Krishi Vigyan Patrika : Mariculture Series 1

KRISHI VIGYAN KENDRA FOR MARICULTURE

NARAKKAL, COCHIN

CENTRAL MARINE FISHERIES RESEARCH INSTITUTE
(I. C. A. R.)
COCHIN

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NARAKKAL, COCHIN

NOVEMBER, 1977

CENTRAL MARINE FISHERIES RESEARCH INSTITUTE
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Hindi and Malayalam translations of this
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Cover Photo:

Fish and prawn seed collection at Puthuvaippu, Cochin
by staff and trainees of the Krishi Vigyan Kendra, Narakkal.

Published by Dr. V. Balakrishnan, Officer-in-Charge, Krishi Vigyan Kendra, Narakkal on behalf of the Director, Central Marine Fisheries Research Institute, Cochin-682 018 and printed at Paico Printing Division, Cochin-682 011

FOREWORD

A major objective of the Central Marine Fisheries Research Institute is the transfer of technology to the end-user by instituting suitable training programmes. The Institute has developed several indigenous techniques for the culture of marine and brackishwater organisms in the recent past. This work is entering the phase of large-scale pilot projects on marine prawn culture, fin fish culture, poly culture of fish and prawns, open sea mussel culture of green and brown mussels, edible oyster culture, pearl oyster culture for production of cultured pearls, and seaweed culture. On the success of the technical feasibility of the culture of these organisms developed at the Institute, the Indian Council of Agricultural Research has been pleased to sanction a KRISHI VIGYAN KENDRA for mariculture at Narakkal. The Institute has a well established field laboratory for the breeding and culture of marine prawns at Narakkal for which a part of the State Fish Farm has been generously handed over for this purpose. The Government of Kerala has also come forward to offer about 9 acres of land for the Krishi Vigyan Kendra at Narakkal, adjacent to the farm. With this co-operative effort and expertise of the Institute the Krishi Vigyan Kendra for mariculture which was started in December 1976, has made good progress during the last few months.

The objective of the Kendra being "learning by doing", it has contacted fishermen farmers of the Vypeen area and already completed training courses for two batches of prawn farmers. It has scheduled a number of courses on improved techniques of prawn and fin fish culture, paddy and prawn culture and mussel culture within the next few months. The Kendra has already attracted considerable attention in creating an awareness among the fishermen and fish and prawn farmers of the Vypeen Island about the possibilities of utilising better techniques for improving their production in the fields.

This Kendra would not have come into existence but for the deep interest taken by Dr. M. S. Swaminathan, Director General, ICAR, in the mariculture work of the Institute and who proposed the constitution of a committee

headed by Dr. J. S. Patel to look into the possibilities of establishing a Kendra for Mariculture at Narakkal. The report which favoured the establishment of such a Kendra was actively pursued and sanctioned at the Council due to the efforts of Dr. O. P. Gautam, Deputy Director General (Edn & Cdn) and Dr. Chandrika Prasad, Assistant Director General (Cdn).

The work of the Kendra is currently taken care of by Dr. V. Balakrishnan and S/Shri P. Karunakaran Nair, K. V. George and K. N. Rasachandra Kartha. The activities of the Kendra, to be more effective should disseminate knowledge to all levels. This could be partly met through the medium of a suitable popular "Journal". The *Krishi Vigyan Patrika : Mariculture Series* has this as its objective and in this series it is proposed to publish the various activities of the Kendra in Hindi, Malayalam and English. It is hoped that the Krishi Vigyan Patrika will help to create a greater awareness and interest in mariculture and keep the fishermen and fish farmers informed about the research techniques developed in the Institute which could be easily assimilated by the end-users.

E. G. SILAS
Director,
Central Marine Fisheries Research Institute,
Cochin 682 018.

CONTENTS

Compiled and Edited by
Dr. V. Balakrishnan and K. Rengarajan

KRISHI VIGYAN KENDRA FOR MARICULTURE

Krishi Vigyan Kendra or Farm Science Centre is an innovative institution aimed at launching a "techniracy" drive in the country. By "techniracy" is meant the imparting of the relevant technical skills to the illiterate. Realising the importance of the dissemination of the technical know-how developed in the research laboratories to the actual producer in the field for increasing his yield, income and in the larger perspective, for enhancing food production, and improving the rural economy, the Indian Council of Agricultural Research has recently established a number of Krishi Vigyan Kendras for farmers engaged in Agriculture, Animal husbandry and Fisheries. The main objective of these Kendras is to apprise and train the practising as well as prospective farmers in modern and scientific line of production and utilisation in the concerned field of their occupations in a short but comprehensive course specially designed and organised on the principle of "learning by doing".

Guiding Principles

The first principle for establishing and running Krishi Vigyan Kendra is that the training is need-based and designed to help practising farmers and fishermen to improve their skills in farming. Thus, the Kendras are conceived as vehicles for carrying the latest advances in science and technology to the field through the provision of appropriate training. For this purpose, each Kendra is linked to a first rate scientific institution.

The second principle relates to the choice of the trainees. They should have roots in the village and should go back to farming. The Kendra will not serve as a passport to employment. If that were so, the Kendra may become yet another category of institution which swells the ranks of job seekers.

The third principle relates to the content of the training programme. Before deciding upon the courses it is necessary that the Kendra conducts a survey of the needs of the region which the Kendra is to serve. By carefully studying this, areas have been identified where relevant training can help farmers to reap full benefits from modern technology.

Aims and Objectives

To train present and prospective fishermen and small farmers of the coastal region in mariculture technology developed for cultivable marine organisms, and their management.

To develop skills among the small farmers and fishermen in seed production, hatchery techniques, farm operation, simple post harvest technology, farm management, economics and marketing of products through participating experiences.

To carry out follow up programme of the training to assess its impact.

To undertake follow-up programmes to develop suitable strategy for the extension work.

To disseminate the findings of research and develop the ability to apply mariculture techniques and information to the solution of farming problems through individual or collective farming programmes.

To assist persons to analyse critically the economic requirements essential for establishing and maintaining efficient farming units.

To develop traits such as co-operation, industry, initiative and self-reliance essential for successful occupational adjustments and human relations.

Scope

Fisheries occupy an important place in the economy of Kerala. The State contributes at present about 40% of the total marine fish landings of India and 85% of the export earnings from marine products from the country. However, the fish production from the inland waters of the State, comprising of 9,800 hectares of lakes and reservoirs, 85,000 ha. of rivers and canals and 340,000 ha. of estuaries and brackish water, is of the order of only 20,000 tonnes.

Brackish water fish culture is practised at present on commercial scale only in Kerala and West Bengal. In Kerala it is prevalent in the low-lying fields adjacent to the backwaters, and forms an age old avocation. The method as practised at present entails cultivation of paddy during the monsoon months when water condition

becomes almost fresh water. After the harvest of paddy in September—October, these fields are prepared for prawn culture by strengthening the bunds and fixing the sluice gates through which the flow of water into the field is regulated. The young ones of prawns and fishes brought in by the tidal currents are trapped in these fields and cultivated. Fishing is carried out during seven to eight days on either side of the full moon and new moon periods by fixing a filter net to the sluice during the ebb-tide. At present, about 4,500 hectares are utilised for paddy and prawn culture.

Recent surveys and investigations have revealed that there is great scope for increasing fish production by concentrating our attention on the culture of suitable species of fishes, prawns, shell fishes, etc. in the vast water area of the coastal zone which is now lying unutilised or underutilised.

A staff member of the Kendra demonstrates the collection of prawn seed from surf

Mariculture has a such direct bearing on the coastal rural economy that it will provide opportunities for self employment, increase production of cultivable marine and estuarine organisms several fold and thereby help augment our food production, support a number of ancillary small scale industries, provide material for export

resulting in the increase of our foreign exchange earnings and bring about an over all improvement in the socio-economic conditions of the coastal fishermen and farmers.

Role of the Central Marine Fisheries Research Institute

The Central Marine Fisheries Research Institute, Cochin has evolved indigenous techniques for the culture of the marine organisms such as prawns, fin fish, edible oysters, pearl oyster, mussels and sea weed, and demonstrated the technical feasibility of undertaking mariculture operations of these organisms in our coastal waters. Large scale pilot projects for testing the economic feasibility of culture of these are now being undertaken. More trials on the culture of other cultivable marine and estuarine organisms are under way.

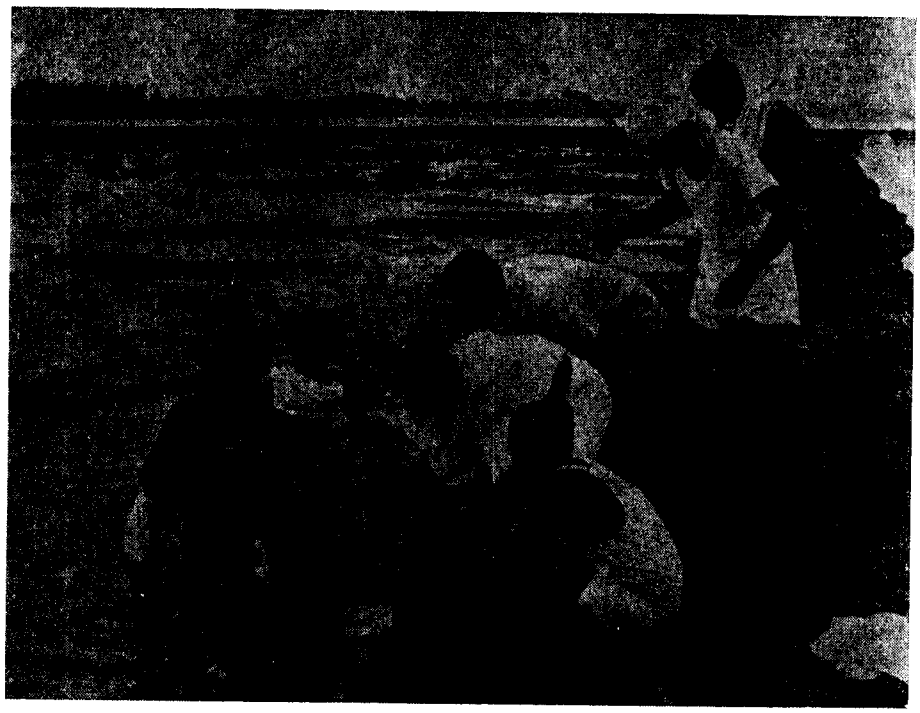
Collection of prawn seeds from puddles by the trainees

With the knowledge thus gained, the Institute is in a position to impart training to fishermen and small farmers to take up mariculture. It is also indicated that the traditional prawn culture in paddy fields adjacent to the backwaters could be

improved upon by stock manipulation and adoption of scientific culture techniques for obtaining enhanced production

Seat of Krishi Vigyan Kendra for Mariculture

Vypeen Island in Ernakulam District—one of the thickly populated regions of the world — is a coastal island lying parallel to the mainland, and is separated from it on the eastern side by the northern extension of the Vembanad Lake (Cochin Backwaters). The Cochin and Azhikode barmouths form the southern and the northern boundaries of the island, while on the western side is the Arabian Sea.



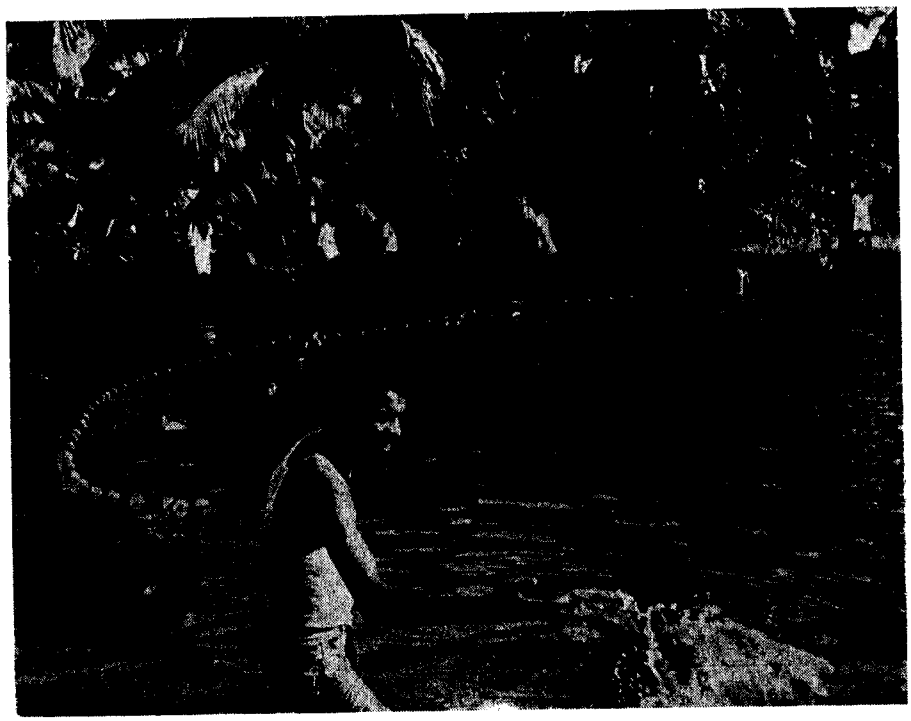
Trainees are taught to handle prawn seed for transport

Through these two bar mouths prawn larvae and juveniles enter the estuaries and backwaters, in millions. The island has plenty of paddy fields and swampy areas where some traditional culture fishery operations are in vogue. The island is an ideal region where proper training in new techniques in mariculture could be given to improve the existing practices as well as to start new mariculture operations

on commercial lines. Narakkal, a village in the middle of the island, has been selected as the seat of the Krishi Vigyan Kendra.

Organisation and Administration

The Krishi Vigyan Kendra for mariculture started functioning under the Central Marine Fisheries Research Institute from 22nd December, 1976. The Kendra is temporarily housed in the Prawn Culture and Propagation Laboratory of the Institute at Narakkal. Negotiations are under way with the Government of Kerala for taking up on lease about 9 acres of land, close to the Prawn Culture and Propagation Laboratory, for its permanent building and farm.



Operation of drag net for prawn and fish by the trainees

The Director of the Institute is in overall charge of the Kendra. The sanctioned Scientific/Technical staff complement at present includes a Senior Scientist (Training), 4 Senior Training Assistants and 4 Training Assistants. The Senior Scientist (Training) is the principal executive officer.

The Office staff consists of Superintendent, Assistant, Junior Stenographer, Junior Clerk and Supporting staff of different categories. Pending filling up of the sanctioned posts, the Kendra at present is run by the active co-operation of the scientific and technical officers of the Institute (Appendix VI).

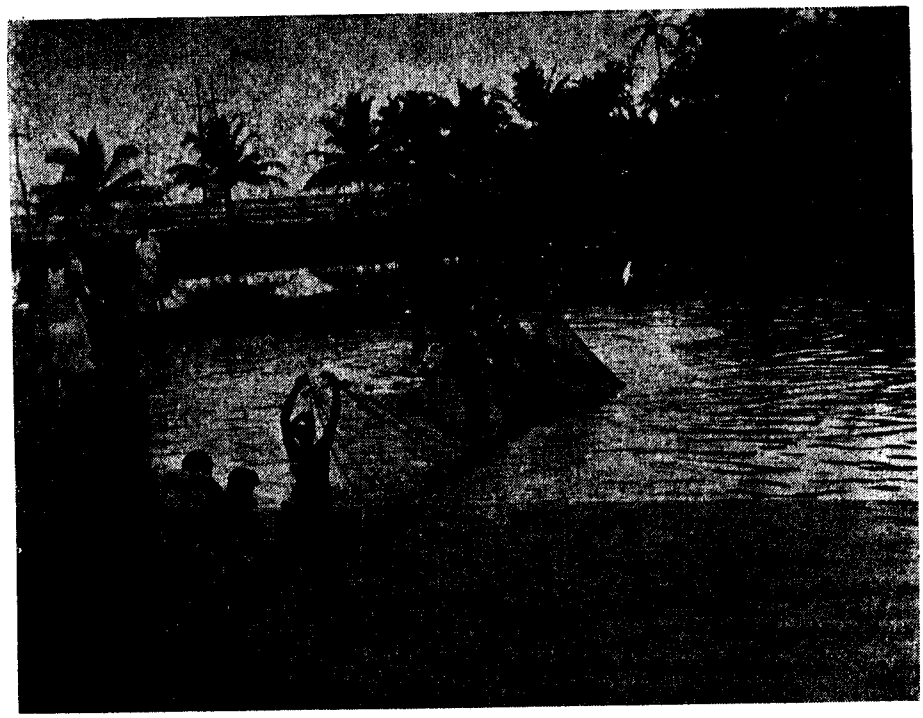
The budget provision for the period ending March 1979 is Rs. 16.43 lakhs (Appendix III).

Management Committee

A management committee consisting of progressive farmers and farm-women and local leaders, besides technical experts, has been constituted to give advice and

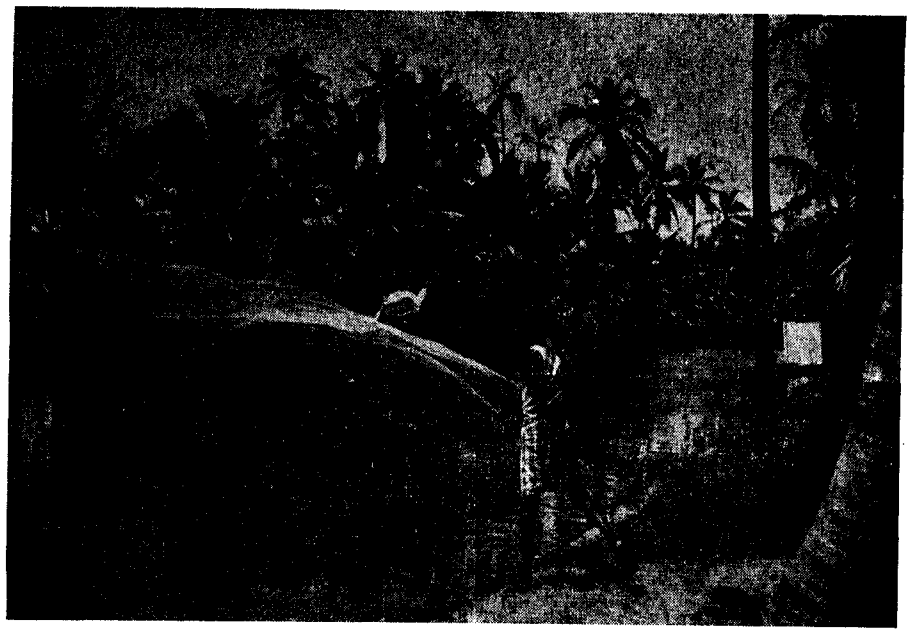
Harvesting of white prawn from the culture ponds by the trainees

guidance in the working of the Krishi Vigyan Kendra. The constitution, membership rules and functions are given in Appendix II, while the names of the present Management Committee are given on the inner cover page.

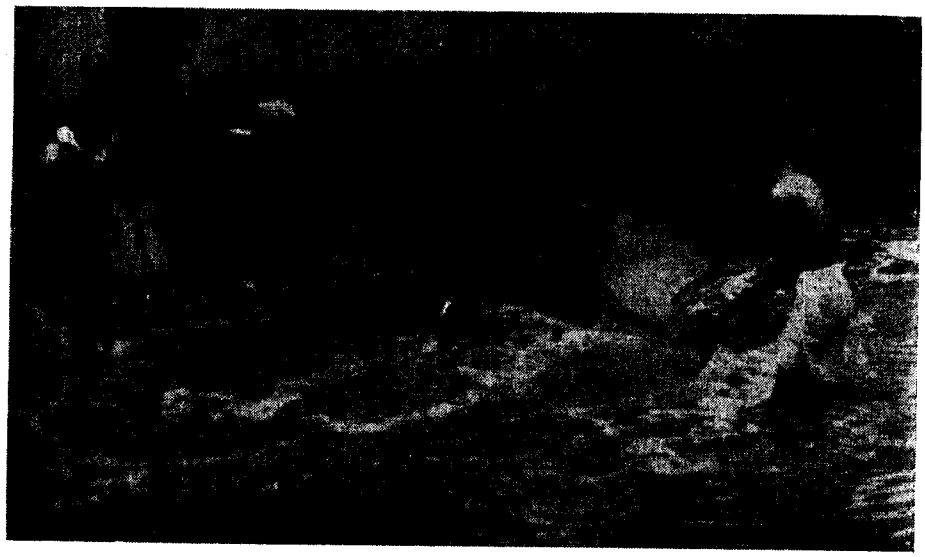


Harvesting of milk fish from culture ponds by the trainees

Harvested milk fish



Trainee operates a cast net



Eradication of predators by adding Mahuwa cake

Details of the Course

The Kendra envisages to impart training in the following subjects:

1) Marine Prawn Culture
2) Fin fish culture
3) Mussel culture
4) Edible oyster culture
5) Seaweed culture

The details of the syllabi are given in Appendix I. The courses are highly practical biased and endeavours to orient the farmers in the modern lines of production. The Institute is also considering to provide opportunities to trainees to have some general

Ophichthyid eels eradicated from the culture pond

education pertinent to health, sanitation, family welfare, panchayat raj and co-operation. These special subjects will form the complementary part of the training programme.

Duration of course

There is no fixed schedule for the courses offered by the Kendra. Each course, each time is tailored to suit the needs of the farmer. The course may vary from 4 to 8 weeks.

Selection of trainees

The principal condition for admission to the training courses is that the trainees should own fish/prawn farm and should be working in the same. However, this condition is sometimes waived because there are many economically weaker and scheduled caste fishermen in the region who do not own farms but permanently work there.

Valedictory function of the first training course
Dr. E. G. Silas, Director, CMFRI addresses the gathering

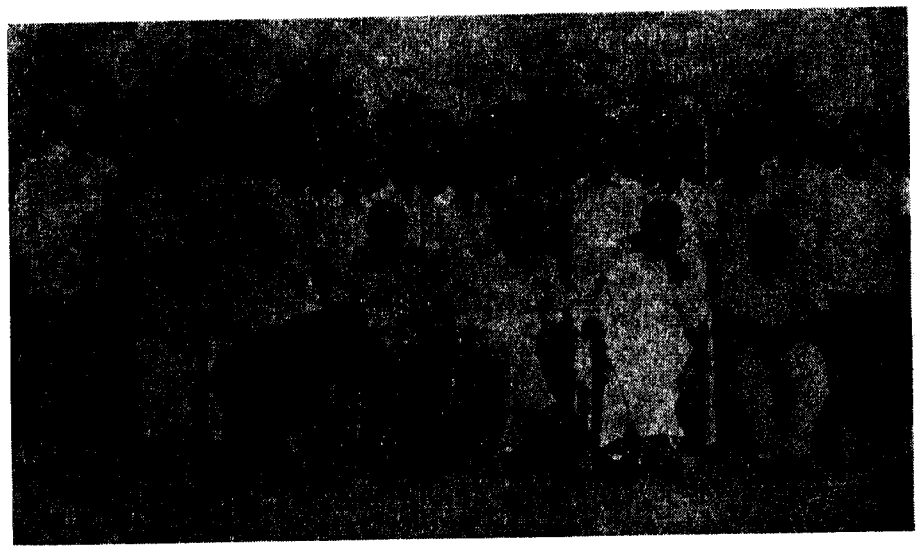
Stipend

Normally the trainees would be provided with free accommodation and boarding, and facilities for extra curricular activities in the hostel attached to the Kendra. However, as there is no hostel facility at present, the trainees are given a stipend of Rs. 150 per month.

Training imparted during 1977

The Kendra has already conducted two training courses in prawn/fish culture, each of one month's duration, since its establishment. One more course in the series will be held during November-December. Future courses will include training in the culture of marine and brackish water fishes, mussel, edible oyster and seaweed, in addition to that of prawn culture.

Trainees of the first course with the staff of the Kendra and the Director of CMFRI



Trainees of the second course with Dr. R. Raghu Prasad, Assistant Director General, ICAR, Dr. E. G. Silas, Director, C. M. F. R. Institute and staff of the Kendra

Field Survey

In order to take inventory of the present status in respect of production, production means, areas utilised, potential area, expenditure pattern, income and other socio-economic conditions of the fishermen as well as the fishing villages in the coastal zone, a survey has been planned so that the Kendra could compare at a later date the development that has taken place in the fishing villages due to the impact of the promotional activities undertaken by it. Information to be collected under the first survey is given in the proforma in Appendix V. Under this programme a survey of the fishing villages of Narakkal has already been initiated.

Follow-up programme

With a view to assess the impact of training in improving the culture practice and consequent socio-economics of the individual farmer as well as the fishing village, a follow-up programme forms an important activity of the Krishi Vigyan Kendra. This will be carried out through frequent visits to the site of operation by the staff members of the Krishi Vigyan Kendra, arranging discussions, meetings, and closely following up the changes effected or adopted by them. This activity would help to identify the bottlenecks encountered in the actual field operation, and to suggest remedial measures as well as to modify the future training programmes.

APPENDIX I

1. SYLLABUS FOR MARINE PRAWN CULTURE

No.	Topic	Theory (units*)	Practical (units*)	Total (units*)
I.	*Introduction to the course:* Aims and objectives—philosophy of the course ("learning by doing") — course on prawn culture.	0.2	—	0.2
II.	*General characteristics of prawns:* Commercial prawns—their distribution-life history—biology—features contributing to the suitability for culture.	0.2	—	0.2
III.	*General review of prawn culture:* Importance of prawn fisheries—present status in India and abroad—dwindling economic returns due to heavy exploitation—needs for finding out additional resources—possibilities and prospects of prawn culture.	0.2	—	0.2
IV.	*Review of existing prawn culture practices:* History—traditional methods as practised in Kerala and West Bengal—production — advantages — disdvantages different systems of prawn culture—selective culture—prawn culture by artificial breeding and rearing — culture in pens—prawn and fish culture—polyculture — advantages—disadvantages.	0.2	—	0.2
V.	*Prawn culture by artificial breeding and rearing:* Maturity stages and characteristics of mature prawns—collection of spawners, availability—grounds—transportation—breeding in the laboratory—rearing of eggs, larvae and postlarvae upto stocking size—identification of larvae.	0.2	5.0	5.2

*One unit = 6 hours.

VI.	*Food and feeding:* Natural food of prawns in different stages—different types of feeds used in culture—phytoplankton—zooplankton—brine shrimp—rotifers.	0.4	2.0	2.4
VII.	*Growth and mortality:* Moulting and growth rates in different environment—growth in culture fields.	0.2	—	0.2
VIII.	*Seed production:* Prawn seed from natural sources —availability—abundance—methods of collection —gear—transportation of seed — problems of large scale production of seeds.	0.4	5.0	5.4
IX.	*Environmental requirements:* Salinity—dissolved oxygen—temperature, etc—their influence on survival rate and growth.	0.3	—	0.3
X.	*Prawn farm:* Classification of prawn farm —selection of farm site—topographical requirements–water conditions — availability of prawn seeds—other factors to be considered—construction of ponds—installation of infrastructure facilities—preparation of ponds for stocking.	0.2	—	0.2
XI.	*Putting up of bunds, sluices, etc. and visit to prawn farms.*	0.2	6.0	6.2
XII.	*Stocking and culture of prawns in the fields:* Stocking size—stocking density—supply of food—methods of increasing production—polyculture—economical species—compatability with prawns—control of diseases—management of farm.	0.4	3.5	3.9
XIII.	*Harvesting and marketing.*	0.2	4.0	4.2
XIV.	*Conservation:* Theory—laws—economic importance, etc.	0.2	—	0.2
XV	*Participated discussion–conclusion*	1.0	0.0	1.0
		4.5	25.5	30.0

2. SYLLABUS FOR FIN FISH CULTURE

General Information

Importance
History

Soil and Water Chemistry

Physical—depth — temperature — turbidity—Chemical — dissolved oxygen — B. O. D. pH — alkalinity — free carbon di oxide — nitrogen — hydrogen sulphide — phosphorus — potassium. The role of pond soil—nutrient cycle.

Fish Pond

General considerations
Selection of pond site — layout of ponds — construction methods — water control—Pond biota—phyto-biota—zoo-biota—their control.

Cultivable Fishes

Qualities of cultivable species
Plankton and detritus feeders — harbivores — omnivores — carnivores.
Types of fish culture — mono — poly — composite.

POLYCULTURE

Procurement of fish seeds

Breeding habit of cultivated species
Artificial propagation
Methods of collection of fry and fingerlings from natural sources
Transportation — theoretical considerations — open and closed containers.

Nursing, Rearing and Stocking ponds and Their Management

Principles of nursing, rearing and stocking
Preparation of ponds
Manuring
Artificial feeding
Growth control
Pond sanitation.

Fish Diseases and Their Control

Fish Culture in Lakes, Reservoirs and Canals

Hydrobiological features
Swamps — fish culture in cages and pens.

Fish Culture in Fresh Water Ponds

Management — economics.

Fish Culture in Brackish Water

Management — economics.

Fish Culture in Paddy Fields

Advantage — types of culture — water and soil conditions — biota — preparation of fields — stocking — management — economics.

Fish Culture in Sewage Water

General considerations — characteristics of sewage — methods of culture — stocking density — growth — production of fish—advantage and disadvantage.

3. SYLLABUS FOR MUSSEL CULTURE

What are mussels?— a short account of the phylum Mollusca and different classes under mollusca—general characters by which mussels could be identified—different species available in India—habitat—growth—reproduction—Spat—food—chemical composition—distribution in India.

Countries where mussel culture is being done on a large scale—different methods followed for the collection of spat—various methods adopted in growing the spat to marketable size —a brief account about the methods followed for mussel culture at Kozhikode and Vizhinjam.

The present status of mussel exploitation in the country—fishing methods and utilization — production rate, potential—harvest—utilization.

Practical

Visits to different sites to study the spat settlement — collection of spat—transport of spat to the site where they are to be cultured — spat to be reared in fibre glass trough to study their behaviour.

Selection of farm site—topographical requirements—water conditions—salinity—dissolved oxygen—transportation—their influence on survival rate and growth of mussel spat.

Collection of material for the construction of raft — poles, rope, anchors, etc. — fabrication of the raft — floating the raft and anchoring it at suitable site.

Collection of spat from selected natural beds — transport of spat to the culture site—seeding of spat on coir ropes and suspending them from the floating raft.

Periodical visits to the raft to study the spat settlement on ropes—observations on fouling organisms—enemies of mussels—studies on the rate of growth—thinning of mussels on ropes if necessary.

4. SYLLABUS FOR EDIBLE OYSTER CULTURE

What are oysters? Where are they found?—a short account of the phylum Mollusca and different classes under the mollusca—General characters by which oysters could be identified —the various species of edible oysters in India and their habitat, growth, reproduction, spatfal, food, chemical composition, distribution in India, etc.

Countries where oyster culture is being done on a large scale—various techniques adopted in the collection of spat—methods followed in growing the young ones to marketable size—various methods followed in marketing of oysters. Earlier attempts on oyster culture at Bombay and Madras — A short account about the edible oyster culture work that is being done at Tuticorin and Mandapam Camp.

The present status of exploitation of oysters in our country—fishing methods and the utilisation of the meat and the shell.

Practical

Visits to various places in and around Ernakulam to find out the settlement of oysters in different environment. Small samples to be collected and taken to laboratory and reared in tanks—condition of gonads to be examined—(If oysters are in ripe condition spawning may take place in the tank) —detailed examination of such processes.

Selection of a suitable farm site—topographical requirements—water conditions—temperature, salinity, dissolved oxygen, etc—their influence on breeding and survival of oysters.

Collection of required material for the construction of rack and cages—suitable anticorrosive paint—fabrication of cages and construction of rack.

Collection of oyster spat/young oysters from the natural beds—oysters to be removed carefully without causing damage to the shells—transport of young oysters to the culture site-sorting, grading and putting them in the cages according to different sizes.

Periodical examination of the rack and the oysters, settlement of fouling organisms to be observed and periodical cleaning of the same from the shells—measurements of oysters to find out the rate of growth.

5. SYLLABUS FOR SEAWEED CULTURE

General information

Importance of seaweeds—historical resume—investigations on seaweeds in the Indian waters.

Classification

Classification of plant kingdom — taxonomic position of seaweeds—kinds of seaweeds:

Green seaweeds (Chlorophyceae)—Characteristics, pigmentation, uses and extraction of products food value and other economic uses, and common forms.

Red seaweeds (Rhodophyceae) — Common forms, characteristics, extraction of agar in cottage industry basis and commercial basis —habitat and nature of substratum.

Brown seaweeds (Phaeophyceae)—Common forms, extraction of algin—cottage as well as commercial basis—pigmentation and characteristics.

Economic importance of seaweeds

Uses of fresh material — uses of agar and algin—food requirements—industrial use—manure and feed for the cattle and poultry.

Distribution of seaweeds

Regional and seasonal distribution in the maritime States—controlling factors.

Survey of seaweeds

Methods of survey — resources estimation—mapping of the areas of abundance of seaweeds.

Management of the resources

Exploitation of the resources—problems of exploitation, regeneration and solutions.

Seaweed culture

Need for the culture, type of culture—economic feasibility of culture—prospects of the culture.

Seaweed utilization

Industrial uses of seaweeds — cottage and commercial basis — export potentialities scope for export - reasons for the ban of export of seaweeds.

New horizon in seaweed farming and utilization

Demonstration (Practical) for the culture practices

APPENDIX II

Local Management Committee for Krishi Vigyan Kendra

(a) Constitution

Each KVK shall have a Management Committee consisting of the following members:-

1. Head of the Institution to which KVK has been located.	Chairman
2. Representative of the State Development Department:	
— Agriculture	Member
— Livestock Production	,,
— Panchayat & development	,,
3. Representative of the Agricultural University in the State having jurisdiction of the District:	
— Agriculture	,,
— Livestock Production	,,
4. Representative of the ICAR	,,
5. A Local Leader	,,
6. A progressive Farmer	,,
7. A Progressive Farm Woman	,,
8. A Lady Social Worker	,,
9. Senior Scientist (Training)	Member secretary

(b) Membership Rules

1. A nominated member of the Committee shall hold office for a period of three years from date of his nomination.

2. Where a person becomes a member of the Committee by virtue of his office, his membership shall terminate when he ceases to hold the office.

3. The Committee shall meet at least once in each quarter.

4. If a casual vacancy arises during the three year period, such vacancy shall be filled in like manner as the original vacancy for the remaining period.

5. The Head of the Institution shall constitute the Committee with the concurrence of the I. C. A. R.

6. At least six members of the Committee shall constitute the quorum for any meeting of the Committee.

(c) Functions

1. Providing necessary guidance and leadership in building up the institution to fulfil its goals and objectives.
2. Considerations of proposals for annual Five Year Plans.
3. Periodical review of progress of the training programmes.
4. Policy issues relating to the Krishi Vigyan Kendra.
5. Such powers as may be delegated by the Governing/Management Body of the Institution to which KVK is attached.

APPENDIX III

Budget Abstract

	Rupees in lakhs			
	1976–'77	1977–'78	1978–'79	Total
1. Pay & Allowance	0.98	2.37	2.49	5.84
2. Other Recurring Expenditure	0.18	0.66	0.70	1.54
3. Non-Recurring Expenditure	5.21	2.04	1.80	9.05
Grand Total	6.37	5.07	4.99	16.43

APPENDIX IV

Biodata of the trainees

Trainees of the First Training Course

Name and Address	Age	Whether Scheduled Caste/Scheduled Tribe/Other Backward Class
1	2	3
1. V. K. Gopi Valiathara House Puthuvaipu	28	SC
2. P. A. Manmadhan Padathuparambil Kedamangalam	27	OB
3. P. N. Mukundan Parayil House Kedamangalam	21	OB
4. A. N. Gopalakrishnan Arrumikkat House Kedamangalam	23	OB
5. N. K. Mohanan Nambiath House Pooyappilly Vadekkekara N. Parur	24	Valan
6. K. J. James Kallarakkal Kedamangalam	24	—
7. K. C. Chakrapani Kannachiranikkathil Kedamangalam	24	—

Educational qualification	Experience	Owns any field or not
4	5	6
S. S. L. C.	12 years in practical prawn farming in paddy fields	$1\frac{1}{2}$ acres
IX Standard	12 years practical experience in paddy field prawn farming	5 acres in Kedamangalam village
S. S. L. C. failed	Knowledge in paddy field prawn culture for number of years	Regularly employed in prawn field
S. S. L. C. failed	–do– (5 years)	10 acres
S. S. L. C.	–do– (5 years)	10 acres
VIII Standard	–do–	10 acres
J. T. S. S. L. C. II year	–do– (4 years)	5 acres

1	2	3
8. N. A. Sukumaran Nikathithara Narakkal	25	SC
9. K. P. Mani S/o Purushan Kallumadathil Narakkal	17	—

Trainees of the Second Course

Name and address	Age	Whether Scheduled Caste/Scheduled Tribe/Other Backward Class
1	2	3
1. K. D. Ranjith Kottada House Cherai	24	—
2. C. V. Simon Chettipanambil Perumanoor Cochin	23	—
3. N. A. Sukumaran Nechikkattu Kedamangalam	27	OB
4. K. J. Mathappan Kallurakal House Kedamangalam	26	—
5. P. K. Surendra Pathil House Perumpadanna N. Parur	25	SC

4	5	6
IX Standard	Seven years of experience in prawn farming in paddy fields	In the fields of Sri.N.K. Raghavan (Elamkunnapuzha)
VIII Standard	2 years	$3\frac{1}{2}$ acres

Educational qualification Experience Owns any field or not

4	5	6
PDC Completed	Helping his father in prawn culture	$1\frac{1}{2}$ acres
S. S. L. C. failed PTC training	Knowledge in prawn culture fishing and specimen collection	Working experience
VII Standard	10 years working experience in paddy field culture	3 acres
S. S. L. C. failed	8 years working experience in paddy field prawn culture	10 acres
IX Standard	5 years	5 acres

1	2	3
6. V. K. Soman Vadekkepurath House Kedamangalam	21	OB
7. K. A. Sasi Kalathilparambil House Kedamangalam	25	OB
8. C. V. Babu Kalanganthuruthi Narakkal	23	—
9. M. X. Boni Mavelil House Chathanad Ezhikkara	21	OB
10. K. P. John Kallarakkal House Ezhikkara P. O. N. Parur	24	Christian
11. K. K. Viswanathan Keethodath Parappil House, Kedamangalam P. O. N. Parur	22	Valan

4	5	6
IX Standard	5 years	10 acres
IX Standard	10 years experience in paddy field prawn culture	7 acres
S. S. L. C. Completed	2 years	10 acres
S. S. L. C. failed	4 years	12 acres
S. S. L. C.	Seven years of experience in prawn farming in paddy fields	Regularly employed in prawn culture field.
VI Standard	4 years	2 acres

APPENDIX V

PROFORMA FOR FIELD SURVEY OF FISHING VILLAGE

I.

1. Name and Address:
2. Community: Fishermen/Others
3. House Number:
4. Panchayat:
5. Village:
6. Taluk:
7. District:
8. State:

II. Members including head of family:

	Male	Female	Total
a. Adults:			
b. Children: (below 15 years)			

III. Occupation details

	No. of Male	No. of Female	No. of Children (Below 15 years)	Total
1. Employed				
2. Agriculture				
3. Prawn culture				
4. Otherwise engaged				
5. School going				

IV. Extent of land in possession

Dry and Wet land

	1	2	3	4	5	Total/ha
a. Village						
b. Survey number						
c. Extent						
d. Nature of possession (Free hold, lease, other)						

V. Extent of field used for prawn/fish culture

	Seasonal	Perennial
a. Village		
b. Survey number		
c. Extent		
d. Nature of possession (free hold, lease, other)		
e. Whether directly connected to back-water/canal		

VI. Nature of prawn/fish culture practised

1. Nature

	Seasonal		Perennial	
	own	lease	own	lease
a. Extent of Field used				
b. Village				
c. Sy. Nos.				
d. No. of persons employed				
e. Expenditure:				
i. Paddy/ha.				
ii. Prawn/ha.				
f. Income:				
i. Paddy/ha.				
ii. Prawn/ha.				

2. Catch Composition

	Seasonal			Perennial		
	Qty.	Count	Price/kg	Qty.	Count	Price/kg
a. *P. indicus*						
b. *P. monodon*						
c. *M. dobsoni*						
d. *M. monoceros*						
e. Fishes						
f. Crabs						

3. Source of Prawn Seed

Seasonal — Wild / Wilful

Perennial — Wild / Wilful

4. Stocking rate/ha

5. Mode of disposal

Raw / Meat / Frozen / Dried / Pulp

a. Prawns

b. Fishes

c. Crabs

6. Variety of paddy seed

7. Quantity of paddy seed/ha

VII. Whether any unutilised cultivable water area in possession: Yes/No

If Yes,

S.No.	Village	Sy. No.	Location	Extent	Connected to backwater/ canal	Reasons for not using	Remarks
1.							
2.							
3.							

VIII. Details of technical help obtained : Yes/No

If Yes,

Source	Type	Whether implemented or not	If implemented, any benefits	If not, reasons

IX. Any other information

Place :

Date : Name and Signature of Surveyor

APPENDIX VI

Members of the Scientific/Technical staff nominated to/associated with the Krishi Vigyan Kendra

Staff nominated from CMFRI, Cochin

1.	Dr. V. Balakrishnan	Officer-in-Charge (S1)
2.	Shri P. Karunakaran Nair	Senior Technical Assistant (T4)
3.	Shri K. V. George	,,
4.	Shri K. N. R. Kartha	Technical Assistant (T II 3)

Staff of CMFRI associated with KVK

5.	Dr. P. Vedavyasa Rao	Scientist (S2)
6.	Dr. P. V. Ramachandran Nair	,,
7.	Dr. K. Alagaraja	,,
8.	Shri K. Nagappan Nair	,,
9.	Shri M. S. Muthu	Scientist (S1)
10.	,, A. Noble	,,
11.	,, V. S. K. Chennubhotla	,,
12.	,, V. Kunjukrishna Pillai	Scientist (S)
13.	,, C. P. Gopinathan	,,
14.	,, A. Jayaprakash	,,
15.	,, K. Rengarajan	,,
16.	Dr. P. S. Kuriakose	,,
17.	,, C. M. James	,,
18.	Shri V. K. Balachandran	,,
19.	Shri S. Palanichamy	Jr. Technical Assistant (T2)
20.	Dr. K. Narayanan	Research Fellow
21.	Shri R. S. Pandey	,,
22.	Kumari N. U. Pennamma	Research Scholar

Administrative Staff

Shri	P. S. Sudarsanan	Superintendent
,,	C. Balamamundinathan	Assistant
,,	R. V. Ajayakumar	Junior Stenographer
,,	V. P. Unnikrishnan	Junior Clerk

Supporting staff

Shri	V. Reghu	Sweeper
,,	R. Madhusudanan Nair	Watchman
,,	N. K. Asokan	,,
,,	K. Rajappan	,,

MOTTO OF KVK

"LEARNING BY DOING"

Krishi Vigyan Patrika : Mariculture Series

Number 1. Krishi Vigyan Kendra for Mariculture

Under Publication

Number 2. Culture of milk fish

Number 3. Paddy and prawn cum fish culture

Number 4. Course content of prawn/fish culture

Number 5. Impressions of KVK trainees


CENTRAL MARINE FISHERIES RESEARCH INSTITUTE