BAY OF BENGAL PROGRAMME
Development of Small-Scale Fisheries

BOBP/REP/26
(GCP/RAS/040/SWE)

Report of the Tenth Meeting of the Advisory Committee

Male, Maldives
17-18 February, 1986

SWEDISH INTERNATIONAL DEVELOPMENT AUTHORITY

FOOD AND AGRICULTURE ORGANIZATION
OF THE UNITED NATIONS

BAY OF BENGAL PROGRAMME BOBP/REP/26

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Executing Agency :

Food and Agriculture Organization of the United Nations

Funding Agency :

Swedish International Development Authority

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This document is the report of the tenth meeting of the Advisory Committee of the SIDA-funded Project for Small-Scale Fisheries Development of the Bay of Bengal Programme (BOBP). The meeting was hosted by the Government of Maldives and was held in Male, February 17-18, 1986.

The meeting constitutes a session of the fourth meeting of the Committee for the Development and Management of Fisheries in the Bay of Bengal (briefly Bay of Bengal Committee or BOBC) held 17-22 February, 1986.

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 Reports series by the FAO headquarters.

The report records the deliberations and conclusions of the Advisory Committee meeting of the small-scale fisheries project. It includes an analysis of progress made by the project in 1985, and a discussion of the work programme during 1986, the last year of operation of the current project. It also gives an account of the tripartite review meeting of another component of BOBP, the UNDP-funded project "Marine fishery resources management in the Bay of Bengal", and of the discussion on the future of BOBP.

"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 in 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). Dhaka (1984), and Bangkok (1985).

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OPENING OF THE SESSIONS

The tenth meeting of the Advisory Committee of the project "Development of Small-Scale Fisheries in the Bay of Bengal" was held in conjunction with the fourth 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 17-22 February 1986 at the Islamic Centre, Male, capital of the Republic of Maldives. It began with an opening ceremony chaired by Mr. Kosol Mutarasint of Thailand, Chairman of the third session of the BOBC. The session was declared open by Mr. Abdul Sattar, Minister of Fisheries, Republic of Maldives. A message from Mr. Maumoon Abdul Gayoom, President of the Republic of Maldives, was conveyed to the committee.

The Advisory Committee meeting of the small-scale fisheries project, which constitutes a session of the BOBC meeting, was held 17-18 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; and from Denmark, Norway, U.K., and SEAFDEC (South East Asian Fisheries Development Centre). A list of participants is found in Appendix A.

Maldives and Sri Lanka were by unanimous consent elected Chairman and Vice Chairman of the BOBC meeting. It was then agreed that the tenth Advisory Committee Meeting would be chaired by the Vice Chairman (Sri Lanka) as Maldives was not a member of the Advisory Committee.

The full report of the BOBC meeting will be published by the FAO headquarters in Rome. What follows are extracts from the proceedings of the BOBC meeting relating to

- The 10th Advisory Committee meeting of the SIDA-funded small-scale fisheries project.
- The tripartite review of the UNDP-funded marine fishery resources project and
- The future of the Bay of Bengal Programme.

REPORT OF THE TENTH MEETING OF THE ADVISORY COMMITTEE OF GCP/RAS/040/SWE – DEVELOPMENT OF SMALL-SCALE FISHERIES OF THE BAY OF BENGAL PROGRAMME.

General

9. The Secretariat submitted the Progress Report for 1985 (see Appendix B) including the proposed work programme for 1986 of the project GCP/RAS/040/SWE ~ Development of Small-Scale Fisheries of the Bay of Bengal Programme (Document lOFC : DM/BB/86/2).

10. In a general introduction attention was drawn to the total and itemized expenditure, the valuable extra-budgetary services of Associate Professional Officers, the high training input, satisfactory counterpart inputs and the work of the Information Service.

11. In the discussion, the excellent implementation and innovative approach of the project was commented upon and satisfaction expressed about the impact achieved in several areas. The expenditures by discipline i.e. Coastal Aquaculture 32%, Fishing Technology 32%, Extension 20%, Development Support 7% and Information Service 9% were noted and considered appropriate.

12. In response to a query from India, the Secretariat stated that the deletion of the post of Fishing Craft Engineer during the year had not affected the output of the project. Nearly all technical development work had been completed and the necessary extension work in craft introduction was adequately handled by the Fishing Technologist and Associate Professional Officers together with counterpart personnel.

13. The importance of the Information Service in this type of regional project and the substantial benefits generated by it were reiterated. It was felt however that more use of the material produced

should be made for information and extension purposes in the local languages. While it was agreed that this must be a national responsibility, the project could assist with advice and materials such as pictures, slides, audio visuals, etc.

Coastal Aquaculture

14. In introducing the subject, the Secretariat highlighted the achievements of the various activities. In the Satkhira project production had increased considerably but was still not satisfactory. Good harvests at Killai in 1985 indicated that the technique of pen culture could be commercially viable for small-scale farmers. Although the social and economic feasibility of small-scale shrimp culture in ponds had not yet been demonstrated at Polekurru, farmers in the vicinity had benefited by learning from the trials. The cockle culture activities in Malaysia had produced useful information on the life history of cockle. The shrimp hatchery operations in Sri Lanka had been fairly successful. The impact of aquaculture demonstration in Thailand, for which BOBP support had been terminated in September 1985, on production and income of farmers, had been found to be very positive.

15. The question of economic and social feasibility was discussed. India stated that the results at Killai held out good prospects for both economic and social feasibility. In the cases of both Polekurru and Satkhira, India and Bangladesh respectively stated that the small-scale fisherfarmers had benefited from project activities by gaining experience and knowledge of the techniques from the demonstrations. In regard to Satkhira, Bangladesh expressed the need for a study of the economics of operating farms of small size. Bangladesh also emphasized the need for undertaking further work in respect of siltation and water-exchange problems in this project during the operation of the proposed future activities. Malaysia mentioned that the target group would benefit from the results of the cockle culture acitivity when better management measures were based on it in the future. Further economic and socio-economic studies however needed to be carried out. Thailand expressed the view that the possibilities for the target group of small-scale operators to benefit directly from the activities varied from case to case since different techniques needed different levels of investment, management etc. Mixed results were therefore to be expected. This however should not necessarily be regarded as a negative outcome, since a one-sided development might disrupt the social harmony essential for stability and long lasting effect of the development effort.

16. Sri Lanka emphasized the constraint of limited land suitable for aquaculture in the country and suggested that the project should provide technical assistance in the identification of suitable areas. In the formulation of future work plans, special attention should be paid to training and extension for small-scale farmers.

17. The question of total destruction of mangrove vegetation for aquaculture was discussed. It was felt that in order to prevent environmental degeneration, aquaculture activities should be so designed as to conserve mangrove vegetation as far as possible. In this connection, India suggested that silvo-pisciculture may be encouraged. Some countries pointed out that there were special multi-disciplinary environmental scoping committees in their countries dealing with the environmental impact assessment aspects in the allocation of land in coastal areas for aquaculture activities.

18. Sweden inquired whether a list of key problems and constraints that had to be overcome and the priorities for future work could be prepared for each country, taking into account the experiences of BOBP, since such a record wculd be invaluable for future projects. It was agreed that this could be done by the project as part of the preparation for the proposed follow-up project.

19. The two major constraints in coastal aquaculture – the availability of seed and the availability and cost of feed – were discussed. Some member countries stated that the problems of seed supply had been almost solved mainly through the establishment of hatcheries. The nursing of fry to ensure higher survival rates in small-scale farming needed further effort. The feed problem was generally felt to be a more serious constraint. Considerable effort had gone into the development of artificial feed in many countries but its cost was a major problem.

Fishing Technology

20. In presenting this item of the Progress Report the Secretariat highlighted the very encouraging development in India in the field of beachlanding craft; there had been a significant improvement in the performance of boats in operation and expansion in the production of such boats. The development of beachlanding craft and other boats in Sri Lanka had produced positive and

conclusive results which however had not yet had a visible impact. The work on set bagnets in Bangladesh had resulted in increased productivity. Activities concerned with cottage industry net making and fish aggregating devices had produced some findings which were interesting but not yet conclusive. The presentation also included the screening of a video film on beachlanding craft and another on engine maintenance, produced for training purposes.

21. In discussing the beachlanding craft, India expressed its great satisfaction with the impact generated by the project. The Central Government and the State Governments concerned had fully adopted the solutions achieved. It was proposed to introduce 2400 craft during the 7th Five-Year Plan. Continued assistance to support this work, particularly in the fields of commercial production of boats, extension and training of operators, would be required. India also supported the suggestion made in a project workshop that extra resources be mobilized for exploratory fishing for large pelagic species in support of the beachlanding craft programme.

22. Sri Lanka expressed satisfaction with the work done there. Little impact had been generated, and the continuation of demonstration activities was requested. The Government hoped that the boats would soon be accepted by the fishermen, so that the fishing effort now concentrated around existing harbours and anchorages could be more evenly distributed by operating craft from open beaches.

23. With particular reference to the successful adoption of beachlanding craft in India, the delegate of Sweden wondered why other countries were also not making full use of such results. Several delegates referred to instances where results had been used, but pointed out that needs and priorities varied among the countries and that consequently all results were not universally applicable in the region. They also stated that they were carefully monitoring the project's work and used its results even if their countries were not actively participating in particular activities.

24. The U.K. pointed out the long time-frame required for this type of development work. In congratulating the project on the achievements made, a tribute was also paid to the designers and sponsors of the project for having provided for a long-term engagement without which the results would not have been produced. The U.K. also saw BOBP's work as a valuable support and supplement to its own efforts in similar areas of work.

25. Some positive indications from the FAD trials prompted Sri Lanka to suggest further trials. Although the results were not conclusive it was interesting that most of the fish caught around FADs were of species not commonly landed by the existing fishery. India suggested that the Andaman and Nicobar islands might be a suitable area for new FAD trials. Maldives summarized its experience of FADs; the aggregation effect had been very high after a short period of 2-3 weeks; the main problems were deployment at great depths (2000 m) and the short lifetime of the devices.

26. The project's experience with hand-operated net braiding machines was found discouraging but not entirely surprising. Other agencies e.g. ODA, had had similar experiences elsewhere in the world.

27. Despite the technical problems encountered by the project in the motorization of country craft, it was felt that such activities would eventually bring substantial benefits to small-scale operators. India hoped that work in this field could be taken up in West Bengal as indicated in the Progress Report.

28. India expressed interest in the work on set bagnets in Bangladesh for possible utilization of results in very similar fishing in West Bengal.

29. On the subject of artificial reefs – an activity which was not taken up during 1985 – the committee was informed about a pilot project being launched by SEAFDEC. It would consist of two components, one of concrete and the other of tyres, covering an area of 1000 ha. Comprehensive multi-disciplinary studies on biology, fishing technology, economics, etc. would be undertaken during the project.

Extension

30. In introducing this item, the Secretariat stressed that it concerned family-oriented extension activities of a general nature other than technical extension which had been covered under Coastal Aquaculture and Fishing Technology. The focus of the work during 1985 had been on primary non-formal education and institutional credit in Orissa. The excellent progress achieved by the

education programme was evident from very satisfactory examination results vis-a-vis examination results from formal education centres. The credit activity had also been very successful. It appeared that both activities would lead to large-scale follow-up projects funded by other sources.

31. During the discussion, India, Sri Lanka and Bangladesh expressed their appreciation of the extension activities carried out in their countries. India highlighted the enthusiastic cooperation between agencies and institutions, both government and voluntary, which had been generated by the non-formal primary education programme and fisheries credit scheme in Orissa. The fisheries extension service in Tamil Nadu was also appreciated. The Government of India wished to promote the adaptation of these schemes to other states. Since India had a large and illiterate fisherfolk population, exploited by middlemen, indebted to moneylenders, generally of a low social status, and living in villages without easy access, India stressed the need to emphasize education, institutional credit, women participation and a family-oriented approach.

32. Sri Lanka referred to the positive impact of the income-earining activities for fisherwomen and expressed interest in using the link worker approach in Sri Lanka, in order to reach the target group.

33. Bangladesh stressed the need for extension support in areas such as supply of drinking water and provision of storage, marketing and transportation facilities for fish, for the benefit of its fisherfolk who were largely illiterate and economically exploited.

34. Sweden, the U.K., Norway and Denmark pointed out, that education was an essential area of extension work, because it was a pre-condition for any kind of development. They expressed their appreciation of the fact that the project did not concentrate only on development of technologies and methodologies but also on the process of their adoption by the target group.

35. The donor agencies were pleased to note the increasing share of project resources allocated for Extension vis-a-vis other disciplines. It was noted that at the beginning of the project in 1979 this type of work had not been covered at all. The change had taken place over the years through the mechanism of the Advisory Committee based on needs of the target group, priorities of the countries and interest of the funding agencies.

36. Malaysia, Thailand and Bangladesh as well as Indonesia and Maldives pointed out that in their countries, different agencies looked after various aspects of the welfare of fisherfolk, and that not all aspects of development work in fishing communities came under the responsibility of the fisheries authorities. Sri Lanka and Denmark on the other hand stressed the need to integrate and coordinate the development work of various departments at the grassroots level, with the help of fisheries extension services, to ensure that the programmes of the former reach the target group.

37. Many delegates and observers showed considerable interest in the operational features of the fisheries credit scheme in Orissa and particularly in the high rate of loan recovery. Further discussion was deferred to the agenda item on credit facilities and subsidies in which the Orissa activity would be presented in detail.

Development Support

38. The Secretariat summarized the work of development support. The Committee roted that an outline for an integrated project for development of small-scale fisheries in a province in Thailand had been prepared; a follow-up project has been prepared for training of fisherwomen link workers in India; cooperation had been established with funding agencies for support of extension activities in India and Bangladesh; an attempt had been made to revive the proposal for motorization of Chandi boats in Bangladesh; surveys on the nutritional status of fisherfolk in India had been carried out.

39. The bilateral funding agencies expressed the view that the development support work was of great value to them, in terms of new project ideas and proposals which could be considered for bilateral funding.

40. India confirmed its great interest in the follow-up project for training of fisherwomen link workers and hoped that the scheme would materialize. The report on the nutritional status of fisherfolk was also awaited with keen interest.

41. Thailand stated that valuable experience had been gained on methods and approaches to reach the target group. The Government was committed to assisting the poorer sectors of the

population. The lessons learned during the BOBP activity were being taken fully into account in designing new plans and programmes. These included'the proposed integrated project in Ranong province for which further assistance from BOBP was envisaged.

42. Sri Lanka felt that it had so far gained very little from the development support work and requested assistance from BOBP in carrying out surveys and in preparing suitable project proposals.

Work Programme – 1986

43. Since 1986 was the last year of operation, the major features of the work programme proposed by the Secretariat were :

(i) termination of all activities including evaluation and reporting and

(ii) preparation of activities for a new follow-up project.

It was estimated to cost US $ 1 million while the available funds at present amounted to only 0.7 million. The proposed allocation by subject matter was as follows : Coastal Aquaculture 23%, Fishing Technology 24%, Extension 22%, Development Support 18% and Information Service 13%.

44. The Committee agreed with the contents of the work programme and the allocations between the different disciplines.

45. In addition, it was suggested that attention should be paid to people's participation in development. A review of experience so far gained by the project and further specific field testing in fishing communities should be undertaken if funds permitted. It was also emphasized that such work should actively involve existing formal and informal organizations in the fishing communities.

46. It was noted that the work programme was prepared on the assumption that the shortfall of $ 0.3 million might be covered during the year. FAO confirmed, though without commitment, that some possibilities in this connection existed within the overall FAO Government Cooperative Programme with Sweden and that utmost efforts would be made to find a solution.

47. Pending further clarifications of the funding situation for 1986 it was agreed that activities requiring substantial funding input needed to be suspended. Similarly, preparatory activities for a new project would also have to be delayed pending clarification of the status of funding, perhaps by mid-1986.

TRIPARTITE REVIEW OF RAS/81/051 – "MARINE FISHERY RESOURCES MANAGEMENT IN THE BAY OF BENGAL".

48. The Secretariat presented the Project's Progress Report for 1985 and the proposed Work Programme for 1986 (document IOFC : DM/BB/86/3).In three of the five working groups – Tuna (Maldives, Sri Lanka), Hilsa (Bangladesh), Mackerel (Thailand, Malaysia, Indonesia) – established under the project tangible improvements in the acquisition and analysis of data had been achieved. In some cases these had also led to important new findings about the resources. It was only in respect of the "Demersals" group that progress was not satisfactory and no further work was recommended during the lifetime of the project. The computerization of a statistics programme (BOBFINS) had suffered some setbacks in the development of software but it was now ready for application; the computer programmes for stock assessment were in use. Attention was also drawn to the general resources reviews undertaken by the project and the formulation of and mobilization of support for exploratory fishing projects for tuna in Maldives and Sri Lanka.

49. All participating countries expressed their appreciation of and satisfaction with the activities undertaken and progress made in 1985 and endorsed the work programme for 1986.

50. Bangladesh stated that the Hilsa resource was very important, and that, in particular, the marine component had gained importance with the reduction of water flow in the rivers. It was looking forward to the working group meeting on Hilsa planned for July 1986 and participation therein by the newly established Fisheries Research Institute, supported by the new IRDC project.

51. Indonesia expressed satisfaction with the improvements in the data base of the mackerel fisheries in the Malacca Straits and requested the project's opinion on the suitability of these data for management purposes at this stage. The project responded that the reliability of the estimates of potential yield of these mackerel resources was yet low, with data still lacking from certain areas; the considerable impact of demersal gear on these resources also needed to be assessed further. A large, probably natural fluctuation in resources abundance had been noted. The only management measure so far recommended was a closed season for an area in Thailand where high abundance of juveniles had been observed.

52. Malaysia stated that its scientists had reached a better level of understanding of the resources situation, not only in Malaysia, but also in adjacent countries and expressed a desire to continue the project.

53. Maldives stated that the project had been of tremendous help in upgrading staff and in strengthening the statistical data base. It further requested continuing efforts in training of field officers. The project confirmed that this would be undertaken during 1986.

54. Sri Lanka specifically wished to record its appreciation of the assistance provided by the project, in the evaluation of tuna resources, training programmes on statistics and sampling techniques and the preparation of a TCP proposal for an offshore tuna survey. It expressed interest in an expansion of the programme, to cover all resources, and not only the shared stocks.

55. Thailand stressed that the increasing need for management required international efforts and that standardization of methodology and inputs was very important. It expressed the hope that India and Burma would also join the project. It appreciated the work done by this project and also by the FAO/DANIDA project "Training in fish stock assessment" (GCP/INT/392/DEN).

56. A joint UNDP/FAO evaluation mission comprising one nominee of each agency had visited the project area in November/December, 1985. Its report (document IOFC : DM/BB/86/Inf. 7) was made available to the Committee during the session. The Committee was informed that the view expressed in the report were those of the mission and not necessarily those of UNDP or FAO.

57. UNDP presented the major findings of the review mission.

58. FAO announced that a cable had been received from UNDP, just before this meeting indicating that it had been decided not to extend the project.

59. The UNDP representative stated that UNDP had been reluctant to agree to the present project in the first place, the objectives of which had been greatly reduced by non-participation of certain countries in the region. Further, none of the BOBC member countries had requested the extension of the project in the next UNDP programming cycle (1987-1991), while over 500 other regional project proposals had been received from central planning authorities, suggesting low priority with recipient countries. The project had therefore not been included by UNDP in a shortlist, circulated in August 1985. Though the evaluation report had made recommendations for extension, they were felt to be not strong enough considering the shortcomings and limitations in the present project. Some activities considered essential could be pursued in another context, for example a proposed regional tuna fisheries project. The UNDP representative indicated that UNDP might reconsider its decision if the countries would clearly demonstrate the need for a continuation of this type of project. In this case UNDP would need to receive communications to this effect from the respective national planning authorities as soon as possible.

60. After a short discussion about the financial history of the project wherein it was agreed that it had indeed been difficult for the participating countries to make firm commitments in their budgets before 1985, because of the late appraisal of the project document, the delegates were invited to present their views.

61. In discussing the evaluation report Malaysia and Sri Lanka made the following comments :

– The summary of the evaluation report did not reflect its contents and contained errors of fact, wrong generalisations and sweeping statements based on insufficient information.

– The report did not specify problems experienced by the project and did not reflect the priority accorded to the project by the various governments.

– The mission should have spent more time in the field and facts should have been checked before presenting its report.

– The statement that government commitment was lacking had not been substantiated. Malaysia for example in 1986 had provided some US $500,000 for continued resource assessment studies in coastal areas and there was an allocation of about US $4 million for the next 5 years which should guarantee continued data collection.

– The success or failure of BOBFINS had been made a major issue by the mission, despite the fact that this programme had barely been finalized and introduced.

The project was basically designed to strengthen, organize and standardize data collection for a regional approach. This assistance should be continued but the project should be reformulated, with emphasis on training, interaction between scientists and policy makers, and the development of computer software for fishery resources assessment.

62. All other member states participating in the project fully agreed with the statements made bv Malaysia and Sri Lanka. They further criticized the limited coverage of member countries and the limited time spent in the field by the mission; some of the meetings arranged in Malaysia and written comments provided by Thailand had been ignored; facts on the actual provision of inputs by each country had not been collected. It was felt that involvement of SARC and ASEAN would demand too much effort by the limited project staff and it was questioned whether the mission had fully realized the implication of this recommendation. It was pointed out that the substance of the report did not justify the conclusions reached, some of which appeared pre-conceived.

63. In view of the comments made, the committee could not endorse the report. All members assigned a very high priority to the work of the project and confirmed full commitment to its successful implementation. This included the introduction of BOBFINS and associated demonstration and training activities. Further support beyond 1986 was essential for exchange of information and experience in the region and UNDP was urged to reconsider its decision and provide this support.

64. India while attending the Tripartite Review as an observer, stated that it did not participate in the current UNDP project for certain reasons quite different from those mentioned in the UNDP/FAO Evaluation Report. However, the position of the Government of India was under review. The final decision of the Government of India would obviously depend on the objectives and areas of activity of the new project, results achieved so far and the outcome of review. If the decision was positive India would like to be associated with the detailed formulation of the project.

65. Donor countries supporting other elements of the Bay of Bengal Programme stressed that knowledge of the resources was a prerequisite for development and the UNDP's decision could affect the future of the entire programme. They assumed that UNDP was aware of the importance of resource assessment in capture fisheries and hoped that it would reconsider its decision.

66. The U.K. noted that the UNDP had been given a wrong impression of the importance of this project, probably due to lack of feedback via national planning institutions, and incorrect assumptions and judgements presented in the report of the evaluation mission. It suggested that the report be edited on the basis of the comments provided by the Committee and FAO, before being distributed officially to member countries. It also stated that the time-frame of stock assessment work was necessarily long and that it was overly optimistic to expect firm results after three to four years.

67. SEAFDEC strongly supported an extension of the project and offered its cooperation in providing training in fishery statistics and socio-economic studies. It also drew attention to the recommendations made at the recent FAO/SEAFDEC Seminar on Planning, Management and Development of Fisheries (IOFC : DM/BB/86/Inf. 6).

68. UNDP indicated that it was aware of the need for stock assessment and resource management. It was important that the time-frame of possible future activities should be clearly defined from the beginning. The participation of India and Burma would also be an important element in UNDP's reconsideration.

69. The Secretariat pointed out that the terms of reference of the mission had been unusual in that it had been required not formulate any recommendations as to the future funding of the project and that mission might have been influenced by this in formulating its recommendations. It was also mentioned that official comments had not yet been made by FAO.

THE FUTURE OF THE BAY OF BENGAL PROGRAMME

90. The Secretariat briefed the Committee on the background of the proposal for the new project "Small-Scale Fisherfolk Communities in the Bay of Bengal". The new project would be funded within the framework of the FAO/Government Cooperative Programme with the donor agencies. FAO was giving a high priority to the new project and hoped that the donor agencies would provide necessary funding for the project. The Committee noted the positive conclusions of the joint SIDA/NORAD/DANIDA appraisal mission which was fielded in September/October 1985.

91. The project proposal was fully endorsed by the Committee. Some member countries stressed that the activities should be oriented towards the identified target group, the poorer segments of the population in the coastal fishing communities. In this context Bangladesh suggested that project activites for rehabilitation of fisherfolk affected by natural calamities should be considered. Bangladesh also stressed the need for an activity to deal with the problems of supplying seed for aquacultural purposes through establishment of a seed bank of culturable species of shrimp and finfish for year-round activites. India suggested implementation of an increased number of mariculture activities under the project.

92. Regarding the proposal for cash contributions to cover local administrative costs, Malaysia suggested that the contributions should instead be used for information services since this is a discipline of common interest to all member countries. This suggestion was endorsed by all countries. India, Sri Lanka and Thailand confirmed agreement in respect of their contributions. Malaysia and Indonesia expected a favourable response from their decision-making authorities. Bangladesh and Maldives also confirmed their commitment to a cash contribution but would have to consult further with concerned authorities regarding the proposed amount.

93. In a joint statement, Denmark, Norway and Sweden expressed their interest in the new project. However, due to limitation of available funds, as well as their opinion that some project activities such as the development of new types of craft and aquacultural activities with limited benefit to the target group could be deleted, the total budget level should be reduced to approximately US $ 8.5 million over a 5-year period. A revised plan of operation which would form the basis for discussion of the possible funding of the project was therefore requested and should be presented to the three donor countries not later than 1 April 1986. This funding should be accommodated within the allocation for the FAO/Government Cooperative Programme by the respective donor countries. It was recommended that an advisory committee including representatives from the donor countries should be part of the project.

94. In continuation of the joint statement, Sweden proposed that in the light of the appraisal mission report, the evaluation which was scheduled to take place during the last year of the current project, would not be required.

95. Further to the joint statement, Norway expressed satisfaction with the Bay of Bengal Programme which was considered useful for the development of the fishery sector in the region and was well in line with Norwegian aid strategies. The Committee was informed that Norway was not able to make a firm commitment in regard to funding together with Denmark and Sweden at this stage and stressed that the project had to be given a high priority by FAO within the frame of the FAO/Government Cooperative Programme with Norway.

96. Denmark also felt that the BOBP played a very useful role in development of the small-scale fisheries in the region. Denmark agreed in principle that it would be desirable for each of the three donor countries to contribute one third of the budget. No firm commitment could be given at this stage. A disbursement plan within the allocations for the FAO/Government Cooperative Programme for the next 5-year period should first be agreed between FAO and Denmark, coordinating the funding with other donor agencies. The final approval of the project proposal by Denmark would be given on that condition.

97. In the light of the reduced funding support from the level originally envisaged and the views expressed in the meeting, some revisions would have to be made in the Plan of Operation. These concerned the inclusion of an Advisory Committee, deletion of research-oriented activities in the fields of Fishing Technology and Coastal Aquaculture and extensive fishing craft development activities under the former. It was also suggested that development support be deleted and that essential activities coming under this module be included under the others and in particular the Extension module.

98. The donor countries suggested in their joint statement that for reasons of cost effectiveness and target group orientation the project should be operated from one main base in Madras. This would not rule out the possibility of outposting staff at other locations if appropriate from an operational point of view. Sri Lanka suggested that the headquarters should be located in Colombo since the preparatory phase of the ongoing project had been located there and due to the advantage

of Sri Lanka's geographical position in relation to the other member countries. Sri Lanka also drew attention to an earlier friendly agreement between Sri Lanka and India in 1982, that the present location of the headquarters be continued up to the termination of the present project. The other member countries of the Committee however, endorsed the proposal of the donor countries.

99. After hearing the views of the other member countries, Sri Lanka accepted the majority decision in the spirit of friendly cooperation. It was also prepared to continue to host outposted staff as referred to by the donor countries. Sri Lanka further suggested that the headquarters of any new similar project beyond the termination of the proposed project in 1991 should be located in Colombo. There was neither support nor objection to the suggestion.

100. The U.K. informed the Committee that the funding of the project for Post Harvest Fish Technology had been approved and that the project would soon materialize. Though bilaterally executed, the project would function under the umbrella of the BOBP. The U.K. was operating several other bilateral projects in the region and hoped to be able to cooperate with BOBP in many of these projects.

Appendix A

LIST OF PARTICIPANTS

Bangladesh

Mr A K Ataur Rahman	Principal Scientific Officer Directorate of Fisheries, Dhaka
Mr Farooq Ahmed	Deputy Chief, Planning Ministry of Fisheries & Livestock, Dhaka

India

Mr B C Sarma	Joint Secretary Ministry of Agriculture, New Delhi
Mr D Sudarsan	Deputy Commissioner (Fisheries) Ministry of Agriculture, New Delhi
Mr Ashim Barman	Director of Fisheries Government of West Bengal, Calcutta

Ma/a ysia

Mr Sharom A Majid	Deputy Director General Department of Fisheries Ministry of Agriculture, Kuala Lumpur
Mr Zuridah Osman Merican	Senior Fisheries Officer Department of Fisheries Ministry of Agriculture, Kuala Lumpur

Sri Lanka

Mr Aloy W Fenando	Additional Secretary Ministry of Fisheries, Colombo
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Appendix B

PROGRESS REPORT – 1985

by Lafs O Engvall, Programme Director

Introduction

1. The SIDA-funded project "Development of Small-Scale Fisheries in the Bay of Bengal" (GCP/RAS/040/SWE) commenced in 1979. The first phase of the project had a duration of five years and ended in 1983. An impact review was undertaken in 1984 which recommended an extension of the project. A three-year extension was subsequently granted by SIDA for the years 1984-86 as a final phase of the project. The total budget for the entire eight-year period is about US $ 9.3 million.

2. The objective of the project is to develop, test and demonstrate ways and means, i.e. methodologies and technologies, by which the living conditions of small-scale fisherfolk can be improved.

3. The project constitutes one, but by far the largest, component of the Bay of Bengal Prograrnme (BOBP) for fisheries development. The other component is the UNDP-funded project "Marine Fishery Resources Management in the Bay of Bengal" (RAS/81/051). It has a duration of four years (1983-86) and a budget of US $ 740,000. Management, administration and information services are shared between the projects on a *pro rata* basis. The headquarters of the BOBP is located in Madras while the UNDP project and technical modules of the SIDA project work out of Colombo.

4. The work of the project is monitored by an Advisory Committee composed of the co-operating agencies in Sri Lanka, India, Bangladesh, Thailand and Malaysia; plus SIDA and FAO. The Committee meets yearly by rotation in the participating countries. From 1985 the Committee meetings are held concurrently with sessions of the IOFC Committee for Development and Management of Fisheries in the Bay of Bengal (BOBC) which is the intergovernmental FAO body for fisheries in the region. It was established in 1981.

5. After termination of the project it is envisaged that a new small-scale fisheries project will commence from 1987 to continue some of the ongoing work and tackle other problems and opportunities. A proposal to this effect is under active consideration by the Scandinavian development agencies of Denmark, Norway and Sweden. This fact has influenced the implementation of the work during 1985 as well as the planning for 1986.

6. The report that follows summarizes and comments on the major activities undertaken in 1985. The intention is not to produce a full account of project work but rather to highlight the major achievements, problems and issues so as to facilitate discussion in the 10th 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. The report also contains a section on the proposed work programme for 1986.

7. The scope of the work has as usual been guided by the report of the latest meeting (9th) of Advisory Committee. There have been only a couple of minor changes to the work programme endorsed in the 9th meeting. They are mentioned below under Fishing Technology and Extension.

Project Inputs

8. Early in the year, at the time of planning for the 1985 work programme, it was estimated that about US $2 million were available for the last two years (1985-86) of operation. The programme proposed to the 9th Advisory Committee meeting was costed at $ 1.5 million, leaving $ 0.5 million for phasing out during 1986 or bridging over into a new project. There were at that time indications that some funds for a new project might be forthcoming during 1986. But after the 9th meeting it became more probable that new funds would not be available until 1987. The programme was therefore somewhat curtailed and the final budget for 1985 amounted to $ 1.35 million leaving a little more comfortable balance for 1986.

9. The actual expenditures during 1985 are estimated at $ 1.33 million (final accounts will be available in March 1986 only). A breakdown of the expenditures against the budget as per FAO accounting codes is given in Table 1.

10. The distribution of actual expenditures by major subject matter are : Coastal Aquaculture 32%, Fishing Technology 32%, Extension 20%, Development Support 7% and Information Service 9%.

11. The core staff of the project was reduced by two posts i.e. Fishing Craft Engineer and Sociologist. Details of the staffing are given in Table 2. Valuable inputs have been provided through associate professional officers (APOs) from Belgium, Netherlands, Norway and Sweden. The net increase during the year is two posts – Aquaculturist and Economist. At the end of the year there are eight posts filled (Table 2).

12. The input for training has produced about 820 man-weeks i.e. 16 man-years of training. It includes all consultations, seminars, workshops, training courses and study tours. Details are found in Table 3. Besides these organized training exercises, the in-service or on-the-job training is very substantial at all levels in all of the activities.

13. The counterpart inputs to the various activities mainly consist of staff plus the office facilities in Madras and Colombo. They continued to be satisfactory except in one or two of the activities.

Project Activities

General

14. The major activities of the project are discussed under four major headings i.e. Coastal Aquaculture, Fishing Technology, Extension and Development Support. Common work including the Information Service is outlined in this section.

15. The Advisory Committee meeting was held in Bangkok 25-26 February, 1985, together with the 3rd session of the BOBC. All participating countries plus SIDA and FAO were as usual represented. The other two members of the BOBC, Indonesia and the Maldives, participated as observers. Other observers were UNDP, ESCAP, Netherlands, Norway, DANIDA, ODA (UK) and SEAFDEC. The report of the meeting has been published as BOBP/REP/22.

16. An outline proposal for a new small-scale fisheries project to succeed the present one was endorsed by the BOBC. FAO undertook to prepare a project request for submission to the potential donors. The project participated in the preparation of the request, together with FAO Headquarters and the FAO Regional Office (RAPA). The outcome was a project entitled "Small-Scale Fisherfolk Communities in the Bay of Bengal" with a duration of 4.5 years from mid-1986 at a cost of a little over US $11 million. The potential donors DANIDA, Norway and SIDA, on receipt of the request, decided to appraise the proposal by fielding a mission in the project area. The mission visited most of the countries in September/October and the project provided briefing material and other assistance throughout the mission. The report of the mission endorses the proposal and recommends joint funding of the project by the three agencies concerned. The report also contains specific recommendations that may warrant adjustments in the draft project document.

17. Thirteen technical reports, four newsletter issues, eight video films, one audio-visual, a few photo exhibitions and displays, some press/TV/film coverage – these summarize the output of the Information Service during the year. Table 4 lists the year's publications. Noteworthy are two papers on non-formal education, which are the first of a new series of "manuals and guides". Another distinctive paper is a report prepared jointly with NSBF (National Swedish Board of Fisheries) on the social feasibility of coastal aquaculture. 1985 was a fairly prolific year for reports, but many more have piled up, and a big rush of manuscripts for editing and printing is inevitable in 1986.

18. The Newsletter, Bay of Bengal News, completed its fifth year of uninterrupted publication. It continues to be a useful tool of dissemination, project reporting and debate. Technical staff have been more and more active in contributing to the Newsletter; one would like to see more inputs into the Newsletter from fisheries officers and scientists of the region. Demand for the Newsletter and for the Reports far outstrips the supply.

19. During the year the project made its debut with video productions. Four promotional video films on project activities (beachcraft, Killai, non-formal education, fisherwomen's extension) were completed, while four training films on engine maintenance were partially completed. How do video films compare with audio-visuals (AVs) in quality and cost? (BOBP has made eight AVs so far). Video images perhaps lack the colour richness and depth of AVs; video productions are more

expensive too, because an AV can be made at low cost from a good readymade slide collection. However, the continuous-image effect of a video gives it a verisimilitude that's missing in AVs. Further, video is a convenient promotional tool for global dissemination : a video tape is easy to duplicate, carry and send anywhere. But how far is video appropriate as a training tool in poor fishing villages of the region? Such questions remain, as BOBP has just begun exploring the video medium. The project now has the equipment, some experience to go by, and a trained hand. Some interesting answers may emerge from future experiences.

20. In the area of publicity, BOBP put up a stall in the Scantech Expo held in Bangkok early in the year; it also took part in the annual tourist trade fair organized by the Tamil Nadu Government in Madras. An Italian television venture on FAO projects made on the occasion of World Food Day gave the BOBP's work good play. As for the print media, several magazines featured BOBP work : Fishing News International, World Fishing, *Marine Policy, Ceres, Development* Forum, *Appropriate Technology, Asian Agribusiness, Fishing Chimes.* Several Swedish journals carried articles and sketches by artist-cum-sail specialist Signar Bengtson. And *Bay of Bengal* News stories continue to be picked up by the regional press.

21. The project played host to a wide range of visitors during the year; They represented expert missions, governments, embassies, FAO and UN projects, NGOs, newspapers, fisheries firms, educational institutions... The time spent on visitor briefing is substantial.

Coastal Aquaculture

22. The work programme as it emerged from the 9th Advisory Committee Meeting has been followed very closely: only a couple of minor delays have occurred in implementing the activities. Two matters of *ad hoc* nature outside the work programme were attended to. An inventory of brackishwater culture activities in Orissa was undertaken without cost to the project. It was done by a young Swedish aquaculturist under a SIDA-sponsored fellowship for Minor Field Studies (MFS). A report will be published. Another minor engagement was assistance to a SIDA-sponsored IRD project in Matara district, Sri Lanka, to identify potential for brackishwater culture. Noteworthy during the year was the great interest in the report of the Consultation on Social Feasibility of Coastal Aquaculture held late in the previous year (BOBP/MIS/2 and *Bay of Bengal News No 17).*

The aquaculture post was vacant for the larger part of the year after the sudden departure of the previous incumbent. A new officer is scheduled to join early 1986. The Project Manager, associate professional officers and Socio-Economist have provided the necessary staff input. The Socio-Economist has been responsible for pen culture introduction in Killai since this project is now testing commercial viability rather than technical feasibility.

23. Satkhira Aquaculture Project (BGD/SAP) : To demonstrate intensive shrimp culture techniques in excavated ponds for increased productivity and to determine important socio-economic parameters for introduction and expansion of intensive shrimp culture.

A pond farm complex of about 10 ha, divided into 11 ponds, and a 3 ha aqua-agro field plus a lab building were established in 1982. The first two culture cycles (1983-84) of shrimp and fish produced unsatisfactory production results. It is learnt though that, despite the low production, farmers in the area benefited in quantitative and qualitative terms by adopting the improved culture techniques.

In 1985 production of commercial shrimp species, mainly *P. monodon,* improved five-fold over the two previous years. But the average yield is still very low, i.e. 147 kg/ha. The maximum yield in one pond was 234 kg/ha. The survival rate is estimated at 21%. Supplementary feed as available was provided on a fairly regular basis until May but became scanty thereafter. Most of the feed was composed of rice bran and fish meal in about equal quantities together with wheat flour as binding material. The total production of finfish was 2000 kg and that of metapenaeid shrimps *1650* kg.

The polyculture of shrimp and fish with salt-resistant paddy could not be confirmed because of unusually high salinity. The rainfall in August/September was less than normal and the salinity remained at 4-6 ppt. Some of the paddy was badly affected. The culture of common carp and grass carp was cancelled because of the high salinity.

During the dry-out season (December/January) two new main sluice gates were installed, which were expected to solve the siltation problem. The amount of silt deposited in the feeder canal was also less this year but is still considerable. It had to be removed towards the end of the year before emptying the pond complex for drying and pond preparation. An office building with a meeting room has been constructed. All electric wiring has been completed but power is not on yet because of bureaucratic delays.

All the goats reared under project auspices have been sold, and the goat-rearing trials discontinued, because of disease attack.

A training programme on shrimp culture was organised for scientific officers and private shrimp farmers. The first session was held in July and covered water management, pest control/removal and harvesting techniques and some general aspects of farm management. The second course was conducted in December and dealt with site selection criteria, design of farm complexes, soil qualities, field identification and procedures of culture species, seed collection, segregation and transport, nursery rearing and pond preparation. The third and final session of the training programme is scheduled for April 1986. It will deal primarily with feeding and general management practices.

After termination of the 1985 culture cycle the pond complex was emptied of water. Silt was removed, ponds dried, limed and tilled and prepared with manure for the 1986 season. An additional experiment in preparation for the next season was nursing of P. monodon post larvae. Whether they can survive and grow during the low salinity period is of particular interest because post larvae at that time of the year cost only about one-third of what they do in February, the peak of the stocking season.

By mid-1985 a socio-economic study report was completed by a Bangladesh consultant group. The study, based on a 10% sample of all rural households in a radius of 2 miles around the demonstration farm, was to identify whether and how small-scale fisherfolk/farmers benefit from shrimp farming, and in particular from the new intensive culture techniques. In spite of its methodological shortcomings the report shows a strong trend towards the emergence of large shrimp farms and a concentration of profits among a few farmers, whereas the incomes of small-scale fishermen/farmers have not even increased in absolute terms. Incomes of small holders leasing out their paddy lands to large shrimp farmers have even dropped, as the land lease is lower than the profit from a good paddy crop, and the labour needs for large shrimp farms'are too low to employ all who have leased their land.

The general status of the project is that it has provided some useful input to shrimp culture in the area, but the production rate is still low and does not suggest that excavated ponds are a viable alternative to traditional culture practices. There are also strong doubts about the usefulness of intensive shrimp culture in terms of benefits to small-scale farmers.

24. Pen culture introduction *in Killai* (PCI) : To investigate the commercial viability of pen culture of shrimp with the participation of fishing families.

The activity was preceded by a technical phase during 1982-84. During that period the technical feasibility of pen culture was investigated. Although production varied in pens of different sizes over a total area of about 2 ha, it was concluded that the technology was feasible for commercial shrimp production. A set of guidelines for size of pen, mode of erection, material, mesh size, etc. was evolved during the technical work. Investigations were also conducted on how best to utilize the results for the benefit of the local community. It was concluded that the fisherfolk would probably not be able to absorb and supply the technology without demonstration training and direct assistance.

Eight local fishermen were selected to farm small pens with BOBP technical supervision and assistance. New pens, 0.25 ha each, were constructed, and one culture cycle in five pens was completed during the year. The harvest yielded 490-660 kg/ha of P. *indicus.* The culture period was 60-90 days from July till October. About 90 days is the maximum duration of a culture cycle, since stocking depends on the seasonal availability of seeds and the harvest has to be completed before the onset of the northeast monsoon, with heavy rains lowering salinity. The stocking size of the seeds was fairly large. It varied from 1.7 to 5 gr. and the yield variation was related closely to the size of seed. During the trial it has become clear that culture that relies on wild seed can

be performed only in two cycles per year, the other period being February-May. But with the yields experienced during the first cycle extrapolated for one year, the culture would be economically viable. A detailed costs and earnings model has been established, and the annual breakeven production is about 1000 kg/ha of P. *indicus* for two harvests.

It may be possible to manage three culture cycles in one year if seeds can be obtained from hatcheries. To test the survival of P. monodon during the monsoon period, a batch of seed was obtained from a privately owned hatchery near Madras. The initial survival during transport was satisfactory; survival during rearing, however, was rather low. It would also not be feasible for each farmer to rear to seeds. For small-scale farmers, government organisations would have to provide nursing facilities and supply the seed to them. Such a practice was started at the end of the year on a trial basis, utilizing a pond complex in the backwaters near the project site at Killai.

Before culture trials were started, a household survey was conducted in the two local communities in Killai. The purpose, apart from collecting baseline data, was to meet with the local population, brief them about the purpose of the project and select fishermen to participate in the trials. It was not easy to get eight fishermen families to participate in the work. Engaging fisherwomen was infeasible too – such work is by tradition done by fishermen alone. The selected fishermen dragged their feet for some time before joining the project. They eventually took part in all steps of pen erection. Difficulties were encountered here since the fishermen were not used to regular working hours. Family meetings were also arranged in which the purpose of pen culture and its potential benefits were explained. After practical training on-the-job the fishermen were also given theoretical training in pen culture management through lessons over a two month period two hours per day.

The fishermen also engaged in seed collection from mid-May. At that time however no small seeds were available. Later on, larger seeds of about two g size had to be collected through cast nets. During the nursing of the seeds in happas, an alarming incident occurred. Just before stocking of the seeds in the pens, a very high mortality was suddenly discovered. Seed samples were sent for chemical analysis and they were found poisoned. Who was responsible for this mischief has not been clarified.

During the rearing period, the shrimp were given supplementary feed in the form of pellets made out of squid and trash fish. The raw material was obtained from trawler landing centres around 30 km south of Killai, and the pellets were manufactured by fishermen at the site. It is estimated that the cost of the feed produced is in the order of 2.50 Rs/kg. The availability of raw material and the manufacturing and storage capacity might be a limiting factor for future expansion. Commercial feed is available from one supplier in India but its cost, Rs. 4.50 Rs/kg, would sharply raise the operational cost and jeopardize its economic viability. This matter needs further investigation. An article on Killai is being published in Bay of *Bengal News No. 21.*

25. Polekurru Aquaculture Project (AAP/IND) : To demonstrate suitable designs of ponds and water management practices for shrimp and fish culture to guide government support schemes for expansion of small-scale brackishwater farming.

A five ha farm of five ponds was established in 1983. The ponds have different configurations : four ponds are tide-fed and one is pump-fed. One more pump-fed pond was added in 1984.The complex also includes a multipurpose building for lab-cum-office use, shrimp and fish sorting, night halting, storage, etc. The production of shrimp (P. *monodon* and *P. indicus)* in the tide-fed ponds varied during two crops between 240530 kg/year. In the pump-fed ponds the production rate was 153-256 kg/crop (in four months).

Production from the early 1985 harvest confirmed the pattern of the previous trials. The pump-fed ponds have produced a crop of about 300 kg/ ha. The tide-fed ponds showed different results. Two of the ponds in which heavy siltation occurred and where the water circulation has been poor produced only about 100 kg/ha; a U-shaped pond with two sluice gates produced about 300 kg/ha in one crop.

Two training programmes were conducted. A group of 10 fishermen who had been selected as beneficiaries under a DRDA pond project were given a 10-day training course at the farm; the fishermen fertilized one pond, harvested another pond, collected seed and learned management practices. The outer training programme was designed for 10 scientific officers and private entrepreneurs; this course was conducted during a seven-day period.

An assessment of the economic viability and social feasibility of shrimp pond culture was undertaken in September. The report of this study is not yet complete and the finding will be incorporated in a final report on shrimp culture potential on the east coast of India. This assessment will also include results of other work by other national and international agencies in the four east coast states. Some preliminary conclusions from Polekurru are that prior to an expansion of shrimp pond culture, the problem of seed and feed supply has to be solved. There are strong indications that earnings from a one ha pond unit would not suffice for a family if it is the only source of income. Either a larger area has to be allocated to the farmer or pond farming has to be considered a supplementary activity for capture fishermen/women.

Regarding the technical characteristics of the ponds, it seems that the most feasible solution is pump-fed ponds through which adequate water exchange can be ensured. A draft technical report of the farm complex and the culture trials has been completed and will be issued shortly as a working paper.

26. *Development and Management of Cockle Culture* (DMC/MAL) : To determine the life history of cockles (maturity, spawning, spatfall, growth, age, etc.) and the economics of the cockle industry to facilitate improved management measures.

A work programme was prepared in August 1984, and a "cockle team" was formed at the Fishery Research Institute (IPP) in Penang to carry out the work with assistance from project consultants. Field studies started in October 1984.

During January-March experiments were carried out with induced spawning. Out of eleven attempts three were successful. Very high mortality was experienced in the first two batches, probably due to poor water quality. The third batch was more longlived and led to spatfall after about a month. The spats were reared for about another month but then died due to a breakdown in the production of zoo plankton feed. It was concluded that further trials would not be meaningful unless the quality of water supplied was improved. There was also no necessity to undertake further trials since the required information was provided by the university (USM) which also undertook successful spawning exercises. They have now reared the cockles to an age of nearly one year.

The maturity and spawning pattern was determined by measuring the condition indices of cockle samples collected from different culture sites. The samples were collected over a full year's period and a fairly clear spawning pattern emerged.

The spatfall areas were mapped during regular field studies. They are usually recorded when the spats reach the size of about 5 mm. The field observations have added to the information but there is still no clear pattern of why the spats settle in particular areas, which often vary from one year to another. Further studies are required but it is believed very difficult to obtain a correlation between the culture areas and natural beds and the spatfalls.

One of the most interesting and revealing studies was the length frequency analysis of cockle samples from five different culture sites. The length frequencies have been analysed by using modern population dynamic models (ELEFAN). The result clearly shows that the maximum yield per recruit is achieved by harvesting the cockles when they are slightly over one year old. The picture is almost identical for the different sites independent of growth and mortality factors. The analysis was carried out by the leader of the cockle team during a visit to ICLARM. Manila, under a fellowship.

A consultant was also engaged to examine the age and growth pattern of cockles by studying the cockle shells. The growth can be derived from the daily or semi-daily tide pattern. It is relatively easy to determine the growth during the latest 6-12 months while the growth of all cockle during their earlier life is difficult to work out. For instance, extreme stress situations such as lack of water for a couple of days during transport, are easily distinguished. Slow and fast growth can also be identified relatively easily. All this can be done by expert scrutiny but a lot of practice is required to acquire the ability to interpret the growth pattern to a satisfactory degree of accuracy. The feasibility of the method is therefore not yet established.

The Department of Fisheries has collected data on production and prices during the year and has made a preliminary analysis of these, together with recent historic data. The study brings the available information up-to-date and offers explanations about production and price variations. The study is, however, hampered by the uncertainty about the accuracy of statistics and the export of both spats and adult cockles tc Thailand about which not enough is known in quantitative terms. Further economic and socio-economic studies are planned for 1986.

An article on cockle culture in Malaysia was published in Bay *of Bengal News No. 18.*

27. Shrimp hatchery & Pen Culture (SHP/SRL) : To demonstrate simple hatchery and pen culture techniques for small-scale operations.

A reconstruction of the brackishwater fishery station at Pitipana for hatchery activities was completed in 1984. Hatchery work was also started and a production of 300,000 post larvae of P. *indicus* and P. merguiensis was attained. A-.2 ha pen was erected near the station and nursing of seeds collected in the lagoon was started.

During the fitst quarter of the year about 500,000 PL-5 were produced. Thereafter there was a steady production of about 70,000 PL-5 per month. The staff of the brackishwater station collected the spawners themselves – this ensured good quality. Improved nursery rearing of the post larvae up to PL-30 was also demonstrated. The dried feed for P. monodon formulated by the consultant the previous year and tested on laboratory scale proved to be successful on a larger scale. During the second half of the year the production of post larvae became erratic, mainly because of changes in staff at the station. An effort was made to sell post larvae to private farmers : small quantities were sold. It is interesting to note that one of the larger private companies with their own hatchery showed interest in purchasing post larvae from the station. The work to date has adequately demonstrated the technology, and scientists have been trained to produce post larvae on a regular basis. The major problem for future use of the station is the water supply. The water is now supplied by truck. For large-scale production the hatchery is not suitable but may serve as a training and demonstration unit.

The culture of shrimp in the pen erected near the station has shown mixed results. One harvest was good, 63 kg in a .2 ha pen. The results, however, are not conclusive since other trials failed nearly completely. It was concluded that the site might not be suitable for commercial production and the trials were discontinued. Instead two other pens were set up on an experimental basis. One is in the Koggala lagoon south of Galle which was stocked with seeds of M. *rosenbergi.* Trials are in progress but early observations are not very encouraging. The second pen has been put up in the Puttalam lagoon for *P. monodon* culture. This is being done in cooperation with a private farmer. Stocking took place late in the year and no results are as yet available. The pen culture trials have perhaps been too ad hoc in nature, and a more consistent effort of demonstration and training is probably required for success. An interesting note with regard to pen material is that webbing made of HDPE with 10 mm mesh and .5 mm twine has been obtained from a local manufacturer in Sri Lanka. This is of interest also for pen culture in India where such material is not available at present.

The hatchery work is being terminated early 1986, while pen culture trials in Koggala and Puttalam will continue.until the first harvest – which will then determine future activities.

28. Aquaculture Demonstration (ACD/THA) : To demonstrate aquaculture techniques to increase incomes and promote measures for improved living standards of small-scale fisherfolk.

This activity has been in operation since 1979 and has led to large-scale expansion of cage culture for seabass and grouper. There are some 3,000 cages in all provinces along the west coast of Thailand. Cockle culture on a significant scale has also been taken up in Phang Nga Province. Limited success in a few villages has been achieved in the culture of oyster and green mussel. The project has also provided jetties, water tanks, community halls and walkways in a few selected villages. Finally, women have been trained in the processing of fishery products, as also in health/hygiene, nutrition and family planning.

The work during 1985 continued along the same pattern as in previous years with demonstration of culture techniques. Emphasis was given to the provinces of Phuket and Ranong where the work was started only in 1984. The support from BOBP was terminated in September. Noteworthy activities and progress during the year are :

- The Ministry of Agriculture and the Provincial Government have extended further credit for both cage and mussel culture.
- An interesting experiment in fattening (of grouper) was concluded in two villages of Phang Nga during a period of five months. Fingerlings of 200-300 g grew about 100 g per month before harvest : this amply demonstrated the benefit of intensive feeding. In one case there was a net return of Bht 45,000 after obtaining a revenue of Bht 75,000. Costs of fingerlings and feed were each about Bht 15,000. The results from the other village were similar.

- Particular attention has also been given to nursing practices and to informing the fish farmers about diseases and other hazards in nursery rearing. Two nursery farmers who started their work during the previous reporting period have done very well and achieved about 60% survival against the usual survival of 20% and less.
- Five officials connected with this activity and with extension activities in general conducted a study tour of BOBP extension activities in Bangladesh, India and Sri Lanka to observe different approaches.

Before the end of the year a mission composed of staff of Thailand Department of Fisheries and the BOBP, with assistance from the FAO Regional Fishery Officer, undertook an impact assessment of the work done. This assessment will be included in the final report of the project. In brief, the conclusions are that cage culture demonstrations have fully met the objectives of the project and have had a very significant impact on income, income distribution, fish production and foreign exchange. Cockle culture has also had an impact, but the primary beneficiaries have not been small-scale operators. The demonstration of oyster and mussel culture has not yet led to any significant impact, although good results have been achieved in a few cases and may still lead to impact in the future. The establishment of infrastructure facilities although locally useful have not had any large-scale impact; initiatives and funds for replication of this approach in other places have not yet emerged.

Fishing Technology

29. This subject covers both Fishing Gear and Methods and Fishing Craft Technology. At the 9th AC meeting, it was suggested that work in these two areas could be described under the common heading of Fishing Technology. In earlier years they were covered under separate headings.

Two activities included in the work programme were not taken up for lack of capacity. They are Artificial Reefs and Improved Fishing Technology. The latter was intended for West Bengal and a study to identify a suitable activity suggested motorization of country craft. This activity can be taken up in the next phase of BOBP. Very little progress was achieved in the two activities concerned with Line and Net Haulers and Motorization of Vallams in Tamil Nadu.

Ad hoc assistance has been provided to CIFNET (the Central Institute of Fisheries Nautical and Engineering Training) in India on trawl gear handling and deck lay-out of small trawlers in connection with a FAO TCP project for construction of ferro-cement boats.

Similar advice has been provided to the Abu Dhabi project in Sri Lanka. The BOBP-designed gantry with net drum, three-drum winch and high opening trawls were adapted and satisfactorily tested during commercial fishing trials. Thirdly, assistance was given to NARA (the National Aquatic Resources Agency) in Sri Lanka on establishing procedures for testing fishing boats. Demonstration trials and staff training were conducted.

The international staff engaged in the various activities during the year have been the Fishing Technologist, the Fishing Craft Engineer (till June) and four associate professional officers. The Socio-Economist has been responsible for the performance of beachlanding craft in India.

30. *Beachlanding Craft* (BLC) : To develop and demonstrate beachlanding craft in India and Sri Lanka as an alternative to the Kattumarams and other local craft to enable coastal fishing communities to increase their productivity and harvest unexploited resources.

About a dozen prototypes of different design, size and material have been built and tested since 1979. The crucial problem in motorization is the engine installation, for which a satisfactory solution has been worked out. At the end of 1984 three feasible solutions, all in FRP, had emerged : two for India (IND 20 and IND 25) and one for Sri Lanka (SRL 14). A beach-hauling winch was developed, tested and put into regular use. Monitoring of craft performance to investigate their commercial viability was started in 1984. The Government has sanctioned a scheme for introducing 90 beachlanding craft on the east coast of India. Under the existing 5-year plan it is intended to introduce a total of 500 BLC.

Highlights of progress during the reporting year are improved performance by beachlanding craft in Andhra Pradesh, and expansion of craft construction in Andhra Pradesh and Orissa. Monitoring of craft performance shows that four boats of the eight operating in Andhra Pradesh and Orissa have recorded earnings above the breakeven point. This is after considering all costs including

those of capital, and without taking subsidies into account. Lower earnings of two other craft are attributed to bureaucratic snags in settling a suitable crew share system, and of one other craft to lack of motivation of the crews for long fishing trips. Good results per fishing trip are also reported from a DANIDA-supported project in Tranquebar which operates IND-25. Although the performance picture (regular operation) has to be improved, there is certainly scope for the craft from the fish resources point of view. The improved performance of BLC is due to the additional experience gained by the fishermen, also due to better supply of gear as to type and quantity. Engine maintenance and repair have also improved. While the project has spurred these improvements, the interest and initiative shown by the fishermen and local fishery administrations have also been responsible. Three workshops have been organised in Madras in which all extension workers and administrators concerned with Beachlanding Craft have participated. The continuous monitoring of performance and the periodic reviews are considered as essential elements in the successful introduction of the craft.

Another very encouraging sign is the interest shown by the authorities and the boatyards in producing Beachlanding Craft. At the end of the year 32 craft were on order from four different boatyards. The project has assisted the Kakinada boatyard in constructing the first IND-20 and a mould of IND-25 for commercial production. The boatyard in Pondicherry which started production last year is continuing with BOBP assistance, but quality control inspection is conducted by project staff. Until recently, the engine boxes – a complicated construction – were manufactured by one supplier in Madras. Towards the end of the year, training was provided to the boatyard technician of Kakinada and the two yards in Orissa. After some further follow-up assistance and inspection, they should also be self-sufficient in supplying these boxes.

Advice has been given continuously to fishermen and to organisations supporting the boat introduction, on suitable gear to be used by the Beachlanding Craft. Occasional fishing trials have also been undertaken. A very positive experience from offshore fishing was recorded in Gopalpur early in the year, when large quantities of fish were caught in areas not exploited hitherto by the fishermen. Promising results in offshore fishing have also come from Uppada. The use of trolling lines from beachcraft during the long periods of steaming to and from fishing grounds was suggested and introduced. During the last month of the year, one boat in Uppada obtained about 50% of the landed revenue from trolling lines, and the other 50% from the driftnetting. Longlining trials were conducted for a two-month period from Pondicherry, but there the results were very disappointing. At least during that time of the year, the use of longlines would not at all be viable.

As regards the technical development of craft, some minor modifications have been made to the IND-20 which now is emerging as a very appropriate craft for beachlanding, sailing and offshore fishing. The only technical development with beachcraft during the year was use of a 10 hp water cooled engine on an IND-20 craft. The results were positive. Such an engine installation, which also contains a gear box, might be a more economic and long-lasting solution than the air cooled engine in other craft.

The remaining three boats of other types – two IND-21 (wooden craft with polystyrene blocks) and one IND-24 (Aluminium) have been taken out of operation after accidents. Since they are not considered competitive with the IND-20 and IND-25, they have not been repaired.

In Sri Lanka, the SRL-14 with a 15 hp water cooled engine in a pivoting box installation has been operated during the major part of the year. It has been used for large-mesh driftnetting offshore like other motorized boats of the same class in Sri Lanka. During the monsoon the craft operated successfully from an open beach and then demonstrated its surf-crossing ability. The beach winch developed earlier was used for hauling it up on the beach. However, any impact from Beachlanding Craft development is still to be seen in Sri Lanka.

31. Cottage industry Net Making (CIN) : To demonstrate net-braiding by manually operated machines and thus provide a village-level alternative to the braiding of nets with mechanical machines on an industrial scale.

During trials in Bangladesh 1982/83, it was concluded that the manually operated braiding machine can produce good quality nets with skilled operators and good supervision. But commercial operations require management/organisation, capital and market outlets which probably cannot be met by traditional village organisations and call for an entrepreneur.

The machines were transferred to a private entrepreneur early in the year. A technician was trained to operate and maintain the machine by the Bombay manufacturer of the machines. After this training and after installation of machines in Chittagong, the entrepreneur started training women to operate the machines. They acquired the necessary skill in a fairly short time (although not the speed as the machine is heavy to operate) to produce nets of adequate quality for commercial use. But the entrepreneur has had difficulties in retaining these women because of stiff competition from the growing garment industry in Chittagong. At the end of the year, the technician/surpervisor was operating one of the machines himself in six-hour shifts per day, and had achieved the speed necessary for economic production of nets. These results will be evaluated in March 1986.

It may be appropriate to refer to the comments made under this activity in the previous yearly report (BOBP/REP/22, p. 17). It was then stated that "Even if these trials prove to be successful and establish that the hand-operated machines can be economically operated under certain conditions, the prospects of such equipment becoming adaptable on a larger scale is very slim" This is because of competition with automatic machines which offer besides economy the advantages of quality and flexibility.

32. Fish Aggregating Devices (FAD) : To develop and demonstrate low-cost FADs for increased productivity and saving of fuel for small-scale fishing units.

Six types of FAD were developed along the southwest coast of Sri Lanka during 1982/83 with disappointing results poor aggregation and short life. A second batch of three low-cost FADs made of bamboo were deployed in 1983/84; these disappeared quickly, probably because of too weak construction. Another batch of seven low cost FADs of different types (logs, bamboo, drums) were deployed late 1984. These seven FADs deployed south of Colombo lasted 36 to 190 days. The average cost of a complete unit including deployment charges was Rs. 8700 (US $ 330).

The difficulties in monitoring FAD operations were pointed out in the previous progress report. The fishermen may for different reasons supply inaccurate information about the composition and quantity of catch, the location and type of capture. Furthermore, at low levels of aggregation it is difficult to evaluate the benefits of FADs without proper monitoring of fish caught around the FAD and away from the FAD in the same fishing area.

Fishing boats have been observed fishing regularly in the vicinity of the FAD perhaps the best evidence of FADs' usefulness. Fishermen in the area have also expressed satisfaction about the devices during interviews. Further, the fishermen themselves have assisted in constructing the FADs. However, in the opinion of NARA personnel conducting the trials, the community input is negligible in relation to the benefits derived.

The best production results were obtained in December 1984 and April-May 1985. An interesting observation is that the predominant species caught around FADs are dolphin fish and rainbow runners – these are rarely caught in the common fishery. The fishing methods used are pole and line, trolling line and drop line.

Another FAD unit deployed during the South West Monsoon (in August 1985) lasted 60 days before it disappeared, owing to an entanglement with a ship anchor. This particular unit was deployed to observe the behaviour of FADs during the monsoon and their effectiveness in aggregating fish. This objective could not be accomplished because of the FADs' loss.

Evaluation and final reporting will be undertaken early 1986.

33. Set Bagnet (SBN/BGD) : To improve the Set Bagnet fishery in Bangladesh by reducing the cost of gear and increasing productivity.

Early trials demonstrated the use of HDPE instead of nylon as netting material, thereby reducing the cost by 25%. Trials with nets of different design and size during three seasons have demonstrated the higher productivity of larger nets though operational costs are equal.

The 1984185 winter season ended in February. Results of comparative fishing trials during that season show that the catch rate of the experimental unit was 81 kg/haul against 61 kg/haul for the traditional unit.

It is also reported that the interest in the fishing community for larger nets increased during the previous season and was reinforced after the latest trials.

During observations of fishing trials it was felt that the mesh size in the codend of the net was unnecessarily small. It was therefore decided to test different mesh sizes during the 1985/86 fishing season. The season started in October and the team was supplemented by a biologist from the fisheries department who observed the catch composition in the net and measured the length frequency of different smaller species. The trials are still ongoing at the time of preparation of this report. The data will be analysed at the end of February after the fishing season ends. Initial observations, however, indicate that there is hardly any difference in the catch and the catch composition of nets with codends of 30 and 40 mm. A final report is to be prepared early 1986. No. more work will be undertaken under this activity.

34. Motorization of Country Craft (MCC/IND) : To demonstrate motorization of country craft to increase productivity and earnings of fishermen.

This activity consists of two components. The first one is motorization of Vallams in Adirampattinam, Tamil Nadu, India, where a pivoting engine installation was used in a Vallam built for this purpose. While the performance was satisfactory, it was felt that a long-tail type engine installation could be a cheaper solution. A long-tail unit assembled by using the VST engine made in India did not work properly. The second component is motorization of the dinghy near Balasore, Orissa. This activity is supported by NORAD under a bilateral fishery development project in Orissa. Before the end of last year one engine was installed, but it was technically deficient and a modified solution had to be applied.

On the Vallam project there has been very little progress during the year. A long-tail unit manufactured in Japan has been ordered. It was delivered shortly before the end of 1985. Installation and trials are scheduled for early 1986.

Under the Orissa project, three more boats have been motorized. The engine installation includes a reverse reduction gearbox so that the crew can, if and when necessary, stop the boat to prevent nets from getting entangled in the propeller. Fishing trials commenced, but problems arose of misalignment between the engine and the propeller shaft because of the rather flexible construction of the wooden hull. A third type of installation will therefore be tested using a flexible coupling and a thrust bearing. Equipment for this was arranged before the end of the year but the fishermen did not wish to take the boats out fishing during the peak season. The work is scheduled for March 1986. Initial fishing results are encouraging.

Although progress has been slow in both the activities because of technical problems, it is believed that the end result will be of real benefit to traditional fisheries. Concerted efforts will therefore be made to finalize the work during 1986.

35. fishing Boat Development (FBD/SRL) : To develop and demonstrate fuel-efficient alternatives to the standard 28-footers in Sri Lanka, capable of trips longer than one day.

In 1982 an evaluation was made of Sri Lanka's fishing boats. Improvements concerning engine power, propellers, layout and anti-fouling were recommended. One 34 footer with a 22 hp engine (SRL-34) was constructed and operated for over two years with positive results. The construction of a new type of craft, SRL-15, was started.

During the year, SRL-34 has continued to operate from Beruwela. It has been mainly engaged in demonstrating its capability for trips of 2 to 3 days. It has not however, demonstrated full economic viability. It is believed that this is due to

limitations in the size of the icebox

- operation in a very limited area close to Beruwela, rather than migration to the best fishing area according to seasons.
- lack of motiovation and interest on the part of the crew, since the boat is operated on an experimental basis.

Many fishermen have, however, shown interest in the craft. In terms of fuel economy, it has proved superior to the traditional 28-footers without loss of speed. At the end of the reporting period the engine had to be changed since spare parts for the original engine are not easily available in Sri Lanka. A detailed costs and earnings model has been established for the boat for comparison with other successful fishing boats of the 28-footer type.

The SRL-15 was completed in the middle of the year. Technical trials showed its superior fuel economy. However, several modifications to the layout were completed only at the end of the year. The craft is now ready for commercial trials. Efforts have also been made to include this craft in the subsidy schemes of the Ministry of Fisheries. Intensive and systematic demonstrations are planned for both SRL-15 and SRL-34 in cooperation with MINFISH and NARA in 1986.

36. *ORU Replacement* (ORU/SRL) : To develop and demonstrate FRP craft of the outrigger type as alternatives to the large wooden ORUs; new craft of the latter type are not any longer available because of log scarcity for ORU construction.

Two 40 ft ORUs were built in 1981 and tested from Negombo with positive results. Two more of the same type were built 1983184. These were to be issued together with the first two ones under a credit scheme. A fifth ORU of slightly different design was built in 1983, for eventual distribution under the same credit scheme. A 26 ft plywood outrigger canoe built in 1984 was being tested under different conditions.

The issue of the five ORUs under the bank scheme has been very slow, and at the end of the reporting period only two of them had been issued to bona fide fishermen.

The SRL-17 has continued to perform well under various fishing conditions. However, whether it is superior to the existing craft is still an open question. It is not likely to replace the 18 footers because of its inferior beachlanding capabilities. Its advantages are low fuel consumption and good sailing qualities. It might therefore be a suitable alternative to traditional ORUs in the 30 foot class. To investigate this further, the testing will continue in areas where such craft are being operated.

On the whole, the efforts at developing an alternative to the ORU have been disappointingly below expectations. Because of high wood prices, the ORU of wooden construction will one day have to be replaced by craft of other materials. FRP is probably the only solution. But FRP still costs more than wood and it may be a long while before new types of craft can make an impact.

Extension

37. BOBP work on extension includes both technology extension and "general extension" – credits, education and family-oriented acitivities for both income earning and social services. Extension of technology is discussed under the respective technical headings; general extension is dealt with here. Two activities listed in the proposed work programme were not implemented for lack of time and funds (Regional Construction on Extension Services) and for lack of counterpart support (Extension Worker Training in India). Articles by project staff on extension services and credits have appeared in several prestigious publications – *Marine Policy, Journal of Indian Education, Journal of Indian Anthropological Society* and *CERES.* The international staff responsible for the work have been the Extension Training Officer, the Sociologist (till August) and associate professional officers.

38. Fisherwomen Activities (FWA/BGD) : To improve the conditions of fisherfolk by promoting and facilitating higher incomes and savings, and by stimulating interest in education, health sanitation and community co-operation among fisherwomen.

At the end of 1984 about 200 women were organised in groups for income-earning activities. The major income was earned from hand-braiding of large mesh driftnets. A savings scheme had also been started. Several other activities were in progress such as rearing of goats, ducks and chicken; planting of fruit trees; and marketing of fish with the help of small project loans. It was earlier proposed to the Government that women activities and women extension staff should be provided for in the plan of the Fisheries Directorate. These arrangements did not materialize; in agreement with the Bangladesh government, it was decided to phase out BOBP support to this activity in the first half of 1985.

The project effort was therefore devoted to identifying a voluntary agency to continue some of the work started by the project. Eventually Nijera Kori, a voluntary organisation, agreed to continue the work provided funds were made available to it. A revolving fund for credits was left behind by the project to be administered by Nijera Kori. The latter is to report twice a year to the Directorate of Fisheries and to BOBP about utilization of these funds. For operational purposes, NORAD in Bangiadesh will provide funds to Nijera Kori. A final report on this activity is under print.

39. Non-formal Adult Education (NFE/IND) : To develop a non-formal education package for use in education programmes by the Tamil Nadu State Government.

The education package was more or less completed at the end of the previous year. It consists of a trainers' manual, an animators' guide, a literacy primer, a literacy work book, a numeracy primer, an animators' edition of the numeracy primer and supplementary reading material. All the material was printed in Tamil by the State's Directorate of Non-Formal Education.

The Trainers' Manual and the Animators' Guide were first published in English as BOBP publications (BOBP/MAG/1 and BOBP/MAG/2). They have been very well received not only within the region, but also in several countries outside it. Articles on non-formal education appeared in the Bay of *Bengal* News No. 17 and 18.

After completion of the package, efforts have been made to obtain funding support for large-scale field testing of the programme and full-scale implementation in Tamil Nadu. A "dialogue" between education specialists and funding agencies was arranged in Madras in which the material and its development was studied, and its relevance and adaptability to different conditions were discussed. The work done was commended highly by the group. Subsequently DANIDA showed interest in funding follow-up work. A proposal for the follow-up work has been prepared and discussed with the funding agencies and with the concerned State institutions. At the end of the year it seemed that only formalities remained before the project could be implemented.

40. Institutional Credit (COR/IND) : To design and test a marine fisheries lending scheme suitable for artisanal fisherfolk.

The methodology and the initial experience of the scheme have been described in the previous progess report (BOBP/REP/22, page 25). A refinance scheme (NABARD) of Rs. 6.5 million for bank credit to Orissa fisherfolk was launched in 1983. Nine different banks are participating and 27 bank branches are actively involved. During the first year abou? Rs. 2.2 million were disbursed. The rate of repayment was 81 % The loans are used for boats, gear and bicycles (for marketing).

Three more rounds of disbursement have been completed during the year. The total amount issued is Rs. 4.8 million to about 1200 fisherfolk families. The loan repayment rate got even better – to 88%. Fishery extension officers trained earlier by the project help implement the scheme. Regular review meetings are being conducted at district and state levels to monitor the disbursements, the selection of beneficiaries and the repayments. The success of the scheme has aroused considerable interest outside Orissa. The Training College of the Reserve Bank of India (RBI) organised a study tour to observe the scheme; the manager of the State Bank of India in Orissa has also been asked to talk about it at the Training College.

Parallel with the credit scheme, a programme for deposit mobilisation has been initiated. One component of this work is a slide show on savings which has been prepared and distributed to the banks involved. To learn more about the earnings, spending and saving patterns in traditional villages for formulation of strategies, a field survey has been conducted. The fishery extension officers have participated in this work too.

The last disbursement of the credit scheme is scheduled for the first quarter of 1986. The savings campaign may however continue a little longer with project inputs from an associate professional officer.

To make further use of the experience gained during the pilot scheme in Orissa, a two-week training course in fisheries banking is being prepared and organised for bank officers. The emphasis will be on credits for artisanal fisherfolk. The syllabus has been prepared in consultation with the Training College of the RBI. National resource institutions have been identified and approached for preparing course material and for taking part in the training course, which is likely to become a regular feature of the Training College programme. The first course with project support will be conducted in April 1986. During the year the project sponsored a study tour to Bangladesh of 15 bank officers and fisheries officials to study the experience of the Grameen Bank, Bangladesh.

A brief report on the credit scheme is being presented to the 4th Session of the BOBC. The final report is under preparation. Articles have appeared in *Bay of Bengal News No. 13, No. 15, No. 18.*

41. Non-Forma/ Primary Education (EOR/IND) : To develop a suitable non-formal education programme for children in fishing villages.

Preparations for the programme began in 1983, and the first capsules (booklets) of a general learning package were published. Twenty non-formal centres were established in coastal fishing villages. By the end of 1984 another 20 centres had been set up and the first learning package was fully printed. The project provided simple furniture and teaching aids for the centres while the buildings, or sheds in some places, were provided by the local communities.

During 1985, the second learning package concerned with community and family life was completed and printed. Printing costs were met with UNICEF funds channelled through the State Council of Educational Research and Training (SCERT). The third package dealing with marine science and technology was finalized in draft form. The utilization of teaching materials at the non-formal centres has been excellent. In the third quarter an examination was held at the 20 established centres opened in December, 1983. Of the 540 students enrolled, 480 children appeared for the examination of whom 94% passed in Language, 95% in Arithmetic and 98% in Environmental Science. The average marks were very satisfactory and the results compared very well with those in Orissa's formal primary schools. Further details about this are presented in Bay of Bengal News No 20. Encouraging has also been the spontaneous community support to the education centres. Parents have provided gifts to the teachers as gestures of goodwill. The basic salary of the teachers is paid for by the SCERT and the project contributes training allowances.

The fourth training review-cum-seminar for teachers, teacher supervisors and fishery officers was conducted to impart training to the teachers, to review experiences from the use of teaching material, to discuss new components of the material, and to review and rectify the operation of non-formal centres. No serious problems were encountered, but supervision of teachers appears to have got slack, because visits by supervisors were few and far between. There were also some delays in providing funds and in paying teachers. But on the whole, the centres and the educational package have functioned well.

To apply the experiences from this activity, a project proposal has been formulated for full-scale use of the material in all coastal districts of Orissa. The proposal has been submitted to potential donors for consideration. One of the agencies, NORAD, has shown interest in sponsoring it as a supplement to its bilateral fishery project in Orissa.

42. *Fisherwomen Extension Activities* (WOM/AP) : To identify and prepare a pilot project to raise the income of fisherwomen.

A socio-economic survey was carried out in 1984 in four coastal villages of Srikakulam district, Andhra Pradesh. This led to the identification of a pilot scheme for small loans to fisherwomen for fish marketing purposes.

A project proposal has been prepared for organization of women for credits, savings and other group action. The specific purpose would be : (a) to make institutional credit available to fisherwomen (b) to assist the women in establishing repayment disciplines and (c) to build up a group organization as a base for further activity. The proposal emphasizes the need for female extension staff to be engaged in field work. This does not seem possible in the Fisheries Department, but the Women and Child Welfare Department (WWD) will assist in organising the groups. WWD will also provide margin money. The loans will be provided by local banks. The scheme is proposed to be included in a state government project in Srikakulam District. Each loan is limited to Rs. 300 and is covered by the Differential Interest Rates (DIR) scheme of 4% interest. At the end of the year about 150 women had been organised in 20 groups in four villages. Loan applications had been forwarded to the bank.

An article on this activity has been published in the Bay *of Bengal News No. 19.*

Development Support

43. Development Support covers the preparation and promotion of projects for small-scale fisheries development, and specific studies facilitating such development; the main concern has been follow-up of results from BOBP activities. It also includes integrated activities not dealing directly with other BOBP activities. Besides the work described below the project has assisted NORAD to review the fisheries component of its integrated Rural Development Project in Hambantota, Sri Lanka. A study of co-operatives in Tamil Nadu, India, has also been initiated.

Responsible for the work has been the Senior Development Adviser (since May). An associate professional officer has assisted in the work on nutrition.

44. Development *of* Small-Scale Fisheries (MSF/THA) : The preliminary purpose of this activity, still under preparation, is to demonstrate an integrated approach in one province to assist small-scale fisherfolk to improve their living conditions by new income generating activities, better social infrastructure and services and conservation of fishery resources.

The work was started only towards the end of the year at the termination of the Aquaculture Demonstration (ACD/THA) activity. Preliminary surveys have resulted in an outline description of work that could be undertaken. The major features are a fisheries management study, the creation of a fishery community extension services system, credits, demonstration of aquaculture and technology for diversification of small-scale fisheries.

45. Project Preparation and Promotion (PPP) : To prepare and promote projects for small-scale fishery development with emphasis on follow-up of Bay of Bengal Programme activities.

Very little work in this area was undertaken from early 1984 till mid-1985 mainly because there was no Development Adviser. Another reason is that it is only recently that many BOBP activities have led to conclusive results suitable for follow-up projects.

As mentioned under Extension, the fisherwomen activities (FWA/BGD) in Bangladesh have been taken over by a non-government organisation supported by NORAD; DANIDA has expressed interest in non-formal adult education in Tamil Nadu; and NORAD in a primary education programme for fisherfolk children in Orissa.

Another project prepared during the year is a follow-up of the fisherwomen link worker training conducted earlier in Tamil Nadu. This project envisages the training of 900 link workers in 400 villages. The proposal has been submitted to potential donors for consideration.

An attempt has also been made to review the proposal for motorization of Chandi boats in Bangladesh. This proposal was prepared about two years ago for an international funding agency, UNCDF. However, the project never materialized, and efforts are now on to reformulate this proposal and enlist support from other funding agencies. More work on this project is scheduled for early 1986.

46. *Nutrition* (NUT) : To assess the nutritional status of fisherfolk in a few villages,to identify the causes of nutritional defiencies and their magnitude and to suggest activities to overcome them.

A desk review of the nutritional status of marine fisherfolk and of resource institutions in nutrition was completed in 1985. The review revealed that there is no dearth of knowhow on the part of institutions dealing with nutrition but specific information on nutrition among fisherfolk is not available.

In co-operation with FAO Headquarters, village surveys have been undertaken in Tamil Nadu, Andhra Pradesh and Orissa under a Norwegian government sponsored nutrition programme. Two villages in each state have been covered. At the end of reporting period the surveys are being analysed. The results will be presented in the workshop being organised in Madras in March 1986. Experts from India will take part along with fishery and nutrition officers from FAO. Except for staff input from one associate professional officer, this activity has been sponsored by the Norwegian Government programme mentioned above. After this workshop, no further technical input is envisaged from the project.

Work Programme 1986

47. Since the project is scheduled to be terminated at the end of 1986 this is the last year of operation. All activities should therefore be terminated and reported on during this period. Even though some of the ongoing work might be continued in a new project from 1987 and onwards, the intention is to conclude the activities as far as possible and not leave them open-ended. At the same time it is felt that some activities of the new project should be prepared during 1986 so as to make use of the accumulated experience and provide continuity of both national and international staff input in areas where further work is considered essential. These considerations have determined the outline of the proposed work programme, which is summarized in Table 5.

48. Common features in all the disciplines are the winding up of activities, including evaluation and reporting. There is only one activity, Beachlanding Craft, for which continued support beyond 1986 might be crucial. Another common feature is the identification and preparation of activities for a new project.

49. The estimated cost of the work programme is about US $ 1 million. The allocation by subject matter is : Coastal Aquaculture 23%, Fishing Technology 24%, Extension 22%, Development Support 18% and Information Service 13%.

50. SIDA money available for 1986 is about $ 0.7 million. Therefore, in order to implement the proposed programme another $ 0.3 million is required. FAO is trying to mobilize these funds but should they fail the programme would have to be drastically curtailed.

51. There will be no organizational changes in the project during 1986 (unless professional posts have to be terminated for lack of funds). The project's role in BOBP, together with the UNDP-funded project (RAS/81/051) will also continue throughout the year; management, information and administration services are shared on a pro *rata* basis.

Table 1

GCP/RAS/040/SWE Budget and Expenditure – 1985 (in US $1

Code	Object of Expenditure	Expenditure 1976/1984	Budget 1985	Estimated Expenditure 1985	Estimated Balance 31.12.85
10	Personnel Services	3,685,290	557,500	579,900	(22,400)
20	Duty Travel	855,985	120,000	120,000	
30	Contractual Services	894,368	200,000	174,800	25,200
40	General Operating Expenses	510,599	97,500	108,900	(11,400)
50	Supplies & Materials	909,031	90,000	87,000	3,000
60	Equipment	406,177	40,000	25,900	14,100
80	Fellowships, Grants and Contribution	343,786	90,000	76,800	13,200
	Sub-Total	7,605,236	1,195000	1,173,300	21,700
90	Project Servicing Cost	1,019,659	155,350	152,529	-
	Future years				684,370
	Grand Total	8,624,895	1,350,350	1,325,829	706,070

Table 2

GCP/RAS/040/SWE – International Staff : 1985

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	Andreasson, A (Sweden)	05/85	
3.	Sr. Fishing Technologist	Pajot, G (France)	10/83*	
4.	Fishing Craft Engineer	Overa, A (Norway)	09180	06/85
5.	Aquaculturist	Karim, M (Bangladesh)	01 /80	03/85
6.	Sociologist	Patchanee, (Ms) N (Thailand)	08/80	08/85
7.	Socio-Economist	Drewes, (Ms) E (Germany FR)	10/80	
8.	Extension Training Officer	Tietze, U (Germany FR)	10/80	
9.	Information Officer	Madhu, S R (India)	10/79	
10.	Fishing Technologist (Ass. Prof. Officer)	Akerman, S E (Sweden)	01183	04185
11.	Sociologist (Ass. Prof. Officer)	Dorresteijn, H (Netherlands)	11183	11185
12.	Aquaculturist (Ass. Prof. Officer)	Funegaard, P B G (Sweden)	10/85	
13.	Economist (Ass. Prof. Officer)	Gillgren, B C (Sweden)	07/85	
14.	Marine Engineer (Ass. Prof. Officer)	Hemminghyth, P A (Norway)	07/83	
15.	Aquaculturist (Ass. Prof. Officer)	Janssen, J A (Netherlands)	10/83	12/85
16.	Naval Architect (Ass. Prof. Officer)	Johansen, S D (Norway)	08183	
17.	Socio-Economist (Ass. Prof. Officer)	Mammo, T (Sweden)	08/85	
18.	Fishing Technologist (Ass. Prof. Officer)	Nyberg, L (Sweden)	10/85	
19.	Aquaculturist (Ass. Prof. Officer)	Reyntjens, D (Belgium)	08/85	
20.	Socio-Economist (Ass. Prof. Officer)	Tempelman, (Ms) D (Netherlands)	03/84	

S. No.	Post	Name of incumbent (Nationality)	Date of (month/year)	
			Arr.	Dep.
Consultants			Man-months	
1.	Fishing Technologist	Akerman, S E (Sweden)	1.5	
2.	Aquaculturist	Angell, C L (U S A)	2.0	
3.	Fishing Craft Engineer	Gulbrandsen, O (Norway)	1.5	
4.	Naval Architect	Ravikumar, R (India)	1.0	
5.	Biologist	Richardson, C A (U.K.)	1.5	
6.	Masterfisherman	Wood, J (U.K.)	2.0	

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

Table 3

GCP/RAS/040/SWE – Training Activities – 1985

S. No.	Subject	Duration (weeks)	Venue	Number of Participants				
				BGD	IND	MAL	SRL	THA
1.	*Consultations/Seminars/ Workshops*							
1.1	Discussion on the problems of cage culture and disease controls for farmers	0.5	Satul/ Trang/Krabi Phang Nga					165
1.2	Beachlanding Craft Introduction for Asst. Directors 8 Inspectors of Fisheries	0.5	Madras		25			
1.3	Seminar on low cost FADs for fishermen in Panadura	0.5	Sri Lanka				30	
1.4	Discussion on the introduction and performance of BLC in India	0.5	Madras		20			
1.5	Workshop on non-formal primary education centres, training of facilitators Et evaluation of learning material for teachers, supervisors and fishery extension officers	1.0	Puri		81			
1.6	Preparation of loan disbursement and review of loan repayment under BOBP/NABARD Artisanal Marine Fisheries Credit Scheme for bankers and fisheries officers of Orissa	1.5	Orissa		60			
1.7	Regional workshop on non-formal primary education centres, training of facilitators & evaluation of learning material for teachers, supervisors and fishery extension officers	1.5	Orissa		60			
1.8	Preparation of loan disbursement and review of loan repayment under BOBP/NABARD artisanal marine fisheries credit scheme for bankers and fisheries officers	0.5	Orissa		172			
1.9	Workshop to review loan disbursements	0.5	Orissa		57			

S. No.	Subject	Duration (weeks)	Venue	Number of Participants				
				BGD	IND	MAL	SRL	THA
1.10	Dialogue on the relevance & scope of BOBP's non-formal adult education experience in Tamil Nadu	0.5	Madras		27			
1.11	Workshop on evaluation of fisherwomen link workers scheme	0.5	Mahabalipuram		29			
2.	*Training Courses*							
2.1	Technical aspects of shrimp pen culture for fisherfolk from Andhra Pradesh	1.0	Killai		18			
2.2	Shrimp breeding & pen culture for officers of the Ministry, NARA & University	2.0	Negombo				11	
2.3	Shrimp culture at Satkhira shrimp culture demonstration farm for officers of DOF private shrimp farmers and members from CARITAS and DANIDA (first session)	0.5	Satkhira	17				
2.4	Shrimp culture at Satkhira shrimp culture demonstration farm for officers of DOF private shrimp farmers and members from CARITAS and DANIDA (second session)	2.0	Satkhira	17				
2.5	Pond culture for fishermen	1.5	Polekurru		10			
2.6	Pen culture for fishermen	0.5	Negombo					
2.7	Pond culture for scientific officers and private entrepreneurs	1.0	Polekurru		12			
2.8	Theoretical training in technical and economical aspects of shrimp pen-culture for fishermen	4.0	Killai		8			
2.9	Development and management of cockle culture for officers from Fisheries Research Institute	4.0	Manila					
2.10	Operation & maintenance of hand-operated net-making machine	8.0	Bombay		1			
2.11	Repair and maintenance of engines by mechanics from Orissa	1.0	Bangalore		2			

S. No.	Subject	Duration (weeks)	Venue	Number of Participants				
				BGD	IND	MAL	SRL	THA
2.12	BLC handling & engine maintenance for fisheries officers, fishermen and BOBP mechanic	1.0	Srikakulam		6			
2.13	Construction of engine boxes	1.0	Kakinada		6			
2.14	Earning, spending and saving pattern of fisher-folk for surveyors and fisheries extension officers	2.0	Bhubaneswar		4			
2.15	Rural Development for women field supervisors	1.0	Rajshahi	1				
2.16	NFE training programme of Rural Development Seva Centre for trainers of BOBP & RDSC	0.5	Tamil Nadu		13			
2.17	Nutrition, Wickerwork & Hairdressing for women	1.0	Satul/Trang					75
3.	*Study Tours*							
3.1	Observation of fish processing, aquaculture and handicrafts for women	0.5	Trang/ Phang Nga/ Phuket					24
3.2	Observation of non-formal primary education in Tamil Nadu for teacher educators (supervisors of non-formal primary education centres) & fisheries officers of Orissa	1.0	Tamil Nadu		19			
3.3	Observation of BOBP extension methodology	2.5	Bangladesh/ Sri Lanka/ India					4
3.4	Observation of credit operations of Bangladesh Grameen Bank for bankers and fisheries officers of Orissa	1.0	Bangladesh		15			

Table 4

GCP/RAS/040/SWE – Publications – 1985

Reports :

BOBP/REP/21	Income-Earning Activities for Women from Fishing Communities in Sri Lanka. Edeltraud Drewes. Madras, India, September 1985.
BOBP/REP/22	Report of the Ninth Meeting of the Advisory Committee. Bangkok, Thailand, February 25-26 1985. Madras, India, May 1985.

Working Papers :

BOBP/WP/32	Pen Culture of Shrimp in the Backwaters of Killai, Tamil Nadu : A study of Techno-economic and Social Feasibility. Rathindra Nath Roy. Madras, India, January 1985.
BOBP/WP/33	Factors that Influence the Role and Status of Fisherwomen. Karuna Anbarasan. Madras, India, April 1985.
BOBP/WP/34	Pilot Survey of Set Bagnet Fisheries of Bangladesh. Abul Kashem. Madras, India, August 1985.
BOBP/WP/35	Pen Culture of Shrimp in the Backwaters of Killai, Tamil Nadu. M Karim and S Victor Chandra Bose. Madras, India, May 1985.
BOBP/WP/39	The Organization of Fish Marketing in Madras Fishing Harbour. M H Kalavathy. Madras, India, September 1985.
BOBP/WP/40	Promotion of Bottom Set Longlining in Sri Lanka. K T Weerasooriya, S S C Pieris, M Fonseka. Madras, India, August 1985.
BOBP/WP/41	The Demersal Fisheries of Sri Lanka. K Sivasubramaniam and R Maldeniya. Madras, India, December 1985.

Manuals and Guides :

BOBP/MAG/1	Towards Shared Learning : Non-formal Adult Education for Marine Fisher-folk. Trainers' Manual. Madras, India, June 1985.
BOBP/MAG/2	Towards Shared Learning : Non-formal Adult Education for Marine Fisherfolk. Animators' Guide. Madras, India, June 1985.

Information Documents :

BOBP/INF/8	Marine Small-Scale Fisheries of Bangladesh : A General Description. Madras, India, Sepember 1985.

Miscellaneous Papers :

BOBP/MIS/2	Consultation on Social Feasibility of Coastal Aquaculture. Madras, India, 26 November - 1 December 1984. Madras, India, November 1985.

Newsletters *(Bay of Bengal News)*

March 1985, June 1985, September 1985, December 1985.

Table 5

GCP/RAS/040/SWE – Work Programme – 1966

1. Coastal Aquaculture (CAC)	Targets
1.1 General (GEN)	Completion of outstanding (5) reports and working papers - Participation in SIDA-sponsored seminar on technology introduction – Preparation of activities for new (1987) project.
1.2 Satkhira – Aquaculture Project (SAP/BGD)	– Support of culture trials during 1986 season with emphasis on increased yield Training course (3rd) – Social feasibility study – Seed collection study Reporting
1.3 Killai Pen Culture Introduction (PCI/IND)	Support of three culture cycles of P.monodon and two of *P. indicus* – Transfer of responsibilities to the fishermen – Study on feeding and feed preparation – Evaluation of commercial viability – Reporting
1.4 Shrimp Culture Potential (SCP/IND)	– Assessment of brackishwater culture potential on the east coast of India (based on work of BOBP and others) National workshop – Reporting
1.5 Development and Management of Cockle Culture (DMC/MAL)	- Workshop (review of progress) – Socio-economic study Reporting
1.6 Brackishwater Culture (BWC/SRL)	Identification of brackishwater culture possibilities – Pen culture trials in Puttalam and Koggala – Economic model of pen culture – Reporting
2. *fishing Technology* (FIT)	
2.1 General (GEN)	– Evaluation and final reporting on high-opening bottom trawling – Evaluation and reporting of prototype line haulers – Completion of outstanding (4) reports and working papers – Preparation of activities for new (1987) project
2.2 Beachlanding Craft (BLC)	– Training of fishermen in India – Assistance to boatyards for commercial production (India) – Monitoring of commercial fishing operations – Offshore fishing trials in India Trials with water cooled engine (India) Demonstration of SRL-14 (with new engine) – Reporting

2.3 Fish Aggregation Devices (FAD)	Monitoring of existing FADs in Sri Lanka till the monsoon (May) – Evaluation and reporting
2.4 Set Bagnets (SBN/BGD)	Trials with different mesh sizes (till February) Reporting
2.5 Motorization of Country Craft (MCC/IND)	– Monitoring and evaluation of dinghies in Orissa (sponsored by NORAD) – Installation and trials with long tail unit of Vallam, Tamil Nadu – Reporting
2.6 Fishing Boat Development (FBD/SRL)	– Demonstration of SRL-15 (with new engine) and SRL-34 – Trials and evaluation of SRL-17 Reporting
3. Extension (EXT)	
3.1 General (GEN)	– Completion of outstanding (6) reports and working papers Preparation of activities for new (1987) project
3.2 institutional Credit Orissa (COR/IND)	– Final round of disbursements – Concluding seminar (1 week) – Supply of a/v sets and slide shows to banks Preparation and conduct of a 2-week training course for bankers Identification of suitable saving schemes – Initiation of savings campaign – Reporting
3.3 Non-Formal Primary Education (EOR/IND)	– Finalization of the last (3rd) learning package including a workshop (2 weeks) Two training/review seminars for teachers, supervisors and extension officers Reporting
4. Development Support (DEV)	
4.1 General (GEN)	– Preparation of activities for new (1987) project
4.2 Management of small-scale fisheries (MSF/THA)	– Preparation of activities Surveys Training
4.3 Studies (STU)	Fishermen's co-operatives in Tamil Nadu
4.4 Project Preparation and Promotion (PPP)	– Follow-up of pipeline projects – Fishing craft programme in Sri Lanka – Offshore fishing trials in support of BLC introduction in India

Publications of the Bay of Bengal *Programme (BOBP)*

The BOBP brings out SIX types of publications

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

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

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

Miscellaneous Papers (BOBP/MIS/. .) concern work not originated by BOBP staff or consultants but which is relevant to the Programme's objectives.

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

Newsletters (Bay of Bengal News), issued quarterly, contain illustrated articles and features in non technical style on BOBP work and related subjects.

A list of publications follows.

Reports *(BOBP/REP/.)*

1. Report of the First Meeting of the Advisory Committee. Colombo, Sri Lanka, 28-29 October 1976. (Published as Appendix 1 of IOFC/DEV/78/441, FAO, Rome, 19781.
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, 19781.
3. Report of the Third Meeting of the Advisory Committee. Chittagong, Bangladesh, 1 10 November 1978. Colombo, Sri Lanka, 1978. (Reissued Madras, India, September 1980)
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, Indra, 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. Chittagong, Bangladesh, 16-21 June 1980. Volume 1 : Proceedings Madras, India, September 1980.
10.2 Report of the Consultation of Stock Assessment for Small-Scale Fisheries in the Bay of Bengal. Chittagong, Bangladesh, 16-21 June 1980. Volume 2 : Papers. Madras, India, October 1980.
11. Report of the Fifth Meeting of the Advisory Committee. Penang, Malaysia, 4-7 November 1980. Madras, India, January 1981
12. Report of the Training Course for Fish Marketing Personnel of Andhra Pradesh. Hyderabad, India, 11 26 November 1980. Madras, Indra, 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 Development Project" in Phang Nga Province, Thailand. Madras, India, March 1982.
15. Report of the Consultation-cum-Workshop on Development of Activities for Improvement of Coastal Fishing Famrlres Dacca, Bangladesh, October 27 November 6, 1981. Madras, India, May 1982.
16. Report of the Seventh Meeting of the Advisory Committee New Delhr, India, January 17-21, 1983 Madras, India, March 1983
17. Report of Investigations to improve the Kattumaram of India's East Coast. Madras, Indra. July 1984.
18 Motorization of Country Craft, Bangladesh. Madras, Indra. 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. Madras, India, September 1985.

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

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

24. Fisherwomen's Activities in Bangladesh. A Participatory Approach to Development. Patchanee Natpracha (In Preparation).

25. Attempts to Stimulate Development Activities in Fishing Communities of Adirampattinam. India. lln Preparation).

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

Working Papers (BOBP/WP/)

1. Investment Reduction and Increase in Service Life of Kattumaram Logs. R. Balan. Madras, India, February 1980.

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. Madras, India, September 1980.

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

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

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

10. Fishing Trials with High-Opening Bottom Trawls in Tamil Nadu, India G. Pajot, 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.

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

13. Trials of Two-Boat Bottom Trawling in Bangladesh. G. Pajot, J. Crockett. Madras, India, October 1981.

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 Soleh Samsi, Sihar Siregar and Martono of the Directorate General of Fisheries, Jakarta, 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. Madras, India, September 1982.

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. Madras, India, April 1986.

25. Fishing Craft Development in Kerala : Evaluation Report. 0. Gulbrandsen. Madras, India. June 1984.

26. Commercial Evaluation of IND-13 Beachcraft at Uppada, India. R. Ravikumar. Madras, India, June 1984

27. Reducing Fuel Costs of Fishing Boats in Sri Lanka. (In preparation).

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

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

33. Factors that Influence the Role and Status of Fisherwomen. Karuna Anbarasan. Madras, India, April 1985.

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

35. Pen Culture of Shrimp in Backwaters of Killai, Tamil Nadu. M. Karim and S. Victor Chandra Bose. Madras, India, May 1935.

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

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

38. Credit for Fisherfolk : The Adirampattinam Experience. R.S. Anbarasan and Ossie Fernandez. Madras, India, March 1986.

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

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

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

42. Fish Trap Trials in Sri Lanka. (Based on the report of Ted Hammerman). Madras, India, January 1986

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1. Towards Shared Learning : Non-formal Adult Education for Marine Fisherfolk. Trainers' Manual. Madras, India, June 1985.

2. Towards Shared Learning : Non-formal Adult Education for Marine Fisherfolk. Animators' Guide. Madras, India, June 1985.

Miscellaneous Papers (BOBP/MIS/.)

1. Fishermen's Cooperatives in Kerala : A Critique. John Kurien. Madras, India, October 1980.

2. Consultation on Social Feasibility of Coastal Aquaculture. Madras, India, 26 November 1 December 1984. Madras, India, November 1985.

Information Documents (BOBP/INF/.)

1. Women and Rural Development in the Bay of Bengal Region : Information Sources. Madras, India, February 1982.

2. Fish Aggregation Devices : Information Sources. Madras, India, February 1982.

3. Marine Small-Scale Fisheries of India : A General Description. Madras, India, March 1983.

4. Marine Small-Scale Fisheries of Andhra Pradesh : A General Description Madras, India, June 1983.

5. Marine Small-Scale Fisheries of Tamil Nadu : A General Description. Madras, India, December 1983.

6. Marine Small-Scale Fisheries of Sri Lanka : A General Description. Madras, India, November 1984.

7. Marine Small-Scale Fisheries of Orissa : A General Description. Madras, India, December 1984

8. Marine Small-Scale Fisheries of Bangladesh : A General Description. Madras, India, September 1985.

9. Food and Nutrition Status of Small-Scale Fisherfolk in India's East Coast States : A Desk Review and Resource Investigation. V. Bhavani. Madras, India, April 1886.

Newsletters (Bay of Bengal News)

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