

REPORT OF  
THE SEMINAR ON TRAINING REQUIREMENTS

Bangkok, Thailand  
23-24 April 1991

Training Department  
Southeast Asian Fisheries Development Center

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## SEMINAR ON TRAINING REQUIREMENTS

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### INTRODUCTION

1. At the invitation of the Training Department of the Southeast Asian Fisheries Development Center, the Seminar on Training Requirements was convened in Bangkok, Thailand, from 23 to 24 April 1991. The Seminar was attended by the representatives of Member Countries: Japan, Malaysia, the Philippines and Thailand; observers from the Netherlands, as well as from international organizations, namely the Economic and Social Commission for Asia and the Pacific (ESCAP), the FAO Regional Office for Asia and the Pacific (RAPA), and the Network of Aquaculture Centres in Asia-Pacific (NACA). The list of participants appears as Annex 1. The Seminar was chaired by SEAFDEC Secretary-General Dr. Thiraphan Bhukaswan.

2. In his opening address, the Secretary-General asked participants to review and assess the recommendations made by the survey mission, and the returns to the questionnaire on the training requirements of the Member Countries. He informed the meeting that the SEAFDEC Council, at its twenty-third meeting in December 1990, agreed that the Training Department should conduct a study on training requirements through a survey mission, a questionnaire, and a seminar. This is geared towards improving the programs of the Training Department in response to the actual training needs, and promoting cooperation among the region's fishery training institutions. The Agenda, as approved during the Seminar, appears as Annex 2.

3. The Chairman added that the recommendations of this Seminar will be the basis for the formulation of the next three-year plan of training courses of the SEAFDEC Training Department, which will be submitted to the Program Committee for endorsement and submission to the SEAFDEC Council for its consideration and approval.

#### **SEAFDEC TRAINING PROGRAMS**

4. As background information, the representatives from TD, MFRD and AQD reported verbally on their Department's training programs conducted from 1986 to 1990.

5. Highlights of the training courses conducted by the Training Department (TD) from 1986 to 1990 at the regional level included marine fishing technology (commercial fisheries), marine fishing technology (small-scale fisheries), marine engineering, fishery extension services, fishfinder and fishing accessories, purse-seine fishery, fishery oceanography, and fish population dynamics.

6. TD also conducted national training-cum-demonstration courses which included fishing accessories, fishing technology and oceanography for university students, and navigation and seamanship.

7. The Marine Fisheries Research Department (MFRD) conducted training courses which reflected its implemented research activities. From 1986 to 1990 training courses at the regional level focused on fish processing and fish preservation. MFRD also conducted regular lecture-demonstration courses on the production of surimi and surimi-based products, directed to the commercial fish processors and administrators in the private sector.

8. Other training courses related to post-harvest technology were conducted on request from Member Countries, and special fellowship training courses were offered for researchers and former trainees from Member Countries who wanted to do specific research of common interest. In addition, MFRD provided extension and monitoring services on the status of the fish processing industry in the region.

9. With the assignment of a JICA expert, MFRD now plans to conduct a training course on food packaging. It was noted that as the training courses offered by MFRD are practical oriented, these could be revised as and when new technology is developed.

10. Training courses conducted by the Aquaculture Department (AQD) from 1988 to 1990 were based on the priorities identified during the Seminar on Training Requirements in Fisheries and Aquaculture in Southeast Asia held in Hua Hin, Thailand, 29-30 March 1988.

11. The five regular training courses prioritized during the seminar at Hua Hin and conducted by AQD from 1988 to 1990 included fish health management, fish nutrition, prawn hatchery/nursery operation and management, marine finfish hatchery and nursery, and culture of natural food organisms. In addition, AQD conducted the following training courses: aquaculture management, artemia culture, sanitation and culture of tropical bivalves, and milkfish hatchery. AQD plans to conduct a training course on sea bass hatchery in 1991.

#### **SURVEY MISSION**

12. In February and March 1991, ID sent a mission to Thailand, Philippines, Singapore, Indonesia, Brunei Darussalam, and Japan. The primary objective of the mission was to review and assess the fishery training needs of institutions and assess the facilities and programs offered with a view to determining

whether an exchange of personnel could be arranged among the institutes. The mission also aimed to ascertain whether such personnel would benefit from additional short-term training not available in their own countries. The report of the survey mission appears as Annex 3.

13. The survey mission identified the training requirements and ways of cooperation with Member and neighbouring countries at the national level. From the discussions with the authorities in the countries visited, the survey mission noted the recommendations which appear in the report of the mission as Annex 3.

#### **QUESTIONNAIRE ON TRAINING REQUIREMENTS**

14. The Questionnaire on Training Requirements (Annex 4) was prepared by the Training Department and sent to target groups in January 1991, namely, fisheries training and education institutions in South and Southeast Asia, SEAFDEC Member Countries and former trainees of the Training Department. The questionnaire listed training subjects that could be offered by the Training Department in the fields of fishing technology, marine engineering and fishery extension services; and short-term training programs on marine fisheries that could also be organized by the Department.

15. The recipients were requested to rank the proposed subjects according to their requirements, as well as provide guidance to the Department with regard to other subjects.

16. The priorities of training subjects, identified by the recipients in the questionnaire returns, were quantitatively analysed by weighted score analysis.

17. In the discussions, it was suggested that, in addition to the government sector, the focus or target clientele of the training courses should include the private sector. The Council Directors should therefore be requested to encourage to offer the SEAFDEC training programs to the private sector as well.

18. The demand for training participants from non-governmental organizations is high, but as their trainees cannot leave their jobs for very long periods, it was suggested that a crash training program be formulated. A module program on sonar operations was suggested for members of the fishing industry. TD pointed out that, when trainees return to their countries they are expected to initiate and conduct training courses on their own. If assistance is needed, TD could send its staff to assist in the setting up and conducting of such training courses.

19. TD was asked to focus on training of trainers as it has good facilities for conducting this kind of training. The program may include training of officers from Member Countries who already have the necessary background. The participants would be guided on the setting up and conducting of training courses so that when they return to their own countries they would be able to formulate and conduct training courses on their own.

20. TD was asked to consider assisting Member Countries in upgrading their training facilities in order to reach a bigger target clientele and achieve faster results through the multiplier effect. Assistance might not be in financial form but in the form of preparation of proposals which the Member Countries can use in seeking financial assistance. As this is beyond its capabilities, SEAFDEC may be able to assist through exchange of information in the form of literature, video tapes and other audio-visual aids.

#### **ASSESSMENT OF TRAINING NEEDS**

21. The training needs identified by Member Countries are shown in Annex 5, while the training needs identified by insititutions in the region appears as Annex 6, and the training needs identified by former trainees as Annex 7.

22. From the results of the questionnaire on training requirements new subjects for the training courses to be conducted by TD were proposed by Member Countries, former trainees and institutions in the region. For the regular courses in the field of marine fisheries, the following subjects were suggested in addition to those that should be continued by TD:

- 1) Resource Management
- 2) Fish Handling and Processing
- 3) Natural Resources Conservation
- 4) Environment and Water Pollution
- 5) Fishery Economics
- 6) Fish Marketing Management
- 7) Fishery Credit
- 8) Scientific Diving

23. For the regular courses in the field of marine fisheries, the list of additional training subjects proposed includes:

- 1) Fishery Cooperative Organizations
- 2) Fishing Boat Skipper (six to twelve months)
- 3) Fishery Post-harvest (three months)
- 4) Fishery Economics (one year)
- 5) Fish Marketing and Management (one year)
- 6) Fishing Credit

24. The proposed additional short-term training courses in the field of marine fisheries, identified by Member Countries, former trainees and institutions in the region are:

- 1) Fish Shelters
- 2) Scientific Diving
- 3) Cooperative Development
- 4) Celestial Navigation
- 5) Fish Processing (emphasis on fish-jelly products)
- 6) Preservation of fish catch (post-harvest)



25. In the field of marine engineering the following additional training subjects were proposed:

- 1) Assembly and Disassembly of Marine Engines
- 2) Fish Processing Machinery
- 3) Construction of Mariculture Facilities

26. Community health was proposed as an additional training subject in the course for fishery extension officers.

27. As some of the training subjects suggested by Member Countries are not relevant to the Training Department, such subjects will be handled by the other departments of SEAFDEC.

#### **FUTURE TRAINING PROGRAMS**

28. Based on the training needs identified by Member Countries, the following regular courses in the field of marine fisheries will be conducted by TD:

- 1) Marine Fishing Technology
- 2) Fishery Extension Services
- 3) Research Training (Biology, Oceanography, etc.)
- 4) Marine Engineering
- 5) Navigation and Seamanship
- 6) Fisheries Planning and Management
- 7) Fisheries Information Systems

29. Training subjects for the regular training courses in fishing technology are:

- 1) Commercial Fisheries  
(six-month course concentrating on commercial fishing technology)

- 2) Small-scale Fisheries  
(six-month course concentrating on small-scale fishing technology, socio-economics of small-scale fisheries, fishery management and fishery co-operatives)
- 3) General Fishing Technology  
(six-month course concentrating on general fishing technology, both commercial and small-scale)
- 4) General Fishing Technology  
(one-year course concentrating on general fishing technology, both commercial and small-scale)
- 5) Commercial Fisheries  
(one-year course concentrating on commercial fishing technology)

30. Training subjects for short-term courses in the field of marine fisheries are:

- 1) Fish Detection and Luring Methods
- 2) Basic Knowledge for Masterfisherman
- 3) Coastal Navigation and Seamanship
- 4) Fishing Gear Materials
- 5) Fishery Biology
- 6) Fishery Oceanography
- 7) Line Fisheries
- 8) Purse-seine Fisheries
- 9) Trawl Fisheries
- 10) Hydroacoustic Equipment and Fishing Machinery
- 11) Fishing Boats and their Design
- 12) Electronic Navigation
- 13) Research Training in Fisheries Biology
- 14) Gill Net Fisheries
- 15) Fishing Grounds

- 16) Research Training in Fishery Oceanography
- 17) Miscellaneous Fisheries
- 18) Set Net Fisheries
- 19) Lift Net Fisheries
- 20) Celestial Navigation
- 21) Model Net and its Experiments

31. Training subjects for the regular course in marine engineering are:

- 1) Operation and Maintenance of Marine Engines
- 2) Internal Combustion Engine for Fishing Boats
- 3) Marine Electricity and Electronics
- 4) Refrigeration and Auxiliary Engine
- 5) Operation and Maintenance of Outboard Engines
- 6) General Marine Engineering
- 7) Fuel Injection Pump and Injection Calibrating Machine

32. Training subjects for the training course for fishery extension officers are:

- 1) Extension Services and Rural Development
- 2) Socio-economics of Small-scale Fisheries
- 3) Extension Methodology
- 4) Communication Media for Extension Work
- 5) Fishery Cooperatives
- 6) Community Awareness and Ways for Development
- 7) Fishery Statistics
- 8) Computer Application for Fishery Statistics
- 9) Marine Affairs
- 10) Teaching Strategies for Adult Learners

33. The meeting agreed that the duration of the training course for fishery extension officers should not be more than 45 days.

## RECOMMENDATIONS

34. Having noted the conclusions of the Survey Mission, the Seminar made the following recommendations:

- 1) The training requirements identified by priority should be used as a basis for planning the training courses to be organized by the SEAFDEC Training Department and other concerned organizations/agencies in the region;
- 2) A brief content of each training course should be prepared by the Training Department, in collaboration with Member Countries, and submitted for the consideration of the Member Countries prior to the Fourteenth Meeting of the Program Committee;
- 3) The certificate or diploma program with an educational qualification recognized by Member Countries should be studied specifically as regards the Certificate of Competency as Skipper before implementation;
- 4) The recruitment and exchange of experts on a short-term basis between the Training Department and Member Countries should be pursued as necessary;
- 5) Future training courses should consider the areas of conservation and management of coastal resources as well as other environmental issues. In this regard, it was suggested that a strong cooperative effort among Member Countries is necessary in the management of resources in the coastal areas and the monitoring systems of environmental issues;

- 6) The training on marine engineering should also include operation and maintenance of automotive diesel engines converted for marine use, as these engines are used by small-scale fishermen in Member and neighbouring countries;
- 7) The survey design and methodology used in the assessment of training requirements should be improved in order to obtain accurate results;
- 8) The questionnaires on training requirements, in future, should be improved by giving more details, explanation and guidance in order to avoid misentry; and
- 9) The Training Department should consider the new areas for training proposed by Member Countries. The priority of these new areas may be included in the next study by TD.

#### **ADOPTION OF THE REPORT**

35. The Report of the Seminar, which was adopted on 24 April 1991, will be submitted to the Program Committee for endorsement and submission to the SEAFDEC Council for consideration and approval at the Council's next meeting.

#### **VOTE OF THANKS**

36. The Chairman thanked everyone who attended the Seminar for their active participation, and the Secretariat for a job well done.

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**REPORT OF  
THE SURVEY MISSION ON REGIONAL FISHERIES  
TRAINING REQUIREMENTS**

## I. INTRODUCTION

To improve the Training Department's programs, in response to the actual training needs for fishery officers and private sector personnel, and to promote cooperation among the region's fishery training institutes, the SEAFDEC Council, at its twenty-third meeting in December 1990, agreed that TD should conduct a study on training requirements by means of a survey mission, a questionnaire and a seminar. The information gathered would be evaluated by the seminar on training requirements to be held subsequently.

The Training Department sent a survey mission to the Member Countries and neighbouring countries, composed of Mr. Somyos Soodhom, Head of the Training Division, Mr. Somnuk Pornpatimakorn, Head of the Training Aids Unit, and Mr. Shinzo Yamamoto, Marine Engineering Instructor. The mission visited government departments and institutes in the following countries: Thailand, between 13 and 22 February 1991; the Philippines from 24 to 28 February 1991; Singapore, on 1 March 1991; Indonesia, from 2 to 6 March 1991; Brunei, from 10 to 12 March 1991; and Japan, from 17 to 22 March 1991.

The primary objective of the mission was to review and assess the fisheries training needs of the institutes visited. At the same time the mission took the opportunity to assess the facilities and programs offered by them with a view to determining whether the recruitment and exchange of experts on a short-term basis between SEAFDEC/TD and institutes in the countries visited could be effected.

The mission wishes to express appreciation of the assistance given by the officials of the departments as well as by the staff of the training institutes visited.

This report presents the results of the study and summarizes the training needs as expressed in the countries visited, for consideration by the Seminar on Training Requirements.

## II. TRAINING REQUIREMENTS AND COOPERATION IN TRAINING OF PERSONNEL

A summary of the findings of the survey team is given below by each Department/institution visited.

### 1. THAILAND

#### a) Department of Fisheries (DOF), Ministry of Agriculture and Cooperatives

Requirements of the Department of Fisheries reflect the national requirements of Thailand. The DOF requested that SEAFDEC/TD continue the regular training courses on fishing technology, marine engineering and fishery extension services. Since the Department is interested in tuna fishing methods especially purse-seining, the course on purse-seining should be continued. The DOF suggested that SEAFDEC/TD conduct refresher courses for TD graduates. It is also interested in research training especially in biology and oceanography. In this area, the Phuket Marine Biological Center would be ready to collaborate with SEAFDEC/TD in conducting training courses on biological research. Short-term training should place emphasis on practical training, i.e., on hydroacoustic equipment, and on marine engines. SEAFDEC/TD should consider offering courses on coastal fisheries and the conservation of fisheries resources. The DOF also requested additional audio-visual materials from SEAFDEC/TD, which would be useful for DOF extension services and external programs.

b) Department of Vocational Education of the Ministry of Education

This department is responsible for all vocational education in Thailand, which includes the agricultural, fishery, technical as well as boat building colleges. Because of the high demand for fishery personnel, two more fishery colleges will be established. Staff development especially in the fields of marine fishing technology and marine engineering is essential. The department therefore requested that SEAFDEC/TD consider allocating more places for their instructors in the regular training programs on marine fishing technology and marine engineering as well as in the course on extension services. The department also requested *in situ* training for instructors from the agricultural, fishery and technical colleges in marine fishing technology, operation and maintenance of marine engines, marine electricity and marine electronics. The department would like to explore the possibility of cooperation with SEAFDEC/TD in the curriculum development of its colleges, fishery programs, and the exchange of publications. Teaching materials both for marine fishing technology and marine engineering are also needed. Basic knowledge of extension methods is also required to improve the skill of personnel engaged in short-term training programs for adult learners and extension programs in the rural areas.

c) Chulalongkorn University, Marine Science Department of the Faculty of Science

The Department of Marine Science offers bachelor and master degrees in the three study programs, i.e., marine biology, and physical and chemical oceanography. The Department of Marine Science has sent its students to attend the short-term training programs for university students in marine capture fisheries and oceanography at SEAFDEC/TD since 1978. The Marine Science Department suggests that this training course be continued.

The department has made the training at SEAFDEC/ID a compulsory program for its students, for which one credit mark is granted. It requested that SEAFDEC/ID increase the period of training to at least two weeks with emphasis on practical training in marine capture fisheries and analysis of oceanographic parameters relating to fisheries resources. It further suggested that, if possible, the course be conducted twice a year during the university students, mid-year and summer vacation.

A request was made that SEAFDEC/ID staff should give lectures at the department in particular on the subject of coastal navigation. The department offered to send staff to collaborate with SEAFDEC/ID in conducting a training course on fishery oceanography. SEAFDEC/ID was asked to provide audio-visual materials on fisheries and related subjects.

d) Kasetsart University, Faculty of Fisheries

The Faculty of Fisheries of Kasetsart University has sent its students to attend the training course for university students conducted by SEAFDEC/ID since 1978. The faculty suggested that the training period be increased to at least 200 hours thereby corresponding to the requirements of the University. It also suggested increasing the frequency of training to twice a year, during the mid-year and summer university vacations, because of the increasing number of students who want to join this training program. The faculty would also like to collaborate with SEAFDEC in developing a master degree program for its graduates. The trainees in this course would divide their time between course studies at the university and some course study and practical training at SEAFDEC/ID. The faculty requested SEAFDEC/ID to place more emphasis, in the university students course, on physical oceanography, and fishing gears and methods. The faculty would also like to seek assistance from SEAFDEC/ID in conducting a scuba diving training course.



e) Fish Marketing Organization (FMO)

The Fish Marketing Organization is a state enterprise that controls the major wholesale fish markets and fishing ports in Thailand. The FMO has coordinated with SEAFDEC/TD in organizing training for fishermen since 1977. The FMO asked SEAFDEC/TD to place greater emphasis on the subject of fish handling. A training course for fishermen as well as audio-visual materials on this topic should be considered. The FMO is also interested in the training of extension officers. As this would be useful for the extension and external programs of the organization, SEAFDEC/TD has been asked to provide some slots in the extension course for FMO personnel.

2. PHILIPPINES

a) Department of Agriculture

The department is in charge of all agricultural and fisheries activities in the Philippines. The view expressed by the Undersecretary for Attached Agencies was that the SEAFDEC/TD regular programs on fishing technology, marine engineering and fisheries extension services should be continued. SEAFDEC/TD should consider training fishery personnel from the private sector in both fishing technology and marine engineering to meet present manpower requirements. Training in fish handling and on board preservation as well as training in the conservation and management of fisheries resources should be considered; the Philippines needs a study module on boat design, and engine installation for small fishing boats as well as audio-visual training materials.

b) University of the Philippines in the Visayas

The College of Fisheries of the University of the Philippines in the Visayas comprises four institutes namely, the Institutes of Fish Processing Technology, Aquaculture, Marine Technology and Oceanography, and Fishery Management. The

Institute of Marine Technology and Oceanography is equipped with a water-circulating tank with flow-rate control equipment to study the behaviour of fishing gears and fishing boats. The setting up of a fishing simulator room is in progress. The college requested that SEAFDEC/TD conduct an advanced course on model-net experiment in the circulating tank as well as on hydroacoustic equipment and fishing machinery. The establishment of links for collaborative activities, inter alia, through the exchange of publications, would be welcome. The college also requested audio-visual materials produced by SEAFDEC/TD.

c) National Commercial Fisheries Development Center (NCFDC)

The NCFDC has been established to provide a common base for development and upgrading of the manpower needs for the marine fishing industry through Skipper/Masterfisherman, Boat Engineering and other specialized courses.

The regular five-month live-in training for technologists of the Bureau of Fisheries and Aquaculture Resources, Department of Agriculture extension officers, fishery schools instructors and other interested sectors includes both the above-mentioned courses. There is a need for upgrading the instructors' knowledge of specialized and new technology. The NCFDC therefore requested SEAFDEC/TD to provide opportunities for their instructors to train at SEAFDEC/TD, especially in the subjects of marine engineering and extension services. The NCFDC also asked SEAFDEC/TD to send technical papers and audio-visual materials to the center.

3. SINGAPORE

a) Fisheries Division, Primary Production Department

The Fisheries Division of the Primary Production Department is in charge of all the fisheries activities in Singapore. The mission was informed that the fisheries training in Singapore is limited by the number of fishermen and fishing

activities. There are no fisheries training schools in Singapore, and basic training in fishing technology or fisheries in general is needed for the fishery officers.

It would therefore be useful if SEAFDEC/TD were to consider organizing short-term training on fisheries in general or basic fishing technology. SEAFDEC/TD should continue the regular training courses in marine fishing technology, marine engineering and marine extension services.

#### 4. INDONESIA

##### a) Directorate-General of Fisheries, Ministry of Agriculture

The Directorate-General of Fisheries has sent its staff to attend the regular training courses and extension service course since 1975 and 1981 respectively. The Directorate-General of Fisheries would like to continue sending its staff to attend the extension services course and other SEAFDEC/TD courses of interest to the department. It was suggested that SEAFDEC/TD should conduct courses on fisheries management and small-scale fisheries, i.e., fishery cooperatives, extension methods and rural development.

##### b) Faculty of Fisheries, Bogor Agricultural University (IPB)

The Faculty of Fisheries is one of the higher education establishments in fisheries responsible for manpower development. The faculty comprises five departments, namely: Living Aquatic Resources Management, Aquaculture, Fisheries Resource Utilization, Fisheries Product Handling and Processing, and Fisheries and Social Economics. The students of the Department of Fisheries Resource Utilization and Living Aquatic Resources Management still do not have adequate facilities for study and practice. To solve this problem the faculty has

proposed the development of the Faculty of Fisheries; the implementation of the project would be carried out within this year.

The development of IPB staff for this project is therefore urgently needed, especially in the fields of Oceanography, Fishing Technology, Fishing Boats, Navigation and Fishing Operations. The faculty is also interested in exchanging technical publications and audio-visual materials with SEAFDEC/TD.

c) Bureau of Agricultural Education, Agency of  
Agricultural Education and Training

The Bureau of Agricultural Education is the coordinating body of the agricultural high schools specializing in Agriculture, Animal Husbandry, Aquaculture, Fishing Techniques and Fishing Machinery. There are seven schools which provide training in fishing techniques. The Bureau suggested that SEAFDEC/TD conduct short-term training courses (not over six months) in general fishing technology, commercial fisheries and small-scale fisheries. In addition, courses on fishing gear materials, fishing grounds, fish detection and luring methods, fishing boats and their design, hydroacoustic equipment and fishing machinery and coastal navigation should be held. These should be *ad hoc* short-term training courses with a duration of 30 to 45 days. Courses on general marine engineering, the operation and maintenance of marine engines, refrigeration, and auxiliary engines should be conducted regularly, with a duration of six months, and a course on operation and maintenance of out-board engines, with a duration of one month. The Bureau suggested that fishery cooperatives, and development methods are important subjects for extension officers. SEAFDEC/TD should conduct these courses with a one to one and a half month duration. The Bureau also requested that SEAFDEC/TD consider additional training for their staff at the Training Department, as well as the exchange of technical publications and audio-visual materials.

d) Bureau of Personnel Training, Agency of Agricultural Education and Training

The Bureau is responsible for additional training of personnel from the Ministry of Agriculture. For fishery training there are five regional training centers, whose main objective is to train fisheries personnel, fishermen and extension workers to improve their knowledge and skills in fisheries. The Bureau requested SEAFDEC/TD to consider their staff for additional training at TD in the courses relating to fishing technology, marine engineering and extension services. The Bureau would like to exchange technical publications and audio-visual materials with SEAFDEC/TD.

e) Fisheries Education and Training Institute

The Fisheries Education and Training Institute conducts high level education and training in fisheries under the Agency of Agricultural Education and Training. There are five programs of study, as follows: 1) Fishing Techniques; 2) Fish Processing and Technology; 3) Marine Engineering; 4) Aquaculture and 5) Aquatic Resource Management. The institute is well-equipped with all facilities needed for training, and two training vessels. The Institute would like to exchange technical publications and audio-visual materials with SEAFDEC/TD.

4. BRUNEI DARUSSALAM

Department of Fisheries

Although the fishery activities in Brunei Darussalam are limited by the number of fishing boats and the area of operation, the Department of Fisheries plans to increase its production by exploiting the resources in the deeper areas of its EEZ. Training on the techniques and skills of fishing technology for the fishermen is urgently needed. The department suggested that SEAFDEC/TD continue the regular training courses on fishing technology, marine engineering and extension services. Short-

term training courses of a similar duration to the extension course should also be held in fishing technology and marine engineering. The department hopes that SEAFDEC/TD will continue to give places to participants from Brunei Darussalam in the extension courses. Short-term training courses of not more than a three-month duration on general fishing technology, operation and maintenance of inboard and out-board marine engines as well as ship hull maintenance are recommended. The department also suggested that SEAFDEC/TD consider the training of private sector personnel. It is recommended that courses on fishery enterprise development and the marketing system should be conducted by SEAFDEC/TD.

#### 5. JAPAN

- a) Fishery Agency, Ministry of Agriculture,  
Fisheries and Forestry

The Fishery Agency is keen to collaborate with SEAFDEC in whatever way may prove beneficial to its Member Countries. It will continue, in collaboration with JICA and OFCF, to supply experts and give support to SEAFDEC/TD as requested.

- b) Experts Assignment Department, Japan International  
Cooperation Agency (JICA)

During the discussion with the Director of the Department, the mission explained the need for SEAFDEC/TD to offer more short-term training on specific subjects. In response the mission was informed that JICA was keen to assist SEAFDEC by trying to find the needed experts as soon as possible.

- c) Overseas Fishery Cooperation Foundation (OFCF)

The Overseas Fishery Cooperation Foundation (OFCF), which includes among its many functions the assignment of experts, has provided SEAFDEC/TD, through JICA, with the services of experts for the past two decades. OFCF assured the mission

that it will continue to do so, as well as giving technical assistance to SEAFDEC/TD. The OFCF training division would like to exchange technical publications as well as audio-visual materials with SEAFDEC/TD.

d) Tokyo University of Fisheries (TUF)

Tokyo University of Fisheries provides education and scientific research related to fisheries. As a recognized fisheries institution in Japan, SEAFDEC/TD has sent staff members to study there since 1979. Of these, two graduated with a master's degree and two are studying for a doctor's degree and two attended short-term training courses. TUF will continue to give technical assistance to SEAFDEC and support staff development to the non-degree or degree level. TUF also would like to conduct joint studies or research with SEAFDEC/TD in the near future.

e) Kanagawa International Fisheries Training Centre (KIFTC)

Kanagawa International Fisheries Training Centre is part of the Japan International Cooperation Agency (JICA). Five training courses are offered annually as follows: (1) an eight-month training course on Coastal Fishing Technology; (2) a five-month training course on Fishery Cooperatives; (3) General Aquaculture; (4) Hull and Engine Maintenance for Small Fishing Boats; and (5) a one-month training course on Fishery Science and Technology. KIFTC also offers individual training courses on specific subjects as requested through JICA. SEAFDEC has sent staff to attend courses on advanced fishing technology and fishery cooperatives. KIFTC would like to assist SEAFDEC/TD in developing its junior staff by offering individual training courses through JICA on specific subjects as requested by SEAFDEC/TD. KIFTC also wishes to exchange technical publications as well as audio-visual materials with TD.

f) Misaki Fisheries High School

The Misaki Fisheries High School offers four study programs, namely: Fishing Techniques, Food Processing, Fisheries Engineering, and Telecommunications and Information. The school also plans to establish an aquaculture study program within the next two years. They have well equipped training vessels, the 485 GT M.S. RYUNAM MARU, a longliner, and the 19 GT M.S. WAKASHIO, a multipurpose ship, as well as a net loft, engineering workshop, processing factory and an out-of-campus training station. The principal pointed out the importance of simulator training in navigation, fishing and engineering and recommended that SEAFDEC/TD set up its own simulators.

### III. CONCLUSIONS

The mission's conclusions based on the foregoing observations, are as follows:

1. SEAFDEC/TD should continue to provide training in fishing technology, marine engineering and extension services.
2. SEAFDEC/TD should consider training programs to cover current fisheries development in a 200 mile Economic Zone of maritime countries, to include coastal as well as small-scale fisheries.
3. SEAFDEC/TD should play a coordinating role within the region to encourage cooperation and to minimize duplication among the various fishery training institutions and their programs.
4. The Training requirements of the countries in the region are similar, and training should focus on officials and operatives of the fishing industry.



5. Short-term training courses on specific subjects, i.e., fishing boats and construction, hull maintenance, fish handling and preservation at sea, and marine electricity and electronics, should be conducted as required.
6. Training instructors and extension supervisors should be recognized as they are the key factor in the transfer of technology to field workers and fishermen. Instructors and supervisors should be conversant not only with the relevant technology, but also with the techniques of transferring technology to the fishermen. The present SEAFDEC/TD Extension Course should be continued.
7. Collaborative training with the national institutions in Member Countries should be developed and strengthened.
8. SEAFDEC/TD should consider organizing *in situ* training programs in collaboration with the national agencies, in order to expand their training activities in Member Countries
9. Institutional and non-institutional training, and the use of audio-visual media should be strengthened to expand training coverage at both the national and regional level. In view of the lack of technical manuals and audio-visual materials for fisheries training programs, SEAFDEC/TD, through the SEAFIS Project and its Training Aids Unit, initiate the compilation and selection of literature as well as audio-visual material on fishery education, training, and related subjects, in the region. These would be translated into English and from English into local languages, and distributed to interested countries.

10. As Member Countries do not recognize the SEAFDEC/TD certificates, SEAFDEC/TD should draw up cooperative projects with other educational institutions and exchange instructors as well as plan a certificate or diploma program leading to an educational qualification recognized by the Member Countries.
11. The need for upgrading technical know-how in the private sector should be explored by the Training Department and concerned organizations.
12. To foster a closer and stronger relationship with its Member Countries, SEAFDEC/TD should recruit experts on a short-term basis from Member Countries.

**QUESTIONNAIRE ON TRAINING REQUIREMENTS**

1. Please indicate your training requirements, and priority, (by number) of the following training subjects:

- 1. Marine Fishing Technology
- 2. Marine Engineering
- 3. Fishery Extension Services
- 4. Navigation and Seamanship
- 5. Research Training (Biology, Oceanography, etc.)
- 6. Others (please specify)
  - a. ....
  - b. ....
  - c. ....

2. For subjects relating to marine fisheries development, in particular marine fishing technology, which of the following should SEADEC/TD conduct courses in: (Please rank priority by number)

- 1. Commercial Fisheries  
(one-year course concentrating on commercial fishing technology)
- 2. Commercial Fisheries  
(a six-month course concentrating on commercial fishing technology)
- 3. Small-scale Fisheries  
(a six-month course concentrating on small-scale fishing technology, socio-economics of small-scale fisheries, fishery management and fishery cooperatives)

- 4. General Fishing Technology  
(one-year course concentrating on general fishing technology, both commercial and small-scale)
- 5. General Fishing Technology  
(a six-month course concentrating on general fishing technology, both commercial and small-scale)
- 6. Others (please specify)
  - a. ....
  - b. ....
  - c. ....

3. (A) Please rank the following training subjects by priority as required for training (by number in the box  ) and indicate in the parentheses the duration of training.

- a. 30 days
- b. 45 days
- c. 60 days
- d. 90 days
- e. 120 days

**Priority**

**Duration**

- |                          |                                      |     |
|--------------------------|--------------------------------------|-----|
| <input type="checkbox"/> | 1. Fishing Gear Materials            | ( ) |
| <input type="checkbox"/> | 2. Fishing Grounds                   | ( ) |
| <input type="checkbox"/> | 3. Fish Detection and Luring Methods | ( ) |
| <input type="checkbox"/> | 4. Purse Seine Fisheries             | ( ) |
| <input type="checkbox"/> | 5. Trawl Fisheries                   | ( ) |
| <input type="checkbox"/> | 6. Gill net Fisheries                | ( ) |

Priority		Duration
<input type="checkbox"/>	7. Lift Net Fisheries	( )
<input type="checkbox"/>	8. Line Fisheries	( )
<input type="checkbox"/>	9. Miscellaneous Fisheries	( )
<input type="checkbox"/>	10. Set Net Fisheries	( )
<input type="checkbox"/>	11. Model Net and Its Experiments	( )
<input type="checkbox"/>	12. Fishing Boats and Their Design	( )
<input type="checkbox"/>	13. Hydroacoustic Equipment and Fishing Machinery	( )
<input type="checkbox"/>	14. Fishery Biology	( )
<input type="checkbox"/>	15. Fishery Oceanography	( )
<input type="checkbox"/>	16. Coastal Navigation and Seamanship	( )
<input type="checkbox"/>	17. Celestial Navigation	( )
<input type="checkbox"/>	18. Electronic Navigation	( )
<input type="checkbox"/>	19. Basic Knowledges for Masterfisherman	( )
<input type="checkbox"/>	20. Research Training in Fishery Biology	( )
<input type="checkbox"/>	21. Research Training in Fishery Oceanography	( )
<input type="checkbox"/>	22. Others (please specify)	( )
<input type="checkbox"/>	a. ....	( )
<input type="checkbox"/>	b. ....	( )
<input type="checkbox"/>	c. ....	( )

(B) Please list which of the above listed subjects you would choose for:

the Marine Fishing Technology Course

.....  
.....  
.....

the Navigation and Seamanship Course

.....  
.....  
.....

the Research Training Course

.....  
.....  
.....

4. The "Marine Engineering" course comprises the subjects listed below. Please indicate your needs in order of priority, by number, in the box  and the duration for training in the parentheses, in the duration column.

- a. 1-2 months
- b. 3 months
- c. 6 months
- d. one year

**Priority**

**Duration**

<input type="checkbox"/>	1. General Marine Engineering	( )
<input type="checkbox"/>	2. Operation and Maintenance of Marine Engines	( )
<input type="checkbox"/>	3. Internal Combustion Engine for Fishing Boats	( )
<input type="checkbox"/>	4. Marine Electricity and Electronics	( )
<input type="checkbox"/>	5. Refrigeration and Auxiliary Engines	( )
<input type="checkbox"/>	6. Operation and Maintenance of Outboard Engines	( )
<input type="checkbox"/>	7. Others (please specify)	( )
<input type="checkbox"/>	a. ....	( )
<input type="checkbox"/>	b. ....	( )
<input type="checkbox"/>	c. ....	( )

5. If SEAFDEC/TD were to conduct courses related to fisheries extension service, please indicate your needs in order of priority, in the box  and the duration of training required in the parentheses:

- a. 30 days
- b. 45 days
- c. 60 days
- d. 90 days

Priority		Duration
<input type="checkbox"/>	1. Extension Methodology	( )
<input type="checkbox"/>	2. Extension Services and Rural Development	( )
<input type="checkbox"/>	3. Surveys of Socio-economics of Small-scale Fisheries	( )
<input type="checkbox"/>	4. Fishery Cooperatives	( )
<input type="checkbox"/>	5. Community Awareness and Ways for Development	( )
<input type="checkbox"/>	6. Communication Media for Extension Work	( )
<input type="checkbox"/>	7. Teaching Strategies for Adult Learners	( )
<input type="checkbox"/>	8. Fishery Statistics	( )
<input type="checkbox"/>	9. Marine Affairs	( )
<input type="checkbox"/>	10. Others (please specify)	( )
<input type="checkbox"/>	a. ....	( )
<input type="checkbox"/>	b. ....	( )
<input type="checkbox"/>	c. ....	( )

**ASSESSMENT OF TRAINING NEEDS  
IDENTIFIED BY MEMBER COUNTRIES**

Table 1. Main subjects which SEAFDEC/TD should continue to conduct as regular courses in the field of marine fisheries.

Subject	Priority identified by			
	Malaysia	Philippines	Singapore	Thailand
1. Marine Fishing Technology	1	1	2	2
2. Marine Engineering	7	1	-	5
3. Fishery Extension Service	3	3	1	4
4. Navigation Seamanship	6	4	-	3
5. Research Training	5	2	-	1
6. Fisheries Planning and Management	2	-	-	-
7. Fisheries Information Systems	4	-	-	-

Table 2. Training subjects for regular training courses in fishing technology.

Subject	Priority identified by			
	Malaysia	Philippines	Singapore	Thailand
1. Commercial Fisheries (one year)	3	-	5	-
2. Commercial Fisheries (six months)	1	1	3	3
3. Small-scale Fisheries (six months)	5	2	1	2
4. General Fishing Technology (one year)	4	-	4	-
5. General Fishing Technology (six months)	2	-	2	1
6. Tuna Fisheries	-	-	-	4



Table 3. Training subjects for short-term training courses in the field of marine fisheries.

Subject	Priority identified by			
	Malaysia	Philippines	Singapore	Thailand
1. Fishing Gear Materials	13	1	4	-
2. Fishing Grounds	12	-	2	-
3. Fish Detection and Luring Methods	11	7	5	5
4. Purse Seine Fisheries	15	2	-	4
5. Trawl Fisheries	14	3	6	-
6. Gill Net Fisheries	16	4	8	-
7. Lift Net Fisheries	17	9	-	-
8. Line Fisheries	18	5	7	10
9. Miscellaneous Fisheries	21	8	11	-
10. Set Net Fisheries	19	6	-	-
11. Model Net and its Experiments	20	-	-	-
12. Fishing Boats and their Design	10	11	3	-
13. Hydroacoustic Equipment and Fishing Machinery	4	10	-	9
14. Fishery Biology	7	-	10	3
15. Fishery Oceanography	3	-	-	2
16. Coastal Navigation and Seamanship	2	12	9	7
17. Celestial Navigation	9	-	-	-
18. Electronic Navigation	1	-	-	8
19. Basic Knowledge for Masterfisherman	6	-	1	6
20. Research Training in Fishery Biology	8	-	-	1
21. Research Training in Fishery Oceanography	5	-	-	10

Table 4. Training subjects for regular courses in marine engineering.

Subject	Priority identified by			
	Malaysia	Philippines	Singapore	Thailand
1. General Marine Engineering	5	-	-	6
2. Operation and Maintenance of Marine Engines	1	2	-	1
3. Internal Combustion Engine for Fishing Boats	4	1	-	3
4. Marine Electricity and Electronics	3	3	-	2
5. Refrigeration and Auxiliary Engines	2	4	-	4
6. Operation and Maintenance of Outboard Engines	6	5	-	5
7. Fuel Injection Pump and Injector Calibrating Machine	-	6	-	-

Table 5. Training subjects for training courses for fishery extension officers.

Subject	Priority identified by			
	Malaysia	Philippines	Singapore	Thailand
1. Extension Methodology	8	4	3	4
2. Extension Services and Rural Development	1	1	4	5
3. Socio-Economics of Small-scale Fisheries	9	3	2	1
4. Fishery Cooperatives	7	7	5	2
5. Community Awareness and Ways for Development	2	2	-	-
6. Communication Media for Extension Work	6	6	6	3
7. Teaching Strategies for Adult Learners	10	5	-	-
8. Fishery Statistics	5	8	1	-
9. Marine Affairs	4	9	-	-
10. Computer Application for Fishery Statistics	3	-	-	-

Table 8. Training subjects for short-term training courses in the field of marine fisheries.

Priority	Subjects	Weighted Score
1.	Fish Detection and Luring Methods	36
2.	Basic Knowledge for Masterfisherman	35
3.	Coastal Navigation and Seamanship	34
4.	Fishing Gear Materials	30
5.	Fishery Biology	28
6.	Fishery Oceanography	27
7.	Line Fisheries	27
8.	Purse-seine Fisheries	27
9.	Trawl Fisheries	25
10.	Hydroacoustic Equipment and Fishing Machinery	25
11.	Fishing Boats and their Design	24
12.	Electronic Navigation	23
13.	Research Training in Fisheries Biology	23
14.	Gill Net Fisheries	21
15.	Fishing Grounds	18
16.	Research Training in Fishery Oceanography	17
17.	Miscellaneous Fisheries	14
18.	Set Net Fisheries	11
19.	Lift Net Fisheries	8
20.	Celestial Navigation	7
21.	Model Net and its Experiments	24

Table 9. Training subjects for regular courses in marine engineering.

Priority	Subjects	Weighted Score
1.	Operation and Maintenance of Marine Engines	20
2.	Internal Combustion Engine for Fishing Boats	16
3.	Marine Electricity and Electronics	16
4.	Refrigeration and Auxiliary Engine	14
5.	Operation and Maintenance of Outboard Engines	9
6.	General Marine Engineering	4
7.	Fuel Injection Pump and Injection Calibrating Machine	2

Table 10. Training subjects for the training courses for fishery extension officers.

Priority	Subjects	Weighted Score
1.	Extension Services and Rural Development	25
2.	Socio-economics of Small-scale Fisheries	22
3.	Extension Methodology	17
4.	Communication Media for Extension Work	15
5.	Fishery Cooperatives	15
6.	Community Awareness and Ways for Development	14
7.	Fishery Statistics	13
8.	Computer Application for Fishery Statistics	6
9.	Marine Affairs	6
10.	Teaching Strategies for Adult Learners	5

**ASSESSMENT OF TRAINING NEEDS  
IDENTIFIED BY FISHERIES INSTITUTIONS**

Table 1. Main training subjects in the field of marine fisheries which SEAFDEC/TD could conduct as regular courses.

Subject	Priority identified by institutions in					
	Bangladesh	Indonesia	Malaysia	Philippines	Sri Lanka	Thailand
1. Marine Fishing Technology	3	1	3	1	1	1
2. Marine Engineering	4	2	1	1	2	4
3. Fishery Extension Services	1	3	4	3	-	3
4. Navigation Seamanship	5	3	1	4	3	4
5. Research Training	2	3	-	2	-	2
6. Natural Resources Conservation	-	6	-	-	-	-
7. Environment and Water Pollution	-	7	-	-	-	-
8. Fish Handling and Processing	-	-	5	-	-	-
9. Fishery Economics	-	-	-	-	-	6
10. Scientific Diving	-	-	-	-	-	6
11. Fishery Marketing Management	-	-	-	-	-	8
12. Fishery Credit	-	-	-	-	-	9

Table 2. Training subjects in the regular courses in the field of marine fisheries.

Subject	Priority identified by institutions in						
	Bangladesh	Indonesia	Malaysia	Philippines	Sri Lanka	Thailand	
1. Commercial Fisheries (one year)	2	5	6	-	5	5	
2. Commercial Fisheries (six months)	4	3	1	7	4	2	
3. Small-scale Fisheries (six months)	5	2	1	2	3	3	
4. General Fishing Technology (one year)	1	6	5	-	1	4	
5. General Fishing Technology (six months)	3	1	1	-	2	1	
6. Fishery Economics (one year)	-	-	-	-	-	6	
7. Fishery Marketing and Management (one year)	-	-	-	-	-	7	
8. Fishery Credit (six months)	-	-	-	-	-	8	
9. Fishery Post-harvest (three months)	-	4	-	-	-	-	
10. Fishing Skipper (six months-one year)	-	-	4	-	-	-	

Table 3. Training subjects for short-term training courses in marine fisheries.

Subject	Priority identified by institutions in					
	Bangladesh	Indonesia	Malaysia	Philippines	Sri Lanka	Thailand
1. Fishing Gear Materials	2	2	-	1	2	1
2. Fishing Grounds	3	5	6	-	3	12
3. Fish Detection and Luring Methods	8	4	1	7	8	5
4. Purse-seine Fisheries	5	7	4	2	5	8
5. Trawl Fisheries	1	-	-	3	1	2
6. Gill Net Fisheries	4	11	5	4	4	14
7. Lift Net Fisheries	6	-	-	9	6	-
8. Line Fisheries	9	8	10	5	9	-
9. Miscellaneous Fisheries	2	-	-	8	-	7
10. Set Net Fisheries	7	-	-	6	7	-
11. Model Net and its Experiment	15	11	-	-	-	13
12. Fishing Boats and their Design	14	6	1	11	15	14
13. Hydroacoustic Equipment and Fishing Machinery	12	1	7	10	14	3
14. Fishery Biology	11	15	-	-	12	16
15. Fishery Oceanography	-	-	-	-	11	3
16. Coastal Navigation and Seamanship	-	3	9	12	-	6
17. Celestial Navigation	-	14	-	-	-	-
18. Electronic Navigation	13	-	1	-	-	8
19. Basic Knowledge for Masterfisherman	10	8	7	-	13	8
20. Research Training in Fishery Biology	-	-	11	-	10	8
21. Research Training in Fishery Oceanography	-	10	10	-	-	-
22. Preservation of Fish Catch Post-harvest	-	-	12	-	-	-
23. Fish Processing - Emphasis on Fisheries Product	-	-	13	-	-	-
24. Scientific Diving	-	-	-	-	-	15

Table 4. Training subjects for regular courses in the field of marine engineering.

Subject	Priority identified by institutions in					
	Bangladesh	Indonesia	Malaysia	Philippines	Sri Lanka	Thailand
1. General Marine Engineering	3	1	3	-	2	3
2. Operation and Maintenance of Marine Engines	2	1	4	2	1	3
3. Internal Combustion Engine for Fishing Boats	5	6	6	1	6	6
4. Marine Electricity and Electronics	6	5	1	3	4	2
5. Refrigeration and Auxiliary Engines	4	4	2	4	5	5
6. Operation and Maintenance of Outboard Engines	1	1	5	5	3	1
7. Fuel Injection Pump & Injector Calibrating Machine	-	-	-	6	-	-
8. Construction of Mariculture Facilities	-	-	-	-	-	7
9. Fish Processing Machinery	-	6	-	-	-	-



Table 5. Training subjects for training courses in the field of fishery extension.

Subject	Priority identified by institutions in					
	Bangladesh	Indonesia	Malaysia	Philippines	Sri Lanka	Thailand
1. Extension Methodology	1	2	2	4	-	2
2. Extension Services and Rural Development	2	4	4	1	-	5
3. Socio-economics of Small-scale Fisheries	3	6	6	3	-	1
4. Fishery Cooperatives	5	1	8	7	-	4
5. Community Awareness and Ways for Development	4	6	6	2	-	6
6. Communication Media for Extension Work	7	6	2	6	-	6
7. Teaching Strategies for Adult Learners	6	6	1	5	-	8
8. Fishery Statistics	8	4	5	8	-	9
9. Marine Affairs	9	3	8	9	-	3
10. Community Health	-	9	-	-	-	-

Table 6. Main training subjects which SEAFDEC/TD should conduct.

Priority	Subjects	Weighted Score
1.	Marine Fishing Technology	32
2.	Marine Engineering	28
3.	Navigation and Seamanship	22
4.	Fishery Extension Services	21
5.	Research Training (biology, oceanography)	19
6.	Fish Handling and Processing	2
7.	Natural Resources Conservation	1
8.	Environment and Water Pollution	1
9.	Fishery Economics	1
10.	Fishery Marketing Management	1
11.	Fishery Credit	1
12.	Scientific Diving	1

Table 7. Training subjects for regular courses in the field of marine fisheries.

Priority	Subjects	Weighted Score
1.	General Fishing Technology (six months)	33
2.	Commercial Fisheries (six months)	27
3.	Small-Scale Fisheries (six months)	26
4.	General Fishing Technology (one year)	18
5.	Commercial Fisheries (one year)	12
6.	Fishing Skipper (six to twelve months)	3
7.	Fishery Post Harvest (three months)	3
8.	Fishery Economics (one year)	1
9.	Fishery Marketing and Management (one year)	1
10.	Fishing Credit (six months)	1

Table 8. Training subjects for short-term training courses in marine fisheries.

Priority	Subjects	Weighted Score
1.	Fishing Gear Materials	72
2.	Purse-seine Fisheries	64
3.	Fish Detection and Luring Methods	60
4.	Trawl Fisheries	58
5.	Gill Net Fisheries	57
6.	Fishing Grounds	52
7.	Hydroacoustic Equipment and Fishing Machinery	43
8.	Fishing Boats and their Design	40
9.	Line Fisheries	40
10.	Coastal Navigation and Seamanship	35
11.	Lift Net Fisheries	32
12.	Set Net Fisheries	30
13.	Electronic Navigation	28
14.	Basic Knowledge for Master-fisherman	26
15.	Research Training in Fishery Biology	22
16.	Fishery Oceanography	21
17.	Miscellaneous Fisheries	17
18.	Model Net and its Experiments	16
19.	Research Training in Fishery Oceanography	10
20.	Fishery Biology	10
21.	Scientific Diving	6
22.	Celestial Navigation	5
23.	Fish Processing - Emphasis on Fish Jelly Products	3
24.	Preservation of Fish Catch (Post-harvest)	2

Table 9. Training subjects for regular courses in the field of marine engineering.

Priority	Subjects	Weighted Score
1.	Operation and Maintenance of Marine Engines	37
2.	Operation and Maintenance of Out-board Engines	29
3.	Marine Electricity and Marine Electronics	28
4.	General Marine Engineering	26
5.	Refrigeration and Auxiliary Engines	26
6.	Internal Combustion Engines	18
7.	Construction of Mariculture Facilities	2
8.	Fuel Injection Pump & Injector Calibrating Machine	2
9.	Fish Processing Machinery	1

Table 10. Training subjects for regular courses in the field of fishery extension services.

Priority	Subjects	Weighted Score
1.	Extension Methodology	35
2.	Extension Services and Rural Development	29
3.	Socio-economics of Small-scale Fisheries	27
4.	Fishery Cooperatives	21
5.	Teaching Strategies for Adult Learners	21
6.	Community Awareness and Ways for Development	20
7.	Communication Media for Extension Work	16
8.	Marine Affairs	14
9.	Fishery Statistics	12
10.	Community Health	1

**ASSESSMENT OF TRAINING NEEDS  
IDENTIFIED BY FORMER TRAINEES OF SEAFDEC/TD**

Table 1. Training subjects which SEAFDEC/TD should continue to conduct in the field of marine fisheries.

Subject	Priority identified by former trainees from			
	Bangladesh	Malaysia	Philippines	Thailand
1. Marine Fishing Technology	-	-	2	1
2. Marine Engineering	-	-	4	4
3. Fisheries Extension Services	-	-	1	2
4. Navigation and Seamanship	-	-	4	4
5. Research Training (biology, oceanography, etc.)	-	-	3	2
6. Resource Management	-	-	6	-

Table 2. Training subjects for the regular courses in the field of marine fisheries.

Subject	Priority identified by former trainees from			
	Bangladesh	Malaysia	Philippines	Thailand
1. Commercial Fisheries (one-year course)	1	2	4	5
2. Commercial Fisheries (six-month courses)	2	1	2	3
3. Small-Scale Fisheries (six-month courses)	3	3	1	2
4. General Fishing Technology (one-year course)	4	5	5	4
5. General Fishing Technology (six-month courses)	5	4	2	1
6. Fishery Cooperative Organization	-	-	6	-

Table 3. Training subjects for short-term training courses in the field of marine fisheries.

Subject	Priority identified by former trainees from			
	Bangladesh	Malaysia	Philippines	Thailand
1. Fishing Gear Materials	15	4	1	15
2. Fishing Ground	2	2	5	4
3. Fish Detection and Luring Methods	15	3	3	13
4. Purse Seine Fisheries	4	6	9	6
5. Trawl Fisheries	1	7	15	13
6. Gill Net Fisheries	6	8	8	16
7. Lift Net Fisheries	7	9	12	16
8. Line Fisheries	8	10	-	9
9. Miscellaneous Fisheries	9	12	-	11
10. Set Net Fisheries	10	11	14	16
11. Model Net and its Experiments	11	-	10	16
12. Fishing Boats and their Design	3	15	10	9
13. Hydroacoustic Equipment and Fishing Machinery	12	13	15	3
14. Fishery Biology	13	-	1	2
15. Fishery Oceanography	5	5	5	11
16. Coastal Navigation and Seamanship	14	1	3	5
17. Celestial Navigation	15	14	15	16
18. Electronic Navigation	-	-	-	8
19. Basic Knowledge for Masterfisherman	-	-	7	15
20. Research Training in Fishery Biology	-	-	-	1
21. Research Training in Fishery Oceanography	-	-	-	7
22. Cooperative Development	-	-	13	-
23. Fish Shelters	-	-	2	-



Table 4. Training subjects for regular courses in marine engineering.

Subject	Priority identified by former trainees from			
	Bangladesh	Malaysia	Philippines	Thailand
1. General Marine Engineering	-	3	1	5
2. Operation and Maintenance of Marine Engines	-	1	2	1
3. Internal Combustion Engine for Fishing Boats	-	4	4	3
4. Marine Electricity and Electronics	-	6	3	2
5. Refrigeration and Auxiliary Engines	-	5	5	6
6. Operation and Maintenance of Outboard Engines	-	2	6	4
7. Assembly and Disassembly Marine Engine	-	-	-	7

Table 5. Training subjects for the courses for fishery extension officers.

Subject	Priority identified by former trainees from			
	Bangladesh	Malaysia	Philippines	Thailand
1. Extension Methodology	8	1	1	2
2. Extension Services and Rural Development	7	5	3	3
3. Survey of Socio-Economics of Small-Scale Fisheries	6	7	2	1
4. Fishery Cooperatives	5	2	3	4
5. Community Awareness and ways for Development	4	3	5	7
6. Communication Media for Extension Work	1	4	6	6
7. Teaching Strategies for Adult Learners	2	6	7	5
8. Fishery Statistics	3	8	8	8
9. Marine Affairs	-	-	-	-

Table 6. Main training subjects which SEAFDEC/TD should continue to conduct.

Priority	Subjects	Weighted Score
1.	Marine Fishing Technology	11
2.	Fishery Extension Services	11
3.	Research Training	9
4.	Marine Engineering	6
5.	Navigation and Seamanship	5
6.	Resource Management	1

Table 7. Training subjects for the regular courses in the field of marine fisheries.

Priority	Subjects	Weighted Score
1.	Commercial Fisheries (six months)	20
2.	Small-Scale Fisheries (six months)	19
3.	General Fishing Technology (six months)	16
4.	Commercial Fisheries (one year)	16
5.	General Fishing Technology (one year)	10
6.	Fishery Cooperative Organization	1

Table 8. Training subjects for short-term training courses in the field of marine fisheries.

Priority	Subjects	Weighted Score
1.	Fishing Grounds	51
2.	Coastal Navigation and Seamanship	41
3.	Purse Seine Fisheries	39
4.	Fishery Oceanography	38
5.	Fishery Biology	32
6.	Fishing Gear Material	30
7.	Fish Detection and Luring Methods	30
8.	Trawl Fisheries	28
9.	Gill Net Fisheries	27
10.	Line Fisheries	22
11.	Hydroacoustic Equipment and Fishing Machinery	21
12.	Lift Net Fisheries	21
13.	Research Training in Fishery Biology	18
14.	Miscellaneous Fisheries	17
15.	Set Net Fisheries	14
16.	Model Net and its Experiments	13
17.	Basic Knowledge for Master-fisherman	13
18.	Research Training in Fishery Oceanography	12
19.	Electronic Navigation	11
20.	Celestial Navigation	5
21.	Fish Shelters	3
22.	Cooperative Development	1

Table 9. Training subjects for regular courses in the field of marine engineering.

Priority	Subjects	Weighted Score
1.	Operation and Maintenance of Marine Engines	20
2.	General Marine Engineering	15
3.	Internal Combustion Engine for Fishing Boats	13
4.	Refrigeration and Auxiliary Engines	12
5.	Marine Electricity and Electronics	10
6.	Operation and Maintenance of Outboard Engines	9
7.	Assembly and Disassembly of Marine Engines	1

Table 10. Training subjects for the courses for fishery extension officers.

Priority	Subjects	Weighted Score
1.	Extension Methodology	24
2.	Fishery Cooperatives	22
3.	Socio-Economics of Small-Scale Fisheries	20
4.	Communication Media for Extension Work	19
5.	Extension Services and Rural Development	18
6.	Community Awareness and ways for Development	17
7.	Teaching Strategies for Adult Learners	16
8.	Fishery Statistics	9
9.	Marine Affairs	-