

HANDBOOK OF TRAINING PROGRAMMES



TRAINERS' TRAINING CENTRE
CENTRAL MARINE FISHERIES RESEARCH INSTITUTE
(INDIAN COUNCIL OF AGRICULTURAL RESEARCH)
COCHIN - 682 014

Reference only-

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Central Marine Fisheries Research Institute
कोची-682 013 (भारत)/Kochi-682 018(India)

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CENTRAL MARINE FISHERIES RESEARCH INSTITUTE
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Published by :

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PREFACE

The Indian Council of Agricultural Research has established specialised Trainers' Training Centres in order to meet the demand of adequately trained teachers and trainers in agriculture and allied subjects to impart training on the principles of learning by doing. The TTCs offer in-service training courses for the trainers/instructors of the extension training centres, agricultural schools and teachers dealing with work experience and vocational courses in high schools and higher secondary schools. In addition to these programmes, the TTCs also offer skill-oriented training programmes to entrepreneurs and progressive farmers.

The Central Marine Fisheries Research Institute has developed expertise on various marine fisheries and mariculture technologies over the past several years. Based on the expertise the Institute has been offering regular training courses to officials from State Governments, Universities, ICAR Institutes, Krishi Vigyan Kendras, training institutions, industry and progressive farmers on subjects like marine prawn hatchery, prawn farming, pearl oyster hatchery, pearl oyster culture, pearl culture, edible oyster hatchery, edible oyster farming, seaweed culture and utilisation, SCUBA diving and estimation of marine fish production and stock assessment. The TTC of the CMFRI, Cochin, established in the year 1983, has so far conducted 87 such training courses for 732 personnel from the various maritime states and Union Territories including Pondicherry, Lakshadweep and the Andaman & Nicobar Islands.

The present Handbook contains details of the various training courses offered by the TTC at the different research centres of the Institute, where the necessary infrastructural facilities and expertise are available. It is hoped that this Handbook will be useful to all the organisations, institutions, universities, industries and farmers who desire to avail these facilities and depute their employees for training at the Institute.

M. Devaraj
Director

Cochin - 14,
June, 1997

Introduction

The Indian Council of Agricultural Research has established specialised Trainers' Training Centres in order to meet the demand of adequately trained teachers and trainers in agriculture and allied subjects to impart training on the principle of learning by doing. The kind and quality of training being envisaged in the Krishi-vigyan Kendras demand practical and experienced trainers. As a matter of fact, the trainers who should be in a position to demonstrate the skills effectively to the trainees/teachers, are not easily available owing to our academic oriented education and training. The Trainers' Training Centres therefore, have been established in specialised subjects mainly in the ICAR Research Institutes. In addition, the TTCs would offer inservice training courses for the trainers/instructors of the extension training centres, agricultural schools and teachers dealing with work experience and vocational courses in high schools and higher secondary schools. A few TTCs have been established exclusively for providing in-service training to women trainers and teachers. In addition to these programmes, TTCs also offer skill-oriented training programmes to entrepreneurs and progressive farmers.

The Trainers' Training Centre (TTC) of Central Marine Fisheries Research Institute was established in 1983 at Narakkal. Since April 1995 the centre has been functioning within the premises of CMFRI Headquarters at Cochin.

The Central Marine Fisheries Research Institute, established in 1947 for Marine Fisheries Research with National Marine Living Resources Data Centre has been engaged in the Marine fishery resources assessment during the early years to ensure the rational exploitation of the available resources and to discover new fishing grounds and new resources along the continental shelf and shelf edge waters. These studies have shown that in some areas the stocks have been heavily exploited. This has led to the diversification and intensification of the research activities in

Mariculture to augment the Marine Fish production. Thus during the past several years, the major thrust has been given for development of culture of fishes, prawns, mussels, edible oysters, pearl oysters, seaweeds etc. The technological feasibilities of some of these have already been demonstrated for the benefit of the interested farmers and other entrepreneurs and some of them have taken up these on a regular commercial basis.

Based on the expertise developed on various marine fisheries and mariculture technologies by the Institute, the Trainers' Training Centre has been organising short-term skill-oriented training courses for the following categories of beneficiaries.

- (i) Trainers of the Krishi Vigyan Kendras.
- (ii) Extension and development staff of fisheries departments of State Governments and Union Territories.
- (iii) Teachers, Scientists and extension workers of Universities and Research Institutes and Officers of Nationalised Banks and Agricultural & Rural Development Bank.
- (iv) Trainers dealing with work experience and vocational course in schools.
- (v) Private entrepreneurs interested in taking up pearl culture, farming of prawns, oysters, mussels, seaweeds etc.

TTC of the CMFRI since its inception has conducted 87 such training programmes for 732 personnel from the various maritime states and Union Territories of Pondicherry, Lakshadweep and the Andaman & Nicobar Islands.

This publication is intended to provide brief information on the scope of the various training programmes, the expertise available in the Institute, course contents, venue, durations, accommodation etc. for those interested in these programmes.

I. Shrimp Farming

The traditional culture of prawns and fishes, already in vogue in the pokkali fields of Kerala and bheries of West Bengal has certain disadvantages. In this practice, selection of species and maintenance of optimum levels of stocking are not possible. Moreover, the undesirable species which enter the fields reduce the number and growth of the desirable species, adversely affecting the production. To overcome these difficulties, the Institute has developed scientific farming methods to improve the traditional system. This technology has been popularised among the small and marginal farmers and fish culturists by demonstrations organised by the Institute at various places and through the Lab-to-Land Programmes in the fields of adopted families. Therefore, there is great demand for trained field and extension personnel in the maritime states in the country. To meet this demand, the Trainers' Training Centre has been organising training programmes on shrimp farming for the officials of government and non - governmental organizations and private entrepreneurs.

(i) Course Content

Theory Sessions

: Present status and prospects of shrimp farming in India, different farming systems, traditional and improved methods of prawn farming, site selection, design and construction of ponds; eradication of predators, fertilisation and preparation of ponds; cultivable species of prawns and their biology; Prawn seed resources; natural resources, collection, sorting, identification and transportation of prawn seed from the wild, hatchery produc-

tion of prawn seed, nursery rearing of prawn larvae, stocking of ponds and monitoring and management in prawn farming; formulation of compounded feeds and methods of preparation; problems of diseases; economics of shrimp farming; adoption status of prawn farming.

- Practical Sessions** : Prawn seed collection from the wild; collection of prawn larvae and juveniles, sorting, counting etc.; analysis of water quality parameters; preparation of compounded feeds; visit to prawn hatcheries, traditional prawn filtration fields and prawn farms.
- (ii) Eligibility** : Biology graduate having experience in aquaculture.
- (iii) Course Strength** : 10
- (iv) Time and Duration** : November-December (10 days)
- (v) Venue** : Trainers' Training Centre,
Central Marine Fisheries
Research Institute,
Cochin - 14.

II. Shrimp Farming for Financing Agencies

(i) Course Content

- Theory Sessions** : Present status and prospects of shrimp farming in India; techno-economic aspects of traditional and scientific practices of shrimp

farming; site selection, design and construction of farms; prawn seed and feed resources; farm management-evaluation of growth and survival of prawns, harvesting and marketing; socio-economic and environmental problems.

- (ii) **Eligibility** : Nominees of banks and other Agencies financing aquaculture programmes.
- (iii) **Course strength** : 15
- (iv) **Time and duration** : December (3 days)
- (v) **Venue** : Trainers' Training Centre,
Central Marine Fisheries
Research Institute,
Cochin - 14.

III. Hatchery Production of Shrimp Seed

The importance of exclusive export oriented shrimp industry of India is well known. More than 70% of the export value of marine products from India is contributed by shrimps. Consequently as in other tropical maritime countries, vast areas are being converted to shrimp farming in our country too. Seed being the main constraint in shrimp farming, Central Marine Fisheries Research Institute has conducted a series of experiments and succeeded in developing an economically viable Mini hatchery system suited to Indian conditions, especially to the farmers having small areas available for shrimp farming.

(i) Course Content

- Theory Sessions** : Status of shrimp hatcheries in India; impact of seed collection

from the wild; different sections in a hatchery: Spawner section, larval rearing section, nursery section, aeration grid, water treatment and distribution section and algal culture section; larval feed, spawner feed, seed acclimation and transport.

- Practical Sessions** : Spawner selection and transport, spawner feed, rematuration of spawners in recirculation system, spawning, hatching, water treatment, stocking, larval rearing, post-larval harvest, live feed culture, preparation of particulate feed.
- (ii) **Eligibility** : Biology graduate having experience in fish/shellfish hatchery.
- (iii) **Course Strength** : 10
- (iv) **Time and Duration** : January-February (15 days)
- (v) **Venue** : Mandapam Regional Centre of CMFRI, Mandapam Camp, Tamilnadu.

IV. Edible Oyster Culture

In India there is a growing demand for oyster meat in some parts of the country as well as for export. The oyster resources are scattered at several places and known to show wide fluctuations in abundance. Since early 70's the Central Marine Fisheries Research Institute has been conducting researches on various

aspects of oyster biology and culture. As a result, a viable technology for oyster culture, including hatchery production of seed, is now available.

(i) Course Content

Theory Sessions:

Part I - Hatchery Technology for seed Production:

Infrastructure facilities of a molluscan hatchery, development of edible oyster hatchery systems in India, reproduction of edible oyster, gonad development and stages of sexual maturity, broodstock management and conditioning, including spawning techniques, early larval developmental stages, larval rearing, techniques and methods in spat setting, micro-algal culture, nursery rearing of oyster seeds.

Part II - Edible Oyster Farming:

Edible oyster culture in the world, edible oysters and their distribution in India, oyster biology, various techniques of oyster culture, spat collection and preparation of spat collectors, rearing of seed oysters to marketable size, farm maintenance, foulers and predators in an oyster farm, harvesting and post-harvest technology.

Practical Sessions:

Part I - Hatchery Technology for Seed Production

Broodstock management and conditioning, induced spawning of edible oyster (thermal and chemical methods), gonadal stages of maturity, larval rearing: larval estimation, stocking and larval measurement, methods in spat-setting, micro-algal culture, preparation of culture media, isolation technique and culture, nursery rearing of oyster seeds.

Part II - Edible Oyster Farming:

Morphology and anatomy of edible oyster, visit to natural

oyster beds, preparation of spat collectors and laying, erection of racks, farm maintenance, harvesting, depuration of oysters, shucking of oysters etc.

- (ii) **Eligibility** : Biology graduate having experience in mariculture.
- (iii) **Course Strength** : 10
- (iv) **Time and Duration** : February-March (10 days)
- (v) **Venue** : Tuticorin Research Centre of CMFRI, No. 90, North Beach Road, Tuticorin-1.

V. Marine Pearl Culture

Pearls have been much sought after gems from time immemorial. Earlier days pearl oysters were fished for extraction of natural pearls. Japan was the first country to succeed in producing cultured pearl and now holds the monopoly in the production of marine pearls. Eventhough experiments on production of cultured pearls were initiated in India in early 1930's success was achieved only in the 70's. India has ample scope to develop and expand the cultured pearl industry in different localities mainly in the Gulf of Mannar, Gulf of Kutch and Andaman and Nicobar Islands. Pearl culture is a long-term investment and huge profits can be made in a successful culture operation as there is always a great demand for pearls. CMFRI has developed indigenous technology for the production of cultured pearls. Considering the great scope of this technology, the Trainers' Training Centre of the Institute conducts regular training course on Marine Pearl Culture.

(i) Course Content

- Theory Sessions** : Indian pearl oyster resources and pearl fisheries, infrastructure facilities of a molluscan hatchery,

reproductive biology of pearl oysters, broodstock management and conditioning techniques of controlled maturation, techniques of induced spawning, early larval developmental stages, larval feeding, micro-algal culture, larval rearing techniques and methods of spat-setting, pearl oyster farming, biofouling and predation, techniques of cultured pearl production, tissue culture in pearl oysters, pearl harvest, cleaning, grading and preservation.

Practical Sessions

: Morphology and anatomy of pearl oysters, gonadal stages of maturity, induced spawning techniques (thermal and chemical methods); larval rearing: larval estimation, measurement and larval feeding, methods in spat setting; selection of oysters and conditioning for operation, graft tissue preparation and nucleus implantation; pearl harvest, cleaning, grading and preservation.

(ii) Eligibility : Biology graduate having experience in mariculture.

(iii) Course Strength : 10

(iv) Time and Duration : March - April (10 days)

- (v) **Venue** : Tuticorin Research Centre of
CMFRI,
No. 90, North Beach Road,
Tuticorin-1.

VI. Live Feed Culture

The success of any hatchery system, either shellfish or finfish entirely depends on the availability of the suitable live food organisms. In the natural environment the larvae feed on any minute food organism which is readily available to them. But in a hatchery, the food which are acceptable to the larvae for their growth and further development have to be identified, isolated and cultured. Hence the culture of live feed is an essential pre-requisite for the rearing operations of economically important cultivable organisms in the hatchery system. The Central Marine Fisheries Research Institute has developed technologies for the mass production of live feed such as micro-algae, rotifers, cladocerans and brine shrimp.

(I) Course Content

Theory Sessions:

Part I - Phytoplankton Culture:

Identification of suitable micro-algae as live feed, isolation of required species of micro-algae in a hatchery system, culture media preparation, growth phases of algal culture, stock culture maintenance, laboratory culture (indoor mass culture and outdoor open tank culture), harvest and preservation of the culture.

Part II - Zooplankton Culture:

Techniques of rotifer culture, method of harvest and utilisation, techniques of brine shrimp culture, production of brine shrimp cysts under controlled conditions and production of brine shrimp biomass under controlled conditions, techniques of moina and daphnia culture.

Practical Sessions:**Part I - Phytoplankton Culture:**

Identification and familiarisation of required species of diatoms and phytoflagellates under microscope, preparation of various culture media, inoculation procedure, procedure of stock culture maintenance, identification of growth phases of the culture, sterilization procedure, indoor and outdoor culture and preservation techniques.

Part II - Zooplankton Culture:

Production of marine rotifers, production of brine shrimp, visit to salt pan areas, collection of cysts and estimation of hatching rate, production of moina and daphnia.

- (ii) **Eligibility** : Biology graduate having experience in finfish/shellfish hatchery.
- (iii) **Course Strength** : 10
- (iv) **Time and Duration** : September-October (16 days)
- (v) **Venue** : Tuticorin Research Centre of CMFRI, No. 90, North Beach Road, Tuticorin-1.

VII. Seaweed Culture and Utilisation

Seaweeds, constituting an important renewable marine resource, grow in the shallow waters of sea attached to rocks and other hard sea substrata. There are about 720 species of seaweeds available in India, of which 60 are commercially important. Seaweeds are used as food as they contain iodine, vitamins, minerals, proteins and essential aminoacids. They are also used as fodder and fertilizer and recently as a source of drugs agar-agar, algin, carrageenan and other phycocolloids.

Due to the over exploitation of these resources for industrial purposes, the natural stocks are diminishing and it has now

become necessary to augment these resources through cultivation. Since 1972, the Central Marine Fisheries Research Institute has been engaged in the cultivation of several economically important seaweeds and has developed simple technologies for their cultivation.

(i) Course Content

- Theory Sessions*** : Classification, distribution and resources of marine algae, economically important seaweeds and their uses, identification of different seaweeds, conservation of commercially important seaweeds, methods to be adopted for commercial exploitation of seaweeds from natural seaweed beds, cultivable species of seaweeds, methods of cultivation and post-harvest technology, extraction of phycocolloids such as agar and carrageenan from red algae and sodium alginate from brown algae, methods of preparation of different seaweeds recipes like jelly, jam, pickle and wafer.
- Practical Sessions*** : Identification of various species of marine algae, extraction of agar and alginic acid, estimation of gel strength, gelling and melting temperatures of agar and viscosity of sodium alginate, preparation of agar jelly, methods of fabrication of coir rope

nets and HDP rope nets, seeding of vegetative fragments on coir rope and HDP rope nets and introduction of nets in shallow and deep waters.

- (ii) **Eligibility** : Biology graduate.
- (iii) **Course Strength** : 10
- (iv) **Time and Duration** : April-May (10 days)
- (v) **Venue** : Mandapam Regional Centre of CMFRI, Mandapam Camp, Tamilnadu.

VIII. Fish and Shellfish Disease Investigations

India has made rapid strides in the aquaculture of shrimps and is poised to take a major lead at international level. However, the progress in shrimp culture suffered a major set back recently due to the outbreak of diseases resulting in crop loss and imposition of crop holidays. The Central Marine Fisheries Research Institute has taken up research programmes on diseases of cultured marine organisms and their treatment on a priority basis. The Institute has provided guidance to farmers and other entrepreneurs for the effective management of the problems of disease in their farming systems.

The training programme is intended to impart skill oriented training on microbiological techniques and diagnostics for early detection and management of disease problems in aquaculture systems.

(i) Course Content

- Theory Sessions** : Overview of fish and shellfish farming and problems of diseases, types of diseases, diag-

nostic methodologies and control strategies, gross anatomy and normal histology, methods of disease prevention and treatment, disease inspection and certification, biotechnological methods of disease management etc.

Practical Sessions : Monitoring of water quality in shrimp farms, fixation procedure for routine histology, wetmount diagnostic procedures, histopathology and diagnostic methods of viral disease, isolation, culture and identification of bacterial and fungal pathogens, drug sensitivity testing, experiments on application of antibiotics, therapeutics etc.

- (ii) **Eligibility** : Biology graduate having experience in Aquaculture/hatchery.
- (iii) **Course Strength** : 10
- (iv) **Time and Duration** : September - October (15 days)
- (v) **Venue** : Mandapam Regional Centre of CMFRI, Mandapam Camp, Tamilnadu.

IX. Computer Based Application of Statistics in Aquaculture/Fisheries

With the advent of computers and its wide use in data analysis, people with minimum exposure to statistical methods and computer application can accomplish data analysis to a

satisfactory level. The Central Marine Fisheries Research Institute has developed software packages for statistical analysis of data. In order to share the Institute's experience with the agencies interested in research in aquaculture and to develop expertise in the country, the Institute organises training course on computer based application of statistics in aquaculture/fisheries.

(i) Course content :

The course will be of 3 modules.

- Module 1 : Introduction of computers.
- Module 2 : Statistical methods:
Probability and distributions
Statistical inference
Design of experiments
Linear programming.
- Module 3 : Hands - on application of statistical packages.

- (ii) Eligibility** : Research workers with primary interest in aquaculture.
- (iii) Course Strength** : 10
- (iv) Time and Duration** : July-August (10 days)
- (v) Venue** : Trainers' Training Centre of CMFRI, Cochin-14.

X. Post-harvest Technology in Fisheries

The fishery products require quick and efficient post-harvest handling and processing due to their highly perishable nature. This also ensures the freshness and nutritive value of the products. Considerable research has been done in the field of scientific handling and processing of fish and shellfish by the Central Institute

of Fisheries Technology (CIFT), Cochin and efficient and less expensive methods of curing and processing have been developed. The Trainers' Training Centre of CMFRI organises training course on Post-harvest technology in fisheries utilizing the expertise and instructional facilities developed by CIFT.

(i) Course content

Theory Sessions : Nutritional aspects of fish, fish handling and preservation, value added products from fish, fishery by-products, general aspects of seafood quality assurance, packaging of seafoods and technology transfer in fisheries.

Practical Sessions : Icing of fish, fish filleting, organoleptic evaluation, fish curing, salting, drying etc.; preparation of fish wafers, soup powder, fish pickles, cutlets, fish fingers etc.

(ii) Eligibility : Biology graduate having experience in fish processing technology.

(iii) Course Strength : 10

(iv) Time and Duration : April-May (10 days)

(v) Venue : Central Institute of Fishery Technology, Matsyapuri - P.O., Cochin - 29.

XI. SCUBA Diving

SCUBA (Self Contained Underwater Breathing Apparatus) diving is an authentic method of assessing the marine resources at the bottom of the sea which is quite essential for the judicious exploitation of these resources by the various agencies concerned. Scientists of the CMFRI have been engaged in carrying out underwater studies using aqualung ever since 1960, Tuticorin as the centre. The Institute has thus a team of Scientists well experienced in this area of underwater diving and exploratory work, with well organised infrastructural facilities for imparting training to aspiring candidates. Training courses have been conducted under this programme to Scientists, technical personnel and other interested individuals.

(I) Course content

Basic rules and pre-requisites for skin diving, selection of diving equipments and their operations, use of aqualungs and its hazards and safety measures to be followed, precautions to be taken in deep diving and safety regulations underwater surveying of marine fishes, collection techniques at sea-bottom and underwater photography, underwater vehicles and other recent advances in sea bottom studies by direct observations.

- (ii) **Eligibility** : Preferably science graduates.
Relaxable in case of experienced technical personnel.
- (iii) **Course Strength** : 6
- (iv) **Time and Duration** : May-June (8 weeks)
- (v) **Venue** : Tuticorin Research Centre of CMFRI, No.90, North Beach Road, Tuticorin-1.

General Information

(i) Time and Duration

Time and duration of the courses given are tentative. The exact date, duration etc., of each course will be decided on a priority basis.

(ii) Course Fee

Course fee charged at different rates for different topics. No course fee for ICAR and KVK candidates.

(iii) Faculty

The TTC maintains a close linkage with the different divisions of the host Institute and also with other government and non-government organisations. Resource personnel as well as instructional facilities available with such agencies are also made use of, ensuring a concerted approach to the transfer of technology programme.

(iv) Boarding and Lodging

The TTC has no boarding and lodging facilities. However, the same will be arranged at the expense of the trainees, on request. There is no provision for paying TA/DA.

(v) Nomination/Application

Nomination/Application prepared in the given format (Appendix I) should reach the Officer-in-Charge, Trainers' Training Centre, Central Marine Fisheries Research Institute (ICAR), Post Box No. 1603, Tatapuram, P.O., Cochin - 682 014 at least one month prior to the date of commencement of each training course. Confirmation letters will be sent to all the selected candidates with copy to the sponsoring agencies. The candidates are expected to

reach the venue of training one day in advance.

For further details please write/contact:

The Officer-in-Charge,	Phone : (Off)	: 394867
Trainers' Training Centre,	Telegram	: CADALMIN EKM
Central Marine Fisheries	Telex	: 0885-6435 MFRI IN
Research Institute,	Fax	: 0484-394909
Post Box No. 1603,		
Tatapuram. P. O.,		
Cochin - 682.014.		

Appendix - I**NOMINATION/APPLICATION FORM
(FORMAT)**

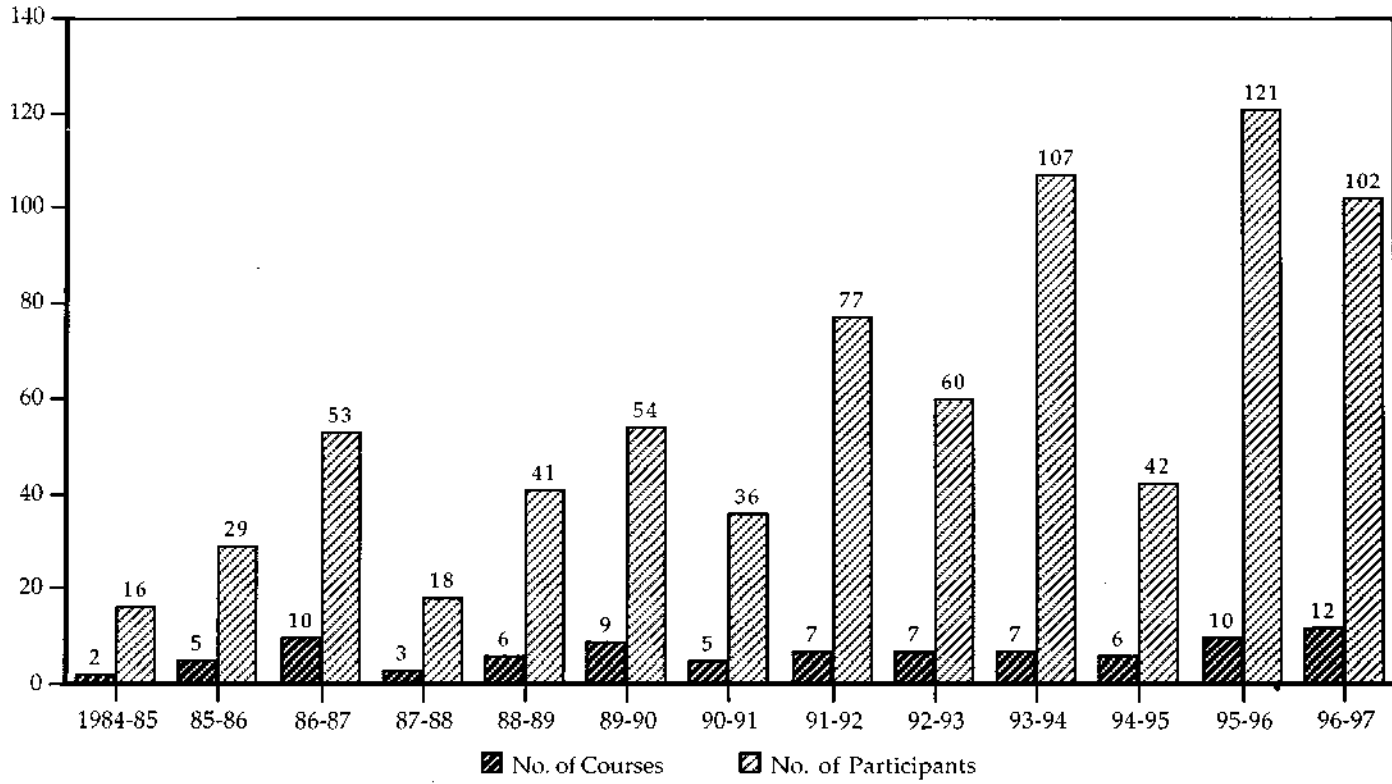
1. Title of the course :
2. Name of the applicant/nominee :
3. Age :
4. Educational qualifications :
5. Address for correspondence :
(including telegraphic address,
telephone No. etc)
6. Details of employment and
experience :
7. Experience if any with regard :
to the topic of training
applied for

Place:

Signature of Applicant/
Sponsoring Agency

Date:

PERFORMANCE OF TTC CMFRI, COCHIN 1984-1997



TRAINERS' TRAINING CENTRE HATCHERY — CMFRI, COCHIN

