

55. On the other hand, there is a distinct possibility that other funding agencies may co-sponsor the BOBP from 1986 (and also that SIDA may continue its support beyond 1986 in a form different from the present one). One may assume that some commitments from other agencies will be forthcoming during the course of 1985.

56. Considering these two factors, the project may be continued without drastic changes for another year. The decision about modalities for phasing out or transition into a new phase of BOBP may therefore be taken in the 10th Advisory Committee Meeting early 1986.

57. Most of the ongoing activities should continue through 1985 but some of them can and should be terminated during the year. Details for each subject matter are given in Table 5. The programme would require a budget of about \$ 1.5 million i.e. about the same as the yearly expenditures during 1983 and 1984. The balance for 1986 would then be about \$0.5 million for termination and phasing out of remaining activities.

58. While the work of the project has been expansion-oriented in earlier years, it will now be characterized by contraction. Emphasis will be given to consolidation, reporting, training, transfer to national institutions and utilization of results for follow-up activities. An attempt is also being made to make the work programme less tight and heavy than in previous years to make staff available for ad hoc services to a larger extent than hitherto. This may include work for other agencies on a reimbursable basis.

59. The organisation of the project will by and large remain unchanged. Minor adjustments in working arrangements may be done to facilitate easy transition into a new BOBP phase (as proposed by the working group in Bangkok) from 1986 and onwards. In essence this means planning, budgeting and working arrangements in proposed modules for Coastal Aquaculture, Fishing Technology (Fishing Gear and Methods and Fishing Craft Technology), Extension and Development Support. The subject of social feasibility of technology introduction – which at times has been reported under Extension and Development Support – would be an integral part of the respective technology subjects.

60. The Information Service will have a heavy workload in producing working papers and reports. The Bay of Bengal News will be issued quarterly as in the past. No major publicity activities are contemplated.

61. The Project's role in BOBP (together with RAS/81/051) is anticipated to continue as at present; the management, information service and administration are shared on a pro rata basis. The interaction of work between the projects is expected to increase. Fishing Technology input will be provided for RAS/81/051 activities concerning tuna fishing and Hilsa investigations; Fishery Biology input will be received for cockle studies.

Table 1

1984 – Budget and Expenditure – GCP/RAS/040/SWE (in U.S. \$)

Code	Object of Expenditure	Expenditure 1976/1983	Budget 1984	Estimated Expenses 1984	Estimated Balance 31-12-84
10	Personnel Services	3,034,545	599,800	634,800	(35,000)
20	Duty Travel	712,738	94,400	146,400	(50,000)
30	Contractual Services	707,514	295,000	190,000	105,000
40	General Operating Expenses	479,128	73,000	93,606	(20,000)
50	Supplies & Materials	777,585	131,600	136,000	(5,000)
60	Equipment	358,021	41,506	51,566	(10,000)
80	Fellowships, grants & contributions	310,914	37,566	32,566	5,000
	Sub-Total	6380,455	1,274,200	1284,206	(10,000)
90	Project servicing cost	860,163	165,646	166,946	—
	Future years	—	—		366,606*
	Grand Total	7,240,618	1,439,846	1,451,146	350,000

* Subject to adjustment for rate of exchange losses.

Table 2

1984 – International Staff GCP/RAS/040/SWE

S. No.	Post	Name of incumbent (Nationality)	Date of (month/year)	
			Arr.	Dep.
Core Staff				
1.	Programme Director	Engvall, L O (Sweden)	11/78	
2.	Sr. Development Adviser	Pietersz, V L C (Sri Lanka)	1/79	6/84
3.	Sr. Fishing Technologist*	Pajot, G (France)	10/83	
4.	Fishing Craft Engineer	Overa, A (Norway)	9/80	
5.	Naval Architect	Ravikumar, R (India)	9/79	4/84
6.	Aquaculturist	Karim, M (Bangladesh)	1/82	
7.	Sociologist	Patchanee (Ms) N (Thailand)	8/80	
8.	Socio-Economist	Drewes (Ms) E (Germany FR)	10/80	
9.	Extension Training Officer	Tietze, U (Germany FR)	10/80	
10.	Information Officer	Madhu, S R (India)	10/79	
11.	Fishing Technologist (Ass. Expert)	Akerman, S E (Sweden)	1/83	
12.	Marine Engineer (Ass. Expert)	Hemminghyth, P A (Norway)	7/83	
13.	Naval Architect (Ass. Expert)	Johansen, S O (Norway)	8/83	
14.	Aquaculturist (Ass. Expert)	Janssen, J A (Netherlands)	10/83	
15.	Sociologist (Ass. Expert)	Dorresteijn, H (Netherlands)	11/83	
16.	Socio-Economist (Ass. Expert)	Tempelman, D (Netherlands)	3/84	
Consultants			Man-months	
1.	Aquaculturist (hatchery)	Mohamed K H (India)	2.5	
2.	Aquaculturist	Ghosh A N (India)	3.5	
3.	Masterfisherman	Gestsson T (Iceland)	4.0	
4.	Artist/writer	Bengtsson S (Sweden)	1.5	

* The same incumbent occupied this post from 1/79 to 5/82.

Table 3
1984- Training Activities – GCP/RAS/040/SWE

S. No.	Subject	Duration (weeks)	Venue	Number of Participants				
				BGD	IND	MAL	SRL	THA
1.	Consultations/Seminars/ Workshops							
1.1	Workshop on methodology of aquaculture demonstration	1	Phuket					16
1.2	Seminar on terminal, economic and social aspects of beachlanding craft introduction in India	½	Madras		11			
1.3	Development of non-formal education trainer's manual	1	Madras		12			
1.4	Field survey of economic social, cultural, educational and health conditions of fisherfolk for the preparation of NFE Trainer's Manual	2	Tamil Nadu		5			
1.5	Review of credit disbursement and utilization of loans received under artisanal marine fisheries credit pilot project	1	Bhubaneswar		48			
1.6	Review of the BOBP Artisanal Marine Fisheries Credit Scheme	1	Balasore Cuttack & Gopalpur-on-sea		67			
1.7	Non-formal education for children of marine fisher-folk in Orissa : 1st Seminar	1	Puri		40			
1.8	Non-formal education for children of marine fisherfolk in Orissa – 2nd seminar	1	Puri		47			
1.9	Non-formal education for children of marine fisherfolk of Orissa – 3rd seminar	1	Puri		54			

S. No.	Subject	Duration (weeks)	Venue	Number of Participants				
				BGD	IND	MAL	SRL	THA
2.	<i>Training Courses</i>							
2.1	Pen culture techniques including water area survey, seed collection, harvesting etc. – for fisheries officials and scientists	1.5	Tamil Nadu		16			
2.2	Water analysis, feed preparation, collection and separation of seed etc. – for fisheries inspectors	1	Kakinada		24			
2.3	Group savings for production – for women involved in fisherwomen activities	1	Satul					42
2.4	Nursing of fish fry – for fishermen from four villages	2	Phuket					11
2.5	Fish cage culture – for fishermen from three villages	1	Phang Nga					60
2.6	Aquaculture demonstration – for farmers from two villages	1	Ranong					40
2.7	General aquaculture – for farmers	1	Trang/Satul					37
2.8	Group leader training of women activities – for fisherwomen	1	Trang/Satul					12
2.9	Aquaculture techniques – for district fisheries officers	1	Prachuabkirikan					22
2.10	Design, construction, rigging and operation of high-opening trawls – for fishermen/netmakers	4.5	Pesalai				18	
2.11	Design, construction, rigging and operation of high-opening trawls – for fishermen/netmakers	4.5	Kalpitiya				10	
2.12	Design, construction, rigging and operation of high-opening trawls – for fishermen/netmakers	5	Orissa					
2.13	Engine repair and maintenance – for mechanics	2	Bangalore					

S. No.	Subject	Duration (weeks)	Venue	Number of Participants				
				BGD	IND	MAL	SRL	THA
2.14	Supplementary & weaning food – for project personnel, link workers & voluntary leaders	½	Chittagong	25				
2.15	Food, nutrition & child care – for women	½	Chittagong	100				
2.16	Community organisation & cooperative management – for fisherwomen cooperative society members	3	Madras		15			
2.17	Orientation on NFE curriculum for marine fisherfolk – for NFE project offices	½	Madras		15			
2.17	Field testing of NFE Trainer's Manual – for animators	2	Tirunelveli		36			
3.	<i>Study Tours</i>							
3.1	Shrimp culture – for scientific officers	1	Andhra Pradesh		2			
3.2	Shrimp culture – for scientific officers	1	Tamil Nadu		2			
3.3	Pen culture at Killai – for research officers	½	Tamil Nadu				2	
3.4	Production of polyethylene netting – for officer of CEYNOR Corporation	½	Tamil Nadu				1	
3.5	Introduction of boats in Tamil Nadu – for fishery officers	1	Tamil Nadu		3			
3.6	Demonstration of beachcraft – for fishery officials and fishermen from Tamil Nadu and Andhra Pradesh	1	Tamil Nadu/ Andhra Pradesh		20			
3.7	Extension work & socio-economic improvement activities for marine fisherfolk – for fishery officers	2	Orissa/A.P. & Tamil Nadu	5				
3.8	Fisherwomen extension training activities for Tamil Nadu fishery officer	2	Sri Lanka/ Bangladesh		1			

Table 4

1984- Publications – GCP/RAS/040/SWE

Reports :

BOBP/REP/17	Report of investigations to Improve the Kattumarams of India's East Coast. Madras, India, July 1984.
BOBP/REP/18	Motorization of Country Craft, Bangladesh. Madras, India, August 1984.
BOBP/REP/19	Report of the Eighth Meeting of the Advisory Committee. Dhaka, Bangladesh, January 16-19, 1984. Madras, India, May 1984.
BOBP/REP/20	Coastal Aquaculture Project for Shrimp and Finfish in Ban Merbok, Kedah, Malaysia. Madras, India, December 1984.

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BOBP/WP/25	Fishing Craft Development in Kerala : Evaluation Report. O. Gulbrandsen. Madras, India, June 1984.
BOBP/WP/26	Commercial Evaluation of IND-13 Beachcraft at Uppada, India. R. Ravikumar. Madras, India, June 1984.
BOBP/WP/28	Fishing Trials 'with Small-Mesh Driftnets in Bangladesh. G. Pajot and T. K. Das. Madras, India, March 1984.
BOBP/WP/29	Artisanal Marine Fisheries of Orissa : A Techno-Demographic study. M.H. Kalavathy and U. Tietze. Madras, India, December 1984.

Newsletter (Bay of Bengal News) :

March 1984, June 1984, September 1984, December 1984.

Information Documents :

BOBP/INF/6	Marine Small-Scale Fisheries of Sri Lanka : A General Description. Madras, India, November 1984.
BOBP/INF/7	Marine Small-Scale Fisheries of Orissa : A General Description. Madras, India, December 1984.

Table 5

1985 – Work Programme – GCP/RAS/040/SWE

Activity		Targets	Comments
1.	Coastal Aquaculture		
1.7	Satkhira-Aquaculture in ponds and paddy field (SAP/BGD)	<ul style="list-style-type: none"> – Full year culture trials of different fish and shrimp species and paddy – Completion of farm complex by provision of main sluice gates, sheds and small dormitory for trainees/visitors. – Installation of electricity and telephone (by Government). – Training of officers and farmers, – Social feasibility study. 	Production results during 1983/84 have been disappointing and more trials and technical support beyond 1985 most likely required.
1.2	Polekurru – Aquaculture in ponds (AAP/IND)	<ul style="list-style-type: none"> – Completion of two years' of trials of shrimp culture by July 1985. – Training course for State fishery officers in June – Social feasibility study – Reporting including on-the-site seminar. 	– The main objective of this activity is to test different pond configurations. Sufficient facilities and in-service training have been provided and the BOBP support can be phased out in the 3rd quarter of 1985.
1.3	Killai-Pen culture introduction (PCI/IND)	<ul style="list-style-type: none"> – Establishment of about eight 0.5 ha farms to be operated by families of the local communities under the project's guidance for one full year. – Preparation of a socio-economic profile of the local communities. 	– This activity is a follow-up of the technical trials conducted since mid-1982. While they have been fairly successful there are doubts about their feasibility in the context of the local communities. Support is required till mid-1986

Activity		Targets	Comments
1.4	Development and Management of Cockle Culture (DMC/MAL)	Field studies of natural beds, culture areas and spatfalls – Growth studies of field samples – Age and growth studies of shells – Laboratory studies of induced spawning and larval rearing. – Collection and analysis of economic information	– The activity started only in Oct. 84. While some valuable results are expected by end-1985 the activity should continue in 1986.
1.5	Seaweed Culture (SWC/MAL)	Reporting	– Carried over from 1984; the final technical report from the subcontractor is awaited.
1.6	Shrimp Hatchery and Pen Culture (SHP/SRL)	– Training in hatchery techniques. Improved larval rearing – Expansion of pen culture area – Reporting	The work can be completed before the end of the year.
1.7	Aquaculture Demonstration (ACD/THA)	– Demonstration of fish culture (cages) and mussel culture (rafts) at new sites in Satul, Trang, Phuket and Ranong – improved nursing practices of fingerlings (seabass) expanded income earning activities (fish processing) for women. – provision of facilities (jetty and water storage) in selected villages. – Social feasibility study – Reporting	– This activity has been very successful with the objectives fulfilled; it should be terminated by year end in its present form and work in 1986 should be concentrated to specific problem areas.

Activity	Targets	Comments
2. <i>Fishing Technology</i>		
2.1 Beachlanding craft (BLC)	<ul style="list-style-type: none"> – Trials with water cooled VST engine in India – Maintenance of engines in India – Beach rollers for easy hauling – Assistance to boatyards for commercial production – Commercial fishing trials – Fishing experiments in India – Social feasibility studies in India – Documents of designs and technical trials 	<ul style="list-style-type: none"> – No further new designs will be taken up and the work will focus on the functioning and introduction of successful craft already developed. The work will not be completed in 1985.
2.2 Fish aggregating devices (FAD)	<ul style="list-style-type: none"> – Completion of ongoing trials in Sri Lanka and evaluation of results. – New trials in India 	<ul style="list-style-type: none"> – The work should continue into 1986.
2.3 Artificial reefs (AFR)	<ul style="list-style-type: none"> – Preparation of a seminar to be held in first half of 1986. 	<ul style="list-style-type: none"> – The purpose would be to bring together available information on artificial reefs (and FAD's). Depending on the scale of the seminar, funds from other sources might be required.
2.4 Line and net haulers (LNH)	<ul style="list-style-type: none"> – Evaluation of prototypes – Reporting 	<ul style="list-style-type: none"> – The potential use of manual haulers seems less than anticipated earlier and the work will be concluded early 1985.
2.5 High opening bottom trawling (HBT)	<ul style="list-style-type: none"> – Reporting 	
2.6 Set Bagnets (SBN/BGD)	<ul style="list-style-type: none"> – Evaluation of 1984/85 trials – Preparation and conduct of 1985/86 trials – Documentation 	<ul style="list-style-type: none"> – The continuation of trials during the 1985/86 season is subject to the evaluation of the 1984/85 results. Continuation of work into 1986 probably desirable.

Activity		Targets	Comments
2.7	Motorization of country craft	<ul style="list-style-type: none"> – Testing of Indian made “long tail” unit – Reporting 	– The work should be completed before end of 1985.
2.8	Fishing Boat Development (FBD/SRL)	<ul style="list-style-type: none"> – Construction and demonstration of SRL-15 (low powered high performance 28 footer) – Acceptances of same under Government schemes – Trials and evaluation of 34 footer – Reporting 	
2.9	ORU Replacement (ORU/SRL)	<ul style="list-style-type: none"> – Trials and evaluation of SRL-17 (outrigger canoe) – Reporting 	
2.10	Improved Fishing Technology (IFT/IND)	<ul style="list-style-type: none"> – Identification of potential improvements. – Start of experimental work 	– New activity
3.	<i>Extension</i>		
3.1	Extension Services (EXS)	<ul style="list-style-type: none"> – Preparation and conduct of a regional consultation on extension services and associated training requirements. 	– To be held late 1985 or possibly early 1986.
3.2	Video (VID)	<ul style="list-style-type: none"> – Sample production of video programmes for training and extension purposes 	– The purpose is to test the medium for a few different subjects and target audiences.
3.3	Fisherwomen Activities (BGD/FWA)	<ul style="list-style-type: none"> – Transfer of responsibilities to DOF and the Community – Identification and promotion of follow-up activities – Reporting 	
3.4	Women Extension Training (WET/IND)	<ul style="list-style-type: none"> – Promotion of follow up activities – Reporting 	

	Activity	Targets	Comments
3.5	Fisherwomen Extension Andhra Pradesh (WOM/AP)	<ul style="list-style-type: none"> - Analysis and documentation of socio-economic survey - Small-scale credits for women - Identification of other feasible activities 	
3.6	Institutional Credit (COR/IND)	<ul style="list-style-type: none"> - Monitoring of loan disbursements - Stabilization of repayments - Savings campaign - Promotion of full utilization of NABARD refinance. - Design and conduct of 2 week training course for bank officers - Selective supply of a/v equipment 	<ul style="list-style-type: none"> - Most of the work will be completed in 1985 but some must be carried over to 1986 including reporting.
3.7	Extension Officer Training (XOR/IND)	<ul style="list-style-type: none"> - Reporting 	<ul style="list-style-type: none"> - Carried over from 1984.
3.8	Non-Formal Adult Education (NFE/IND)	<ul style="list-style-type: none"> - Printing of NFE material in English and Tamil - Training of trainers and field guidance - Promotion of adaptation of material in other states. - Reporting 	<ul style="list-style-type: none"> - The work is scheduled to be terminated in the second half of 1985.
3.9	Non-Formal Primary Education (EOR/IND)	<ul style="list-style-type: none"> - Introduction, printing and distribution of learning packages. - Teacher training, evaluation of learning materials and monitoring of 40 pilot centres. 	<ul style="list-style-type: none"> - The work is expected to be completed in the first half of 1996.
3.10	Extension Worker Training (EWT/IND)	<ul style="list-style-type: none"> - Preparation of training programme - Survey of small-scale fisheries. 	<ul style="list-style-type: none"> - New activity.

	Activity	Targets	Comments
4.	<i>Development Support</i>		
4.1	Project Preparation (PPP)	<ul style="list-style-type: none"> – Beachlanding craft in India and Sri Lanka – Low powered fishing craft in Sri Lanka – High opening bottom trawling in India – Motorization of country craft in Bangladesh and India – Women extension services in Bangladesh and India – Non-formal education in India 	<ul style="list-style-type: none"> – The preparation of national projects will during the year concentrate on the follow-up of BOBP results but also concern others on request
4.2	Nutrition (NUT)	<ul style="list-style-type: none"> – Desk review of nutrition situation in fishing communities 	<ul style="list-style-type: none"> – This is a new activity in response to the action programme on nutrition of the World Fisheries Conference.

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Development of Small-Scale Fisheries (GCP/RAS/040/SWE)

Reports (BOBP/REP/....)

1. Report of the First Meeting of the Advisory Committee.
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(Published as Appendix 1 of IOF/DEV/78/44.1, FAO, 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.
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4. Role of Women in Small-Scale Fisheries of the Bay of Bengal. Madras, India, October 1980.
5. Report of the Workshop on Social Feasibility in Small-Scale Fisheries Development.
Madras, India, 3-8 September 1979. Madras, India, April, 1980.
6. Report of the Workshop on Extension Service Requirements in Small-Scale Fisheries.
Colombo, Sri Lanka, 8-12 October 1979. Madras, India, June 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.
9. Report of the Training Course for Fish Marketing Personnel of Tamil Nadu.
Madras, India, 3-14 December 1979. Madras, India, September 1980.
- 10.1 Report of the Consultation on Stock Assessment for Small-Scale Fisheries in the Bay of Bengal.
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Volume 1 : Proceedings. Madras, India, September 1980.
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11. Report of the Fifth Meeting of the Advisory Committee. Penang, Malaysia, 4-7 November 1980.
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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 1982.
14. Report of the First Phase of the "Aquaculture Demonstration for Small-Scale Fisheries
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15. Report of the Consultation-cum-Workshop on Development of Activities for Improvement
of Coastal Fishing Families. Dacca, Bangladesh, October 27-November 6, 1981.
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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. Motorisation 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.
Edeltraud Drewes (in preparation).
22. Report of the Ninth Meeting of the Advisory Committee.
Bangkok, Thailand, February 25-26, 1985. Madras, India, May 1985.

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2. Inventory of Kattumarams and their Fishing Gear in Andhra Pradesh and Tamil Nadu:
T.R. Menon. Madras, India, October 1980.
3. Improvement of Large-Mesh Driftnets for Small-Scale Fisheries in Sri Lanka.
G. Pajot. Madras, India, June 1980.
4. Inboard Motorisation of Small G.R.P. Boats in Sri Lanka. Madras, India, September 1980.
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.
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7. Technical Trials of Beachcraft Prototypes in India. O. Gulbrandsen, G.P. Gowing, R. Ravikumar.
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8. Current Knowledge of Fisheries Resources in the Shelf Area of the Bay of Bengal.
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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, John 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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Madras, India, October 1981.
13. Trials of Two-Boat Bottom Trawling in Bangladesh. G. Pajot, J. Crockett.
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14. Three Fishing Villages in Tamil Nadu. Edeltraud Drewes. Madras, India, February 1982.
15. Pilot Survey of Driftnet Fisheries in Bangladesh. M. Bergstrom. Madras, India, May 1982.
16. Further Trials with Bottom Longlines in Sri Lanka. Madras, India, July 1982.
17. Exploration of the Possibilities of Coastal Aquaculture Development in Andhra Pradesh.
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Indonesia. Madras, India, August 1982.
18. Review of Brackishwater Aquaculture Development in Tamil Nadu.
Kasemsant Chalayondeja and Anant Saraya of the Department of Fisheries, Thailand.
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19. Coastal Village Development in Four Fishing Communities of Adirampattinam, Tamil Nadu, India.
F.W. Blase. Madras, India, December 1982.
20. Further Trials of Mechanized Trawling for Food Fish in Tamil Nadu.
G. Pajot, J. Crockett, S. Pandurangan, P.V. Ramamoorthy. Madras, India, December 1982.
21. Improved Deck Machinery and Layout for Small Coastal Trawlers.
G. Pajot, J. Crockett, S. Pandurangan and P.V. Ramamoorthy. Madras, India, June 1983.
22. The Impact of Management Training on the Performance of Marketing Officers in State
Fisheries Corporations. U. Tietze. Madras, India, June 1983.
23. Review of Experiences with and Present Knowledge about Fish Aggregating Devices.
M. Bergstrom. Madras, India, November 1983.
24. Traditional Marine Fishing Craft and Gear of Orissa. P. Mohapatra. (Under preparation).
25. Fishing Craft Development in Kerala : Evaluation Report. O. Gulbrandsen.
Madras, India, June 1984.
26. Commercial Evaluation of IND-13 Beachcraft at Uppada, India.
R. Ravikumar. Madras, India, June 1984.
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28. Fishing Trials with Small-Mesh Driftnets in Bangladesh. G. Pajot and T.K. Das. Madras, India, March 1984.
29. Artisanal Marine Fisheries of Orissa : A Techno-demographic Study. M.H. Kalavathy and U. Tietze. Madras, India, December 1984.
30. Mackerels in the Malacca Straits. Colombo, Sri Lanka, February 1985.
31. The Tuna Fishery in the EEZs of India, Maldives, and Sri Lanka. Colombo, Sri Lanka, February 1985.
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33. Factors that Influence the Role and Status of Fisher-women : A Study of Three Villages in Tamil Nadu. Karuna Anbarasan. Madras, India, April 1985.
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1. Fishermen's Cooperatives in Kerala : A Critique, John Kurien. Madras, India, October 1980.

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