RESEARCH PROJECTS

1985 - '86

CENTRAL MARINE FISHERIES RESEARCH INSTITUTE

COCHIN - 682 018

INDIAN COUNCIL OF AGRICULTURAL RESEARCH

CENTRAL MARINE FISHERIES RESEARCH INSTITUTE

RESEARCH PROJECTS FOR 1985-86

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On-going projects

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On-going projects

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New Project			
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Project completed

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Project completed

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On-going Project

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5. Project completed

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RESEARCH PROJECT - 1985-'86

1. Institute Code No. FSS/FRA/1.1 2. I.C.A.R. Code No.

3. Name and address of Research Institute: C.M.F.R. Institute, Cochin

4. Title of project: Assessment of Marine Fishery Resources of the Exclusive Economic Zone.

5. Title of sub-project: Acquisition of data on exploited marine fishery resources for stock assessment in Exclusive Economic Zone.

6. Name and designation of project Leader: S.K. Dharma Raja S-3

7. Name(s) and designation(s) of Project Leader and Project Associates together with time proposed to be spent and work to be done.

Centre	Name	Designation	Time to be spent (%)	Work to be done
	T.Jacob	S-3	20	As per colm.
Cochin	S.K.Dharma Raja	S-3	40	10
	K.Alagaraja	S-3	20	
	K.Narayana Kurup	S-2	30	
	K.Balan	S-1	30	
	K.S.Scariah	S-1	30	
	K.Vijayalekshmi	S-1	25	
	M. Sreenath	S-	30	

Technical Assistance: Syed Basheeruddin, S.S.Dan, J.P.Karbhari, G.Balakrishnan, U.K.Sathyavan, Varughese Philipose, Varughese Jacob, G.Krishnankutty Nair, P.Sivaraman V.Rajendran, V.P.Annam, A.Kanakkan, P.K.Mahadevan Pillai, S.Haja Najumuddin, P.L.Ammini, C.J.Prasad, K.C.Yohannan, Joseph Andrews, Abha Kant, P.Karunakaran Nair and Technical staff at out-stations.

8. Location of the research project: Cochin

9.a) Objective: Acquisition of data on exploited marine fishery resources in E.E.Z. needed for stock assessment.

b) Practical utility: This project facilitates assessment of fish stocks exploited.

10. Technical Programme: 1) Acquisition of data on marine fish landings and effort expended on region-wise and species-wise basis. 2) Biological data on items such as length and weight of species landed 3) Environmental data on wind pattern and movement of current 4) Price of important species at landing centres and 5) Scrutiny and verification of data for processing.

Work done: Data obtained during 1983 and 1984 were processed and analysed. Resourceswise analysis in respect of major fishes was also made for the region where they are distributed.

Work envisaged in the current year:

1) Acquisition of data for the year 1985-'86.
2) Regionwise and specieswise analysis of catch, effort and some related biological and environmental aspects from the coastal waters on the basis of stratified multistage random sampling design.

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11. Date of start: April 1985 12. Likely date of completion: March 1990.

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13. Estimated man-months: 27 man months/year

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14. Facilities required:

i) Land	:No	v) Fish ponds	:No
ii) Labour	:No	vi) Foreign exchange	:No
iii) Special equipment	:No	vii) Other items	:No
iv) Animal sheds	:No	viii) Total estimated cost	: Institute's Budget

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15. If financed by an organisation other than the Institute: No.

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16. Approximate cost:

a) Salary of scientific staff
b) Salary of Technical staff
c) Salary of supporting staff, if any
d) Casual labour cost, if any
e) Cost of equipment, facility etc.
f) Contingencies, such of chemicals, fertilizers, seed, animals, feeds, sprayers etc.
g) Total cost: Institute's budget.

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17. Signatures of:

Sd/-	Sd/-	Sd/-
Project Leader	Head of Division	Director

RESEARCH PROJECT - 1985-'86

1. Institute Code No. FSS/FRA/1.3 2. I.C.A.R. Code No.

3. Name and address of Research Institute: C.M.F.R. Institute, Cochin

4. Title of project: Assessment of Marine Fishery Resources of the Exclusive Economic Zone.

5. Title of sub-project: Stock Assessment of commercially important Fishes of the Exploited Zone.

6. Name and designation of Project Leader: K.Alagaraja, S-3.

7. Name(s) and designation(s) of Project Leader and Project Associates together with time proposed to be spent and work to be done.

Centre	Name	Designation	Time to be spent (%)	Work to be done
Cochin	K.Alagaraja	S-3	30	As per colm.10
	T.Jacob	S-3	15	
	S.K.Dharma Raja	S-3	20	
	K.Narayana Kurup	S-2	20	
	K.Balan	S-1	20	
	M.Srinath	S-1	20	
	K.S.Scariah	S-1	20	
	K.Vijayalekshmi	S-1	15	

Technical Assistance:

8. Location of the research project: Cochin.

9 a) Objectives: Assessment of the stocks of commercially important fishes is essential for their judicious exploitation. The aim of the project is to find out the effect of fishing on the stocks of commercially important fishes and thus determine the level of exploitation which will give sustainable yields from the exploited stocks.

b) Practical utility:

Data are essential for the rational exploitation of commercially important fish stocks and for the proper fishery management.

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10. Technical programme:

i) Modifications and improvement in the methods for fish stock assessment suitable to tropical fishery.

ii) Utilisation of the results obtained from the project No.FSS/FRA/1.1 for assessing the exploited fish stocks.

Work done:

Stock assessment of i) important species of cat fish for the regions Waltair, Mandapam, Cochin, Mangalore and Veraval ii) Parapeneopsis stylifera and Metapenaeus dobsonii for the region Cochin and Sakthikulangara was carried out.

Work envisaged for current year:

Stock assessment of other major fishes will be taken up.

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11. Date of start: April 1985. 12. Likely date of completion: March 1990.

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13. Estimated man-months: 19 man months/year

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14. Facilities required:

i) Land	: No	v) Fish ponds:	: No
ii) Labour	: No	vi) Foreign exchange	: No
iii) Special equipment	: No	vii) Other items	: No
iv) Animal sheds	: No	viii) Total estimated cost: Institute's budget.	

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15. If financed by an organisation other than the Institute: No.

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16. Approximate cost:

a) Salary of Scientific staff
b) Salary of Technical staff
c) Salary of Supporting staff, if any
d) Casual Labour cost, if any
e) Cost of equipment, facility etc.
f) Contingencies, such of chemicals, fertilizers, seed, animals feeds sprayers etc.
g) Total cost: Institute's budget

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17. Signatures of:

Sd/-
Project Leader

Sd/-
Head of Division

Sd/-
Director

RESEARCH PROJECT - 1985-'86

1. Institute Code No.FSS/FRA/ST.1 2. I.C.A.R. Code No.

3. Name and address of Research Institute: C.M.F.R.Institute, Cochin.

4. Title of project: Assessment of Marine Fishery Resources of the Exclusive Economic Zone.

5. Title of sub-project: National Marine Living Resources Data Centre.

6. Name and designation of project leader. T.Jacob, S-3

7. Name(s) and designation(s) of project Leader and Project Associates together with time proposed to be spent and work to be done.

Centre	Name	Designation	Time to be spent(%)	Work to be done
Cochin	T.Jacob	S-3	30	As per colm.10.
	S.K.Dharma Raja	S-3	20	
	K.Alagaraja	S-3	20	
	K.Narayana Kurup	S-2	30	
	K.Balan	S-1	30	
	M.Srinath	S-1	30	
	K.S.Scariah	S-1	30	
	K.Vijayaleskhmi	S-1	15	

Technical Assistance: G.Balakrishnan, U.K.Satyavan, Varughese Philipose, Varughese Jacob, G.Krishnankutty Nair, P.Sivaraman, V.Rajendran, V.P.Annam, P.K.Mahadevan Pillai, A.Kanakkan, S.Haja Najumuddin, C.J.Prasad, P.L.Ammini, K.C.Yohannan, Joseph Andrews, Abha Kant, M.B.Seynuddin, K.P.George, P.P.Pavithran, M.R.Beena, P.T.Mani, M.Ramachandran, K.Anandan and Lata Thote.

8. Location of the research project: Cochin

9. a) Objectives: Maintenance of computerised information system relating to marine living resources.

   b) Practical utility: The system will help in the rapid acquisition of information on potential and exploited stocks, in E.E.Z. and dissemination of the same to the various National and International agencies and fishing industry for research and development.

   Information on anciliary resources and endangered species also will be retrieved and disseminated.

10. Technical Programme:

1. To standardise the data entry format
2. To develop suitable programme packages.
3. Maintenance of data on

i) Catch and effort ii) biological aspects such as age, sex, maturity and fecundity; iii) environmental data such as physico-chemical characteristics of the coastal and offshore waters and matereological conditions and iv) economic aspects such as socio-economic impact, cost of production and market mechanism.

v) Culture experiments bearing on aspects such as nutrition, genetics and physiology.

4. Maintenance of linkage with other organisations for retrieval of data on marine fisheries.
5. Processing the data and dissemination of information to the various end users.

Work done:

The Council has accorded sanction to purchase an electronic computer. On the basis of the recommendation of the Technical Committee constituted by I.C.A.R, action was taken to procure fourth generation main frame computer for scientific applications. Work of transfer of data to punch cards was continued. Intensive training was given to the field staff for recording the data in the restructured schedules.

Management of EDP systems on board the Fishery Oceanographic Research vessel "Sagar Sampada".

Work envisaged in the current year:

1. Installation of a computer.
2. Training of scientific/technical personnel for the management of the computer programme.
3. Development of programme packages for processing data base management and communications.
4. Dissemination of available information to the user sectors both national and international.

11. Date of start: April 1985 12. Likely date of completion: March 1990

13. Estimated man-months: 25 man months/year.

14. Facilities required:

i)	Land	: No	v)	Fish ponds	:No
ii)	Labour	: No	vi)	Foreign exchange	:No
iii)	Special equipment	: No.	vii)	Other items	:No
iv)	Animal sheds	: No.	viii)	Total estimated cost: Institute's budget.	

15. If financed by an organisation other than the Institute: No

16. Approximate cost

a) Salary of Scientific staff
b) Salary of Technical staff
c) Salary of Supporting staff, if any
d) Casual Labour cost, if any
e) Cost of equipment, facility etc.
f) Contingencies, such of chemicals, fertilizers, seed, animals, feeds sprayers etc.
g) Total cost: Institute's budget.

17. Signatures of:

sd/-	sd/-	sd/-
Project Leader	Head of Division	Director

RESEARCH PROJECT - 1985-'86

1. Institute Code NO.FSS/FRA/.16 2. I.C.A.R. Code No.

3. Name and address of Research Institute: C.M.F.R.Institute, Cochin.

4. Title of project: Assessment of Marine Fishery Resources of the Exclusive Economic Zone.

5. Title of sub-project: Evaluation of change in the pattern of catch and composition in the artisanal and mechanised units in Tamil Nadu.

6. Name and designation of Project Leader: K.Vijayalekshmi, S-1

7. Name(s) and designation(s) of project Leader and Project Associates together with time proposed to be spent and work to be done.

Centre	Name	Designation	Time to be spent (%)	Work to be done
Cochin	K.Vijayalekshmi	S-1	30	As per colm. 10

Technical Assistance:

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8. Location of the research project: Cochin

9 a) Objectives: In the past, due to introduction of mechanised fishing, changes in the composition of the fish catch both quantitatively and qualitatively have taken place. This aspect is to be studied under this project.

b) Practical utility: The relative pressures exerted on commercially important species by both mechanised and non-mechanised units could be evaluated which would be useful in formulating better management policies.

10. Technical Programme:

Data obtained from mechanised and non-mechanised units in Tamil Nadu during the last one decade will be critically studied.

Work done:

Specieswise estimates of landings for Tamil Nadu for the three periods 1967-69, 1972-74 and 1980-82 were analysed.

Work envisaged in current year:

Detailed analysis in respect of landings from mechanised and non-mechanised fishing crafts for the three periods 1967-69, 1972-74 and 1980-82 for the Palk Bay and Gulf of Mannar and of Tamil Nadu will be taken up and completed.

11. Date of start: April 1984 12. Likely date of completion: March 1986.

13. Estimated man-months: 4 man months/year

14. Facilities required:

i) Land	: No	v) Fish ponds	: No
ii) Labour	: No	vi) Foreign exchange	: No
iii) Special equipment	: No	vii) Other items	: No
iv) Animal sheds	: No	viii) Total estimated cost: Institute's budget.	

15. If financed by an organisation other than the Institute: No

16. Approximate cost:

a) Salary of scientific staff
b) Salary of Technical staff
c) Salary of Supporting staff, if any
d) Casual Labour cost, if any
e) Cost of equipment, facility etc.
f) Contingencies, such of chemicals, fertilizers, seed, animals, feeds sprayers etc.
g) Total cost: Institute's budget.

17. Signatures of:

Sd/-	Sd/-	Sd/-
Project Leader	Head of Division	Director

RESEARCH PROJECT - 1985-86

1. Institute code No: F.E. & E/1.1 2.I.C.A.R. Code No:

3. Name and address of Research Institute :C.M.F.R.Institute, Cochin-18

4. Title of Project : Socio-economic investigations in marine fisheries sector.

5. Title of sub-project : Socio-economics of fishermen households and economics of indigenous fishing units at Vizhinjam and Calicut areas of Kerala state.

6. Name and designation of Project Leader : R.Sathiadhas, S-1.

7. Name(s) and designation(s) of Project Leader and Project Associates together with time proposed to be spent and work to be done.

Centre	Name	Designation	Time to be spent(%)	Work to be done
Cochin	R.Sathiadhas	S-1	50%	As per colm 10.
	K.K.P.Panikkar	S-1	40%	

Technical Assistance:

(Field staff to be recruited)

8. Location of the Research Project: Cochin.

9.a) Objectives: To carry out a comprehensive survey of small-scale fisheries of selected fishing villages in southern states with special reference to the economics of indigenous fishing units and impact of introduction of new technologies and practices on traditional fishery sector.

b) Practical utility: The information gathered by this survey would help to identify the difficulties/bottlenecks encountered in the small-scale fishery sector and suggest remedial measures in view of formulating further developmental programmes.

10. Technical programme: Data pertaining to cost-benefit factors of traditional fishing practices, socio-economic status of the fishermen families and the impact of introduction of new fishing technologies will be collected from selected fishing villages and studied.

Work done: The second phase of the survey in Pudumanikuppam and Thiruvottiyoorkuppam fishing villages on sample households representing different categories such as (i) boat owners (ii) wage earners and (iii) families depending on fishery related activities has been carried out and quarterwise data about various socio-economic parameters have been collected. Data on costs and earnings of 20 units of catamarans operating at Thiruvottiyoorkuppam was also collected on daily basis for an year and the work of tabulation and analysis of data have been taken up.

Work envisaged in current year: Data on costs and earnings of artisanal fishing units such as catamarans, plank built boats and catamarans fitted with outboard motors will be collected from selected fish landing centres at Vizhinjam and Calicut areas of Kerala.

11. Date of start: April 1985. 12. Likely date of completion: March 1987.

13. Estimated man-months: 11 man months/year.

14. Facilities required:

i. Land : No
ii. Labour : No
iii. Special equipment :No
iv. Animal sheds : No.
v. Fish ponds : No
vi. Foreign exchange : No
vii. Other items :No
viii. Total estimated cost: Institute's budget.

15. If financed by an organisation other than the Institute :No

16. Approximate cost:

a) Salary of Scientific staff
b) Salary of Technical staff
c) Salary of Supporting staff, if any
d) Casual Labour cost, if any
e) Cost of equipment, facility etc.
f) Contingencies, such of chemicals, fertilizers, seed, animal, feeds sprayers etc.
g) Total cost:

17. Signatures of:

Sd/-
Project Leader

Sd/-
Head of Division

Sd/-
Director.

RESEARCH PROJECT - 1985-86

1. Institute code No: FE & E/4.1 2. I.C.A.R. Code No:

3. Name and address of Research Institute : C.M.F.R.Institute, Cochin-18

4. Title of Project : Studies on cost of production, profitability and optimum resource allocation in marine fisheries sector.

5. Title of sub-project : Economics of mechanised fishing units in Tuticorin and Mangalore areas.

6. Name and designation of Project Leader : K.K.P.Panikkar, S-1

7. Name(s) and designation(s) of Project Leader and Project Associates together with time proposed to be spent and work to be done.

Centre	Name	Designation	Time to be spent(%)	Work to be done
Cochin	K.K.P.Panikkar	S-1	50%	As per colm. 10
	T.Jacob	S-3	20%	
	R.Sathiadhas	S-1	40%	

Technical Assistance: (To be obtained)

8. Location of the research project: Cochin

9. a) Objectives: 1) To study the economics of different types of mechanised fishing units and their comparative economic efficiency. 2) To study the input-out relationship in mechanised crafts and gears.

b) Practical Utility: The study will help the industry to take entrepreneurial decisions and credit agencies to formulate appropriate lending policies. The study will also help in estimating the demand for fuel and the proper channelisation of its supply.

10. Technical programme: Samples from different types of mechanised units will be selected and detailed information on inputs and output will be collected for a period of one year. The work will be taken up at selected centres.

Work done: Data on the costs and earnings of purse-seiners gill netters and trawlers collected from Cochin Fisheries Harbour have been processed. Similar study has been taken up at Sakthikulangara area.

Work envisaged: Costs and earning data for different types of mechanised units will be collected from selected centres in Tuticorin region of Tamil Nadu and Mangalore region of Karnataka.

11. Date of start: April 1985. 12. Likely date of completion: March 1987.

13. Estimated man-months: 13 man-months/year.

14. Facilities required:

i.	Land :No	v.	Fish ponds :No
ii.	Labour :No	vi.	Foreign exchange: No
iii.	Special equipment: No	vii.	Other items:
iv.	Animal sheds :No.	viii.	Total estimated cost: Institute's budget.

15. If financed by organisation other than the Institute : No.

16. Approximate cost:

a) Salary of Scientific staff
b) Salary of Technical staff
c) Salary of Supporting staff, if any
d) Casual Labour cost, if any
e) Cost of equipment, facility etc.
f) Contingencies, such of chemicals, fertilizers, seed, animals, feeds, sprayers etc.
g) Total cost:

17. Signatures of:

Sd/-	Sd/-	Sd/-
Project Leader	Head of Division	Director.

1.Institute code No: FEED/10.1 2.I.C.A.R.Code No:

3.Name and address of Research Institute: C.M.F.R.Institute, Cochin-18.

4.Title of Project : Studies on cost of production, profitability and optimum resource allocation in marine fisheries sector.

5.Title of sub-project: Economics of different fishing units in Orissa.

6.Name and designation of Project Leader : Kamalkumar Datta, S-1

7.Name(s) and Designation(s) of Project Leader and Project Associates together with time proposed to be spent and work to be done.

Centre	Name	Designation	Time to be spent (%)	Work to be done
Cochin	Kamalkumar Datta	S-1	90	As per colm 10

Technical Assistance: S.S.Dan, Field Officer.

8.Location of the Research Project: Cochin

9.a)Objectives: i)To determine the costs and returns of major fishing gears; ii) To estimate returns to capital and labour.

b)Practical utility: The data collected will enable the study of returns to owners (capital) and crew (labour) based on various sharing system. It will provide sufficient information for policy formulation in fishery sector in East coast. It will be beneficial for an investor select a suitable fishing system.

10.Technical Programme: Samples of mechanised and artisanal units will be selected. Data regarding fishing hours, no. of trips, cost of repairing of gear and craft, catches, price data, fuel consumption, labour cost, investment and reinvestment pattern and sources of finances will be collected for sample days in each month for one year. Suitable econometric techniques will be used for analysis of data.

Work done:

Work envisaged: The survey will be conducted in selected landing centres from four districts in Orissa coast. Detailed costs and earnings data from selected units (both mechanised and non-mechanised) will be collected for sample days covering different seasons for a period of one year.

11. Date of start: April 1985

12. Likely date of completion: March 1987.

13. Estimated man-months: 11 man-months/year.

14. Facilities required:

i. Land : No
ii. Labour : No
iii. Special equipment: No.
iv. Animal sheds : No.
v. Fish ponds : No
vi. Foreign exchange: No
vii. Other items : No
viii. Total estimated cost: Institute's budget.

15. If financed by an organisation other than the Institute : No.

16. Approximate cost:

a) Salary of Scientific staff
b) Salary of Technical Staff
c) Salary of Supporting staff, if any
d) Casual Labour cost, if any
e) Cost of equipment, facility etc.
f) Contingencies, such of chemicals, fertilizers, seed, animals, feeds sprayers etc.
g) Total cost:

17. Signatures of:

Sd/-	Sd/-	Sd/-
Project Leader	Head of Division	Director.

RESEARCH PROJECT - 1985-86

1. Institute code No: FE & E/11.1 2. I.C.A.R. Code No:

3. Name and address of Research Institute : C.M.F.R. Institute, Cochin-18.

4. Title of Project : Design and Evaluation of Fisheries Extension Methods.

5. Title of sub-project: Design and evaluation of teaching aids on prawn culture technology.

6. Name and designation of Project Leader : Krishna Srinath, S-1.

7. Name(s) and Designation(s) of project leader and project Associates together with time proposed to be spent and work to be done.

Centre	Name	Designation	Time to be spent (%)	Work to be done
Cochin	Krishna Srinath	S-1	25%	As in colm. 10.

Technical Assistance: (To be obtained)

8. Location of the Research Project: Cochin

9. a) Objectives: To develop and evaluate teaching aids to be used in different extension and training programmes of the Institute.

b) Practical utility: Teaching aids which include audiovisual aids render the process of teaching and learning easy, lively and effective. Teaching aids attract attention of the learner, holds up interest for a longer time, help to reinforce the idea quickly and retain the same for a long time ton the part of the learner.

10. Technical programme: Projected and non-projected aids suitable for different training and extension situation will be developed and evaluated.

Work done: Planned and initiated work for setting up of a centralized display unit at the Institute. Photographs on the activities and achievements of the Tuticorin Research Centre, Narakkal Prawn Hatchery Laboratory and Krishi Vigyan Kendra were taken and slides were prepared. Planned and organised the Institute's participation in Cochin '84. All India Exhibition where the activities and achievements of the Institute were projected through photographs, charts, posters, handouts and live and dry specimens.

Work envisaged: i) Organisation of slide presentation on prawn culture technology - finalization of script, editing of slides, voice recording with music and synchronization with slides.

ii) Evaluation of teaching aid.

11. Date of start: April 1984

12. Likely date of completion: March 1986

13. Estimated man-months: 3 man-months/year.

14. Facilities required:

i. Land	v. Fish ponds
ii. Labour	vi. Foreign exchange
iii. Special equipment	vii. Other items
iv. Animal sheds	viii. Total estimated cost

15. If financed by an organisation other than Institute, then give the following information:

(a) Name of Financing Organisation:
(b) Title of the Project (If the Project forms a part of a larger project)

16. Approximate cost:

a) Salary of Scientific staff
b) Salary of Technical staff
c) Salary of Supporting staff, if any
d) Casual labour cost, if any
e) Cost of equipment, facility etc.
f) Contingencies, such of chemicals fertilizers, seed, animals, feeds, sprayers etc.
g) Total costs.

17. Signatures of

Sd/-	Sd/-	Sd/-
Project Leader	Head of Division	Director.

RESEARCH PROJECT - 1985-86

1. Institute code No: FE & E/12.1 2. I.C.A.R. Code No:

3. Name and address of Research Institute : C!M.F.R.Institute, Cochin-18.

4. Title of Project: Investigations on the adoption of innovations in capture and culture fisheries.

5. Title of sub-projects and experiments : An evaluative study of the extent of utilization of knowledge gained by rural women through training programmes in prawn/fish culture.

6. Name and designation of Project Leader : Krishna Srinath, S-1

7. Name(s) and Designation(s) of project leader and project Associates together with time proposed tobe spent and work to be done:

Centre	Name	Designation	Time to be spent (%)	Work to be done
Cochin	Krishna Srinath	S-1	40	As per item 10

Technical Assistance: -

8. Location of the research project: Cochin

9.a) Objectives: To Assess the extent of utilisation of the knowledge gained by women through the training programmes in fisheries.

b) Practical utility: The information would serve as an excellent feed-back and help in planning need-based training programme.

10. Technical programme: Identification of population, selection of households, formulation of interview schedules, collection of data and critical analysis of the same for drawing conclusion.

Workdone:

Work envisaged: i) Location of women trained under various training courses in the Krishivigyan Kendra, Narakkal.

ii) Selection of sample using suitable sampling techniques
iii) Formulation of interview schedules and attitude scale
iv) Collection of Institutional andfield data.
v) Analysis of data and interpretation of results.

11. Date of start: April 1985. 12.Likely date of completion: June '86.

13. Estimated man-months: 5 man-months.

14. Facilities required:

i. Land
ii. Labour
iii. Special equipment
iv. Animal sheds
v. Fish ponds
vi. Foreign exchange
vii. Other items
viii. Total estimated cost.

15. If financed by an organisation other than the Institute, then given the following information:

(a) Name of Financing Organisation:
(b) Title of the Project (If the project forms a part of a larger project)

16. Approximate cost:

a) Salary of Scientific staff
b) Salary of Technical staff
c) Salary of Supporting staff, if any
d) Casual labour cost, if any
e) Cost ofequipment, facility etc.
f) Contingencies, such of chemicals, fertilizers, seed, animals, feeds, sprayers etc.
g) Total cost.

17. Signatures of:

Sd/-	Sd/-	Sd/-
Project Leader	Head of Division	Director.

RESEARCH PROJECT - 1985-86

1. Institute Code No.FE &E/13 2.I.C.A.R. CODE No.

3. Name and address of Research Institute : C.M.F.R.Institute, Cochin-18.

4. Title of Project : Studies on cost of production, profitability and optimum resources allocation in marine fishery sector.

5. Title of sub-project : Costs and returns of Dol net fishery in North West coast.

6. Name and designation of Project Leader : D.B.S. Sehara, S-2.

7. Name(s) and designation(s) of Project Leader and Project Associates together with time proposed to be spent and work to be done.

Centre	Name	Designation	Time tobe spent(%)	Work to be done
Cochin	D.B.S.Sehara	S-2	90	As per colm. 10

Technical Assistance: J.P.Karbhari, T-7.

8. Location of the research project: Cochin

9. a) Objectives: 1) To estimate returns on investment and net income to owners.
2) To compare levels of income of owners and wage earners.

b) Practical utility: Data collected will enable the study of income status of owners and wage-earners engaged in dolnet fishing. It will also provide vital information on returns to capital of dolnet units in North-West coast.

10. Technical programme: Sample dolnet operating units will be selected. Data regarding fixed and variable costs, catch, price, and earnings will be collected through primary survey. Catch observation will be recorded for sample days on selected units each month for 1985-86. Suitable econometric techniques will be used for analysis of data.

Work done: Ten villages of Maharashtra coast and eight villages of Gujarat coast were surveyed to collect priliminary village information. Two representative fishing villages in Maharashtra and one village in Gujarat were selected for studying costs and returns of dolnet operating units.

Work envisaged: Sample dolnet operating units will be selected in all the three villages. Data regarding the details of crafts and gears used will be collected in the first stage. Catch and operating cost particulars will be observed for sample days in each month for a period of one year. Data regarding fixed and variable costs, catch, price, employment and earnings will be collected three times a year representing good, moderate and lean fishing season.

11. Date of start: April '84. 12. Likely date of completion: Sept. '86.

13. Estimated man-months: 11 man-months/year.

14. Facilities required:

i.	Land : No	v.	Fish ponds :No
ii.	Labour : No	vi.	Foreign exchange:No
iii.	Special equipment :No	vii.	Other items :No
iv.	Animal sheds :No.	viii.	Total estimated cost: Institute's budget.

15. If financed by an organisation other than the Institute : No

16. Approximate cost:

a) Salary of Scientific staff
b) Salary of Technical staff
c) Salary of Supporting Staff, if any
d) Casual Labour cost, if any
e) Cost of equipment, facility etc.
f) Contingencies, such of chemicals, fertilizers, seed, animals, feeds sprayers etc.
g) Total cost.

17. Signatures of:

Sd/-	Sd/-	Sd/-
Project Leader	Head of Division	Director.

RESEARCH PROJECT 1985-86

1.Institute code No:FE & E 14. 2. I.C.A.R.Code No:

3.Name and address of Research Institute: C.M.F.R.Institute, Cochin-18.

4.Title of Project : The Role of Women in Marine Fisheries

5.Title of sub-project: A study of the role of women in prawn peeling and the infrastructure existing in centralised and decentralised units in Cochin area .

6.Name & Designation of Project Leader : Jancy Jacob, S-1

7.Name(s) and Designation(s) of Project Leader and Project Associates together with time proposed to be spent and work to be done:

Centre	Name	Designation	Time to be spent(%)	Work to be done
Cochin	Jancy Jacob	S-1	90	As per colm. 10

8.Location of the research project : Cochin

9.(a) i) Objectives:To study the role of women in fish processing, extent of employment and income generation, their level of aspiration and job satisfaction.

ii) A comparative study of the infrastructure existing in different units.

(b) Practical utility: A large number of women are engaged in prawn peeling in Kerala. The work out-put and product quality may depend not only on the infrastructure available but also on the socio-economic status and job satisfaction of the women employed. The present study will help to analyse the inter-relationship of such factors. This study will also help in fishery programme planning involving women. The present study will throw light into the working conditions prevailing in various units and establish whether they conform to the expected standards.

10. Technical programme: Prawn peeling units will be selected from Cochin area by stratified random sampling procedure. Data on socio-economic status, employment pattern, income, job satisfaction, infrastructure of units and other related items will be collected by individual contacts using structured interview schedule. The data will be critically examined and analysed for drawing conclusions.

Work done: - New Project.

Work envisaged: Formulation of interview schedules, protesting the schedule, collection of data related to socio-economic status, media exposure, pattern of employment, working conditions, job satisfaction, level of aspiration, structure and facilities of various units and other associated items. Tabulation of data collected, analysis by statistical methods and writing of report.

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11. Date of start: April 1985. 12. Likely date of completion: March 1986.

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13. Estimated man-months: 11 man-months/year.

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14. Facilities required:

i. Land
ii. Labour
iii. Special equipment
iv. Animal sheds
v. Fish ponds
vi. Foreign exchange
vii. Other items
viii. Total estimated cost:

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15. If financed by an organisation other than the Institute, then give the following information:
(a) Name of Financing Organisation
(b) Title of the Project (If the project forms a part of a larger project)

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16. Approximate cost:

a) Salary of Scientific staff
b) Salary of Technical staff
c) Salary of Supporting staff, if any
d) Casual labour cost, if any
e) Cost of equipment, facility etc.
f) Contingencies, such of chemicals, fertilizers, seed, animals, feeds, sprayers etc.
g) Total cost.

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17. Signatures of:

Sd/-	Sd/-	Sd/-
Project Leader	Head of Division	Director.

RESEARCH PROJECT - 1985-86

1. Institute code No: FE/E/15 2. I.C.A.R. Code No:

3. Name and address of Research Institute : C.M.F.R. Institute, Cochin-18.

4. Title of Project : Content Analysis of Fisheries Programmes and news in mass media

5. Title of sub-project: A diagnostic study of content and coverage of fisheries news in national and regional dailies and magazines.

6. Name and designation of Project Leader : A. Regunathan, S-1

7. Name(s) and designation(s) of project leader and project Associates together with time proposed to be spent and work to be done

Centre	Name	Designation	Time to be spent (%)	Work to be done
Cochin	A. Regunathan	S-1	80	as in Colm. 10

Technical Assistance:

8. Location of the research project: Cochin

9. a) Objectives:
   1. To find out the space provided for fishery news and the frequency of publication
   2. To assess the source of fishery news and geographical area covered.
   3. To identify the knowledge gap in specific subject matter areas and time lag in communication and feedback.

   b) Practical utility: The study will show the accumulation of advanced knowledge in different content areas, knowledge gap in specific subject matter areas, time lags in communication, inappropriateness in communication, principal sources of information dissimination, preferential treatment of fishery news in magazines and dailies in terms of significance and help in the activities of the extension system effictively linking the innovative and consumer systems.

10. Technical programme: Fishery news items in selected dailies and magazines will be analysed in comparison to news on other systems of production.

Work done: Nil

Work envisaged: News items on fisheries and other systems of production in national and regional dailies and magazines in English, Malayalam and Tamil will be collected and analysed.

11. Date of start: November 1985

12. Likely date of completion: March 1987

13. Estimated man-months: 11 months/year

14. Facilities required:

i. Land :
ii. Labour:
iii. Special equipment:
iv. Animal sheds
v. Fish ponds
vi. Foreign exchange
vii. Other items
viii. Total estimated cost: Rs. 1500/-

15. If financed by an organisation other than Institute, then give the following information:

(a) Name of Financing Organisation: N.A.

(b) Title of the Project (If the Project forms a part of a larger project)

16. Approximate cost:

a) Salary of Scientific staff
b) Salary of Technical staff
c) Salary of Supporting staff, if any
d) Casual labour cost, if any
e) Cost of equipment, facility etc.
f) Contingencies, such of chemicals fertilizers, seed, animals, feeds, sprayers etc.
g) Total costs.: Rs. 1500/- (Rs. Onethousand fivehundred only)

17. Signatures of

Sd/-
Project Leader

Sd/-
Head of Division

Sd/-
Director.

1. Institute Code No. FB/PR/3.1 2. I.C.A.R. Code No.

3. Name and address of Research Institute : CMFR Institute, COCHIN.

4. Title of Project : Investigations on the resources of tunas and related fishes.

5. Title of Sub-project : Resources of tunas and billfishes

6. Name and designation of Project Leader : E.G. SILAS, S-5

7. Name(s) and designation(s) of Project Leader and Project Associates together with ~~the~~ time proposed to be spent and work to be done.

Centre	Name	Designation	Time to be spent (%)	Work to be done
Minicoy	G. Gopakumar	S-2		1-7
Goa	G.M. Kulkarni	S-1		1-5
Mangalore	C. Muthiah	S-2		1-5
Calicut	T.M. Yohannan	S-2		1-5
Cochin	E.G. Silas	S-5		1
	P.P. Pillai	S-2 (APL)		1-6
	M. Srinath	S-1		1-4
	A.A. Jayaprakash	S-2		1-6
Tuticorin	Pon. Siraimeetan	S-1		1-5
Madras	S. Sreenivasa Rangan	S-1		1-5

Technical Assistance: K.K. Kunhikoya (Minicoy), H. Ramachandra (Mangalore), M. Ayyappan Pillai (Cochin), P. Sadasiva Sarma (Vizhinjam), C. Manimaran (Tuticorin), M.V. Somaraju (Waltair).

8. Location of the Research project: Minicoy, Goa, Mangalore, Calicut, Cochin, Vizhinjam, Tuticorin, Madras and Waltair.

9. a) Objectives: (1) To estimate the resources of tunas and bill fishes in the shelf waters, EEZ and contiguous areas; and to study the state of exploitation of these resources. (2) To study the biological parameters such as the age, growth, reproduction and behaviour patterns of tunas and to investigate the role of environment in tuna fisheries. (3) To investigate the bait fish resources of the Lakshadweep Islands.

10. Technical Programme: (1) Research and exploratory surveys and aerial surveys will be undertaken to chart the pattern of distribution and abundance of these resources in the EEZ and contiguous seas around Indian in space and time (2) On board participation and collection of information on tuna fisheries by utilizing vessel facilities of other organisations, for longline operations and purse seining. (3) Collection of species-wise data on catch, effort and biological characteristics of tunas and billfishes. (4) Observations on the purse seine and drift net landings of tunas and billfishes at Mangalore, Calicut, Cochin and other selected centres. (5) Investigations on the behaviour pattern of tunas and in relation to environmental parameters. (6) Eggs and larval studies in relation to environmental conditions.

(7) Observations on the distribution and abundance of baitfish resources in the Lakshadweep Is.

Work done: Data on catch and effort and species composition of tunas collected from the observation centres was analysed and studied for relative abundance, in terms of areas and seasons, of the fishery as a whole and of the dominant species in particular. Data on the biology of the main species E. affinis, A. thazard, K. pelamis and T. albacares have been studied and estimates of growth, mortality and exploitation rates have been obtained. The yield curves for the first two species were obtained. The work on the stock assessment of these resources is in progress. The nature of the baitfish fishery, its component species and seasonality have been studied.

Work envisaged: Emphasis on the stock assessment of the dominant coastal and oceanic species of the EEZ would be given. In depth studies on the availability and abundance of livebait at Minicoy will be undertaken.

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11. Date of start : 1976 12. Likely date of completion : continuing

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13. Estimated man-months :

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14. Facilities required:

i. Land	: no	v. Fish ponds	: No
ii. Labour	: no	vi. Foreign exchange	: Yes
iii. Special equipment	: yes	vii. Other items	: -
iv. Animal sheds	: no	viii. Total estimated cost	: Institute's Budget.

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15. If financed by an organisation other than the Institute : No.

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16. Approximate cost:

a) Salary of Scientific staff
b) Salary of Technical staff
c) Salary of Supporting staff, if any
d) Casual Labour cost, if any
e) Cost of equipment, facility etc
f) Contingencies, such of chemicals, fertilizers, seed animals, feed sprayers etc.
g) Total cost: Institute's Budget.

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17. Signatures of:

RESEARCH PROJECT - 1985-86

1. Institute Code No. FB/PR/5.4 2. I.C.A.R. Code No.

3. Name and address of Research Institute : CMFR INSTITUTE, COCHIN.

4. Title of Project : Investigations on other pelagic resources

5. Title of Sub-project : Resource characteristics of Pomfrets.

6. Name and designation of Project Leader : M.H. Dhulkhed, S-3

7. Name(s) and designation(s) of Project Leader and Project Associates together with time proposed to be spent and work to be done.

Centre	Name	Designation	time to be spent (%)	work to be done
Puri	K.R.M. Nair	S-1		1-3
Cochin	T. Jacob	S-3		3
	K. Balan	S-1		3
	A.A. Jayaprakash	S-2		1-3
Calicut	M. Kumaran	S-3		1-3
Mangalore	Madan Mohan	S-2		1-3
Karwar	M.H. Dhulkhed	S-3		1-3
Bombay	V.M. Deshmukh	S-2		1-3
	M. Zaffar Khan	S-1		1-3

Technical Assistance: K.V. Rao (Puri), V.A. Narayankutty (Cochin), V.K. Janaki (Calicut), Uma. S. Bhat (Mangalore), Hanumantharaya (Karwar), S.V. Chavan (Bombay) and H.K. Dhokia (Veraval).

8. Location of the research project : Puri, Cochin, Calicut, Mangalore Karwar, Bombay and Veraval.

9. a) Objectives:
   1) To study the fishery, biology and resource characteristics of commercially important Pomfrets.
   2) To evaluate changes in stocks of Pomfrets in relation to fishery.

   b) Practical utility:
   The pomfrets are among the best quality table fish with high unit value and export potential. There are considerable lacunae in our knowledge of their resource characteristics which should be filled to evaluate stock size.

10. Technical programme: (1) Data on the catch and effort to be collected at the landing places and on board the exploratory vessels. Species composition to be studied; (2) Studies on age,

growth, maturity, spawning, food and feeding of commercially important species. (3) Studies on growth of the predominant species to obtain age structure and mortality rates in order to estimate maximum sustainable yield.

Work done: Analysis of the accumulated data on catch, effort and species composition has yielded a clear picture of the exploited resources in terms of regional and seasonal abundance of the dominant species. Biological observations on the two major species of Pomfrets have yielded data which have been, analysed and studied. The growth and mortality parameters of the species are being studied and work on the stock assessment is in progress.

Work envisaged: Emphasis on the stock assessment of the dominant species would be given. Gaps in the biology of the species would be filled by better coverage of the exploited resources.

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11. Date of start : 1976 12. Likely date of completion : Continuing

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13. Estimated man-months :

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14. Facilities required:

i.	Land : No	v.	Fish ponds	:	No
ii.	Labour : No	vi.	Foreign exchange	:	No
iii.	Special equipment : No	vii.	Other items	:	No
iv.	Animal sheds : No	viii.	Total estimated cost	:	Institute's Budget.

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15. If financed by an organisation other than the Institute : No

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16. Approximate cost:
a) Salary of Scientific Staff
b) Salary of Technical staff
c) Salary of supporting staff, if any
d) Casual labour cost, if any
e) Cost of equipment, facility etc.
f) Contingencies, such of chemicals, fertilizers, seed, animals, feeds sprayers etc.
g) Total cost: Institute's Budget.

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17. Signatures of:

Sd/-	Sd/-	Sd/-
Project Leader	Head of Division	Director

RESEARCH PROJECT - 1985-86

1. Institute Code No. FB/PR/9.1 2. I.C.A.R. Code No.

3. Name and address of Research Institute : CMFR INSTITUTE, COCHIN.

4. Title of Project : Survey of Pelagic Fish Resources of the Exclusive Economic Zone.

5. Title of Sub-project : Estimation of the Fishery and Resources of oil sardine.

6. Name and designation of Project Leader : V. Balan, S-3

7. Name(s) and designation(s) of Project Leader and Project Associates together with time proposed to be spent and work to be done

Centre	Name	Designation	Time to be spent (%)	Work to be done
Vizhinjam	P.N.Radhakrishnan Nair	S-2		1-4
Cochin	V. Balan	S-3		1-4
	K. Narayana Kurup	S-2		4
	T. Jacob	S-3		4
Calicut	M. Kumaran	S-3		1-4
Mangalore	Madan Mohan	S-2		1-4
Karwar	G.G. Annigeri	S-2		1-4
Goa	G.M. Kulkarni	S-1		1-2

Technical Assistance: M. Abdul Nizar (Cochin), V. Janaki (Calicut), Uma S. Bhat (Mangalore), N. Chinnappa Gowda (Karwar), and S.G. Vincent (Vizhinjam).

8. Location of the Research project : Vizhinjam, Cochin, Calicut, Mangalore, Karwar and Goa.

9. a) Objectives: 1) To Monitor the fishery and biological characteristics of the resource. (2) To assess the magnitude of the exploitable resource. (3) Assess the impact of purse seine fishery on the artisanal fishery.

b) Practical utility: The characteristics of oil sardine resource have to be determined continuously and its catch trends watched. The areas from where production could be increased have to be determined. Monitoring of the eggs and larval abundance would aid in forecasting fishery projects. studies have to be continued to see that the fishing does not affect adversely the production potential of this valuable resource.

10. Technical programme: 1. Collection of data on catch and effort of purse seiners and indigenous units. 2. Observations on length, weight, sex and maturity of the fish. 3. Rate of growth, age, composition, mortality and spawning will be investigated. 4. Analysis of data of last ten years of Cochin, Calicut, Mangalore and Karwar to assess the stock abundance.

Work done: The accumulated data on the biology of the species and the fishery have been analysed for the estimation of growth and mortality parameters, and work on the stock assessment of the resource is in progress.

Work envisaged: Studies on the stock assessment and the impact of the purse seine fishery on the resource and on the artisanal fishery would be continued. Spawning and zonal surveys will be conducted to study the distribution and abundance of larvae and adults in space and time.

11. Date of start: 1981-82 12. Likely date of completion: continuing

13. Estimated man-months :

14. Facilities required:

i.	Land : No	v.	Fish ponds	: No	
ii.	Labour : No	vi.	Foreign exchange	: No.	
iii.	Special equipment: No	vii.	Other items	: No	
iv.	Animal shed : No	viii.	Total estimated cost	: Institute's Budget.	

15. If financed by an organisation other than the Institute : No.

16. Approximate cost:
a) Salary of Scientific staff
b) Salary of Technical staff
c) Salary of Supporting staff, if any
d) Casual labour cost, if any
e) Cost of equipment, facility etc.
f) Contingencies, such of chemicals, fertilizers, seed, animals, feeds sprayers etc.
g) Total cost: Institute's Budget.

17. Signatures of:

Sd/-
Project Leader

Sd/-
Head of Division

Sd/-
Director

1. Institute Code No. FB/PR/9.2 2. I.C.A.R. Code No.

3. Name and address of Research Institute : CMFR INSTITUTE COCHIN

4. Title of Project : Survey of Pelagic fish resources of the Exclusive Economic Zone

5. Title of Sub-project : Evaluation of the fishery and resources of Lesser sardines.

6. Name and designation of Project Leader : P. Sam Bennet, S-2

7. Name(s) and designation(s) of Project Leader and Project Associates together with time proposed to be spent and work to be done

Centre	Name	Designation	Time to be spent (%)	Work to be done
Waltair	G. Luther	S-3		1-3
Madras	P.T. Meenakshisundaran	S-3		1-3
	S. Srinivasa Rangan	S-1		1-3
Mandapam	R. Thiagarajan	S-2		1-3
Tuticorin	P. Sam Bennet	S-2		1-3
Vizhinjam	P.N.Radhakrishnan Nair	S-2		1-3
Cochin	K. Narayana Kurup	S-2		1-2
	K.S. Scaria	S-1		1-2
Mangalore	Madan Mohan	S-2		1-3
Karwar	G.G. Annigeri	S-2		1-3

Technical Assistance: M. Samuel Sumithrudu (Waltair), R. Mohan (Madras), G. Arumugham(Tuticorin), T.A. Omana(Vizhinjam), Uma S. Bhat (Mangalore), and N. Chinnappa Gowda (Karwar).

8. Location of the Research project : Waltair, Madras, Mandapam, Tuticorin, Vizhinjam, Cochin, Mandalore and Karwar.

9. a) Objectives: Detailed species-wise evaluation of the lesser sardine stocks in the areas of their distribution. 2. Study of fishery important biological features of major species at all centres.

b) Practical utility: It is important to study the nature and abundance of the lesser sardine stocks, fishery and biological characters of constituent species so that the fishery could be rationally exploited to give optimum yield.

10. Technical programme: 1. Gear-wise and species-wise catch data be taken all centres of observation. 2. [illegible] Biological observations such as size and age composition, mortality sex and maturity be made for commercially important species. 3. Effect of fishery on the stocks of lesser sardine to be evaluated.

Work done: Data on the catch, effort, species composition, size and age composition and on biology of predominant species were collected and studied from 8 centres. Processing of resources data was completed for stock estimate.

Work envisaged: The work envisaged during 1985 will be on similar lines as in the previous year with emphases on stock assessment studies based on resources data.

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11. Date of start: 1981-82 12. Likely date of completion: Continuing

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13. Estimated man-months :

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14. Facilities required:

i. Land	: No	v. Fish ponds	: No
ii. Labour	: No	vi. Foreigh exchange	: No
iii. Special equipment	: No	vii. Other items	: No
iv. Animal sheds	: No	viii. Total estimated cost	: Institute's Budget.

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15. If financed by an organisation other than the Institute : No

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16. Approximate cost:
a) Salary of Scientific staff
b) Salary of Technical staff
c) Salary of Supporting staff, if any
d) Casual Labour cost, if any
e) Cost of equipment, facility etc.
f) Contingencies, such of chemicals, fertilizers, seed, animals, feeds sprayers etc.
g) Total cost: Institute's Budget.

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17. Signatures of:

Sd/-	Sd/-	Sd/-
Project Leader	Head of Division	Director

1. Institute Code No. FB/PR/9.3 2. I.C.A.R. Code No.

2. Name and address of Research Institute: CMFR INSTITUTE COCHIN

4. Title of Project : Survey of Pelagic Fish resources of the Exclusive Economic Zone

5. Title of Sub-project : The fishery and resources characteristics of anchovies.

6. Name and designation of Project Leader : G. Luther, S-3.

7. Name(s) and designation(s) of Project Leader and Project Associates together with time proposed to be spent and work to be done.

Centre	Name	Designation	Time to be spent (%)	Work to be done
Waltair	G. Luther	S-3		1-4
Madras	P. Devadoss	S-2		1-3
Vizhinjam	N. Gopalakrishna pillai	S-2		1-3
Cochin	K. Alagaraja	S-3		4
	K. Balan	S-1		4
Mangalore	G. Syda Rao	S-2		1-3
Cochin	K.V. Narayana Rao	S-3		1-4

Technical Assistance: M. Samuel Sumithrudu (Waltair), S. Chandrasekhar (Madras), A.K. Velayudhan (Vizhinjam), H. Ramachandra (Mangalore), R. Reghu (Cochin).

8. Location of the research project: Waltair, Madras, Vizhinjam, Cochin and Mangalore.

9. a) Objectives: 1. To assess the magnitude of the exploited fishery and the stock of anchovy resources and to study their relative composition and species-wise abundance in space and time.
2. To monitor the important biological and fishery characteristics of the commercially important species.

b) Practical utility: Information on the distribution and abundance of anchovies together with biological aspects is necessary for an appraisal of their commercial exploitation prospects and to develop a prediction system.

10. Technical programme: (1) Collection of catch and effort data from the different types of gear separately for the general Stolephorus Thryssa, Coilia, Setipinna and Thrissina. (2) Species composition of the different genera of anchovies in the different types of gear. (3) Collection of catch and catch rate data on Stolephorus

devisi/S. heterolobus and S. bataviensis, length and age distribution, maturity stages, sex ratio, intensity of feeding, length weight, growth and mortality. (4) Assessment of stock position of Stolephorus resources based on past data to be continued.

Work done: Regular data on the exploited resources and on the biology of the predominant anchovy species have been collected as per the work programme, processed and studied for the fishery trends, species composition, growth and age and maturity cycle. Past data on the anchovy resources (Stolephorus) was processed and studies on growth, asymptotic length and exploitation rates are in progress.

Work envisaged: Worm on the similar lines will be continued during 1985 with emphasis on the stock assessment based on the resources data collected during the earlier years.

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11. Date of start: 1981-82 12. Likely date of completion: Continuing

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13. Estimated man-months :

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14. Facilities required:

i. Land	:No	v. Fish ponds	: No
ii. Labour	: No	vi. Foreign exchange	: No
iii. Special equipment	: No	vii. Other items	: No
iv. Animal sheds	: No	viii. Total estimated cost.	: Institute's Budget

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15. If financed by an organisation other than the Institute : No

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16. Approximate cost:
a) Salary of Scientific staff
b) Salary of Technical staff
c) Salary of Supporting staff, if any
d) Casual labour cost, if any
e) Cost of equipment, facility etc.
f) Contingencies, such of chemicals, fertilizers, seed, animals, feeds sprayers etc.
g) Total cost : Institute's Budget.

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17. Signatures of:

Sd/-	Sd/-	Sd/-
Project Leader	Head of Division	Director

1. Institute Code No. FB/PR/9.4. 2. I.C.A.R. Code No.

3. Name and address of Research Institute : CMFR INSTITUTE, COCHIN

4. Title of Project : Survey of pelagic fish resources of the Exclusive Economic Zone.

5. Title of Sub-project : Evaluation of the fishery and resources of mackerel.

6. Name and designation of Project Leader : A. Noble, S-3.

7. Name(s) and Designation(s) of Project Leader and Project Associates together with time proposed to be spent and work to be done.

Centre	Name	Designation	Time to be spent (%)	Work to be done
Waltair	S. Reuben	S-2		1-6
Madras	N.S. Radhakrishnan	S-2		1-6
Mandapam	M. Sivadas	S-1		1-6
Vizhinjam	N. Gopalakrishna Pillai	S-2		1-6
Cochin	A. Noble	S-3		1-6
	M. Srinath	S-1		5-6
Calicut	T.M. Yohannan	S-2		1-6
Mangalore	M.V. Pai	S-3 (APL)		1-6
Karwar	M.H. Dhulkhed	S-3		1-6
Goa	G.M. Kulkarni	S-1		1-6

Technical Assistance: M.V. Somaraju (Waltair), T.A. Omana (Vizhinjam) V.A. Narayanan Kutty, M.N. Kesavan Elayathu (Cochin), Alli C. Gupta (Mangalore), S. Hanumantharaya (Karwar).

9. a) Objectives: (1) To study the relative abundance of the mackerel in space and time. (2) To understand the resource characteristics and to have estimates on the stock. (3) Locate spawning grounds, study eggs & larvae, and forecast the fishery.

b) Practical utility: Monitoring resource and biological data on continuous basis is essential to understand, predict changes in its population structure and to evolve effective management policies on the exploitation of this resource.

10. Technical programme: (1) Collection of data on catch and effort; size and age composition, sex and maturity condition. (2) Impact of purse seine fishery on the resource to be evaluated.

(3) Spawning and young fish survey to be undertaken subject to availability of facilities. (4) Recruitment studies with the aid of aerial and acoustic surveys and remote sensing to be taken up subject to availability of facilities. (5) Analysis of past data for resource characteristics and estimation of stocks. (6) Fishery forecast.

Work done: Investigations on the fishery and biology of the resource from 9 centres were carried out. Data on the catch, effort and catch rate, gear-wise catch, seasonality, size and age composition and maturation cycle of the exploited resource were collected and studied. The accumulated data on the biology of the species and the fishery have been analysed for the estimation of growth, mortality and longivity parameters; and work on the stock assessment of the species is in progress.

Work envisaged: Monitoring of resource characteristics as envisaged in Technical programme to be done. Stock assessment studies would be emphasised. Effect of fishing, standing crop, total stock, potential - to be worked out.

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11. Date of start: 1981-82 12. Likely date of completion: Continuing

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13. Estimated man-months : Man-months/year

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14. Facilities required:

i. Land	: Nil	v. Fish ponds	: Nil
ii. Labour	: Nil	vi. Foreign exchange	: Nil
iii. Special equipment	: Nil	vii. Other items	: Nil
iv. Animal sheds	: Nil	viii. Total estimated cost.	: Institute's Budget.

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15. If financed by an organisation other than the Institute : No.

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16. Approximate cost:
a) Salary of Scientific staff
b) Salary of Technical staff
c) Salary of Supporting staff, if any
d) Casual Labour cost, if any
e) Cost of equipment, facility etc.
f) Contingencies, such of chemicals, fertilizers, seed, animals, feeds, sprayers, etc.
g) Total cost : Institute's Budget.

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17. Signatures of:

Sd/-	Sd/-	Sd/-
(Project Leader)	(Head of Division)	(Director)

RESEARCH PROJECT - 1985-86

1. Institute Code No. FB/PR/9.5 2. I.C.A.R. Code No.

3. Name and address of Research Institute : CMFR INSTITUTE COCHIN.

4. Title of project : Survey of Pelagic Fish resources of exclusive Economic Zone.

5. Title of Sub-project : Evaluation of the fishery and resources of Seer fishes.

6. Name and designation of project Leader : M. Vasudev Pai, S-3

7. Name(s) and designation(s) of Project Leader and Project Associates together with time proposed to be spent and work to be done.

Centre	Name	Designation	Time to be spent (%)	Work to be done
Waltair	G. Luther	S-3(APL)	-	1-3
Mandapam	R. Thiagarajan	S-2	-	1-3
Vizhinjam	N. Gopalakrishna Pillai	S-2	-	1-3
Cochin	M. Srinath	S-1	-	2
Calicut	T.M. Yohannan	S-2	-	1-3
Mangalore	M. Vasudev Pai	S-3	-	1-3
	C. Muthiah	S-1	-	1-3
Tuticorin	H. Mohammed Kasim	S-2	-	1-3

Technical Assistance: S. Sumithrudu (Waltair), C. Manimaran (Tuticorin), S.G. Vincent (Vizhinjam), M.N. Kesavan Elayathu (Cochin and H. Ramachandra (Mangalore).

8. Location of the research Project. : Waltair, Tuticorin, Vizhinjam, Cochin, Calicut and Mangalore.

9. a) Objectives: (1) To study the relative abundance of seer fisher in space and time. (2) To evaluate the fishery and resoruces characteristics of seer fishes such as size and age composition and mortality for stock assessment.

b) Practical Utility: The importance of seer fishes in the internal and external trade is increasing. Detailed information on their distribution and relative abundance would help in increasing the catches and proper management of the resources.

10. Technical Programme: (1) Collection of catch and effort data for estimating the relative abundance of the species on different grounds.

(2) Detailed study will be made of the size and age composition of the catches and recruitment and mortality based on exploited resource. (3) Experimental fishing to be conducted on board the research vessels of the Institute.

Work done: The pattern of distribution, seasonality and the magnitude of exploitation of the seer fish resources have been studies from the analysis of catch, effort and species composition data. The accumulated data on the size distribution of the two dominant species have been analyse analysed for the estimation of growth, mortality and longivity. The work on the stock assessement of the resources in in progress.

Work envisaged: Similar work will be undertaken with exphasis on the completion of the stock assessment studies of the predominant species.

11.	Date of start : 1981-82		12. Likely date of completion 1985-86		
13.	Estimated man-months	:			
14.	Facilities required:				
	i. Land	: No.	v. Fish ponds	: No.	
	ii. Labour	: No	vi. Foreign exchange	: No.	
	iii. Special equipment	: No.	vii. Other items	: No.	
	Iv. Animal sheds	: No	viii. Total estimated cost.	: Institute's Budget	
15.	If financed by an organisation other than the Institute	: No.			

16. Approximate cost:

a) Salary of Scientific staff
b) Salary of Technical staff
c) Salary of Supporting staff, if any
d) Casual Labour cost, if any
e) Cost of equipment, facility etc.
f) Contingencies, such of chemicals, fertilizers, seed, animals, feeds sprayers etc.
g) Total cost : Institute's Budget.

17. Signature of:

Sd/-	Sd/-	Sd/-
Project Leader	Head of Division	Director

RESEARCH PROJECT - 1985-86

1. Institute Code No.: FB/PR/9.6 2. I.C.A.R. Code No.

3. Name and address of Research Institute. : CMFR INSTITUTE, COCHIN.

4. Title of Project : Survey of Pelagic Fishery resources of the exclusive Ecnomic Zone.

5. Title of Sub-project : Evaluation of the fishery and resources of Bombay duck

6. Name and designation of Project Leader : V.M. Deshmukh, S-2

7. Name(s) and designation(s) of Project Leader and Project Associates together with time proposed to be spent and work to be done.

Centre	Name	Designation	Time to be spent (%)	Work to be done
Bombay	V.M. Deshmukh	S-2	-	1-3
	Alexander Kurian	S-2 (APL)	-	1-3
	M. Zaffar Khan	S-1	-	1-3
Cochin	K. Alagaraja	S-3	-	2-3
	S.K. Dharmaraja	S-3	-	2-3

Technical Assistance: S.V. Chavan (Bombay), J.D. Sarang (Bombay), H.K. Dhokia (Veraval).

8. Location of the research Project. : Bombay and Veraval

9. a) Objectives: (1) To assess the relative abundance of Bombay duck in space and time; (2) To monitor the characteristics of the resources such as size and age composition, spawning cycle, growth rate and mortality; (3) To study the effect of fishery on the population in relation to stock size.

   b) Practical utility: Bombay duck forms an important fishery in India. As there are indications of the resources being subjected to heavy fishing a detailed monitoring an and assessment of the stocks in necessary for the proper management of the fishery.

10. Technical Programme: (1) Accurate resources data especially on catch and effort will be collected from landing centres. (2) Biological aspects such as size distribution, age and growth, food and feeding habits, maturity, sex ratio spawning and mortality will be studied. (3) Study of the resource data for stock assessment.

Work done: The accumulated data on the biology of the species and its fishery have been analysed for the estimation of population parameters such as growth, mortality and longivity and work on the stock assessment of the resource is in progress.

Work envisaged:- Emphasis would be given on the stock assessment programme. Monitoring the commercial fishery will be continued at all the observation centres to study the inpact of the fishery on the stocks.

11.	Date of start : 1981-82		12. Likely date of completion: continuing.		
13.	Estimated man-months	: Man months/year			
14.	Facilities required:				
	i. Land	: No	v. Fish ponds	:	No
	ii. Labour	: No	vi. Fireign exchange	:	No
	iii. Special equipment	: No	vii. Other items	:	No
	iv. Animal sheds	: No	viii. Total estimated cost.	:	Institute's Budget
15.	If financed by an organisation other than the Institute	:			
16.	Approximate cost:				
	a) Salary of Scientific staff				
	b) Salary of Technical staff				
	c) Salary of Supporting staff, if any				
	d) Casual Labour cost, if any.				
	e) Cost of equipment, facility etc.				
	f) Contingencies, such of chemicals, fertilizers, seed, animals, feeds sprayers etc.				
	g) Total cost : Institute's Budget				
17.	Signatures of:				

Sd/-	Sd/-	Sd/-
Project Leader	Head of Division	Director

RESEARCH PROJECT - 1985-86

1. Institute Code No: FB/PR/9.7 2. I.C.A.R. Code No.

3. Name and address of Research Institute : CMFR Institute, COCHIN.

4. Title of project : Survey of the Pelagic fish resources of the EEZ.

5. Title of Sub-project : Evaluation of the fishery and resources of Carangids

6. Name and designation of Project Leader : S. Reuben, S-2

7. Name(s) and designation(s) of Project Leader and Project Associates together with time proposed to be spent and work to be done.

Centre	Name	Designation	Time to be spent (%)	Work to be done
Waltair	S. Reuben	S-2	-	1-2
Madras	N.S. Radhakrishnan	S-2	-	1-2
Mandapam	M.Sivadas	S-1	-	1-2
Tuticorin	H. Mohammed Kasim	S-2	-	1-2
Vizhinjam	P. Radhakrishnan Nair	S-2	-	1-2
Cochin	K.V. Somasekharan Nair	S-2	-	1-2
Veraval	S.G. Raje	S-1	-	1-2

Technical Assistance: Waltair (M.V. Somaraju), Madras (K. Muthiah), Vizhinjam (P. Sadasiva Snrma), Cochin (V.A. Narayanan Kutty), and Veraval (H.K. Dhokia).

8. Location of the research Project. : Waltair, Madras, Mandapam, Vizhinjam, Cochin and Veraval.

9. a) Objectives: (1) To evaluate the relative abundance of the resource of Carangids along the east and west coasts of India. (2) To monitor the important fishery and biological characteristics of the commercially important species. (3) To determine stock potential and effect of fishing on the stocks.

b) Practical utility: Since this is an under exploited resource with great potential detailed studies on the resource characteristics of dominant species will be of great help in the appraisal of their commercial exploitation prospects.

10. Technical Programme: (1) Collection of catch and effort data and species composition from different types of gear from selected centres. (2) Collection of data on size, growth, age structure, sex and maturity and food of commercially important species.

Work done: The biological and fishery data on the predominant species D.dayi, M.cordyla, C.Carangus and Alphes Kalla of the carangid fishery have been analysed for the estimation of growth, mortality and Longivity parameter and the work on population assessment is under progress.

Work engisaged: Emphasis would be given on the stock assessment studies of the predominant species.

11.	Date of start: 1981-82	12. Likely date of completion: 1985-86			
13.	Estimated man-months :				
14.	Facilities required:				
	i. Land	: No.	v.	Fish ponds	: No
	ii. Labour	: No	vi.	Foreign exchange	: No
	iii. Special equipment		vii.	Other items	: No
			viii.	Total estimated cost.	: Institute's Budget
	iv. Animal sheds	: No			
15.	If financed by an organisation other than the Institute	: No.			

16. Approximate cost:

a) Salary of Scientific staff
b) Salary of Technical staff
c) Salary of Supporting staff, if any.
d) Casual Labour cost, if any
e) Cost of equipment, facility etc.
f) Contingenties, such of chemicals, fertilizers, seed, animals, feeds sprayers etc.
g) Total cost : Institute's Budget.

17. Signatures of:

Sd/-	Sd/-	Sd/-
Project Leader	Head of Division	Director

RESEARCH PROJECT 1985-86

1.	Institute Code No. FB/PR/10	2. I.C.A.R. Code No.
3.	Name and address of Research Institute	CMFR INSTITUTE, COCHIN
4.	Title of Project	Survey of the Pelagic fish resources of Exclusive Economic Zone.
5.	Title of Sub-Project	Studies on the fishery and resource characteristics of the Indian Shad, Hilsa ilisha off West Bengal-Orissa coast.
6.	Name and designation of Project Leader	S. Reuben, S-2

7. Name(s) and designation(s) of Project Leader and Project Associates together with time proposed to be spent and work done.

Centre	Name	Designation	Time to be spent (%)	Work to be done
Contai	S.S. Dan	Field Officer(T-7)	25	1-6
Waltair	S. Reuben	S-2	25	1-6
Madras	P.T. Meenakshi-sundaram	S-3	25	1-6
Cochin	S.K. Dharmaraja	S-3(APL)	25	1-6

Technical Assistance: Contai (Sapan Kumar Ghosh, Pulin Behari Dey), Gopalpur (K. Dhanaraju, K. Ramasomayajulu), Puri (Sukhadev Bar), Waltair (M.V. Somaraju), Madras(S.Chandrasekhar) and Cochin Varghese Philipposc).

8.	Location of the Research Project:	Contai, Gopalpur, Puri, Waltair, Madras and Cochin

9. a) Objectives: 1) To evaluate the fishery and resource characteristics of the Indian shad, Hilsa Ilisha from the Marine environment; (2) To estimate the stock size; 3) To study the effect of marine fishery on the stock.

b) Practical Utility: The Indian shad forms an important resource in the northern part of Bay of Bengal shared by India, Bengladesh and Burma. It is an anadromus migratory species, ascending to estuarine and riverine systems in the region for breeding. The fishery yields annually about 10,580 mt in West Bengal and Orissa coast of which 69.8% is taken from the marine and 30.2% from the estuarine and riverine environment. The Indian shad occupies an important position in the economic and social life of the people living in the above two states. Earlier studies made in India on the riverine and estuarine

phases of life history of the species have indicated a drastic-decline of its stock entering the Hooghly estuarine and fresh water systems which is ascribed to the construction of dams, weirs and barages. Besides, the size of the breeding stock that enters the esturaine and riverine systems in the region, year after year may also be dependent on the magnitude of the stock in the marine environment where significant catches are taken. The knowledge gained on the aspects as detailed under (a) has immediate application in the understanding the strength of the stock in the marine environment, besides helping in the formulation of management and conservation policies for a rational exploitation of the resources in the region.

10. Technical Programme: 1) Collection of gear-wise data on catch, fishing effort and catch-per unit effort of the fishery of Hilsa ilisha from major landing centres as per random sampling survey programme. 2) Length composition of the species in the landings on all observation days and from all gears. 3) Detailed study of the peak fishery by Scientist/Tech.Asst. teams at the major landing centres. 4) Racial studies of the species tof be undertaken from selected centres; 5) [illegible] survey and experimental [illegible] to be conducted on board Ships [illegible] Calcutta-Orissa; 5) Studies on the length-weight relationship, rate of growth, age structure, rate of exploitation and mortality to be undertaken to assess the stock size and maximum sustainable yield.

Workdone: The exploited resources and the biology of Hilsa ilisha from the marine environment were studied based on the fishery landings from the observation centres. Studies on the price structure and marketing of the landings were also undertaken during winter and summer season by undertaking team visitsto the landing, landing and marketing centres.

Work envisaged: Similar studies would be undertaken during the current season with emphasis on the assessment of Hilsa stocks from the marine invironment.

11. Date of start: 1984-85 12. Likely data completion: 1988-89

13. Estimated man-months : 12 man-months/year

14. Facilities required: i) Land - No; ii) Labour-No; iii) special equipment - No; iv) Animal shed - No; v) Fish ponds -No; vi) Foreign exchange- No; Vii) Other items - No; viii) Total estimated cost - Institute's budget.

15. If financed by an organisation other than the Institute: No.

16. Approximate cost: a) Salary of scientific staff; b) salary of Technical staff; c) Salary of Supporting staff; if any; d) Casual labour cost, if any; e) Cost of equipment, facility etc.;f) Contingencies, such of chemicals, fertilizers, seed, animals, feeds, sprayers etc.; g) Total cost; Institute's Budget

17. Signatures of:

Sd/-
Project Leader

Sd/-
Head of Division

Sd/-
Director

RESEARCH PROJECT - 1985-86

1. Institute Code No. FB/PR/11* 2. I.C.A.R. Code No.

3. Name and address of Research Institute : CMFR INSTITUTE COCHIN

4. Title of Project : Survey of the pelagic fish resources of the Exclusive Economic Zone (EEZ)

5. Title of Sub-project : Mesopelagic resources of the EEZ

6. Name and designation of the Project Leader : M. Kumaran, S-3.

7. Name(s) and designation(s) of Project Leader and Project Associates together with time proposed to be spent and work to be done.

Centre	Name	Designation	Time to be spent (%)	Work to be done
Bombay	Alexander Kurien	S-2	30	1-4
Mangalore	Madan Mohan	S-2	20	1-4
Calicut	M. Kumaran	S-3	30	1-4
Cochin	P. Parameswaran Pillai	S-2	30	1-4
	A.A. Jayaprakash	S-2	30	1-4
Madras	P.T. Meenakshisundaram	S-3 (APL)*	30	1-4
Waltair	S. Reuben	S-2	30	1-4

Technical Assistance: J.D. Sarang (Bombay), H. Ramachandra (Mangalore), V. Janaki (Calicut), V.A. Narayan Kutty (Cochin), R. Mohan (Madras), M.V. Somaraju (Waltair).

8. Location of the research project: : Bombay, Mangalore, Calicut, Cochin, Madras and Waltair

9. a) Objectives: To conduct exploratory/research survey of meso-pelagic resources, particularly of economic value, of the outershelf and oceanic waters of the EEZ with a view to find new resources and fishing grounds. 2. To evaluate the resource potential of the under exploited areas and to assess the magnitude of the resources available for exploitation.

b) Practical utility: Mesopelagic resources comprising of file-fishes (Odonus sp), butter fishes (Psenes Sp) and Myetophids (Myctophum sp) Vincigeneria sp)etc) constitute potential resource of economic significance. Preliminary surveys carried out in the outer continental shelf and slope of some regions of our coasts have shown the availability of exploitable concentrations of mesopelagic resources. Detailed information on the distribution pattern, seasonal abundance and biology of the component species of the resources in the EEZ of our country is a prerequisite for rational exploitation and utilization of these resources.

* New project.

10. Technical programme: 1. Participation in the exploratory/ experimental fishing cruise of Research vessels Skipjack and Sagar Sampada. 2. Collection of data on mesopelagic resources in the data proformae. 3. Analysis of the data for distribution pattern, seasonal abundance and biological and fishing parameters relating to major species. 4. Assessment of mesopelagic resources in the EEZ on the basis of data analysed.

Work envisaged: Work on the items 1 and 2 of Technical programme will be initiated during the current year as and when larger research vessels are available for the exploratory/fishing cruises

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11. Date of start : 1985-86 12. Likely date of completion: continuing

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13. Estimated man-months : 40 man-months/year

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14. Facilities required:

i) Land : No
ii) Labour : No
iii) Special equipment: Research/Fishing vessels qquiped for
iv) survey and diversified fishing.
iv) Animal sheds: No
v) Fish ponds : No
vi) Foreign exchange : No
vii) Other items : Nil
viii) Total estimated cost: Institute's Budget.

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15. If financed by an organization other than the Institute : No

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16. Approximate cost:

a) Salary of the Scientific and Technical staff
b) Salary of the Supporting staff, if any
c) Casual labour cost, if any
d) Cost of equipment, facilities etc.
e) Contingencies, such of samples, chemicals, fertilizers, seed, animals, feeds sprayers etc.
g) Total cost : Institute's Budget.

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17. Signatures of :

Sd/-
Project Leader

Sd/-
Head of Division

Sd/-
Director.

RESEARCH PROJECT - 1985-86

1. Institute Code No. FB/DR/1.8.2 2. I.C.A.R. Code No.

3. Name and address of Research Institute: CMFR Institute, Cochin.

4. Title of Project : Assessment of the demersal resources of Exclusive Economic Zone.

5. Title of Sub-project : Resource characteristics of perches.

6. Name and designation of Project Leader : P. Sam Bennet, Scientist S-2

7. Name (s) and designation (s) of Project Leader and Project Associates together with time proposed to be spent and work to be done.

Centre	Name	Designation	Time to be spent (%)	Work to be done
Tuticorin	P. Sam Bennet	S-2		1-3
"	H. Mohamed Kasim	S-1		"
Mandapam	K.M.S. Ameer Hamsa	S-1		"
Vizhinjam	P.A. Thomas	S-2		"
Cochin	Grace Mathew	S-1		"
Bombay	S.K. Chakraborty	S-1		"

Technical Assistance:

G. Arumugam (Tuticorin), S.G. Vincent (Vizhinjam), Chandran (Cochin), B.B. Chavan (Bombay)

8. Location of the research project: Tuticorin, Mandapam, Vizhinjam, Cochin and Bombay.

9. (a) Objectives: Study of the resource characteristics of the Kalava and other perch populations contributing to the commercial fisheries, with estimation of growth and mortality parameters.

(b) Practical utility: Individual species or related species-groups contribute to highly significant regional fisheries along the east and west coasts, and a knowledge of the above aspects is essential for a proper understanding of the presently fished and potential resources and a judicious exploitation of the same.

10. Technical programme:

1) Collection and analysis of data on effort, catch and species composition of Kalava and related species from commercial landings.

2) Collection and analysis of data on length, weight, food, maturation, spawning and fecundity of the main species at the different centres (serranids on the est coast and lethrinids on the east).

3) Estimation of growth and mortality rates leading to yield per recruit/stock assessment.

Work done: Studies on the relative abundance of perches at centres where they form significant fisheries have been carried out. Detailed biological observations on two component species (which occur consistently in adequate numbers.).

Work envisaged: Continued monitoring of the commercial fish landings to keep watch on the level of exploitation of the resource and special emphasis on the characteristics of the individual species populations to assess the potential and the optimum fishing level. The Kalava (rock-cod) resources of the west coast and the lethrinids resources of the east coast would be the major field of study.

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11. Date of start : 1981-82 12. Likely date of completion : 1987-88.

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13. Estimated man-months :

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14. Facilities required: i) Land : No ii) Labour : No iii) Special equipment : No iv) Animal sheds : No v) Fish ponds : No vi) Foreign exchange : No vii) Other items : No viii) Total estimated cost : Institute's Budget.

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15. If financed by an organisation other than the Institute: No.

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16. Approximate cost:

a) Salary of scientific staff

b) Salary of technical staff

c) Salary of supporting staff, if any

d) Casual labour cost, if any

e) Cost of equipment, facility etc.

f) Contingencies, such as chemicals, fertilizers, seeds, animal feeds, sprayers etc.

g) Total cost: Institute's Budget.

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17. Signature of:

Sd/-	Sd/-	Sd/-
Project Leader	Head of Division	Director

RESEARCH PROJECT - 1985-86

1. Institute Code No. FB/DR/1.8.4 2. I.C.A.R. Code No.

3. Name and address of Research Institute: CMFR Institute, Cochin.

4. Title of Project : Survey of demersal resources of the Exclusive Economic Zone.

5. Title of Sub-project : Assessment of sciaenid resources

6. Name and designation of the Project Leader: T. Appa Rao, Scientist S-2

7. Name (s) and designation (s) of Project Leader and Project Associates together with time proposed to be spent and work to be done.

Centre	Name	Designation	Time to be spent (%)	Work to be done
Kakinada	V. Sriramachandra Murty	S-2		1-4
Madras	P. Devadoss	S-2		"
	E. Vivekanandan	S-2		"
Cochin	K.V. Somasekharan Nair	S-1		"
Bombay	S.K. Chakraborty	S-1		"
Veraval	T. Appa Rao	S-2		"
	S.G. Raje	S-1		"

Technical Assistance:

K. Narayana Rao (Waltair), P. Ramalingam (Kakinada), P. Ramadas (Madras) B.B. Chandran (Cochin).

8. Location of research Project : Waltair, Kakinada, Madras, Cochin, Bombay and Veraval.

9. (a) Objectives: Study of pupulation characteristics by biological observation on the demersal species and estimating the growth and mortality factors.

(b) Practical utility: Sciaenids forming consistently important multi-species groups in the demersal fisheries at most centres, the detailed study of the dominant species on the above lines is essential to understand the potential of the resource.

10. Technical programme:

1) Collection and analysis of fishing effort, catch and species composition data.

2) Collection and analysis biological data on the main constituent species.

3) Studies on growth and age of the dominant species.

4) Estimation of growth and mortality rates.

Work done: Besides the appraisel of the magnitude and trend of the exploitation of the resource along the east and west coasts, biological observations have been made on six dominant species.

Work envisaged: More detailed biological observations and estimation of the growth and mortality rates of the populations of the main species.

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11. Date of start : 1981-82 12. Likely date of completion: 1987-88.

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13. Estimated man-months :

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14. Facilities required : i) Land : No ii) Labour : No iii) Special equipment : No iv) Animals sheds : No v) Fish ponds : No vi) Foreign exchange : No vii) Other items : No viii) Total estimate cost : Institute's Budget.

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15. If financed by an organisation other than the Institute : No.

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16. Approximate cost:

a) Salary of scientific staff

b) Salary of technical staff

c) Salary of supporting staff, if any

d) Casual labour cost, if any

e) Cost of equipment, facility etc.

f) Contingencies, such as chemicals, fertilizers, seeds, animal feeds, sprayers etc.

g) Total cost: Institute's Budget.

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17. Signature of:

Sd/-	Sd/-	Sd/-
Project Leader	Head of Division	Director

1. Institute Code No. FB/DR/1.8.5 2. I.C.A.R. Code No.

3. Name and address of Research Institute: CMFR Institute, Cochin.

4. Title of Project : Survey of the demersal resources of the Exclusive Economic Zone.

5. Title of Sub-project : Resource characteristics of silver bellies.

6. Name and designation of the Project Leader: V. Sriramachandra Murty, Scientist S-2

7. Name (s) and designation (s) of Project Leader and Project Associates together with time proposed to be spent and work to be done.

Centre	Name	Designation	Time to be spent (%)	Work to be done
Waltair	Y. Appanna Sastry	S-1		1-2
Kakinada	V. Sriramachandra Murty	S-2		"
Madras	S. Srinivasarangan	S-1		"
Mandapam	P. Livingston	S-1		"
Calicut	N.G. Menon	S-2		"

Technical Assistance:

P. Ramalingam (Kakinada), S.K. Balakumar (Madras) M. Badruddin (Mandapam)

8. Location of the research Project: Waltair, Madras, Kakinada, Mandapam and Calicut.

9. (a) Objectives: Estimation of the mortality rates and yield-per-recruit of the dominant species in the commercial fisheries at the different centres.

(b) Practical utility: A resource of such regional abundance as to form the basis for attendant industries for fish-meal production etc., the need is great for an immediate understanding of the present exploitation and the potential for expansion, for which studies, as indicated above, are essential.

10. Technical programme:

1) Collection and analysis of data on effort, catch and species composition.

2) Collection and analysis of data on the various aspects of biology of L. bindus and S. insidiator at Waltair, Kakinada, Madras, L. dussumeri and L. jonesi at Mandapam.

3) Estimation of age and growth.

4) Estimation of mortality rate and yield per recruit of the above species.

Work done: Data on the various aspects of the biology of the main species have been collected and estimates of population parameters relating to L. bindus and S. insiator made.

Work envisaged: Extension of similar work to other species and centres.

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11. Date of start : 1981-82 12. Likely date of completion: 1987-88.

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13. Estimated man-months :

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14. Facilities required : i) Land : No ii) Labour : No iii) Special equipment : No iv) Animal sheds : No v) Fish ponds : No vi) Foreign Exchange : No vii) Other items : No viii Total estimated cost : Institute's Budget.

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15. If financed by an organisation other than the Institute : No.

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16. Approximate cost:

a) Salary of scientific staff

b) Salary of technical staff

c) Salary of supporting staff, if any

d) Casual labour cost, if any

e) Cost of equipment, facility etc.

f) Contingencies, such as chemicals, fertilizers, seeds, animal feeds, sprayers etc.

g) Total cost: Institute's Budget.

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17. Signature of:

Sd/-	Sd/-	Sd/-
Project Leader	Head of Division	Director

1. Institute Code No. FB/DR/1.9.1 2. I.C.A.R. Code No.

3. Name and address of Research Institute: CMFR Institute, Cochin.

4. Title of Project : Survey of the demersal resources of Exclusive Economic Zone

5. Title of Sub-project : Survey and monitoring of major demersal fisheries

6. Name and designation of Project Leader: C. Mukundan, Scientist S-2

7. Name (s) and designation (s) of Project Leader and Project Associates together with time proposed to be spent and work to be done.

Centre	Name	Designation	Time to be spent (%)	Work to be done
Waltair	Y. Appanna Sastry	S-1		1-4
Kakinada	V. Sriramachandra Murty	S-2		"
Madras	M.D.K. Kuthalingam	S-3		"
	P.T. Meenashisundaram	S-2		"
	E. Vivekanandan	S-2		"
Mandapam	P. Livingston	S-1		"
Vizhinjam	C. Mukundan	S-2		"
Cochin	K.V. Somasekharan Nair	S-1		"
Veraval	S.G. Raje	S-1		"

Technical Assistance:

W. Venugopalan (Kakinada), S. Chandrasekharan (Madras), M. Badruddin (Mandapam), C. Manimaran (Tuticorin), Abdul Nizar (Cochin), R.C. Kavitkar (Bombay).

8. Location of the research Project: Bombay, Cochin, Vizhinjam, Tuticorin, Mandapam, Madras, Kakinada, Waltair, Veraval.

9. (a) Objectives: Study of the demersal fishery resources and also the major component species/groups, available for exploitation by the mechanized vessels at the different centres.

(b) Practical utility: With growing mechanization the exploitation of ground fisheries off the mainland has increased manyfold. For a judicious exploitation of the additional areas an adequate knowledge of the nature of these grounds, the relative richness of the different fishing areas, and the magnitude of the resources is necessary. The Project seeks to provide such a survey and charting of the more

10. Technical programme:

1) Collection and analysis of data on coastal ground-fish resources by co-ordinated operation of the Institute vessels, wherever available.

2) Collection and analysis of data from commercial fishery and from exploratory fishing by vessels of Governmental and other agencies.

3) Assessment of the resources available and charting of the fishing grounds.

4) Experimental fishing using the Institute vessels in selected areas or for selected resources.

Work done: The extent and pattern of exploitation of the ground-fish resources off east and west coasts have been studied by monitoring landings by demersal gears from the Institute's boats, Governmental Agencies and private commercial trawlers.

Work envisaged: Continued monitoring of exploitation and analysis of results of exploitation of fishing grounds would be made at all centres. Special programme of experimental fishing would be undertaken between Madras and Point Calimere for charting the area and night-trawling for study of diurnal changes in catch.

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11. Date of start : 1981-82 12. Likely date of completion: 1987-88.

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13. Estimated man-months :

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14. Facilities required: i) Land : ii) Labour : iii) Special equipment : iv) Animal sheds : v) Fish ponds : vi) Foreign Exchange : vii) Other items : viii) Total estimated cost : Institute's Budget.

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15. If financed by an organisation other than the Institute : No.

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16. Approximate cost:

a) Salary of scientific staff

b) Salary of technical staff

c) Salary of supporting staff, if any

d) Casual labour cost, if any

e) Cost of equipment, facility etc.

f) Contingencies, such as chemicals, fertilizers, seeds, animal feeds, sprayers etc.

g) Total cost: Institute's Budget.

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17. Signature of:

Sd/-	Sd/-	Sd/-
Project Leader	Head of Division	Director

1. Institute Code No. FB/DR/1.9.2 2. I.C.A.R. Code No.

3. Name and address of Research Institute: CMFR Institute, Cochin.

4. Title of Project : Survey of demersal resources of Exclusive Economic Zone

5. Title of Sub-project : Bathypelagic resources of the EEZ

6. Name and designation of Project Leader: M.J. George, Scientist S-3

7. Name (s) and designation (s) of Project Leader and Project Associates together with time proposed to be spent and work to be done.

Centre	Name	Designation	Work to be spent (%)	Work to be done
Cochin	M.J. George	S-3		1-4
	C. Suseelan	S-2		"
	M.M. Meiyappan	S-1		"
	K. Rengarajan	S-2		"
	I. David Raj	S-1		"

Technical Assistance:

K.N. Gopalakrishnan (Cochin)

8. Location of the research Project: Cochin

9. (a) Objectives: To undertake exploratory/research survey of bathypelagic resources, particularly of economic value, beyond the areas at present exploited with a view to find new resources and fishing grounds. To evaluate the resource potential of the under-exploited areas and to assess the magnitude of the resources available for exploitation.

(b) Practical utility: Bathypelagic resources comprising fishes, prawns, lobsters, crabs and other organisms constitute a fishery of considerable economic significance. Preliminary surveys carried out in the continental shelf and slope of certain regions of our coasts have shown the availability of exploitable deep-sea crustacean and other bathypelagic resources. Detailed information on the distribution pattern, seasonal abundance and biology of the conventional fishing grounds in the Exclusive Economic Zone of our country forms a pre-requisite for rational exploitation and accelerated development of these resources.

10. Technical programme:

1) Participation in the exploratory/experimental fishing cruises of Research Vessels and other larger vessels.

2) Collection of data on bathypelagic resources in the prescribed proforma.

3) Analysis of data for distribution pattern, seasonal abundance and bilogical and fishing parameters relating to fishes.

4) Assessment of exploitable bathpelagic resources in the extended economic zone on the basis of the data analysed.

Work envisaged in current year: Work on this project will commence as and when the larger research vessels are available for cruises.

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11. Date of start : 1984-85 12. Likely date of completion: 1986-87.

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13. Estimated man-months :

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14. Facilities required: i) Land : No ii) Labour : No iii) Special equipment : No iv) Animal sheds : No v) Fish ponds : No vi) Foreign Exchange : No vii) Other items : viii) Total estimated cost : Institute's Budget.

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15. If financed by an organisation other than the Institute: No.

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16. Approximate cost:

a) Salary of scientific staff

b) Salary of technical staff

c) Salary of supporting staff, if any

d) Casual labour cost, if any

e) Cost of equipment, facility etc.

f) Contingencies, such as chemicals, fertilizers, seeds, animal feeds, sprayers etc.

g) Total cost: Institute's Budget.

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17. Signature of:

Sd/-	Sd/-	Sd/-
Project Leader	Head of Division	Director

1. Institute Code No. FB/DR/1.10 2. I.C.A.R. Code No.

3. Name and address of Research Institute: CMFR Institute, Cochin.

4. Title of Project : Survey of the demersal resources of the Exclusive Economic Zone

5. Title of Sub-project : Preparation of fishery atlases

6. Name and designation of Project Leader: C. Mukundan, Scientist S-2

7. Name (s) and designation (s) of Project Leader and Project Associates together with time proposed to be spent and work to be done.

Centre	Name	Designation	Time to be spent (%)	Work to be done
Vizhinjam	C. Mukundan	S-2		1-2

Technical Assistance:

P.K. Mahadevan Pillai (Cochin)

8. Location of the research Project: Cochin, Vizhinjam.

9. (a) Objectives: To chart the area-wise and season-wise distribution and abundance of pomfrets, catfishes and sciaenids (with related parameters).

(b) Practical utility: Information on these three groups, which are commercially significant, is to be compiled and presented in a consolidated form, which would be useful to the industry.

10. Technical programme:

1) Catch and effort data for these groups would be analysed on an all-India basis.

2) Related biological and environmental information on the constituent species, available so far, would also be consolidated.

Work done: The analysis of the earlier year's catch was carried out category-wise, area-wise and season-wise.

Work envisaged: Analysis on the above lines would be continued.

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11. Date of start : 1981-82 12. Likely date of completion: 1986-87.

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13. Estimated man-months :

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14. Facilities required: i) Land : No ii) Labour : No iii) Special equipment : No iv) Animal sheds : No v) Fish ponds : No vi) Foreign Exchange : No vii) Other items : No viii) Total estimated cost: Institute's Budget.

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15. If financed by an organisation other than the Institute: No.

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16. Approximate cost:

a) Salary of scientific staff

b) Salary of technical staff

c) Salary of supporting staff, if any

d) Casual labour cost, if any

e) Cost of equipment, facility etc.

f) Contingencies, such as chemicals, fertilizers, seeds, animal feeds, sprayers etc.

g) Total cost: Institute's Budget.

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17. Signature of:

Sd/-	Sd/-	Sd/-
Project Leader	Head of Division	Director

RESEARCH PROJECT - 1985-86

1. Institute Code No. IF/CUL/1.3 2. I.C.A.R. Code No.

3. Name and address of Research Institute: CMFR Institute, Cochin.

4. Title of Project : Mariculture-culture of fin-fishes

5. Title of Sub-project : Pond culture of marine fishes

6. Name and designation of the Project Leader: R. Marichamy, S-2

7. Name (s) and designation (s) of Project Leader and Project Associates together with time proposed to be spent and work to be done.

Centre	Name	Designation	Time to be spent (%)	Work to be done
Tuticorin	R. Marichamy	S-2		1-6
Mandapam	V.S. Rengaswami	S-1		"
	A. Raju	S-1		"
	V. Gandhi	S-1		"
Madras	P. Nammalwar	S-2		"
	G. Mohanraj	S-2		"

Technical Assistance:

S. Rajapackiam (Tuticorin), M.R. Arputharaj (Mandapam)

A.C. Sekher (Madras)

8. Location of the research Project: Tuticorin, Mandapam and Madras.

9. (a) Objectives: To assess the production potential of different groups of marine fishes in mono-and polyculture systems in ponds.

(b) Practical utility: Development of suitable techniques for the different cultivable species would lead to large-scale culture of compatible species.

10. Technical programme:

1) Observation on seed availability in the wild and collection of seed from suitable selected centres for stocking.

2) Experiments on compatible species for selection for mono-and polyculture.

3) Stocking of different species at different densities with different levels of application of fertilizer to ponds and of feeding of fish.

4) Monitoring of the necessary environmental parameters of the ponds.

5) Monitoring the growth of fish in ponds in terms of length and weight.

6) Harvesting and estimating production under different systems.

Work done: Seasonal and quantitative availability of the seed in the wild has been studied at Mandapam and similar work is in progress at other centres. Fish culture experiments have been carried out with milkfish and mullets.

Work envisaged: The culture work would be expanded to cover new species, particularly those compatible for polyculture. Many infrastructure facilities will have to be built up at centres like Tuticorin & Madras and many existing ones adequately expanded at Mandapam, namely in seawater circulation (deeping of channels, feeder canals and pumping of water etc.).

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11. Date of start : 1985-86 12. Likely date of completion: 1987-88.

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13. Estimated man-months :

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14. Facilities required : i) Land : No ii) Labour : No iii) Special equipment : No iv) Animal sheds : No v) Fish ponds : vi) Foreign Exchange : vii.) Other items : viii) Total estimated cost : Institute's Budget.

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15. If financed by an organisation other than the Institute : No

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16. Approximate cost:

a) Salary of scientific staff

b) Salary of technical staff

c) Salary of supporting staff

d) Casual labour cost, if any

e) Cost of equipment, facility etc.

f) Contingencies, such as chemicals, fertilizers, seeds, animal feeds, sprayers etc.

g) Total cost: Institute's Budget.

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17. Signature of:

Sd/-	Sd/-	Sd/-
Project Leader	Head of Division	

RESEARCH PROJECT - 1985-86

1. Institute Code No. DF/CUL/1.4 2. I.C.A.R. Code No.

3. Name and address of Research Institute: CMFR Institute, Cochin.

4. Title of Project : Mariculture-culture of fin-fishes.

5. Title of Sub-project : Cage culture of marine fishes

6. Name and designation of the Project Leader: K.M.S. Ameer Hamsa, Scientist S-1

7. Name (s) and designation (s) of Project Leader and Project Associates together with time proposed to be spent and work to be done.

Centre	Name	Designation	Time to be spent (%)	Work to be done
Mandapam	K.M.S. Ameer Hamsa	S-1		
	Sampson Manickam	S-1		

Technical Assistance:

M.R. Arputharaj (Mandapam),

8. Location of the research Project: [illegible] Mandapam Camp, [illegible]ad,

9. (a) Objectives: To investigate the possibility of culture of commercially important marine fishes, in coastal enclosures like cages, and to assess the production potential of these fishes in mono-and polyculture systems.

(b) Practical utility: The development of culture practices on the above lines would help in utilization of relatively shallow coastal areas for large-scale fish production.

10. Technical programme:

1) Survey and selection of suitable sites for cage culture in the open sea.

2) Collection of seed and stocking the cages.

3) Evolve suitable techniques for mono-and polyculture in different cage systems.

4) Use of suitable feeds for the selected species.

5) Monitoring the growth of fish in terms of length and weight.

6) Study production potential for different species at different centres.

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11. Date of start : 1983-84 12. Likely date of completion: 1988-89.

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13. Estimated man-months :

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14. Facilities required : i) Land : ii) Labour : iii) Special equipment : iv) Animal sheds : v) Fish ponds : vi) Foreign Exchange : vii) Other items : viii) Total estimated cost : Institute's Budget.

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16. Approximate cost:

a) Salary of scientific staff

b) Salary of technical staff

c) Salary of supporting staff, if any

d) Casual labour cost, if any

e) Cost of equipment, facility etc.

f) Contingencies, such as chemicals, fertilizers, seeds, animal feeds, sprayers etc.

g) Total cost: Institute's Budget.

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17. Signature of:

Sd/-	Sd/-	Sd/-
Project Leader	Head of Division	Director

RESEARCH PROJECT - 1985-86

1. Institute Code No. DF/CUL/1.5 2. I.C.A.R. Code No.

3. Name and address of Research Institute: CMFR Institute, Cochin.

4. Title of Project : Mariculture-culture of fin-fishes.

5. Title of Sub-project : Culture of marine fish in polythene-lined ponds

6. Name and designation of the Project Leader: S. Lazarus, Scientist S-2

7. Name (s) and designation (s) of Project Leader and Project Associates together with time proposed to be spent and work to be done.

Centre	Name	Designation	Time to be spent (%)	Work to be done
Calicut	S. Lazarus	S-2		1-5

Technical Assistance:

K. Nandakumaran (Calicut)

8. Location of the research Project: Calicut

9. (a) Objectives: To develop suitable culture techniques of marine fish culture for utilization of un used coastal areas and to assess the production potential of different kinds of marine fishes in such systems.

(b) Practical utility: Arid stretches of beach which are lying unutilized could be converted for culture of fish, making use of these technologies.

10. Technical programme:

1) Study the availability of seed in the wild and selection of suitable species for culture.

2) Collection of seed and stocking.

3) Culture of the selected species in polythene-lined ponds under different conditions of stocking, manuring and feeding.

4) Monitoring environmental parameters and the growth of fish.

5) Harvesting and estimating production.

Work done: Many species like Chanos, Mugil & Megalops have been cultured in such ponds and their production rates studied.

Work envisaged: Work is to be extended to include new species for similar studies.

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11. Date of start : 1985-86 12. Likely date of completion: 1987-88.

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13. Estimated man-months :

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14. Facilities required : i) Land : ii) Labour : iii) Special equipment : iv) Animal sheds : v) Fish ponds : vi) Foreign Exchange : vii) Other items : viii) Total estimate cost : Institute's Budget.

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15. If financed by an organisation other than the Institute : No.

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16. Approximate cost:

a) Salary of sdientific staff

b) Salary of technical staff

c) Salary of supporting staff, if any

d) Casual labour cost, if any

e) Cost of equipment, facility etc.

f) Contingencies, such as chemicals, fertilizers, seeds, animal feeds sprayers etc.

g) Total cost: Institute's Budget.

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17. Signature of:

Sd/-	Sd/-	Sd/-
Project Leader	Head of Division	Director

RESEARCH PROJECT - 1985-86

1. Institute Code No. DF/CUL/1.6 2. I.C.A.R. Code No.

3. Name and address of Research Institute : CMFR Institute, Cochin

4. Title of Project : Mariculture-culture of fin-fishes

5. Title of Sub-project : Pen-culture of marine fish

6. Name and designation of Project Leader: R.S. Lal Mohan, Scientist S-2

7. Name (s) and designation (s) of Project Leader and Project Associates together with time proposed to be spent and work to be done.

Centre	Name	Designation	Time to be spent (%)	Work to be done
Mandapam	R.S. Lal Mohan	S-2		1-4

Technical Assistance:

M.R. Arputharaj (Mandapam)

8. Location of the research Project: Mandapam

9. (a) Objectives: To develop suitable techniques for fish culture using seasonally inundated coastal areas and derelict waters.

(b) Practical utility: Low-lying coastal regions which are at present lying unutilised could be turned into productive areas, with the development of such techniques and selection of suitable species.

10. Technical programme:

1) Collection of seed from the wild for stocking.

2) Culture of selected species in pens and lagoon areas at different levels of stocking and of natural and artifical feeding.

3) Monitoring environmental factors and the growth rate of fish in the pen.

4) Harvesting and estimation of production under the different systems.

Work done: Milk fish and mullets have been cultured in pens successfully.

Work envisaged: Similar work to be continued with other compatible species too and the experiments at different levels of stocking and feeding to improve growth within the season.

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11. Date of start : 1984-85 12. Likely date completion: 1987-88.

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13. Estimated man-months:

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14. Facilities required: i) Land : ii) Labour : iii) Special equipment : iv) Animal sheds : v) Fish ponds : vi) Foreign Exchange : vii) Other items : viii) Total estimated cost : Institute's Budget.

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15. If financed by an organisation other than the Institute: No

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16. Approximate cost:

a) Salary of scientific staff

b) Salary of technical staff

c) Salary of supporting staff, if any

d) Casual labour cost, if any

e) Cost of equipment, facility etc.

f) Contingencies, such as chemicals, fertilizers, seeds, animal feeds, sprayers etc.

g) Total cost: Institute's Budget.

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17. Signature of:

Sd/-	Sd/-	Sd/-
Project Leader	Head of Division	Director

RESEARCH PROJECT 1985-86

1. Institute Code No. DF/RE/11 2. I.C.A.R. Code No.

3. Name and address of Research Institute: CMFR Institute, Cochin.

4. Title of Project : Survey of demersal resources

5. Title of Sub-project : Assessment of cat-fish resources.

6. Name and designation of Project Leader : V.N. Bande, Scientist S-2

7. Name (s) and designation (s) of Project Leader and Project Associates together with time proposed to be spent and work to be done.

Centre	Name	Designation	Time to be spent (%)	Work to be done
Veraval	S.G. Raje	S-1		1-4
Mangalore	C. Muthiah	S-1		"
Calicut	N. Gopinatha Menon	S-2		"
Cochin	V.N. Bande	S-2		"
	K. Alagaraja	S-2		"
Waltair	Y. Appanna Sastry	S-1		"

Technical Assistance:

H.K. Dokia (Veraval), R.G. Kavitkar (Bombay), H. Ramachandra (Mangalore), K. Balachandran (Cochin), K. Balakrishnan (Madras) K. Narayanan Rao (Waltair)

8. Location of the research Project: Veraval, Bombay, Mangalore, Calicut, Cochin, Madras and Waltair.

9. (a) Objectives: Assessment of the stocks available for exploitation, based on estimation of the landings and of the growth and maturity parameters of the populations fished.

(b) Practical utility: Catfishes have emerged as a very significant group contributing substantially to the marine fish landings at many centres, particularly after the rapid expansion of mechanized fishing, and an appraisal of the stocks available is necessary for a planned and proper exploitation of the resource.

10. Technical programme:

1) Collection and analysis of data on effort, catch and species composition from landings by exploratory and commercial fishing.

2) Collection and analysis of biological data on the main constituent species.

3) Estimation of population parameters.

4) Assessment of yield per recruit/stock.

Work done: Assessments carried out on the resources of five species from observations at selected centres on east and west coast, based mainly on commercial landings.

Work envisaged: Work on the same lines to be continued and expanded, based on extended coverage by mechanised fishery and the operations of other exploratory vessels.

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11. Date of start : 1985-86 12. Likely date of completion: 1989-90.

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13. Estimated man months :

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14. Facilities reguired : 1) Land: Nil ii) Labour: Nil iii) Special equipment: Research Vessel iv) Animal sheds: Nil v) Fish ponds: Nil vi) Foreign exchange: Nil vii) Other items: Nil viii) Total estimated cost: Institute's Budget.

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15. If financed by an organisation other than the Institute: No.

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16. Approximate cost:

a) Salary of scientific staff

b) Salary of technical staff

c) Salary of supporting staff, if any

d) Casual labour cost, if any

e) Cost of equipment, facility etc.

f) Contingencies, such of chemicals, fertilizers, seeds, animal feeds, sprayers etc.

g) Total cost: Institute's Budget.

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17. Signature of:

Sd/-	Sd/-	Sd/-
Project Leader	Head of Division	Director

RESEARCH PROJECT - 1985-86

1. Institute Code No. DF/RE/12 2. I.C.A.R. Code No.

3. Name and address of Research Institute : CMFR Institute, Cochin.

4. Title of Project : Survey of the demersal resources

5. Title of Sub-project : Stock assessment thread-fin breams

6. Name and designation of Project Leader : V. Sriramachandra Murty, Scientist S-2

7. Name (s) and designation (s) of Project Leader and Project Associates together with time proposed to be spent and work to be done.

Centre	Name	Designation	Time to be spent (%)	Work to be done
Kakinada	V. Sriramachandra Murty	S-2		1-4
Madras	E. Vivekanandan	S-2		"
Vizhinjam	P.A. Thomas	S-2		"
Cochin	K.V. Somasekharan Nair	S-1		"
	M. Srinath	S-1		"
	K. Balan	S-1		"
Bombay	S.K. Chakraborty	S-1		"
Veraval	S.G. Raje	S-1		"

Technical Assistance:

K. Narayana Rao (Waltair), P. Ramalingam (Kakinada), P. Ramadoss (Madras), M.N. Kesavan Eleyathu (Cochin) H.K. Dhokia (Veraval)

8. Location of research Project : Waltair, Kakinada, Madras, Cochin, Bombay and Veraval.

9. (a) Objectives: Estimation of the mortality rates and yield-per-recruit of the major species of threadfin breams, forming significant fisheries at different centres.

(b) Practical utility: This is a resource that is regionally and seasonally exploited at present but has a tremendous potential with the expansion of the demersal offshore fisheries. Studies on the constituent species along the above lines is essential for the proper exploitation of this resource and future formulation of management policies.

10. Technical programme:

1) Collection and analysis of data on effort, catch and species composition from commercial landings.

2) Collection and analysis of data on length, weight, food•maturation, spawning and fecundity of the two main constituent species, N. japonicus and N. mesoprion.

3) Collection of scale samples and otoliths of N. japonicus for study of growth and age.

4) Estimation of mortality rate and yield-per-recruit of the species.

Work done: Besides study of the seasonal trends and magnitude of the fisheries at different centres, estimates of growth, mortality and stock size relating to N. japonicus fishery on the east coast have been made.

Work envisaged: Similar work, in progress on the east and west coasts, would be expanded to more centres and to cover the additional species of N. mesoprion.

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11. Date of start : 1985-86 12. Likely date of completion: 1989-90.

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13. Estimated man-months :

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14. Facilities required : i) Land : No ii) Labour : No iii) Special equipment : No iv) Animal sheds : No v) Fish ponds : No vi) Foreign Exchange : No vii) Other items : No viii) Total estimate cost : Institute Budget.

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15. If financed by an organisation other than the Institute : No.

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16. Approximate cost:

a) Salary of scientific staff

b) Salary of technical staff

c) Salary of supporting staff, if any

d) Casual labour cost, if any

e) Cost of equipment, facility etc.

f) Contingencies, such as chemicals, fertilizers, seeds, animal feeds, sprayers etc.

g) Total cost: Institute's Budget.

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17. Signature of:

Sd/-	Sd/-	Sd/-
Project Leader	Head of Division	Director

RESEARCH PROJECT - 1985 -'86

1. Institute Code No. CF/RE/1.1.1 2. I.C.A.R. Code No.

3. Name and address of Research Institute : CMFP Institute, Cochin

4. Title of Project : Crustacean resources of E.E.Z.

5. Title of Sub-project : Assessment of penaeid prawn resources

6. Name and designation of Project Leader : M.J. George, Scientist S3

7. Name(s) and designation(s) of Project Leader and Project Associates together with time proposed to be spent and work to be done

Centre	Name	Designation	Time to be spent (%)	Work to be done
Cochin	M.J. George	S3	25	1-3
	K.Alagaraja	S3	25	2
	C. Suseelan	S2	25	1-3
Puri	K.R.Manmadan Nair	S1	50	1-3
Waltair	G.Sudhakara Rao,	S2	75	1-3
Kakinada	S.Lalitha Devi	S1	25	1-3
Madras	D.B. James	S2	25	1-3
Tuticorin	S. Shanmugam	S1	50	1-3
Cochin	K.N. Rajan	S1	100	1-3
	G.Nandakumar	S2	100	1-3
Mangalore	K.K. Sukumaran	S1	25	1-3
Karwar	K.Y. Telang	S1	50	1-3
Bombay	S. Ramamurthy	S3	35	1-3
	M.Aravindakshan,	S	50	1-3
Veraval	V.D. Deshmukh	S1	40	1-3
Calicut	N.S. Kurup	S1	75	1-3

Technical Assistance: P.V.K. Rao(Puri), C.Nalini, K. Chellappan (Cochin), O.Tippaisamy (Mangalore), K.K. Balasubramanian, V. Suresh, S. Lakshmi(Calicut), Manickaraja (Tuticorin, J.B. Varma (Kakinada), B.P. Tumber (Veraval), A.Y.Mestri (Bombay), P.Thirumilu (Madras), C.K. Dinesh (Karwar).

8. Location of the research project: Puri, Waltair, Kakinada, Madras, Tuticorin, Calicut, Mangalore, Karwar, Bombay, Veraval, Cochin.

9. a) Objectives: 1.To assess the magnitude of exploited resources of the various species of penaeid prawns and to study their relative abundance in space and time along the Indian coast. 2. To monitor the population characteristics of all the important species at different places. (3) To study the biological characteristics of the commercial species and to maintain the relevant data on a continuing basis. 4) To undertake spawning surveys of important species of the inshore and offshore waters. 5) To evaluate the resources potential

of the under exploited areas and to find new resources beyond theconventional fishing grounds.

b) Practical utility: Penaeid prawns contribute to more than half of the marine prawn production of the country and are in great demand in export trade. The exploitation of this resources has increased considerably in recent years. Some new fishing grounds have also be discovered and commercial exploitation has extended there also. The effect of the increased fishing pressure on the prawn stock has to be closely watched and the biological as well as population characteristics of stock are studied to provide scientific data for framing suitable management policies to obtain maximum sustainable yield.

10) Technical Programme: 1) Data on catch and effort for the penaeid prawns fished from the sea will be collected at the centres mentioned above based on random sampling. 2)Species composition and their seasonal abundance in the catch, size and sex composition, maturity, food and other biological aspects of the individual species will be analysed. 3) Detailed studies on population characteristics will be undertaken. 4) Spawning and resources surveys will be carried out at selected centres. 5) Record the variations in prices of the different grades of prawns. 6) Ship board observations on the DOD vessels and other research vessels will be intensified.
Work done: The scientists involved in this project from all the Centres participated in a Workshop conducted at the Headquarters to finalize the analysis of data for the assessment of prawn stocks from their respective regions. The papers embodying the results are being prepared for publication.
Work envisaged in current year: Items 1-6 of the technical programme will be carried out to continue the monitoring of the prawn stocks.

11. Date of start: 1981-82. 12.Likely date of completion:1987-88

13. Estimated man-months: (for scientific personnel only)
70 man months

14. Facilities required:
i. Land: Nil; ii. Labour: Nil; iii. Special equipment: Nil; iv.Animal sheds: Nil; v. Fish ponds: Nil; vi.Foreign Exchange: Nil; vii. Other items: Nil; viii. Total estimated cost: Institute's budget

15. If financed by an organisation other than the Institute: Nil

16. Approximate cost : Institute's Budget

17. Signature of:

Sd/-	Sd/-	Sd/-
Project Leader	Head of Division	Director

RESEARCH PROJECT - 1985- '86

1. Institute Code No. CF/RE/1.1.2. 2. I.C.A.R. Code No.

3. Name and address of Research Institute : CMFR Institute, Cochin

4. Title of Project : Crustacean Resources of the E.E.Z.

5. Title of sub-project : Assessment of non-penaeid prawn resources

6. Name and designation of Project Leader : S. Ramamurthy, Scientist S-3

7. Name(s) and designation(s) of Project Leader and Project Associates together with time proposed to be spent and work to be done

Centre	Name	Designation	Time to be spent(%)	Work to be done
Bombay	S. Ramamurthy	S3	35	1-4
	M. Aravindakshan	S	50	"
Kakinada	S. Lalitha Devi	S1	25	"
Veraval	V.D. Deshmukh	S1	40	"

Technical Assistance: J.B. Varma (Kakinada), A.D. Sawant(Bombay), B.P. Thumber (Veraval)

8. Location of the research project: Kakinada, Bombay, Veraval

9. a) Objectives:
1. To assess the magnitude of the exploited resources of the various species of nonpenaeid prawns and to study their relative abundance in space and time along the Indian coast. 2. To monitor the population characteristics of the commercial species and to maintain the relevant data on a continuing basis. 3. To study the biological and population aspects of constituent species. 4. To evaluate the resources potential beyond the presently exploited fishing zones.

b) Practical utility: Nonpenaeid prawns are the second major category of the prawn resources and support around the year fishery of high magnitude in certain regions. A proper assessment of the resources through collection of data on catch, effort and population characteristics and biology of constituent species is essential for the rational exploitation of the resources.

10. Technical Programme: 1) Data on catch and effort for non-penaeid prawns will be collected at the above mentioned centres based on random sampling. 2) Data on species composition, size and sex distribution, maturation, fecundity, spawning, larval distribution, growth, food and feeding and their biological aspects of important species will be collected. 3) Detailed studies on population characteristics will be undertaken. 4) At centres where research vessels are available trawling surveys will be conducted to discover new resources of deep sea non-penaeid prawns.

Work done: Data on catch, effort, biological aspects and prices of different species of nonpenaeids of different observation centres have been collected and studied. The fishery decreased at Veraval, Bombay and Kakinada. The resources data from 1961-80 in Maharashtra were analysed to study the catch trends.

Work envisaged in current year: A detailed analysis of the data collected so far from each centre on catch, effort, length frequency and other biological data would be undertaken this year with a view to make a proper assessment of the stocks and a detailed review paper on the stock assessment got ready for publication.

11. Date of start: 1981-82. 12. Likely date of completion: 1987-88

13. Estimated man-months: (Scientific personnel only)
18 man months/year

14. Facilities required:
i. Land: Nil; ii. Labour: Nil; iii. Special equipment: Nil; iv. Animal sheds: Nil; v. Fish ponds: Nil; vi. Foreign Exchange: Nil; vii. Other items: Nil; viii. Total estimated cost: Institute's Budget

15. If financed by an organisation other than the Institute:
Nil

16. Approximate cost: a) Salary of scientific staff.; b) Salary of Technical staff.; c) Salary of Supporting staff, if any; d) Casual labour cost, if any; e) Cost of equipment, facility etc.; f) Contingencies, such as chemicals, fertilizers, seeds, animals, feeds, sprayers etc.; g) Total cost: Institute's Budget.

17. Signature of:

Sd/-	Sd/-	Sd/-
Project Leader	Head of Division	Director

RESEARCH PROJECT - 1985-'86

1. Institute Code No. CF/RE/1.1.3. 2. I.C.A.R. Code No.

3. Name and address of Research Institute : CMFR Institute, Cochin

4. Title of Project : Crustacean Resources Investigations

5. Title of Sub-project: Assessment of prawn resources in the nursery grounds

6. Name and designation of Project Leader : C. Suseelan, Scientist S2

7. Name(s) and designation(s) of Project Leader and Project Associates together with time proposed to be spent and work to be done

Centre	Name	Designation	Time to be spent(%)	Work to be done
Puri	K.R. Manmadan Nair	S1	50	1-3 at Puri
Kakinada	S. Lalitha Devi	S1	25	1-3 at Kakinada
Madras	D.B. James	S2	25	1-3 at Madras
Cochin	V.S. Kakati	S1	50	1-3 at Cochin
	C. Suseelan	S2	50	1-3 at Cochin
Calicut	N.S. Kurup	S1	25	1-3 of Korapuzha
Mangalore	K.K. Sukumaran	S1	25	1-3 of Nethravathi
Karwar	K.Y. Telang	S1	25	1-3 at Karwar

Technical Assistance: P.V.K. Rao,(Puri), K.N. Gopalakrishnan, K.Chellappan (Cochin, Quilon), Dinesh (Karwar), K.Koumudi Menon (Calicut), P.Thirumulu (Madras).

8. Location of the research Project: Puri, Kakinada, Madras, Cochin, Calicut, Mangalore, Karwar

9. a) Objectives: 1) To study the rate of recruitment of post-larvae and juvenile penaeid prawns with the nursery areas and to use their abundance as an index for forecasting the magnitude of the fishery of the succeeding period. (2) To study the distribution, growth rates, migration, mortality etc. of various species in important estuarine systems. 3) To assess the catch rates of juvenile prawns in order to indicate the trend of abundance of juvenile population inside the nursery areas.

b) Practical utility: The success or failure of the prawn fishery could be predicted in advance using the index of

post larval and juvenile abundance in the estuarines and backwaters. As the exploitation of juvenile prawns from the nursery areas is fast increasing everywhere, data on catch, effort and biological characteristics of the constituent species will provide scientific backing to frame management policies for judicious exploitation and conservation of resources.

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10. Technical programme:

1) The rate of recruitment of post-larvae and juvenile prawns into the nursery grounds will be studied at selected centres by using quantitative sampling methods. 2) Data on catch and effort for juvenile penaeid prawns will be collected for major fisheries. 3) Data on species composition, sex ratio and biological aspects such as growth, movements etc. of important species will be studied.

Work done: The recruitment pattern, biological characteristics and exploitation of juvenile penaeid prawns in the nursery areas were studied from selected centres.

Work envisaged in current year: The qualitative and quantitative data on postlarval and juvenile prawns so far recorded at each of the project centres will be analysed in detail and a comprehensive report of the results prepared for publication. The monitoring studies will be continued only for the major fisheries.

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11. Date of start: 1981-82. 12. Likely date of completion:1987-88

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13. Estimated man-months: 33 man months (Scientific personnel only)

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14. Facilities required:
i. Land : Nil.; ii. Labour: Nil.; iii. Special equipment: Nil.; iv. Animal sheds: Nil.; v. Fish ponds: Nil.; vi. Foreign exchange: Nil.; vii. Other items: Nil.; viii. Total estimated cost: Institute's budget.

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15. If financed by an organisation other than the Institute: Nil.

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16. Approximate cost:
a) Salary of Scientific staff
b) Salary of Technical staff
c) Salary of Supporting staff, if any
d) Casual labour cost, if any
e) Cost of equipment, facility etc.
f) Contingencies, such of chemicals, fertilizers, seed, animals, feeds, sprayers etc.

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17. Signature of:

Sd/-	Sd/-	Sd/-
Project Leader	Head of Division	Director

RESEARCH PROJECT - 1985 -'86

1. Institute Code No.CF/RE/1.3 2. I.C.A.R. Code No.

3. Name and address of Research Institute : CMFR Institute, Cochin

4. Title of Project : Crustacean resources of E.E.Z.

5. Title of Sub-project : Assessment of lobster and crab resources

6. Name and designation of Project Leader : P.V. Kagwade Scientist S2

7. Name(s) and designation(s) of Project Leader and Project Associates together with time proposed to be spent and work to be done

Centre	Name	Designation	Time to be spent (%)	Work to be done
Madras	E.V. Radhakrishnan	S2	15	1-3
Bombay	P.V. Kagwade	S2	75	"
Veraval	V.D. Deshmukh	S1	20	"
Tuticorin	M.Rajamani	S1	25	"

Technical Assistance: A. Mohan(Madras), W.Venugopalam(Kakinada), M.Manickaraja (Tuticorin), V.Suresh, (Calicut), Subramanian (Cochin), A.Y.Mestry (Bombay), B.P.Tumber(Veraval), O.Tipaisamy (Mangalore).

8. Location of the research project: Kakinada, Madras, Cochin, Tuticorin, Calicut, Mangalore, Bombay, Veraval

9. a) Objectives: 1) To collect resources data on shallow water lobsters and commercially important crabs. 2. To elucidata the various biological aspects such as age and growth, food and feeding habits, maturation, spawning migration and behaviour of commercially important species of lobsters and crabs.

b) Practical utility: Lobsters and crabs from about 10-15% of the total crustacean landings in India and there is an export market for lobster tails and crab meat. The characteristics of these natural resources have to be fully determined and the rate of their exploitation closely watched to avoid overfishing.

10. Technical Programme:
1. Regular observations on species-wise abundance of different groups. 2. Studies on biological characteristics of concerned species. 3. Estimation of mortality and population parameters.

Work done: Resources data on lobster and crabs were collected. Decrease in the catches of both the groups were noticed in important fishing areas. Age, growth and maturity size of Panulirus polyphagus were determined.

Work envisaged in current year: A detailed analysis of the data collected so far from each centres on catch, effort, length frequency and other biological data would be undertaken this year with a view to make a proper assessment of the stocks and a detailed review paper on the stock assessment got ready for publication.

11. Date of start: 1981-82. 12.Likely date of completion:1987-88

13. Estimated man-months : 13.2 man-months

14. Facilities required:
i. Land : Nil.; ii. Labour: Nil.; iii. Special equipment: Nil.; iv. Animal sheds: Nil.; v. Fish ponds: Nil.; vi.Foreign exchange: Nil.; vii. Other items: Nil.; viii.Total estimated cost: Institute's Budget.

15. If financed by an organisation other than the Institute: Nil

16. Approximate cost:
a) Salary of Scientific staff
b) Salary of Technical staff
c) Salary of Supporting staff
d) Casual Labour cost, if any
e) Cost of equipment, facility etc.
f) Contingencies, such of chemicals, fertilizers, seed, animals, feeds, sprayers etc.
g) Total cost : Institute's budget

17. Signature of:

Sd/-	Sd/-	Sd/-
Project Leader	Head of Division	Director

RESEARCH PROJECT - 1985 -'86

1. Institute Code No.CF/RE/1.4 2. I.C.A.R. Code No.

3. Name and address of Research Institute : C.F.R. Institute, Cochin

4. Title of Project : Crustacean Resources Investigations

5. Title of sub-project : Prawn Fishery Atlas

6. Name and designation of Project Lead : E.G. Silas

7. Name(s) and designation(s) of Project Leader and Project Associates together with time proposed to be spent and work to be done

Centre	Name	Designation	Time to be spent (%)	Work to be done
C Cochin	E.G.Silas	Director	10	1-2
-do-	K.Rengarajan	S2	25	"
-do-	S.K.Dharmaraja	S2	10	"
-do-	I. David Raj	S1	25	"

Technical Assistance:

8. Location of the research project: Cochin

9. a) Objectives:
   1) To present all information about prawn resources, their biology, ecology and utilisation in a pictorial form.

   b) Practical utility:

   The fishing atlas will be of great use to the industry and the Government of the maritime states in planning future developments. It will also highlight the gaps in our knowledge regarding the prawn resources of the country which need further investigations.

10. Technical Programme: 1) Processing and summarising of all available data on the prawn resources of India.
    2) Preparation of fishery maps and charts to show the magnitude of the prawn fishery in the various geographical regions, depth-wise distribution of the species, relative abundance of the prawns in space and time, size distribution of the species on the estuarine, inshore and

offshore regions and the fishing methods employed for catching prawns in various areas.

Work done: Data on prawn landings by EFP vessels along the Indian coast for the year 1979-80 has been analysed for the preparation of the atlas.

Work envisaged in current year: Similar analysis for the year 1980-81 will be taken up.

11.Date of start: 1981-82. 12.Likely date of completion:1987-88

13.Estimated man-months : (Scientific personnel only) 8.4 man months

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14.Facilities required:

i.	Land	: Nil	v.	Fish ponds	: Nil
ii.	Labour	: Nil	vi.	Foreign exchange	: Nil
iii.	Special equipment	: Nil	vii.	Other items	: Nil
iv.	Animal sheds	: Nil	viii.	Total estimated cost: Institute's Budget	

15.If financed by an organisation other than the Institute: Nil

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16.Approximate cost:

a) Salary of scientific staff
b) Salary of technical staff
c) Salary of supporting staff
d) Casual labour cost, if any,
e) Cost of equipment, facility etc.
f) Contingencies, such of chemicals, fertilizers, seed, animals, feeds, sprayers etc.
g) Total cost : Institute's budget

17.Signature of:

Sd/-	Sd/-	Sd/-
Project Leader	Head of Division	Director

1. Institute Code No. CF/RE/1.7 2. I.C.A.R. Code No.

3. Name and address of Research Institute : CMFR Institute, Cochin

4. Title of Project : Crustacean Resources of EEZ

5. Title of sub-project : Assessment of Stomatopod resources

6. Name and designation of Project Leader : M.M. Kunju, Scientist S2

7. Name(s) and designation(s) of Project Leader and Project Associates together with time proposed to be spent and work to be done

Centre	Name	Designation	Time to be spent (%)	Work to be done
Madras	D.B. James	S2	25	1-3
Calicut	M.M. Kunju	S2	25	"
	N.S. Kurup	S1	15	"
Mangalore	K.K. Sukumaran(APL)	S-1	15	"
Karwar	K.Y. Telang	S1	25	"
Waltair	G.Sudhakara Rao	S2	25	"

Technical Assistance: Koumudi Menon (Calicut), C.Nalini(Cochin), Thippeswamy (Mangalore), Dinesh(Karwar), P.Thirumulu(Madras).

8. Location of the research project: Madras, Calicut, Cochin, Mangalore, Karwar

9. a) Objectives:
   1. To assess the magnitude of the exploited stomatopod resources and to study their relative abundance in space and time along the Indian coasts.
   2. To study the biology and population characteristics of stomatopods with a view to make an appraisal of the commercial exploitation prospects.

   b) Practical utility: Stomatopods form about 10-15% of the catch landed by trawlers. This resource is not fully utilised at present. They are good raw material for converting into fish meal poultry feed, manure and also for human consumption. An accurate assessment of their resources along with biological factors is an essential prerequisite for the exploitation.

10. Technical Programme: 1) Data on catch and effort, species composition etc. will be collected.
2) Size composition, sex ratio, maturity and other biological aspects will be studied from the samples obtained from commercial and experimental trawling.
3) Estimation of spatial and seasonal distribution of stomatopods will be made on the basis of data collected from experimental and other trawler catches together with biological studies.

Work done: Catch and effort data on stomatopod landing at various centres were analysed. Maximum landings are recorded at Mangalore, while there is general increase in all other centres except Karwar. December to April is the peak season.

Work envisaged in current year: A detailed analysis of the data collected so far from each centre on catch, effort, length frequency and other biological data would be undertaken this year with a view to make paper on the stock assessment ready for publication.

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11. Date of start: 1981-82. 12. Likely date of completion: 1987-88

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13. Estimated man-months: (Scientific personnel only)
15.6 15 man months

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14. Facilities required:

i.	Land	: Nil	v.	Fish ponds	:Nil
ii.	Labour	: Nil	vi.	Foreign exchange	:Nil
iii.	Special equipment	: Nil	vii.	Other items	:Nil
iv.	Animal sheds	: Nil	viii.	Total estimated cost	: Institute's Budget

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15. If financed by an organisation other than the Institute ; Nil

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16. Approximate cost:

a) Salary of Scientific staff
b) Salary of Technical Staff
c) Salary of Supporting staff, if any
d) Casual labour cost, if any
e) Cost of equipment, facility etc.
f) Contingencies, such of chemicals, fertilisers, seeds, animals, feeds, sprayers etc.
g) Total cost : Institute's Budget

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17. Signature of:

Sd/-
Head of Division

Sd/-
Director

Sd/-
Project Leader

1. Institute Code No.CF/RE/1.1.7. 2. I.C.A.R.Code No.

3. Name and address of Research Institute : CMFR Institute, Cochin

4. Title of Project : Crustacean Resources Investigations

5. Title of Sub-project : A study on standardisation of prawn fishing effort of different types of traps

6. Name and designation of Project Leader : K.R. Manmadhan Nair, Scientist S1

7. Name(s) and designation(s) of Project Leader and Project Associates together with time proposed to be spent and work to be done

Centre	Name	Designation	Time to be spent (%)	Work to be done
Puri	K.R.Manmadhan Nair	S-1		
Technical Assistance:	P.V.Krishna Rao,	T-1, Puri		

8. Location of the research project : Puri

9. a) Objectives:
To standardise the fishery effort of "Dhaudi" and "Baja" - the two important types of traps employed in the commercial fishery of chilka - for proper assessment of the prawn stock.

b) Practical utility

Traps are the most important gears employed in capturing juvenile marine prawns from Chilka lake. The heterogenity in commercial traps renders estimation of stock and rate of exploitation of the prawns difficult. Therefore, standardisation of the efforts put in by the different types of traps would enable to make realistic estimates of the prawn stock and study the population characteristics of important species.

10. Technical Programme:

i) An adequate number of "Dhaudi" and "Baja" will be hired and experimental fishing conducted with the help of fishermen during the fullmoon and newmoon nights. A total number of 24 such operations will be conducted.

ii) Hydrographic parameters will be recorded simultaneously.

iii) The catch, effort and biological data will be statistically analysed.

Work done: Item 1-3 under technical programme were carried out.

Work envisaged: The technical programme will be continued during the year.

11.Date of start: April 1984 12.Likely date of completion: March 1986

13.Estimated man-months : 3

14.Facilities required:

i)	Land	: Nil	v.	Fish ponds	: Nil
ii)	Labour	: Nil	vi.	Foreign exchange	: Nil
iii)	Special equipment	: Nil	vii.	Other items	: Nil
iv)	Animals sheds	: Nil	viii.	Total estimated cost: Institute's budget	

15.If financed by an organisation other than the Institute: Nil

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16.Approximate cost:

a) Salary of Scientific Staff

b) Salary of Technical staff

c) Salary of Supporting staff, if any

d) Casual labour cost, if any

e) Contingencies such as chemicals, fertilizers, seed, animals, feeds, sprayers etc.

f) Cost of equipment, facility etc.

g) Total cost : Institute's Budget

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17. Signature of:

Sd/-	Sd/-	Sd/-
Project Leader	Head of Division	Director

1. Institute Code No.CF/CUL/1.1.1. 2.I.C.A.R. Code No.

3. Name and address of Research Institute : CMFR Institute, Cochin

4. Title of Project : Culture of Crustaceans

5. Title of Sub-project : Field culture of marine prawns

6. Name and designation of Project Leader : M. Kathirvel, Scientist S1

7. Name(s) and designation(s) of Project Leader and Project Associates together with time proposed to be spent and work to be done.

Centre	Name	Designation	Time to be spent (%)	Work to be done
Madras	M. Kathirvel	S1	35	1-3
	K. Devarajan	S2	35	1-3
	M. Rajagopalan	S1	25	1-3
Calicut	S. Lazarus	S2	50	1-2
Tuticorin	M. Rajamani	S1	25	1-3
	S. Shanmugham	S1	25	1-3
Narakkal	Syed Ahamed Ali	S1	15	4

Technical Assistance: M. Manickaraja (Tuticorin), Shahul Hameed, M. Selvaraj, (Madras), K. Nandakumaran (Calicut)

8. Location of the Research Project: Madras, Tuticorin, Calicut, and Narakkal

9. a) Objectives:
   1) To develop methods of culturing marine prawns in different types of coastal ecosystems for increasing production of prawns.through aquaculture. (2) To test the economic viability of such prawns culture methods.

   b) Practical utility:
   The establishment of marine prawn culture in the coastal areas would help augment prawn production in the country. Better utilization of derelict coastal waters, would provide employment opportunities for the rural population in coastal areas and improve their economy.

10. Technical Programme: 1) Field culture experiments by selective stocking of fast growing species of marine prawns will be carried out and the techniques of culture under different conditions and systems evaluated. 2) Data on growth and production under various culture conditions will be collected. 3) Culture of marine prawns in salt pan areas in Madras and Tuticorin will be taken up. 4) Compounded feeds prepared from locally available raw materials will be tested in the laboratory as well as in the field to select the most suitable feed for accelerated growth.

Work done: Experiments have been done on the culture of P.indicus and P.monodon in coastal ponds, salt pans and in coconut groves. The suitability of these ecosystems for prawn culture has been demonstrated. Yield of 600 kg/ha have been achieved in 50 day growing periods.

Work envisaged in current year: Field experiments on the effect of stocking density duration of crop and salinity on growth and production of cultured prawns in salt pans and other coastal ecosystems will be taken up at Madras, Tuticorin and Calicut.

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11. Date of start : 1984-85. 12. Likely date of completion: 1987-88

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13. Estimated man-months : 25.25 man-months

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14. Facilities required:

i) Land : Nil., ii) Labour: 4 men/ha/day., iii) Special equipment : Nil., iv) Animal sheds : Nil., v) Fish ponds: Nil, vi) Foreign exchange: Nil., vii) Other items : Nil., viii) Total estimated cost : Institute's budget

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15. If financed by an organisation other than the Institute: Nil

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16. Approximate cost:

a) Salary of Scientific staff
b) Salary of Technical staff
c) Salary of Supporting staff, if any
d) Casual labour cost, if any
e) Cost of equipment, facility etc.
f) Contingencies, such of chemicals, fertilizers, seeds, animals, feeds, sprayers etc.
g) Total cost : Institute's Budget

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17. Signature of:

Sd/-	Sd/-	Sd/-
Project Leader	Head of Division	Director

1. Institute Code No.CF/CUL/1.1.2. 2.I.C.A.R.Code No.

3. Name and address of Research Institute : CMFR Institute, Cochin

4. Title of Project : Culture of Crustaceans

5. Title of sub-project : Hatchery production of marine prawn seed

6. Name and designation of Project Leader : M.S. Muthu, Scientist S3

7. Name(s) and designation(s) of Project Leader and Project Associates together with time proposed to be spent and work to be done

Centre	Name	Designation	Time to be spent (%)	Work to be done
Narakkal	M.S. Muthu	S3	50	1-7
	N.N.Pillai	S2	75	2,3,4,5,7
	A.Laxminarayana	S2	50	1, 2, 4
	S.K. Pandian	S2	75	2,3,4,5,7
	A.R.Thirunavukkarasu,	S2	75	2,3,4,5,7
	Syed Ahamed Ali	S2	35	5,6,7
	Mary K.Manisseri	S2	75	2, 4
Madras	K. Devarajan	S2	50	1, 2, 3,7
	M. Kathirvel	S1	50	1, 2, 3,7
Tuticorin	M. Rajamani	S1	50	1, 2, 3,7
	S. Shanmugham	S1	25	1, 2, 3,7

Technical Assistance: K.K. Surendran, C.S.Sasidharan, Sivadas (Narakkal), M.Manickaraja (Tuticorin), A.Ramakrishnan, Shahul Hameed (Madras).

8. Location of the research project: Narakkal(Cochin), Kovalam (Madras) and Tuticorin

9. a) Objectives:

1. To develop methods for inducing the marine prawns to mature and spawn in captivity and for maintaining a broodstock of prawns in maturation facilities so that hatchery operation could proceed without interruption.
2. To simplify hatchery techniques for large scale production of marine prawn seed.
3. To standardize nursery practices for growing the hatchery reared postlarvae to stocking size.
4. To develop microparticulate compounded feeds for the various larval stages in order to reduce dependance on live food organisms.

b) Practical utility: An assured supply of marine prawn seed is a pre-requisite for successful commercial culture. The

the ponds at the appropriate time. Hatchery production on a large scale as envisaged in this project is the only solution to this problem.

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10. Technical Programme: 1. Induced maturation and spawning of commercially important marine prawns in captivity by environmental control, eyestalk ablation, hormone treatment etc. will be studied in greater detail. 2. Hatchery reared juveniles of commercially important marine prawns will be stocked in grow-out ponds attached to the hatchery and their growth monitored to maintain a supply of broodstock prawns. 3. Larval rearing proceedures will be further simplified and standardized. 4. The changes in the ecosystem of the larval rearing tanks during the course of larval rearing will be studied in detail. 5. Larval rearing experiments using microparticulate diets will be undertaken. 6. The nutritive quality of phytoplankton cultures used for feeding the prawn larvae will be assessed in terms of amino-acid and fatty acid profiles. 7. Hatchery reared PL5 will be grown to stocking size (20-25 mm) in various types of nurseries using different stocking densities and feeds.

Work done: P.indicus, P.monodon, P.semisulcatus and P.japonicus have been induced to mature and spawn in captivity by unilateral eyestalk ablation. P.indicus has been domesticated at the Narakkal Prawn Hatchery Laboratory. Simple, low-cost indigenous technology for hatchery production of penaeid prawn seed has been developed. Methods of culturing locally available live food-organisms to feed the prawn larvae have been developed.

Work envisaged in current year: Work on items No.1-7 listed under Technical Programme will be undertaken during the year. Emphasis will be on P.semisulcatus at Tuticorin. At Kovalam, Madras work on P.japonicus will be taken up in addition to P.monodon, while at Narakkal the accent will be on P.indicus and P.monodon.

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11. Date of start: 1981-82 12. Likely date of completion: 1987-88

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13. Estimated man-months : 73.2 man months

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14. Facilities required: i) Land: Nil. ii) Labour: 5 men/hatchery iii) Special equipment: Nil iv) Animal sheds: Nil v) Fish ponds: Nil vi) Foreign exchange: Nil vii) Other items: Nil viii) Total estimated cost: Institute's Budget.

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15. If financed by an organisation other than the Institute: Nil

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16. Approximate cost:
a) - g) Total cost : Institute's Budget

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17. Signatures of:

Sd/-	Sd/-	Sd/-
Project Leader	Head of Division	Director

1. Institute Code No.CF/CUL/1.1.3 2.I.C.A.R.Code No.

3. Name and address of Research Institute : CMFR Institute, Cochin

4. Title of Project : Culture of commercially important crabs

5. Title of sub-project: Artificial propagation of green crabs

6. Name and designation of Project Leader : R. Marichamy Scientist S2

7. Name(s) and designation(s) of Project Leader and Project Associates together with time proposed to be spent and work to be done

Centre	Name	Designation	Time to be spent(%)	Work to be done
Tuticorin	R.Marichamy	S-2	35	1-3

Technical Assistance: S. Rajapackiam, T-1

8. Location of the research project : Tuticorin

9. a) Objectives: To develop suitable techniques for the culture of commercially important portunid crab and to study the feasibility of green crab culture on a large scale.

b) Practical utility: The commercially important crabs occurring in our coastal waters are suitable for culture. The results of this research programme would enable to develop and establish crab culture practices and to augment crab production.

10.Technical Programme:

1) Berried green crabs will be collected from the natural habitat and the eggs hatched in captivity will be reared to stocking size.
2) Maturation of crabs in captivity through eye-stalk ablation will be studied.
3) Techniques of field culturing of crabs in coastal waters will be developed and the feasibility of large scale culture will be studied.

Work done: Some experiments on cage culture and pond culture of Scylla serrata have been done. Ovigerous female collected from the wild were reared during incubation period and the larval stock reared upto zoea stage.

Work envisaged in current year: Work on induced maturation of crabs in captivity will be undertaken and methods of rearing the larvae to stocking size under controlled condition will be developed in addition to work on field culture of crabs in ponds etc.

11.Date of start: 1978 12.Likely date of completion:1987-88

13.Estimated man-months : Scientific personnel only 4.2 man months

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14.Facilities required :

i. Land	: Nil	v. Fish ponds	:2 Nos
ii. Labour	: 2 man/day	vi. Foreign exchange	: Nil
iii.Special equipment:	Nil	vii.Other items	: Nil
iv. Animal sheds:	Nil	viii.Total estimated cost	: Institute's Budget

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15.If financed by an organisation other than the Institute : Nil

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16.Approximate cost:

a) Salary of Scientific staff
b) Salary of Technical staff
c) Salary of Supporting staff, if any
d) Casual labour cost, if any
e) Cost of equipment, facility etc.
f) Contingencies, such of chemicals, fertilizers, seed, animals, feeds, sprayers etc.
g) Total cost : Institute's Budget

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17. Signatures of:

Sd/-	Sd/-	Sd/-
Project Leader	Head of Division	Director

1. Institute Code No.CF/CUL/1.1.5 2.I.C.A.R. Code No.

3. Name and address of Research Institute : CMFR Institute, Cochin

4. Title of Project : Culture of Crustaceans

5. Title of Sub-project : Artificial insemination and breeding of prawns

6. Name and designation of Project Leader : M.S. Muthu Scientist S3

7. Name(s) and designation(s) of Project Leader and Project Associates together with time proposed to be spent and work to be done

Centre	Name	Designation	Time to be spent (%)	Work to be done
Narakkal (Cochin)	M.S. Muthu	S3	25	1-4
	A.Laxminarayana	S2	25	1-4

Technical Assistance: C.S. Sasidharan

8. Location of the research project : Narakkal (Cochin)

9. a) Objectives:

1. To develop methods of artificial insemination of prawns
2. To selectively breed the artificially inseminated prawns in captivity and to develop hybrids.

b) Practical utility: Development of a technique for artificial insemination in prawns will open up a new field in the selective breeding and evolution of improved strains of prawns for culture purposes. It will also enable hybridization of closely related species and genetic improvement of cultivable prawns.

10. Technical Programme:

1. Suitable methods of extracting the intact spermatiphore from male prawns will be developed.
2. Techniques of artificially transferring the extracted spermatophores into the thelycum of the female prawns will be devised.

3. The artificially impregnated females will be induced to mature and spawn in captivity.

4. The eggs spawned will be reared under controlled conditions to study the viability and characteristics of the animals produced.

Work done: A method of artificial insemination of prawns with a closed thelycum, belonging to the genus Penaeus has been developed. Using the technique artificially inseminated P.indicus and P.monodon have been successfully bred and the larvae reared upto postlarvae stage.

Work envisaged in current year: The technique will be further perfected. Hybridination experiments will be carried out.

11.Date of start: 1982-83 12.Likely date of completion:1987-88

13.Estimated man-months : 6 man-months/year

14.Facilities required :

i. Land	: Nil	v.	Fish ponds	: Nil
ii.Labour	: Nil	vi.	Foreign exchange	: Nil
iii.Special equipment	: Nil	vii.	Other items	: Nil
iv. Animal sheds	: Nil	viii.	Total estimated cost: Institute's Budget	

15.If financed by an organisation other than the Institute: Nil

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16.Approximate cost:

a) Salary of Scientific staff
b) Salary of Technical staff
c) Salary of Supporting staff, if any
d) Casual Labour cost, if any
e) Cost of equipment, facility etc.
f) Contingencies, such of chemicals, fertilizers, seed, animals, feeds, sprayers etc.
g) Total cost : Institute's Budget

17.Signatures of:

Sd/-	Sd/-	Sd/-
Project Leader	Head of Division	Director

RESEARCH PROJECT - 1985 -'86

1. Institute Code No.CF/CUL/1.1.7. 2. I.C.A.R.Code No.

3. Name and address of Research Institute : C.M.F.R. Institute, Cochin

4. Title of Project : Culture of Crustaceans

5. Title of sub-project : Sea Ranching of marine prawns

6. Project Leader : N.N. Pillai, Scientist S2

7. Name(s) and designation(s) of Project Leader and Project Associates together with time proposed to be spent and work to be done

Centre	Name	Designation	Time to be spent (%)	Work to be done
Cochin/ Narakkal	N.N. Pillai	S2	20	i
	M.S. Muthu	S3	15	i
	K.V.George	T7	20	i
	A.Laxminarayana	S2	15	i
	S.K. Pandian	S2	15	i
	Syed Ahamed Adiy	S2	10	i
	A.R.Thirunavukkarasu	S2	15	i
Tuticorin	M. Rajamani	S1	25	i, ii & iv
Madras	M. Kathirvel	S1	15	1, ii,& iv
	K. Devarajan	S2	15	i, ii & iv
Mandapam	V.Gandhi	S1	10	iii & v
	A.Raju	S1	10	iii & v

Technical Assistance: K.K. Surendran, C.S. Sasidharan, Sivadas (Narakkal), M.Manickaraja (Tuticorin), A.Ramakrishnan, Shahul Hameed (Madras), Arpudharaj (Mandapam Camp).

8. Location of the Research project : Mandapam Camp, Tuticorin, Narakkal, Madras

9. a) Objectives:
To release the hatchery reared seed of marine penaeid prawns into the sea in order to enhance the population of prawns in the sea and thus increase the magnitude of the prawn catch from the marine prawn fishery.

b) Practical utility:
The marine prawn catch in the country has not increased in recent years in spite of increased fishing effort. By introducing hatchery reared prawn seed in the advanced post larval stages, when they have a better chance of survival under natural conditions, the recruitment of prawns to the capture fishery could be improved. This

is especially possible in the burrowing species of prawns such as Penaeus semisulcatus, P.japonocus and Metapenaeus affinis which do not penetrate into the estuaries during their juvenile phase and which also do not seem to migrate far from their place of origin.

10.a) Technical Programme: i) Initially hatchery reared prawn seed from Narakkal, Madras and Tuticorin will be transported to Mandapam in oxygen filled containers and released into the 500 acre lagoon on the Palk Bay side. ii) Growth and survival will be monitored by periodic sampling. iii)Later a hatchery for P.semisulcatus will be established at Mandapam Camp. iv) Methods of reducing mortality of the introduced prawn seed will be developed. v) Feeding the postlarvae with artificial feed in the nursery ponds before releasing into the sea.

b) Work done: About 2 lakhs seed of P.indicus produced at the Narakkal Prawn Hatchery have been released in the lagoon at Mandapam. Experiments on large scale transport of prawn seed in various containers have been carried out.

c) Work envisaged in the current year: Item No.i, ii and iv shown in the Technical Programme will be taken up during the year.

11.Date of srtart: 1984-85. 12.Date of completion: 1987-88

13.Estimated man-months : 19.8 man-months (Scientific personnel only)

14.Facilities required

i. Land	:	v) Fish ponds	:
ii. Labour	:	vi)Foreign exchange	:
iii. Special equipment	:	vii)Other items	:
iv. Animal sheds	:	viii) Total estimated cost: Institute's Budget	

15.If financed by an organisation other than the Institute:

16.Approximate cost

a) Salary of Scientific staff
b) Salary of Technical staff
c) Salary of Supporting staff, if any
d) Casual labour cost, if any,
e) Cost of equipment, facility etc.
f) Contingencies, such of chemicals, fertilizers, seed, animals, feeds, sprayers etc.
g) Total cost : Institute's Budget

17.Signatures of:

Sd/-	Sd/-	Sd/-
Project Leader	Head of Division	Director

RESEARCH PROJECT - 1985 -'86

1. Institute Code No.CF/CUL/1.5 2. I.C.A.R. Code No.

3. Name and address of Research Institute : CMFR Institute, Cochin

4. Title of Project : Culture of Crustaceans

5. Title of Sub-project : Culture of spiny lobsters (*Panulirus* sp.)

6. Name and designation of Project Leader : E.V. Radhakrishnan, Scientist S-2

7. Name(s) and designation(s) of Project Leader and Project associates together with time proposed to be spent and work to be done

Centre	Name	Designation	Time to be spent (%)	Work to be done
Madras	E.V. Radhakrishnan	S2	100	1-4
	M. Vijayakumaran	S2	50	3-4
Technical Assistance: Shahul Hameed				

8. Location of the Research Project : Madras

9. a) Objectives:

To develop suitable indigenous techniques for the culture of commercially important spiny lobsters

b) Practical utility: Large scale culture of lobsters will augment production and export of this highly prized crustacean.

10. Technical Programme

1) Berried females collected from the sea will be kept in the laboratory to hatch the eggs and the phyllosoma will be reared to the puerulus stage using suitable live and artificial feeds. Induced maturation of lobsters in captivity will be tried through hormonal control.
2) Puerulii will be collected from the sea using different types of collectors and reared under controlled conditions
3) Development of artificial feed for the lobsters. 4) Experiments will be conducted to accelerate growth rate in juvenile lobsters. 5) Neuro-endocrine studies on growth and moulting of lobsters.

Work done: Growth rate of spiny lobsters have been accelerated by three to seven times by eyestalk ablation in captivity, reducing the rearing period from eighteeen to six months. Lobsters have been made to spawn in the laboratory and the phyllosoma reared upto the sixth stage.

Work envisaged in current year: Studies on effect of quality of food on conversion, growth, tail weight and quality of flesh of ablated spiny lobsters will be taken up. Mass culture of lobsters to evaluate the techno-economic feasibility also will be carried out.

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11. Date of start : 1981-82 12.Likely date of completion: 1987-88

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13. Estimated man-months : Scientific personnel only 18 man-months/year

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14. Facilities required :

i) Land	: Nil	v) Fish ponds	: Nil
ii) Labour	: Nil	vi) Foreign exchange	: Nil
iii) Special equipment	: Nil	vii) Other items	: Nil
iv) Animal sheds	: Nil	viii) Total estimated cost: Institute's Budget	

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15. If financed by an organisation other than the Institute : Nil

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16. Approximate cost:

a) Salary of scientific staff
b) Salary of technical staff
c) Salary of Supporting staff, if any
d) Casual labour cost, if any
e) Cost of equipment, facility etc.
f) Contingencies, such of chemicals, fertilizers, seed, animals, feeds, sprayers etc.
g) Total cost : Institute's Budget

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17. Signatures of:

Sd/-
Project Leader

Sd/-
Head of Division

Sd/-
Director

RESEARCH PROJECT - 1985-86

1. Institute Code No. MOL/RE/1.2.1 2. I.C.A.R. Code No.

3. Name and address of Research Institute : CMFR INSTITUTE, COCHIN

4. Title of Project : Molluscan Fishery Resources

5. Title of Sub-project : Survey of cephalopod resources in the Exclusive Economic Zone

6. Name and designation of Project Leader : E.G. Silas, S-5

7. Name(s) and designation(s) of Project Leader and Project Associates together with time proposed to be spent and work to be done

Centre	Name	Designation	Time to be spent (%)	Work to be done
Veraval	-	-	-	Tech.Prog. 1-5
Bombay	Kuber Vidyasagar	S-2	40	"
Mangalore	G. Syda Rao	S-2	20	"
Cochin	K. Alagarswami(A.P.L.)	S-3	5	"
	M.M. Meiyappan	S-1	30	"
	P.V. Sreenivasan	S-1	15	"
Vizhinjam	K. Prabhakaran Nair	S-2	30	"
Tuticorin	K. Satyanarayana Rao	S-3	25	"
Madras	R. Sarvesan	S-2	40	"
Waltair	G. Radhakrishnan	S-1	40	"
Technical Assistance:				

8. Location of the research Project : Veraval, Bombay, Mangalore, Cochin, Vizhinjam, Tuticorin, Madras and Waltair

9. a) Objectives: To conduct exploratory surveys in the Exclusive Economic Zone using modern methods of fishing to identify, chart and assess the oceanic squid resources which form one of the major potential resources of the EEZ for commercial exploitation.

   b) Practical Utility: The Government have given high priority to the exploitation of the Exclusive Economic Zone for increasing marine fish production. The oceanic squids form one of the major resources of the zone and the survey will provide data on the identity, distribution and abundance of the resources for use in commercial exploitation.

10. Technical Programme:

1. Exploratory surveys of the Exclusive Economic Zone for oceanic squids using modern methods of fishing including squid jigging.
2. Acoustic aerial and remote sensing surveys for squid resources.
3. Participation in the Institute's Research Vessel programmes and in collaborative programmes with Govt. of India Ocean Development and Fisheries Organisations for survey of squid resources.
4. To study the biology of the component species, pattern of distribution, abundance, spawning congregations and migration.
5. Assessment of the potential stocks of oceanic squid resources of the Exclusive Economic Zone.

Work done: Catch and effort data of cephalopod caught by EFP vessels operated in different areas have been analysed.

Work envisaged in current year: Squid and cuttlefish resources survey will be carried out using Institute's Research Vessel SKIPJACK, and the catch data provided by the EFP vessels will be analysed.

11. Date of start: 1981-82 12. Likely date of completion: 1989-90

13. Estimated man-months : -

14. Facilities required:

i.	Land	: -	v.	Fish ponds	: -
ii.	Labour	: -	vi.	Foreign exchange	: Yes
iii.	Special equipment	: Yes	vii.	Other items	: -
iv.	Animal sheds	: -	viii.	Total estimated cost	: Institute's budget

15. If financed by an organisation other than the Institute: -

16. Approximate cost: a) Salary of Scientific staff; b) Salary of Technical staff; c) Salary of Supporting staff, if any; d) Casual labour cost, if any; e) Cost of equipment, facility etc. f) contingencies, such of chemicals, fertilisers, seed, animals, feeds sprayers etc; g) Total cost: Institute's budget.

17. Signature of:

Sd/-	Sd/-	Sd/-
Project Leader	Head of Division	Director

RESEARCH PROJECT - 1985-86

1. Institute Code No. MOL/RE/1.2.2 2. I.C.A.R. Code No.

3. Name and address of Research Institute : CMFR INSTITUTE, COCHIN

4. Title of Project : Molluscan Fishery Resource

5. Title of Sub-project : Stock assessment of cephalopod resources of the inshore waters

6. Name and designation of Project Leader : K. Alagarswami, S-3

7. Name(s) and designation(s) of Project Leader and Project Associates together with time proposed to be spent and work to be done.

Centre	Name	Designation	Time to be spent(%)	Work to be done
Veraval	Raje			
Bombay	Kuber Vidyasagar	S-2	60	
"	K.S. Sundaram	S-1	100	
Mangalore	G. Syda Rao	S-2	40	Tech.Prog.
Cochin	K. Alagarswami	S-3	10	
	M.M. Meiyappan	S-1	70	
	P.V.Sreenivasan	S-1	75%	
	M. Srinath	S-1	-	
Vizhinjam	K. Prabhakaran Nair	S-2	70	1-6
Tuticorin	K. Satyanarayana Rao (APL)	S-3	25	
Mandapam	P. Natarajan	S-1	100	
Madras	R. Sarvesan	S-2	60	
Waltair	G. Radhakrishnan	S-1	60	

Technical Assistance: M. Prasada Rao (Waltair), P. Thillairajan (Mandapam), G. Sreenivasan (Tuticorin), T.A. Omana (Vizhinjam)

8. Location of the research project : Veraval, Bombay, Mangalore, Cochin, Vizhinjam, Tuticorin, Mandapam, Madras and Waltair

9. a) Objectives: In the past, data on the cephalopod (cuttlefish, squid and octopus) resources of the inshore waters have been collected and their distribution has been studied. In view of their importance in the export trade, detailed investigations on the assessment of stocks of the component species will be taken up to estimate the potential in order to guide the inshore fishing industry for increasing production.

b) Practical Utility: Information on the stocks of cephalopod resources in the inshore waters will help in planning development programmes for increasing production through intensification of effort in identified areas and on specific stocks and introduction of modern methods of fishing.

10. Technical Programme:

1. Monitoring of the exploited cephalopod stocks in the inshore waters.
2. Experimental fishing with different gears including squid jigging and dip-nets with light attraction and trawl nets with Cadalmin class vessels in the inshore waters.
3. Stock assessment of cuttlefish and squid resources.
4. Preparation of fishery atlas for cephalopod resources.
5. Racial studies of selected species

Work done: Exploitation of cephalopod resources of inshore waters has been monitored and biological parameters of certain species have been collected for stock assessment studies.

Work envisaged in current year: Continuation of monitoring the exploited resources, and collecting more data on biological characteristics and races to aid stock assessment.

11. Date of start : 1981-82 12. Likely date of completion: 1989-90

13. Estimated man-months : -

14. Facilities required:

i.	Land	: -	v.	Fish ponds	: -
ii.	Labour	: -		Foreign exchange	: Yes
iii.	Special equipment	: Yes		Other items	: -
iv.	Animal sheds	: -		Total estimated cost	: Institute's budget

15. If financed by an organisation other than the Institute : -

16. Approximate cost: a) Salary of Scientific staff; b) Salary of Technical staff; c) Salary of Supporting staff, if any; d) Casual Labour cost, if any; e) Cost of equipment, facility etc; f) Contingencies, such of chemicals, fertilisers, seed, animals feeds sprayers etc. g) Total cost: Institute's budget.

17. Signature of:

Sd/-	Sd/-	Sd/-
Project Leader	Head of Division	Director

RESEARCH PROJECT - 1985-86

1. Institute Code No. MOL/RE/1.8 2. I.C.A.R. Code No.

3. Name and address of Research Institute : CMFR INSTITUTE, COCHIN

4. Title of Project : Molluscan Fishery Resources

5. Title of Sub-project : Recruitment studies in clam population

6. Name and designation of Project Leader : G. Syda Rao, S-2

7. Name(s) and designation(s) of Project Leader and Project Associates together with time proposed to be spent and work to be done

Centre	Name	Designation	Time to be spent (%)	Work to be done
Karwar	N. Ramachandran	S-1	20	1-3
Mangalore	G. Syda Rao	S-2	20	1-3

Technical Assistance: H.S. Shivanna (Karwar)

8. Location of the research project : Mangalore and Karwar

9. a) Objectives: It is well known that under favourable conditions the clam spat settle in high densities and in a few months, before the exploitation phase, the abundance is much reduced usually due to natural mortality. This project aims to elucidate the pattern of recruitment of clam populations in natural beds and determine conditions favourable for successful recruitment.

   b) Practical Utility: Information on changes in the abundance of clam population from seed stage to the time they reach the recruitment age for commercial exploitation will help to evolve suitable strategy for better utilisation of the seed resource in clam culture.

10. Technical Programme:

1. To determine environmental conditions conducive to successful spatfall.
2. To monitor the changes in population from settlement to exploitation in terms of abundance and size/age in relation to environmental conditions and
3. To estimate rate of exploitation and effect on stocks.

Work done: Data have been collected on the changes in population density in relation to environmental conditions and length composition of Anadara granosa at Kakinada and Meretrix sp. at Karwar. (Programme at Kakinada has been discontinued; initiated at Mangalore)

Work envisaged in current year: To continue monitoring the changes in the population structure of clams and complete items 1 to 3 of Technical Programme.

11. Date of start : 1982-83 12. Likely date of completion: 1986-87

13. Estimated man-months : -

14. Facilities required:

i.	Land : No	v.	Fish ponds	:	No
ii.	Labour : Yes	vi.	Foreign exchange	:	No
iii.	Special equipment : No	vii.	Other items	:	No
iv.	Animal sheds : No	viii.	Total estimated cost	:	Institute's budget

15. If financed by an organisation other than the Institute: No

16. Approximate cost: a) Salary of Scientific staff; b) Salary of Technical staff; c) Salary of Supporting staff, if any; d) Casual Labour cost, if any; e) Cost of equipment, facility etc.; f) Contingencies, such of chemicals, fertilisers, seed, animals, feeds sprayers etc.,

17. Signature of:

Sd/-	Sd/-	Sd/-
Project Leader	Head of Division	Director

RESEARCH PROJECT 1985-86

1. Institute Code No. MOL/CUL/1.1 2. I.C.A.R. Code No.

3. Name and address of Research Institute : CMFR INSTITUTE, COCHIN

4. Title of the Project : Mariculture-Culture of Molluscs

5. Title of Sub-project : Culture of Edible oyster

6. Name and designation of Project Leader : K. Nagappan Nayar, S-3

7. Name(s) and designation(s) of Project Leader and Project Associates together with time proposed to be spent and work to be done

Centre	Name	Designation	Time to be spent(%)	Work to be done
Tuticorin	K. Nagappan Nayar	S-3	10	1-9
	K.Satyanarayana Rao	S-3	10	1-9
	P. Muthiah	S-2	30	1-9
	M.E. Rajapandian	S-2	30	1-9
Kakinada	K.A. Narasimham	S-3	20	10
Karwar	N. Ramachandran	S-1	40	1-9

Technical Assistance: C.T. Rajan, D. Sundararajan, N. Vaidyanathan, G. Srinivasan (Tuticorin), H.S. Shivanna (Karwar)

8. Location of the research project: Tuticorin, Kakinada, Karwar

9. a) Objectives: The project aims at evolving suitable farming techniques for growing and production of oysters and in the collection of required quantities of spat by employing different techniques and standardizing them. Studies on the biological aspects of oysters will enable us to determine the growth rate, spawning period and the size at which the harvesting can be done. The project also envisages studies on environmental factors which will help in the proper farm management. Depuration techniques for the harvested stocks will also be developed. It is also proposed to assess oyster growing area for toxic dinoflagellates and oyster meat for shellfish toxins. The project will also identify other suitable areas along the coasts for oyster/

) Practical Utility: Oysters are highly nutritious food but the natural production as well as consumption is very low. Basic techniques for the culture of oysters have been developed and the high production potential has been demonstrated. However, several intrinsic problems remain to be investigated, answers to which are essential for large-scale production of oysters through culture practices.

10. Technical Programme (Revised):

1. To study the identity of cultivable species of oysters.
2. Developing and experimenting on oyster farming system other than rack-tray method.
3. Spat collection experiments to intensify collection of oyster spat by using different collectors.
4. Growing and harvesting oysters.
5. To investigate the nutritional value of oyster meat at different sizes.
6. Studies on maturation of gonads and reproductive cycle.
7. Fattening of oysters.
8. Developing suitable methods of purification of harvested oysters.
9. Monitoring of oyster growing area for toxic dinoflagellates and of oyster meat for shellfish toxins (at Tuticorin).
10. Studies on biology of oysters at Kakinada for getting necessary information to undertake culture.

Work done: Spat collection was done using lime-coated tiles shell rens etc. Growth, breeding periodicity, condition factor, parasites and predatory control were studies.

Work envisaged in current year: Efforts will be made to intensify spat collection and improve oyster growing systems. Experimental work will be done on biochemical composition of oysters, fattening, depuration and monitoring for toxic dinoflagellates and shellfish toxins. Studies on the biology of oysters at Kakinada will be taken up.

11. Date of start : 1978 12. Likely date of completion: 1989-90

13. Estimated man-months :

14. Facilities required:

i.	Land : -	v.	Fish ponds	:	Farm
ii.	Labour : Yes	vi.	Foreign exchange	:	-
iii.	Special equipment : -	vii.	Other items	:	-
iv.	Animal sheds : -	viii.	Total estimated cost	:	Institute's budget

15. If financed by an organisation other than the Institute : -

16. Approximate cost: a) Salary of Scientific staff; b) Salary of Technical staff; c) Salary of Supporting staff; d) Casual labour cost, if any; e) Cost of equipment, facility etc. f) contingencies such as chemicals, fertilisers, seed, animals, feeds, sprayers etc. g) Total cost: Institute's budget.

17. Signature of:

Sd/-	Sd/-	Sd/-
Project Leader	Head of Division	Director

RESEARCH PROJECT - 1985-86

1. Institute Code No. MOL/CUL/1.3 2. I.C.A.R. Code No.

3. Name and address of Research Institute : CMFR INSTITUTE, COCHIN

4. Title of Project : Mariculture-Culture of molluscs

5. Title of Sub-project : Culture of clams and windowpane oyster

6. Name and designation of Project Leader : K.A. Narasimham, S-2

7. Name(s) and designation(s) of Project Leader and Project Associates together with time proposed to be spent and work to be done

Centre	Name	Designation	Time to be spent (%)	Work to be done
Kakinada	K.A. Narasimham	S-2	20	2-4
Mangalore	G. Syda Rao	S-2	20	1-3
Karwar	N. Ramachandran	S-1	40	1-3

Technical Assistance: Ch. Ellithatayya (Kakinada), D. Nagaraja (Mangalore) and H.S. Shivanna (Karwar)

8. Location of the research project : Kakinada, Mangalore and Karwar

9. a) Objectives: The main thrust will be to evolve suitable farming methods for clams and windowpane oyster. Transplantation of seed clams from thickly populated beds to suitable places.

b) Practical Utility: Being a very important source of sustenence fishery along the Indian coast clam farming needs a major thrust. The results obtained will enable us to take up large scale farming at selected centres along the coast and thereby increase the production of this low cost protein food.

10. Technical Programme:

1. To transplant seed clams from thickly populated beds to areas suitable for growth and fattening. The species to be studied are Meretrix meretrix, and M. casta at Karwar, Paphia malabarica and M. casta at Mangalore and the windowpane oyster Placenta placenta at Kakinada.
2. To monitor the soil and water conditions of the clam/windowpane oyster beds and the farm
3. To study and compare the growth, maturity, spawning and index of condition of natural beds of clams/windowpane oyster with those of cultured population.
4. To monitor for toxic dinoflagellates in Kumble and Mulki estuaries and for shellfish toxins in clam meat.

Work done: Culture of the Blood clam, Anadara granosa by transplantation of seeds without pen enclosure at Kakinada met with success. The optimum stocking density of blood clam was worked as 300 nos/m^2.

Work envisaged in current year: Farming of clams by using different stocking densities will be attempted at Mangalore. Window-pane oyster culture work will be taken up at Kakinada. At Mangalore monitoring of toxic dinoflagellates and shellfish toxins will be done.

11. Date of start : 1978 12. Likely date of completion: 1986-87

13. Estimated man-months : -

14. Facilities required:

i.	Land : No	v.	Fish ponds :	Clam farms
ii.	Labour : Yes	vi.	Foreign exchange :	No
iii.	Special equipment : No	vii.	Other items :	No
iv.	Animal sheds : No	viii.	Total estimated cost:	Institute's budget

15. If financed by an organisations other than the Institute : -

16. Approximate cost: a) Salary of Scientific staff; b) Salary of Technical staff; c) Salary of Supporting staff, if any; d) Casual labour cost, if any; e) Cost of equipment, facility etc., f) Contingencies, such of chemicals, fertilisers, seed, animals, feeds sprayers etc., g) Total cost: Institute's budget.

17. Signature of:

Sd/-	Sd/-	Sd/-
Project Leader	Head of Division	Director

RESEARCH PROJECT - 1985-86

1. Institute Code No. MOL/CUL/1.4 2. I.C.A.R. Code No.

3. Name and address of Research Institute : CMFR INSTITUTE, COCHIN

4. Title of Project : Mariculture - Culture of Molluscs

5. Title of Sub-project : Pearl culture

6. Name and designation of Project Leader : K. Alagarswami, S-3

7. Name(s) and designation(s) of Project Leader and Project Associates together with time proposed to be spent and work to be done

Centre	Name	Designation	Time to be spent (%)	Work to be done
Tuticorin	K. Alagarswami	S-3	15	1-9
	A. Chellam (APL)	S-2	50	Tech.Prog. 1,2,3&4
	S. Dharmaraj	S-2	40	Tech.Prog. 8 & 9
	T.S. Velayudhan	S-1	40	Tech.Prog. 5,6,& 7
	A.C.C. Victor	S-2	90	-

Technical Assistance: K. Srinivasagam (4,5,8), J. Antony Pitchai (1,2,3,9) A. Dasman Fernando (1,2,3,7,9) Soosai V. Rayan (1,2,3,6,9)

8. Location of the research project : Tuticorin, Mandapam

9. a) Objectives: To carry out further researches on pearl culture to improve upon all aspects and update the technology for higher rates of pearl production and improvement of quality of cultured pearls.

   b) Practical Utility: The breakthrough in pearl culture technology was achieved at this Institute and the maritime States, Union Territories have been assisted to take up development work in pearl culture. Being the nerve centre for pearl culture researches in the country, the present project at the Institute will help in updating the technology and assist the development efforts towards establishment of pearl culture industry by providing R & D support.

10. Technical Programmes:

1. Pearl oyster collection and rearing;
2. Development of techniques for large-scale collection of spat from natural beds;

3. Standardisation of farming technology;
4. Monitoring of growth and reproduction of farm oysters;
5. Studies on pearl-sac formation; (completed in part)
6. Influence of environmental parameters in pearl culture;
7. Control of biofouling and boring;
8. Improvements in pearl oyster surgical techniques for enhancing production rate and quality;

Work done: Farming continues to be done in harbour basin farm. Collapsible raft and FRP-float raft have been experimented. Boring is being controlled by freshwater-dip treatment. Surgery work is carried out on a modest scale.

Work envisaged in current year: A major thrust on the items to improve and standardise pearl culture technology.

11. Date of start : 1978 12. Likely date of completion: 1989-90

13. Estimated man-months : -

14. Facilities required:

i.	Land	: yes	v.	Fish ponds	: Pearl culture farm
ii.	Labour	: yes			
iii.	Special equipment	: yes	vi.	Foreign exchange	: yes
iv.	Animal sheds	: No	vii.	Other items	: Nil
			viii.	Total Estimated cost:	Institute's Budget

15. If financial by an organisation : No other than the Institute

16. Approximate cost: a) Salary of Scientific staff; b) Salary of Technical staff, c) Salary of Supporting staff, if any; d) Casual Labour cost, if any; e) Cost of equipment, facility etc.; f) Contingencies, such of chemicals, fertilisers, seed, animals, feeds sprayers etc. g) Total cost: Institute's budget

17. Signature of:

Sd/-
Project Leader

Sd/-
Head of Division

Sd/-
Director

RESEARCH PROJECT 1985-86

1. Institute Code No. MOL/CUL/1.6 2. I.C.A.R. Code No.

3. Name and Address of Research Institute : CMFR INSTITUTE, COCHIN

4. Title of Project : Mariculture - Culture of Molluscs

5. Title of Sub-project : Development of hatchery systems for mussel seed production

6. Name and designation of Project Leader : K. Rangarajan, S-3

7. Name (s) and designation(s) of Project Leader and Project Associates together with time proposed to be spent and work to be done

Centre	Name	Designation	Time to be spent (%)	Work to be done
Madras	K. Rangarajan	S-3	50	1-4
Vizhinjam	K.K. Appukuttan	S-2	40	1-4

Technical Assistance: R. Thangavelu, P. Poovannan (Madras), T. Prabhakaran Nair, Mathew Joseph, K.T. Thomas (Vizhinjam)

8. Location of the research project : Madras, Vizhinjam

9. a) Objectives: To develop suitable hatchery techniques for seed production of mussels, so as to get a constant supply of seed throughout the year without having to depend on nature for seed requirements.

   b) Practical Utility: As availability of natural seed cannot be relied upon suitable hatchery methods evolved will be of immense help in providing an uninterrupted supply of hatchery seed to culturists.

10. Technical Programme:

1. To try different methods of conditioning the adults and inducing them to spawn by suitable physical or chemical stimulations.
2. Mass culture of algae and flagellates to be used as food for the larvae and spat.
3. Suitable techniques to be evolved for the collection of spat at the setting time of the larvae in the tank.
4. To develop a proper nursery system.

Work done: Success has been achieved in experimental spat production in the laboratory for both green mussel and brown mussel.

Work envisaged in current year: Achieving large-scale settlement of spat under laboratory conditions by intensifying the work. Standardisation of techniques.

11. Date of start: 1978 12. Likely date of completion: 1986-87

13. Estimated man-months : -

14. Facilities required:

i.	Land :	v.	Fish ponds :		
ii.	Labour :	vi.	Foreign exchange:		
iii.	Special equipment :	vii.	Other items :		
iv.	Animal sheds :	viii.	Total estimated cost :	Institute's budget	

15. If financed by an organisation other than the Institute : -

16. Approximate cost: a) Salary of Scientific staff; b) Salary of Technical staff; c) Salary of Supporting staff, if any; d) Casual Labour cost, if any; e) Cost of equipment, facility etc; f) Contingencies, such of chemicals, fertilisers, seed, animals, feeds sprayers etc. g) Total cost: Institute's budget.

17. Signature of:

Sd/-	Sd/-	Sd/-
Project Leader	Head of Division	Director

RESEARCH PROJECT - 1985-86

1. Institute Code No. MOL/CUL/1.7.1 2. I.C.A.R. Code No.

3. Name and address of Research Institute : CMFR INSTITUTE, COCHIN

4. Title of Project : Mariculture - Culture of Molluscs

5. Title of Sub-project : Experimental pearl oyster hatchery for mass production of spat

6. Name and designation of Project Leader : K. Alagarswami, S-3

7. Name(s) and designation(s) of Project Leader and Project Associates together with time proposed to be spent and work to be done

Centre	Name	Designation	Time to be spent (%)	Work to be done
Tuticorin	K. Alagarswami	S-3	15%	1-4
	S. Dharmaraj (A.P.L.)	S-2	50%	2
	A. Chellam	S-2	40	3,4
	T.S. Velayudhan	S-1	50	1

Technical Assistance: K. Srinivasagam, (2), J. Antony Pitchai (3), Dasman Fernando (1), Soosai V. Rayan (4)

8. Location of the research Project : Tuticorin

9. a) Objectives: An indigenous technology for artificial breeding and spat production of pearl oyster has already been developed on a laboratory scale. The present project aims at mass production of pearl oyster spat in an experimental hatchery and standardisation of design and procedures for a pilot-scale hatchery. Sea-ranching is expected to augment the natural population in the beds.

   b) Practical Utility: The design and procedures standardised under the project would help in establishing viable commercial hatcheries for pearl oyster to enable uninterrupted supplied of the biological raw material to pearl culture industry.

10. Technical Programme:

1. Application of controlled maturation and spawning techniques for large-scale spawning.
2. Introduction of new designs in larval rearing system for streamlining and maximising larval production.
3. Large-scale spat settlement, transplantation and juvenile rearing in farm.
4. Mass culture of algae in out-door tanks for juvenile feeding.
5. Transplantation of hatchery spat to the natural beds.

Work done: Under an earlier project (MOL/CUL/1.7) a breakthrough was achieved in developing techniques for artificial production of pearl oyster seed. New experimental hatchery has been established and being stabilised.

Work envisaged in current year: Scaling up of operations and introduction of new designs in experimental hatchery. Sea-ranching of pearl oyster and results.

11. Date of start: 1983-84 12. Likely date of completion: 1989-90

13. Estimated man-months :

14. Facilities required:

i.	Land : No	v.	Fish ponds	:	Farm
ii.	Labour : No	vi.	Foreign exchange	:	Yes
iii.	Special equipment : Yes	vii.	Other items	:	No
		viii.	Total estimated cost	:	Institute's budget
iv.	Animal sheds: No.				

15. If financed by an organisation other than the Institute: -

16. Approximate cost: a) Salary of Scientific staff; b) Salary of Technical staff; c) Salary of Supporting staff, if any; d) Casual Labour cost, if any; e) Cost of equipment, facility, etc. f) Contingencies, such of chemicals, fertilisers, seed, animals, feeds sprayers etc.; g) Total cost: Institute's budget

17. Signature of:

Sd/-	Sd/-	Sd/-
Project Leader	Head of Division	Director

RESEARCH PROJECT - 1985-86

1. Institute Code No. MOL/CUL/1.9 2. I.C.A.R. Code No.

3. Name and address of Research Institute : CMFR INSTITUTE, COCHIN

4. Title of Project : Mariculture - Culture of Molluscs

5. Title of Sub-project : Development of hatchery system for clam seed production

6. Name and designation of Project Leader : K.A. Narasimham, S-3

7. Name(s) and designation(s) of Project Leader and Project Associates together with time proposed to be spent and work to be done

Centre	Name	Designation	Time to be spent (%)	Work to be done
Kakinada	K.A. Narasimham	S-3	20	Tech.Prog. 2 & 3

Technical Assistance: To be posted.

8. Location of the research project : Kakinada

9. a) Objectives: To develop appropriate hatchery technology for controlled production of clam seed.

   b) Practical Utility: The availability of clam seed in natural beds for culture operations is unpredictable. While theoretically two clam harvests each of 5-6 months duration can be obtained in a year, seed availability is limiting the operations to a single crop. This project would help to provide clam seed throughout the year and pave the way to take up studies on larval ecology and improvement of genetic quality of different clam species.

10. Technical Programme:

1. To establish a full fledged laboratory with controlled conditions.
2. To maintain and condition adult clams (Anadara granosa and Paphia sp.) in the laboratory and try various physical and chemical methods to induce them to spawn
3. Culture of suitable phytoplankters to be used as food for larvae and spat.
4. To develop proper nursery system for raising the spat.

Work done: Cultures of the phytoplankters Isochrysis and Tetraselmis maintained in the laboratory. By stripping the ripe gonads, gametes were obtained, fertilisation was achieved and larval development studied upto 'D' stage.

Work envisaged in current year: Development of techniques for induced spawning and larval rearing to settlement stage.

11. Date of start : 1982-83 12. Likely date of completion: 1987-88

13. Estimated man-months : -

14. Facilities required:

i.	Land	: No	v.	Fish ponds	: yes
ii.	Labour	: Yes	vi.	Foreign exchange	: No
iii.	Special equipment	: Yes	vii.	Other items	: No
iv.	Animal sheds	: No.	viii.	Total estimated cost	: Institute's budget

15. If financed by an organisation other than the Institute : No

16. Approximate cost: a) Salary of Scientific staff; b) Salary of Technical staff; c) Salary of supporting staff, if any; d) Casual Labour cost, if any; e) Cost of equipment, facility etc; f) Contingencies, such of chemicals, fertilisers, seed, animals, feeds sprayers etc.

17. Signature of:

Sd/-	Sd/-	Sd/-
Project Leader	Head of Division	Director

RESEARCH PROJECT 1985-86

1. Institute Code No. MOL/CUL/1.10 2. I.C.A.R. Code No.

3. Name and address of Research Institute : CMFR INSTITUTE, COCHIN

4. Title of Project : Mariculture- Culture of Molluscs

5. Title of Sub-project : Breeding and experimental sea-ranching of commercially important gastropods

6. Name and designation of Project Leader : S. Mahadevan, S-3

7. Name(s) and designation(s) of Project Leader and Project Associates together with time proposed to be spent and work to be done

Centre	Name	Designation	Time to be spent (%)	Work to be done
Mandapam	S. Mahadevan	S-3	40	1-4
	K. Ramadoss	S-2	90	1-4
Vizhinjam	K.K. Appukuttan	S-2	30	1

Technical Assistance: P. Thillairajan (Mandapam)

8. Location of the research project : Mandapam, Vizhinjam

9. a) Objectives:

1. To develop suitable techniques for the breeding of commercially important gastropods and rearing the young ones to sizes appropriate for trnaplantation to natural beds.
2. To plan and carry out experimental sea-ranching of important selected gastropod species and monitor the effect on improvement/replenishment of natural populations.

b) Practical Utility: For several years, species such as Xancus pyrum in the mainland waters and Trochus niloticus and Turbo marmoratus in the Andaman and Nicobar waters have been subject to heavy exploitation. Their breeding potential and recruitment to exploited fishery have not been understood. The present project aims at developing controlled breeding techniques for gastropods such as Trochus stellatus and T. radiatus, in order to be able to use such systems for production of juveniles on large scale and replenishment of stocks through sea-ranching in future.

10. Technical Programme:

1. To study the breeding habits of adults, larval development and juvenile growth of selected gastropods representing different reproductive strategies (gastropods under consideration are species of Xancus, Turbo, Trochus, Haliotis, Thais, Cypraea and Conus).
2. Controlled breeding and seed production of local gastropod species at the project centres.
3. Development of controlled breeding techniques for Trochus niloticus and Turbo marmoratus after success under item 2.
4. Experimental sea-ranching and monitoring of survival, and improvement/replenishment of natural populations.

Work done: Fair amount of success has been achieved in breeding Trochus under laboratory conditions. Infrastructural facilities for larval metamorphosis and further development have been created.

Work envisaged in the current year: 1. Collection of spawners and stimulating spawning with different stimuli. 2. Rearing the larval forms to adult size. 3. Establishment of filtered seawater facility and culturing selected species of diatoms as larval food. 4. Releasing the tended stock in natural beds.

11. Date of start : 1983-84 12. Likely date of completion: 1986-87

13. Estimated man-months :

14. Facilities required:

i.	Land	: No	v.	Fish ponds	: Marine Aquarium
ii.	Labour	: Yes			
iii.	Special equipment	: Yes	vi.	Foreign exchange	: Yes
			vii.	Other items	: Nil
iv.	Animal sheds	: No	viii.	Total estimated cost	: Institute's budget

15. If financed by an organisation: other than the Institute -

16. Approximate cost: a) Salary of Scientific staff; b) Salary of Technical Staff; c) Salary of Supporting staff, if any; d) Casual Labour cost, if any, e) Cost of equipment, facility etc. f) Contingencies, such of chemicals, fertilisers, seed, animals, feeds sprayers etc. g) Total cost: Institute's budget.

17. Signature of:

Sd/-	Sd/-	Sd/-
Project Leader	Head of Division	Director

RESEARCH PROJECT 1985-86

1. Institute Code No. MCL/CUL/1.2.1 2. I.C.A.R. Code No.

3. Name and address of Research Institute : CMFR INSTITUTE, COCHIN

4. Title of Project : Mariculture-Culture of Molluscs

5. Title of Sub-project : Culture of green mussel in salt-water lagoon

6. Name and designation of Project Leader : K. Rangarajan, S-3

7. Name(s) and designation(s) of Project Leader and Project Associates together with time proposed to be spent and work to be done

Centre	Name	Designation	Time to be spent (%)	Work to be done
Madras	K. Rangarajan	S-3	50%	Tech.Prog. 1-4

Technical Assistance: R. Thangavelu, P. Poovannan

8. Location of the research project : Madras

9. a) Objectives: To experiment and evolve suitable techniques for the farming of mussels in the coastal lagoon ecosystem (Muttukadu)

b) Practical Utility: Vast areas of lagoons along the east coast are practically lying unutilised at present, Most of the areas could be utilized to culture mussels. The development of proper culture system plays an important role in increased production and bring the farming of mussels within the reach of coastal rural population.

10. Technical Programme:

1. To evolve suitable techniques for farming the green mussel in Muttukadu lagoon near Madras.
2. To study the environmental and biological factors influencing reproduction in the population of mussels.
3. To study the growth potential of green mussel in lagoon ecosystem.
4. To estimate production rates under different culture methods
5. To study the meat content of mussels.

Work done: Preliminary experimental work has been carried out which gave encouraging results.

Work envisaged in current year: As per technical programme.

11. Date of start : 1984-85 12. Likely date of completion: 1986-87

13. Estimated man-months : -

14. Facilities required:

i.	Land	: No	v.	Fish ponds	: Mussel farm
ii.	Labour	: Yes	vi.	Foreign exchange	: No
iii.	Special equipment	: Yes	vii.	Other items	: No
iv.	Animal sheds	: No	viii.	Total estimated cost	: Institute's budget

15. If financed by an organisation other than the Institute : No

16. Approximate cost: a) Salary of Scientific staff; b) Salary of Technical staff; c) Salary of Supporting staff; d) Casual Labour cost, if any, e) Cost of equipment, facility etc., f) Contingencies, such of chemicals, fertilisers, seed animals, feeds sprayers etc.; g) Total cost: Institute's budget

17. Signature of:

Sd/-	Sd/-	Sd/-
Project Leader	Head of Division	Director

RESEARCH PROJECT - 1985-86

1. Institute Code No. MOL/CUL/1.2.2 2. I.C.A.R. Code No.

3. Name and address of Research Institute : CMFR INSTITUTE, COCHIN

4. Title of Project : Mariculture - Culture of molluscs

5. Title of Sub-project : Investigations on mussel spat settlement and seed slipping on transplantation

6. Name and designation of Project Leader : K.K. Appukuttan, S-2

7. Name(s) and designation(s) of Project Leader and Project Associates together with time proposed to be spent and work to be done

Centre	Name	Designation	Time to be spent (%)	Work to be done
Vizhinjam	K.K. Appukuttan	S-2	30%	Tech.Prog. 1-4
Calicut	P.S. Kuriakose	S-2	20%	

Technical Assistance: T. Prabhakaran Nair, K.T. Thomas, Mathew Joseph (Vizhinjam); V.G. Surendranathan and M.P. Sivadasan (Calicut)

8. Location of the research project : Vizhinjam, Calicut.

9. a) Objectives: To study the mussel spat attachment and seed settlement in nature and in farm and to investigate the causes of large-scale slipping of seed when transplanted to culture ropes. The candidate species is the brown mussel Perna indica and the green mussel P. viridis.

b) Practical Utility: Recently large scale slipping of seed mussel was identified as one of the constraints in mussel culture and very little information is available on this aspect. The present investigation would help in enhancing production in mussel culture farm through appropriate measures to prevent slipping of transplanted seed.

10. Technical Programme:

1. Observations on primary and secondary settlement of mussel spat in natural bed at Vizhinjam and Calicut.
2. Collection and transplantation of mussel seed from various ecological conditions.
3. To study the rate of slipping under various conditions.
4. To study the environmental parameters to know the optimum conditions for proper settlement of seed.

Work done: Experiments have been initiated on the shipping of mussel seed on transplanting to culture ropes.

Work envisaged in current year: The experiments will be continued and the rate of shipping of seed of different sizes and the factors influencing proper settlement will be studied as indicated in Technical programme.

11. Date of start: 1984-85 12. Likely date of completion: 1986-87

13. Estimated man-months : -

14. Facilities required:

i.	Land	:	v.	Fish ponds	:
ii.	Labour	:	vi.	Foreign exchange	:
iii.	Special equipment	:	vii.	Other items	:
iv.	Animal sheds	:	viii.	Total estimated cost	:

15. If financed by an organisation other than the Institute : No

16. Approximate cost: a) Salary of Scientific staff; b) Salary of Technical staff; c) Salary of Supporting staff, if any; d) Casual Labour cost, if any, e) Cost of equipment, facility etc; f) Contingencies, such of chemicals, fertilisers, seed, animals, feeds sprayers etc; g) Total cost: Institute's budget.

17. Signature of:

Sd/-	Sd/-	Sd/-
Project Leader	Head of Division	Director

RESEARCH PROJECT - 1985-86

1. Institute Code No. MOL/CUL/1.2.3 2. I.C.A.R. Code No.

3. Name and address of Research Institute : CMFR INSTITUTE, COCHIN

4. Title of Project : Mariculture - Culture of Molluscs

5. Tile of Sub-project : Pilot project in mussel culture

6. Name and designation of Project Leader : P.S. Kuriakose, S-2

7. Name(s) and designation(s) of Project Leader and Project Associates together with time proposed to be spent and work to be done

Centre	Name	Designation	Time to be spent (%)	Work to be done
Calicut	P.S. Kuriakose	S-2	80%	1-7

Technical Assistance: V.G. Surendranathan, M.P. Sivadasan

8. Location of the research Project : Calicut

9. a) Objectives: To work out the techno-economic feasibility of open-sea mussel culture of Perna viridis and identify problems in large scale culture through appropriate feed-back.

   b) Practical Utility: The project will demonstrate the high production potential and economic viability of mussel farming in the coastal waters. The techno-economic data will be provided to organisations interested in commercial mussel farming.

10. Technical Programme:

1. Open-sea raft culture of mussels adopting standard norms.
2. Standardisation of spat collection, transportation, conditioning, selection and seeding operations for large-scale farming.
3. Economics of mussel culture.
4. Demonstration of technical know-how and commercial viability of mussel farming.

5. Purification of mussels.
6. Development of strategy with cooperation of State Fisheries Development Corporations, Integrated Fisheries Project and Marine Products Development Authority for marketing of farm produced mussels.
7. Investigations on technological and biological problems based on feed-back.

Work done: The techniques of open-sea mussel culture have been developed at the Institute on experimental basis and the high production potential has been ascertained.

Work envisaged in current year: To implement items 1-7 of the technical programme.

11. Date of start: 1984-85 12. Likely date of completion: 1986-87

13. Estimated man-months : 40

14. Facilities required:

i.	Land	: -	v.	Fish ponds	: Open sea-mussel farm
ii.	Labour	: yes			
iii.	Special equipment	: -	vi.	Foreign exchange	: -
			vii.	Other items	: boat purification
iv.	Animal sheds	: -	viii.	Total estimated cost	: Institute's budget

15. If financed by an organisation other than the Institute : -

16. Approximate cost: a) Salary of Scientific staff; b) Salary of Technical staff; c) Salary of Supporting staff; d) Casual Labour cost, if any, e) Cost of equipment, facility etc. f) Contingencies, such of chemicals, fertilisers, seed, animals, feeds sprayers etc; g) Total cost: Institute's budget

17. Signature of:

Sd/-	Sd/-	Sd/-
Project Leader	Head of Division	Director

RESEARCH PROJECT 1985-86

1. Institute Code No. NOL/CUL/1.8 2. I.C.A.R. Code No.

3. Name and address of Research Institute : CMFR INSTITUTE, COCHIN

4. Title of Project : Mariculture - Culture of Molluscs

5. Title of Sub-project : Culture of cephalopods

6. Name and designation of Project Leader : D. Sivalingam, S-1

7. Name(s) and designation(s) of Project Leader and Project Associates together with time proposed to be spent and work to be done

Centre	Name	Designation	Time to be spent (%)	Work to be done
Mandapam	D. Sivalingam	S-1	100%	Tech.Prog. 1-4

Technical Assistance: P. Thillairajan

8. Location of the research Project : Mandapam

9. a) Objectives: To develop techniques for breeding and culture of cephalopods.

   b) Practical Utility: Culture techniques for rearing cephalopods, when developed successfully, have good scope for adoption on commercial lines for enhancing production. The cephalopods have a high demand in the export market.

10. Technical Programme:

1. Maintenance of adults of cuttlefish (Sepia spp.) in marine aquaria for observations on reproductive behaviour.
2. Collection of egg clusters of cuttlefish (Sepia spp.) and investigations on optimum hatching conditions.
3. Investigations on nutritional and other physiological requirements for growth during juvenile phase.
4. Development of appropriate techniques for the grow-out phase of culture.

Work done: Good progress has been made to rear the young ones of Sepia to adults. The difficulties in feeding the young stages have been rectified by providing alternate foods. Attempts to culture Artemia salina by setting up a suitable water circulation system and using Artemia for feeding the young cephalopods as a substitute for Mysis.

Work envisaged in current year: Mass culture of cephalopods and release of the adults in the natural habitat as a part of sea-ranching programme.

11. Date of start: 1984-85 12. Date of completion: 1986-87

13. Estimated man-months : -

14. Facilities required:

i.	Land	: -	v.	Fish ponds	: -
ii.	Labour	: -	vi.	Foreign exchange	: -
iii.	Special equipment	: yes	vii.	Other items	: Cages
			viii.	Total estimated cost	: Institute's budget
iv.	Animal sheds	: Marine aquaria			

15. If financed by an organisation other than the Institute: -

16. Approximate cost: a) Salary of Scientific staff; b) Salary of Technical staff; c) Salary of Supporting staff; d) Casual Labour cost, if any; e) Cost of equipment, facility etc. f) Contingencies, such of chemicals, fertilisers, seed, animals, feeds sprayers etc., g) Total cost: Institute's budget

17. Signature of:

Sd/-	Sd/-	Sd/-
Project Leader	Head of Division	Director

RESEARCH PROJECT 1985-86

1. Institute Code No. MOL/CUL/1.1.1 2. I.C.A.R. Code No.

3. Name and address of Research Institute : CMFR INSTITUTE, COCHIN

4. Title of Project : Mariculture-Culture of Molluscs

5. Title of Sub-project : Pilot Project in oyster culture

6. Name and Designation of Project Leader : K. Satyanarayana Rao, S-3

7. Name(s) and Designation(s) of Project Leader and Project Associates together with time proposed to be spent and work to be done

Centre	Name	Designation	Time to be spent (%)	Work to be done
Tuticorin	K. Satyanarayana Rao	S-3	60	1-7
	P. Muthiah	S-2	40	1-7

Technical Assistance: D. Sundararajan, N. Vaidyanathan, G.Sreenivasan

8. Location of the research Project : Tuticorin

9. a) Objectives: To determine the economic feasibility of oyster culture and find out the problems involved in large scale culture operations. The species to be cultured is Crassostrea madrasensis.

   b) Practical Utility: The project will indicate the commercial feasibility of oyster farming. The techno-economic results obtained in the project will be given to enterpreneurs interested in conducting oyster farming commercially.

10. Technical Programme:

1. Culture of oysters in coastal waters.
2. Standardisation of spat collection, conditioning, transportation, selection and oyster growing system.
3. Economics of oyster culture.
4. Demonstration of technical know-how and commercial viability of oyster farming.
5. Depuration of oysters.
6. Evolving of strategies with the co-operation of Integrated Fisheries Project, Fisheries Development Corporation and Marine Products Development Authority for the marketing of farmed oysters.
7. Studies on technical and biological problems noticed on implementing the project.

Work done: The technique of oyster culture has been developed by the Institute and good production potential has been noted.

Work envisaged in current year: To implement items 1-7 of the Technical programme.

11. Date of start: 1985-86 12. Likely date of completion: 1989-90

13. Estimated man-months :

14. Facilities required:

i. Land	: -	v. Fish ponds	: Oyster farm
ii. Labour	: yes	vi. Foreign exchange	: -
iii. Special equipment	: -	vii. Other items	: Farming materials and depuration tanks.
iv. Animal sheds	: -	viii. Total estimated cost	: Institute's budget

15. If financed by an organisation other than the Institute : No

16. Approximate cost: a) Salary of Scientific staff, b) Salary of Technical staff; c) Salary of Supporting staff, if any; d) Casual Labour cost, if any e) Cost of equipment, facility etc. f) Contingencies, such of chemicals, fertilisers, seed, animals, feeds, sprayers, etc. g) Total cost: Institute's budget

17. Signature of:

Sd/-	Sd/-	Sd/-
Project Leader	Head of Division	Director

RESEARCH PROJECT - 1985-86

1. Institute Code No. MOL/CUL/133.2 2. I.C.A.R. Code No.

3. Name and address of Research Institute : CMFR INSTITUTE, COCHIN

4. Title of Project : Mariculture-culture of Molluscs

5. Title of Sub-project : Investigations on eco-physiological factors influencing developmental biology of clams

6. Name and designation of Project Leader : G.P. Kumaraswamy Achary, S-1

7. Name(s) and designation(s) of Project Leader and Project Associates together with time proposed to be spent and work to be done

Centre	Name	Designation	Time to be spent (%)	Work to be done
CMFRI Vizhinjam	G.P. Kumaraswamy Achary	S-1	100	Tech.Project 1-5

Technical Assistance: Mathew Joseph

8. Location of research project : Vizhinjam

9. a) Objectives: To develop appropriate technology for triggering and shortening the process of gametogenesis to mass production of clams to help large scale farming.

b) Practical Utility: Clams form a major source of protein food in addition to the shells being utilised as a raw material for cement and other lime based industries. The shortage of production in the natural environment has affected the industry and also the employment opportunity of the rural people. The result of the study will help enhancement of production in the natural environment as well as by scientific farming.

10. Technical Programme: Investigations on the eco-physiological factors influencing the developmental biology of clams with emphasis on the following aspects in the laboratory and in the natural environment to be carried out.

1) Gametogenesis 2) Oviposition 3) Fertilisation and development 4) Spat formation and settlement 5) Technology for spawning rearing and nursery systems for clam culture.

The work will be oriented for developing the technology in the commercial species like Villorita cyprinoides, Katelysia opima; Meretrix casta, M. meretrix and other economically important clams.

Work done: Artificial spawning and rearing in Villorita cyprinoides is already done in the laboratory conditions by induced spawning method Investigations on the resource potential and spawning season of the clams of Kerala and Karnataka is also completed.

Work envisaged in current year: Investigations as per technical programme 1-5.

11. Date of start : 1985-86 (later part) 12. Likely date of completion: 1989-90

13. Estimated man-months :

14. Facilities required:

i.	Land : Nil	v.	Fish ponds	:	Nil
ii.	Labour : Nil	vi.	Foreign exchange	:	Nil
iii.	Special equipment : Nil	vii.	Other items	:	Nil
iv.	Animal sheds : Nil	viii.	Total estimated cost	:	Institute's budget

15. If financed by and organisation other than the Institute: Nil

16. Approximate cost: a) Salary of Scientific staff b) Salary of Technical staff; c) Salary of Supporting staff; d) Casual labourer cost, if any e) Cost of equipment, facility etc; f) Contingencies, such of chemicals, fertilisers, seed, animals, feeds sprayers etc; g) Total cost: Institute budget.

17. Signature of:

Sd/-	Sd/-	Sd/-
Project Leader	Head of Division	Director

RESEARCH PROJECT 1985-86

1. Institute Code No. MCL/CUL/1.5.1 2. I.C.A.R. Code No.

3. Name and address of Research Institute : CMFR INSTITUTE, COCHIN

4. Title of Project : Mariculture-Culture of Molluscs

5. Title of Sub-project : Mass production of edible oyster seed in hatchery system

6. Name and Designation of Project Leader : K. Nagappan Nayar, S-3

7. Name(s) and Designation(s) of Project Leader and Project Associates together with time proposed to be spent and work to be done

Centre	Name	Designation	Time to be spent (%)	Work to be done
Tuticorin	K. Nagappan Nayar	S-3	10	1-8
	K. Satyanarayana Rao	S-3	10	1 & 2
	P. Mu[illegible]iah	S-2	20	7-8
	M.E. Rajapandian	S-2	60%	3-6

Technical Assistance: A.D. Gandhi, N. Vaidyanathan

8. Location of the research project : Tuticorin

9. a) Objectives: 1. Selection and maintenance of broodstock to effect spawning as and when required. 2. Induced maturation and spawning of oysters in laboratory. 3. Mass production of oyster spat by rearing larvae by hatchery techniques. 4. Finding out suitable methods of rearing hatchery produced spat in natural environment. 5. Developing strains of oysters with desirable qualities.

b) Practical Utility: It would be possible to obtain regular supplies of oyster seed throughout the year for conducting oyster culture. The genetic quality of oysters could also be improved by adopting hatchery techniques.

10. Technical Programme:

1. Selection and maintenance of broodstock.
2. Conditioning of oysters for maturation.
3. Induced spawning of oysters.
4. Mass rearing of larvae for the production of oyster spat.
5. Use of improved types of spat collectors.
6. Production of cultchless spat.
7. Growing of spat to stocking size.
8. Mass culture of phytoplankters for feeding broodstock, larvae and spat.

11. Date of start : 1985-86 12. Likely date of completion: 1989-90

13. Estimated man-months : -

14. Facilities required:

i.	Land :	v.	Fish ponds :
ii.	Labour :	vi.	Foreign exchange:
iii.	Special equipment: yes	vii.	Other items :
iv.	Animal sheds : -	viii.	Total estimated cost : Institute's budget

15. If financed by an organisation other than the Institute: -

16. Approximate cost: a) Salary of Scientific staff; b) Salary of Technical staff; c) Salary of Supporting staff, if any; d) Casual labour cost, if any; e) Cost of equipment, facility etc; f) Contingencies, such as chemicals, fertilisers, seed, animals, feeds, sprayers etc. g) Total cost: Institute's budget.

17. Signature of:

Sd/-	Sd/-	Sd/-
Project Leader	Head of Division	Director

RESEARCH PROJECT 1985-86

1. Institute Code No. MBO/ES/1.1 2. I.C.A.R. Code No.

3. Name and address of Research Institute : C.M.F.R. Institute, Cochin

4. Title of Project : Fishery Oceanography Investigations

5. Title of Sub-Project : Physical and chemical aspects of the waters of the Exclusive Economic Zone.

6. Name and designation of Project Leader : A.V.S. Murty, S-3

7. Name(s) and designation(s) of Project Leader and Project Associates together with time proposed to be spent and work to be done

Centre	Name	Designation	Time to be spent (%)	Work to be done
Cochin	A.V.S. Murty	S-3	75	1-3
	C.P.Ramamirtham	S-2	50	"
	D.S. Rao	S-2	10	"
	S. Muthuswamy	S-1	50	"
Madras	K.G.Girijavallabhan	S-1	25	"
Mandapam	S. Krishna Pillai	S-1	25	"
Tuticorin	R. Marichamy	S-2	20	"
Minicoy	C.V. Mathew	S-1	25	"

Technical Assistance: K.P. Viswanathan (Calicut), T. Dandapani (Madras), M. Selvaraj (Mandapam), R. Vasanthakumar (Vizhinjam), N.P. Kunhikrishnan (Cochin), G.S. Bhat (Mangalore), Ch. Ellithathayya (Kakinada), S.P. Dahyalal, S. Rajapackiam (Tuticorin).

8. Location of the Research Project : Karwar, Mangalore, Calicut, Cochin, Vizhinjam, Tuticorin, Mandapam, Madras, Kakinada and Waltair

9. (a) Objectives: To determine the sea water characteristics of the Exclusive Economic Zone and their influence on biological productivity and fisheries.

(b) Practical Utility: A continuous monitoring programme of the sea water characteristics is of great value in assessing the fertility, biological productivity and fisheries of the Economic Zone.

10. Technical Programme: 1. Hydrographical and meteorological data to be collected, processed and analysed for physical and chemical parameters. 2. Nutrient contents of the sea water to be analysed and processed for the seasonal variations in relation to the rate of primary organic production. 3. To identify the environmental factors which influence the fisheries.

Work done: Essentially a monitoring programme of environmental factors which are of direct influence governing the distribution and occurrence of fishery resources. Basic parameters from all the important centres on a seasonal basis have been covered. A synoptic picture for the entire EEZ is required from vessel based observations has to be drawn with the aid of R.V. Skipjack and vessels of DOD. along with fishing observations.

Work envisaged in current year: Fishery oceanographic programmes will be considerably strengthened with regular participation in the cruises of FORV Sagar Sampada. along with fishing operations.

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11. Date of start: 1978 12. Likely date of completion: continuing

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13. Estimated man-months: man months/year

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14. Facilities required:

i.	Land - No	v.	Fish ponds - No
ii.	Labour - No	vi.	Foreign exchange - Yes
iii.	Special equipment - Yes	vii.	Other items - No
iv.	Animal sheds - No	viii.	Total estimated cost - Institute's Budget

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15. If financed by an organisation other than the Institute : No

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16. Approximate cost:

a) Salary of Scientific staff
b) Salary of Technical staff
c) Salary of Supporting staff, if any
d) Casual Labour cost, if any
e) Cost of equipment, facility etc.
f) Contingencies, such of chemicals, fertilizers, seed, animals, feeds, sprayers etc.
g) Total cost : Institute's Budget

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17. Signatures of:

Sd/-	Sd/-	Sd/-
Project Leader	Head of Division	Director

RESEARCH PROJECT - 1985-86

1. Institute Code No. MBO/FEL/1.1 2. I.C.A.R. Code No.

3. Name and address of Research Institute : C.M.F.R. Institute, Cochin

4. Title of Project : Fish eggs and larvae

5. Title of Sub-project : Eggs and larvae of commercially important fishes from the shelf and adjacent waters (EEZ)

6. Name and designation of Project Leader : K.C.George, S-3

7. Name (s) and designation (s) of Project Leader and Project Associates together with time proposed to be spent and work to be done

Centre	Name	Designation	Time to be spent (%)	Work to be done
Cochin	K.C. George	S-3	25	1-3
Vizhinjam	Rani Mary Jacob	S-2	30	"
Mandapam	P.Benzam	S-1	30	"
Tuticorin	Pon Siraimeetan	S-1	30	"

Technical Assistance: Geetha Antony (Cochin)

8. Location of the Research Project : Cochin, Vizhinjam, Mandapam and Tuticorin

9. (a) Objectives: (1) To identify the spawning grounds and seasons of commercial fishes. (2) To study recruitment patterns from the larval distribution and abundance.

   (b) Practical utility: The data would help in attempting fishery forecasts for the benefit of the industry.

10. Technical Programme: Regular collection of Icthyoplankton from inshore waters and the shelf areas with Cadalmin vessels/R.V.Skipjack/ FORV Sagar Sampada and qualitative and quantitative study of the material.

Work done: Seasonal abundance of eggs and larvae were monitored from 4 observation centres along the coasts (Cochin, Vizhinjam, Mandapam and Tuticorin). Monsoon related spawning intensities were noticed in most commercial species especially clupeids.

Work envisaged in the current year: Emphasis will be laid on study of larval recruitment based on R.V.Skipjack and Sagar Sampada collections.

11. Date of start : 1976 12. Likely date of completion: continuing

13. Estimated man-months : man months/year

14. Facilities required:

i)	Land	- No	v)	Fish ponds	- No
ii)	Labour	- No	vi)	Foreign exchange	- No
iii)	Special equipment	- Yes	vii)	Other items	- No
iv)	Animal sheds	- No	viii)	Total estimated cost	- Institute's Budget

15. If financed by an organisation other than the Institute : No

16. Approximate cost:

a) Salary of Scientific staff
b) Salary of Technical staff
c) Salary of Supporting staff, if any
d) Casual Labour cost, if any
e) Cost of equipment, facility, etc.
f) Contingencies, such of chemicals, fertilizers, seed, animals, feeds, sprayers etc.
g) Total cost - Institute's Budget

17. Signatures of:

Sd/-	Sd/-	Sd/-
Project Leader	Head of Division	Director

RESEARCH PROJECT - 1985 - '86.

1. Institute Code No. MBO/MS/1.1 2. I.C.A.R. Code No.

3. Name and address of Research Institute : C.M.F.R. Institute, Cochin.

4. Title of Project : Ecological studies of mangrove swamps

5. Title of Sub-Project : Ecology of the mangrove swamps and their associated fauna and flora

6. Name and designation of Project Leader : M.S. Rajagopalan, S-3.

7. Name(s) and designation(s) of Project Leader and Project Associates together with time proposed to be spent and work to be done.

Centre	Name	Designation	Time to be spent (%)	work to be done
Cochin	M.S. Rajagopalan	S-3		1-3
	S. Banik	S-1		5
	G.S. Daniel Selvaraj	S-1		1-3

Technical Assistance: A. Kanagam (Cochin)

8. Location of the Research Project : Cochin, Madras and Kakinada

9. a) Objectives: 1. To understand the various ecological aspects connected with mangrove areas. 2. To determine quantitatively and qualitatively the mangrove associated fauna, their inter-relationship and influence on fisheries. 3. To evaluate nutritional composition in terms carbohydrates of the halophytes (back mangroves).

b) Practical Utility: Mangrove areas have characteristic flora & fauna and have high productivity. Further, mangrove areas serve as nursery grounds for many species of fishes and prawns. Hence valuable information can be gained from the point of view of coastal aquaculture. To explore the possibility of utilizing halophytes as fodder.

10. Technical Programme: 1. Detailed survey of mangrove vegetation, resident and migratory fauna with special reference to succession of plant and animal communities. 2. Collect information on hydrographic conditions, primary productivity, soil etc. 3. Locate areas which serve as nursery grounds for fishes and shell fishes. 4. To determine the carbohydrate content of halophytes of the back mangrove region. 5. To study the physico-chemical properties and soil microbiology of mangrove soils at Cochin.

Work done: Mangrove areas at Cochin backwater, Killai estuary, Gulf of Kutch and Kakinada have been surveyed and the ecology and biology of mangroves have been studied.

Work envisaged in current year: Intensification of the ecological studies at Cochin and Kakinada as per technical programme and also at Madras.

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11. Date of start : 1976 12. Likely date of completion : 1985-86

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13. Estimated man-months : 24 man months/year

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14. Facilities required:

i) Land	- No	v) Fish ponds	- No
ii) Labour	- No	vi) Foreign exchange	- No
iii) Special equipment	- No	vii) Other items	- No
iv) Animal sheds	- No	viii) Total estimated cost	- Institute's Budget

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15. If financed by an organisation other than the Institute. : No

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16. Approximate cost:

a) Salary of Scientific staff
b) Salary of Technical staff
c) Salary of Supporting staff, if any
d) Casual Labour cost, if any
e) Cost of equipment, facility etc.
f) Contingencies, such of chemicals, fertilizers, seed, animals, feeds, sprayers etc.
g) Total cost - Institute's Budget.

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17. Signatures of:

Sd/-	Sd/-	Sd/-
Project Leader	Head of Division	Director

RESEARCH PROJECT - 1985-86

1. Institute Code No. MBO/PP/1.1 2. I.C.A.R. Code No.

3. Name and address of Research Institute: C.M.F.R. Institute, Cochin

4. Title of Project : Phytoplankton and Primary Productivity

5. Title of Sub-Project : Phytoplankton and primary productivity of the EEZ

6. Name and designation of Project Leader : K. Radhakrishna, S-3

7. Name(s) and designation(s) of Project Leader and Project Associates together with time proposed to be spent and work to be done

Centre	Name	Designation	Time to be spent (%)	Work to be done
Waltair	K. Radhakrishna	S-3	25	1-4
Kakinada	G.S. Daniel Selvaraj	S-?	50	"
Madras	K.G. Girijavallabhan	S-?	25	"
Tuticorin	C.P. Gopinathan	S-2	25	"
Minicoy	C.V. Mathew	S-1	20	"
Vizhinjam	Rani Mary Jacob	S-2	25	"
Cochin	P.V. Ramachandran Nair	S-3	10	"

Technical Assistance: B. Narayana Rao (Waltair), T. Dhandapani (Madras), V.K. Balachandran (Cochin) and P. Swarnalatha (Calicut)

8. Location of the research Project : Waltair, Kakinada, Madras, Tuticorin, Vizhinjam, Cochin, Calicut and Minicoy

9. (a) Objectives: 1. Assessment of productivity potential of the EEZ. 2. Determination of temporal and spatial variability in productivity. 3. Study of the influence of hydrobiological parameters on primary productivity.

(b) Practical Utility: Phytoplankton productivity being the primary base of the marine food pyramid, its estimation would help assess the ultimate fishery potential of our EEZ.

10. Technical Programme: 1. Measurement of primary productivity by oxygen and/or radiocarbon methods. 2. Estimation of phytoplankton standing crop in terms of pigments and total counts. 3. Measurement of related physico-chemical parameters in the Euphotic Zone and correlation with

productivity. 4. Taxonomical and ecological studies on phytoplankton.

Work done: Assessment of primary productivity of EEZ and Indian Ocean in general has been made. Further intensive studies on areas of upwelling and their contribution to the energy budget of the adjacent areas together with the yield ratio for the upwelling regions require to be investigated. Relationship of changes with potential resources has been established.

Work envisaged in current year: Primary Productivity work will be considerably strengthened with regular participation in the cruises of FORV Sagar Sampada.

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11. Date of start: 1976 12. Likely date of completion: continuing

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13. Estimated man-months: man months/year

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14. Facilities required:

i)	Land - No	v)	Fish ponds - No
ii)	Labour - No	vi)	Foreign exchange - Yes
iii)	Special equipment - Yes	vii)	Other items - No
iv)	Animal sheds - No	viii)	Total estimated cost Institute's Budget

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15. If financed by an organisation other than the Institute: No

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16. Approximate cost:

a) Salary of Scientific staff
b) Salary of Technical Staff
c) Salary of Supporting staff, if any
d) Casual Labour cost, if any
e) Cost of equipment, facility etc.
f) Contingencies, such of chemicals, fertilizers, seed, animals, feeds, sprayers etc.
g) Total cost - Institute's Budget

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17. Signatures of:

Sd/-	Sd/-	Sd/-
Project Leader	Head of Division	Director

RESEARCH PROJECT - 1985-86

1. Institute Code No. MBO/PL/1 2. I.C.A.R. Code No.

3. Name and address of Research Institute : C.M.F.R. Institute, Cochin

4. Title of Project : Secondary Production

5. Title of Sub-project : Zooplankton in relation to productivity, recruitment and fisheries

6. Name and designation of Project Leader: K.J. Mathew, S-2

7. Name(s) and designation(s) of Project Leader and Project Associates together with time proposed to be spent and work to be done

Centre	Name	Designation	Time to be spent (%)	Work to be done
Cochin	T.S. Naomi	S_1	50	1-6
	K.J. Mathew	S-2	25	"
	K. Rengarajan	S-2	25	"
Minicoy	C.V. Mathew	S-1	30	"
Vizhinjam	P.A. Thomas	S-2	30	"
	Rani Mary Jacob	S-2	30	"
Tuticorin	Pon Siraimeetan	S-1	30	"
Mandapam	S. Krishna Pillai	S-1	30	"
Madras	K.G. Girijavallabhan	S-1	20	"

Technical Assistance: P.M. Aboobaker (Cochin), G. Subramanya Bhat (Mangalore), K. Ramachandran Nair (Vizhinjam) and T. Dhandapani (Madras)

8. Location of the Research Project: Cochin, Minicoy, Vizhinjam, Tuticorin, Mandapam and Madras

9. (a) Objectives: 1) Estimation of zooplankton biomass and correlation with primary production and related hydrographic parameters. 2) Quantitative and qualitative analysis of zooplankton and correlation with food components of major pelagic fishes.

(b) Practical Utility: Zooplankton being the important link in the marine food chain, its study is essential for establishing a meaningful correlation between primary production and fish resources and also to predict fluctuations in our pelagic fisheries.

10. Technical Programme: (a) Regular collection of samples for zoeplankton from selected stations over a geographic area following standard methods. (b) Quantitative and qualitative analysis of zooplankton. (c) Taxonomy and biology of important zooplankton groups. (d) Study of the importance of zooplankters as indicators of water masses. (e) Study the seasonal distribution and abundance of zooplankton in relation to hydrographic parameters. (f) Working out indices of productivity at the various levels employing statistical methods, for determining the role of zooplankton in the trophic chain. (g) Estimation on the monthly standing crop of zooplankton of the EEZ at selected centres and the preparation of monthly charts.

Work done: A general picture of the seasonal variation of the components of zooplankters have been derived from 9 centres. Distribution of zooplankters in space and time with reference to recruitment in major fishing zones has been studied. In the sub-Antarctic regions as part of the sub-Antarctic programme a detailed investigation on krill resources is envisaged. Observations are being correlated with available resources.

Work envisaged in current year: Secondary Production work will be considerably strengthened with regular participation in the cruises of FORV Sagar Sampada.

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11. Date of start : 1985 12. Likely date of completion: Continuing

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13. Estimated man-months : man-months/year

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14. Facilities required :

i)	Land - No	v)	Fish ponds - No
ii)	Labour - No	vi)	Foreign exchange - No
iii	Special equipment - No	vii)	Other items - No
iv)	Animal sheds - No	viii)	Total estimated cost- Institute's Budget

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15. If financed by an organisation other than the Institute: No

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16. Approximate cost:

a) Salary of Scientific staff
b) Salary of Technical staff
c) Salary of Supporting staff, if any
d) Casual Labour cost, if any
e) Cost of equipment, facility etc.
f) Contingencies, such of chemicals, fertilizers, seed, animals, feeds, sprayers etc.
g) Total cost - Institute's Budget

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17. Signatures of:

Sd/-	Sd/-	Sd/-
Project Leader	Head of Division	Director

1. Institute Code No. MBO/SW/1.2 2. I.C.A.R. Code No.

3. Name and address of Research Institute: C.M.F.R. Institute, Cochin

4. Title of Project : Seaweed Resources Investigations

5. Title of Sub-project: Culture of economically important seaweeds

6. Name and designation of Project Leader : N. Kaliaperumal, S-2

7. Name(s) and designation(s) of Project Leader and Project Associates together with time proposed to be spent and work to be done

Centre	Name	Designation	Time to be spent (%)	Work to be done
Mandapam	N. Kaliaperumal	S-2	50	1-3
Madras	Geetha Bharathan	S-1	30	"

Technical Assistance: S. Kalimuthu, J.R. Ramalingam, M. Selvaraj and M. Najmuddin (Mandapam)

8. Location of the Research Project : Mandapam and Madras

9. (a) Objectives: To carry out culture experiments on commercially important seaweeds in order to develop suitable techniques for seaweed farming.

(b) Practical Utility: This will provide additional raw materials in off seasons and also production could be increased according to the demand.

10. Technical Programme: 1. Farming and culturing of economically important seaweeds by means of vegetative propagation and spores. 2. Enhancement of seaweed production by management of solar radiation. 3. Study of genetic variation in Gracilaria corticata.

Work done: Viable technologies for the culture of agarophytes and alginophytes, for which there is demand from industry, were developed in the Institute. A comprehensive survey on the availability of seaweed resources, was conducted jointly with CSMCRI and State Fisheries

Department. Investigation on sporulation from tetrasporic and cystocarpic plants of selected agarophytes were conducted with reference to the environmental factors which influence them. This would be a stride towards laboratory culture. Factors determining the production and suitable sites will be investigated.

Work envisaged in current year: Culture of agarophytes will be intensified. In addition edible seaweeds and alginophytes also will be taken up. Culture by spores also will be attempted.

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11. Date of start: 1981 12. Likely date of completion: continuing

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13. Estimated man-months : man months/year

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14. Facilities required:

i) Land - No
ii) Labour - No
iii) Special equipment-No
iv) Animal sheds- No
v) Fish ponds - No
vi) Foreign exchange- No
vii) Other items - No
viii) Total estimated cost - Institute's Budget

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15. If financed by an organisation other than the Institute : No

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16. Approximate cost :

a) Salary of Scientific staff
b) Salary of Technical staff
c) Salary of Supporting staff, if any
d) Casual Labour cost, if any
e) Cost of equipment, facility etc.
f) Contingencies, such of chemicals, fertilizers, seed, animals, feeds, sprayers etc.
g) Total cost - Institute's Budget

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17. Signatures of:

Sd/-	Sd/-	Sd/-
Project Leader	Head of Division	Director

RESEARCH PROJECT - 1985-86

1. Institute Code No. MBO/MP/1.1 2. I.C.A.R. Code No.

3. Name and address of Research Institute : C.M.F.R. Institute, Cochin

4. Title of Project : Marine Pollution

5. Title of Sub-Project : Marine Pollution in relation to protection of living resources

6. Name and designation of Project Leader : P.V. Ramachandran Nair, S-3

7. Name(s) and designation(s) of Project Leader and Project Associates together with time proposed to be spent and work to be done

Centre	Name	Designation	Time to be spent (%)	Work to be done
Cochin	P.V. Ramachandran Nair	S-3		1-4
	V. Kunjukrishna Pillai	S-2		"
	A. Geethanand Ponniah	S-1		"
	S. Muthuswamy	S-1		1-2
Tuticorin	R. Marichamy	S-2		1-3
Cochin	I. David Raj	S-1		1-4

Technical Assistance: D. Vincent, K.K. Valsala, R.V. Singh (Cochin)

8. Location of the Research Project : Cochin and Tuticorin

9. (a) Objectives: To identify sources of marine pollution, assess their effect on living organisms and to suggest tolerable levels for protecting the living resources of inshore areas, specially fisheries.

(b) Practical Utility: In recent years there has been a world-wide awareness of the problems of marine pollution because of the immense growth of human population and industries, large scale application of pesticides and several other forms of human interferences with the natural environments. Apart from these, certain biological phenomena like phytoplankton blooms create conditions which lead to pollution and ultimately deoxygenation of water and mortality of fish and other marine life. Hence, studies on marine environmental damage by different sources become an obvious necessity.

10. Technical Programme: 1. Instances of mass mortality due to pollution will be investigated with regard to source and level of pollution in water. 2. In areas where instances of aquatic pollution are prevalent, suitable surveys will be conducted to identify type of pollution and their effect on the biota. 3. The levels of mercury

in water in nearshore areas of Tuticorin will be monitored. 4. The levels and selected heavy metals in the environment will be monitored in selected areas.

Work done: Necessary infrastructure facilities have been built up. Hot spots of pollution have been identified. Causes of sporadic occurrence of mass mortality of fishes in rivers and estuaries have been determined. Standardization procedures of pesticide residues and heavy metal concentrations have been worked.

Work envisaged in current year: Further intensification of pesticide residues and heavy metal residues in common fishes, crustaceans and molluscs from areas where there are effluent discharges from industries such as Binaga Bay in Karwar, Mutthkkadu near Kalpakkam, Tuticorin near SPIC.

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11. Date of start: 1982 12. Likely date of completion: 1985-86

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13. Estimated man-months : man months/year

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14. Facilities required:

i)	Land - No	v)	Fish ponds - No
ii)	Labour - No	vi)	Foreign exchange - Yes
iii)	Special equipment - Yes	vii)	Other items - No
iv)	Animal sheds - No	viii)	Total estimated cost - Institute's Budget

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15. If financed by an organisation other than the Institute : No

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16. Approximate cost:

a) Salary of Scientific staff
b) Salary of Technical staff
c) Salary of Supporting staff, if any
d) Casual labour cost, if any
e) Cost of equipment, facility etc.
f) Contingencies, such of chemicals, fertilizers, seed, animals, feeds, sprayers etc.
g) Total cost : Institute's Budget

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17. Signatures of:

Sd/-	Sd/-	Sd/-
Project Leader	Head of Division	Director

RESEARCH PROJECT - 1985-86

1. Institute Code No. MBO/MP/1.2 — 2. I.C.A.R. Code No.

3. Name and address of Research Institute : C.M.F.R. Institute, Cochin

4. Title of Project : Marine Pollution

5. Title of Sub-project : Environmental monitoring of aquaculture systems

6. Name and designation of Project Leader : V. Kunjukrishna Pillai, S-2

7. Name(s) and designation(s) of Project Leader and Project Associates together with time proposed to be spent and work to be done

Centre	Name	Designation	Time to be spent (%)	Work to be done
Cochin	V. Kunjukrishna Pillai	S-2	50	1-3
	V. Chandrika	S-1	30	"
Madras	Geetha Bharathan	S-1	30	"
	M. Rajagopalan	S-1	30	1-4
	K.G. Girijavallabhan	S-1	10	1-3
Cochin	I. David Raj	S-1		"
	Sankar Alavandi	S-1	50	1-3

Technical Assistance: D. Vincent, K.K. Valsala (Cochin), T. Dhandapani (Madras), J.X. Rodrigo (Tuticorin) and V. Rangacharyalu

8. Location of the Research Project : Cochin, Madras

9. (a) Objectives: 1. To collect baseline information on salinity, O_2, nutrients and organic carbon content in the water and substratum and to link with production from the respective fields for a comparative evaluation. 2. To monitor variations in environmental parameters which cause stress on culture animals and also to explore remedial measures. 3. To estimate parameters that can be used as indices of the productivity of culture systems.

(b) Practical Utility: The programme envisages monitoring of water quality and nature of substratum and also abundance and variations of benthic biota. Knowledge gathered on these lines may considerably help in foreseeing the problems affecting the growth and survival of culture organisms. Information on the chemical composition of the substratum and rate of oxygen reduction potential (Eh) will certainly help in controlling unfavourable situations. The abundance and variations of the benthic biota along with estimates of organic carbon in water and mud will give a true picture of the productivity of the ecosystem. There is scope to use these parameters as an index of overall productivity of prawn culture ecosystems.

10. Technical Programme: 1. Collection and analysis of physico-chemical data including water temperature, pH, Eh, salinity, dissolved oxygen and nutrients from selected prawn culture systems where commercial culture is practised. 2. Determine the organic carbon contents of sediment. 3. Determine the interstitial salinity in culture fields. 4. Record growth rate regularly and keep surveillance on mortality.

Work done: Regular monitoring of environmental parameters were carried out at respective centres of observation. Instance of fish mortality and the causes such as oxygen depletion and occurrence of phytoplankton blooms were investigated in depth. Ammonia along with pH or acidity have been the causative factors.
Work envisaged in current year: Monitoring programme will be continued at Muthukkadu and other areas with the aid of Mobile Laboratory. E. coli faecal indicator organism of pollution in the mangrove ecosystem is also being monitored.

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11. Date of start : 1982 12. Likely date of completion: 1985-86

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13. Estimated man-months : man months/year

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14. Facilities required:

i)	Land - No	v)	Fish ponds - No
ii)	Labour - No	vi)	Foreign exchange - Yes
iii)	Special equipment - Yes	vii)	Other items - No
iv)	Animal sheds - No	viii)	Total estimated cost - Institute's Budget

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15. If financed by an organisation other than the Institute : No

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16. Approximate cost:

a) Salary of Scientific staff
b) Salary of Technical staff
c) Salary of Supporting staff, if any
d) Casual labour cost, if any
e) Cost of equipment, facility etc.
f) Contingencies, such of chemicals, fertilizers, seed, animals, feeds, sprayers etc.
g) Total cost : Institute's Budget

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17. Signatures of:

Sd/-	Sd/-	Sd/-
Project Leader	Head of Division	Director

1. Institute Code No. M80/MP/1.3 2. I.C.A.R. Code No.

3. Name and address of Research Institute : C.M.F.R. Institute, Cochin

4. Title of Project : Marine Pollution

5. Title of Sub-project : Investigations on the pesticide residues and heavy metals in the environment and living resources of the estuarine and inshore waters

6. Name and designation of Project Leader : V. Kunjukrishna Pillai, S-2

7. Name(s) and designation(s) of Project Leader and Project Associates together with time proposed to be spent and work to be done

Centre	Name	Designation	Time to be spent (%)	Work to be done
Cochin	V. Kunjukrishna Pillai	S-2		1-3

Technical Assistance: D. Vincent, K.K. Valsala (Cochin)

8. Location of the Research Project : Cochin

9. (a) Objectives: Pollution from pesticides and heavy metals in the aquatic environment and their build up in the organisms is a major problem for investigation. This is of particular significance when the potential for large scale aquaculture in this region is taken into consideration. There are reports of mortality of fishes and crustaceans due to large scale application of pesticides in the agricultural lands lying adjacent to Cochin backwaters and hence requires regular monitoring.

(b) Practical Utility: Information on the pesticide residue concentration in the environment as well as in the animals from this area is almost lacking. Data on the short-term as well as long-term effects of major pesticides on the ecosystem and the organisms will be highly useful in evaluating several biological effects on the population as well as in assessing the damage which can result due to biological magnification and food chain transport.

10. Technical Programme: 1. Baseline studies and survey to identify the level of pesticide residue in the aquatic environment and in commercially important organisms. 2. Detailed investigations on selected species to study the pesticide residues and heavy metal concentration and their effects. 3. Evolve a suitable programme for regular monitoring of pesticide residues in this region.

Work done: The necessary instrumentation for the work has been procured. The standards have been obtained and instrument calibration has been conducted. Pesticide residues are found in the lipid pool.

Work envisaged in current year: Pesticide and heavy metal residues will be monitored in the coastal environment.

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11. Date of start : 1985 12. Likely date of completion: continuing

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13. Estimated man-months : man months/year

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14. Facilities required:

i)	Land - No	v)	Fish ponds - No
ii)	Labour - No	vi)	Foreign exchange - Yes
iii)	Special equipment - Yes	vii)	Other items - No
iv)	Animal sheds - No	viii)	Total estimated cost - Institute's Budget

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15. If financed by an organisation other than the Institute: No

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16. Approximate cost:

a) Salary of Scientific staff
b) Salary of Technical staff
c) Salary of Supporting staff, if any
d) Casual labour cost, if any
e) Cost of equipment, facility etc.
f) Contingencies, such of chemicals, fertilizers, seed, animals, feeds, sprayers etc.
g) Total cost : Institute's Budget

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17. Signatures of:

Sd/-	Sd/-	Sd/-
Project Leader	Head of Division	Director

RESEARCH PROJECT - 1985-86

1. Institute Code No. FED/BT/1 2. I.C.A.R. Code No.

3. Name and address of Research Institute: C.M.F.R. Institute, Cochin

4. Title of Project : Investigations of algal proteins, carbohydrates, lipids, polysaccharides and other chemical constituents.

5. Title of Sub-Project : --

6. Name and designation of Project Leader : V.S.K. Chennubhotla, S-3

7. Name(s) and designation(s) of Project Leader and Project Associates together with time proposed to be spent and work to be done

Centre	Name	Designation	Time to be spent (%)	Work to be done
Cochin	V.S.K. Chennubhotla	S-3		1-8
	S. Muthuswamy	S-1		"

Technical Assistance: J.R. Ramalingam, M. Najmuddin (Mandapam)

8. Location of the research project : Cochin, Mandapam

9. (a) Objectives: To develop mass cultures of micro-algae rich in quality protein, with a view to use them in aquaculture practices, including feed formulation on a substitute for the conventional protein source. Estimating the proteins, carbohydrates, lipids, polysaccharides etc from macro-algae.
(b) Practical Utility: In view of the aquaculture developments and current awareness of quality protein enriched feed formulation, the scientists are trying to switch over from the conventional protein sources to SCP. Quite a lot of information is already available in this field, by the actual inclusion of SCP in fish feed formulation and is yet to get popularised among the aquaculturist. So a scheme for developing SCP from micro-algae to use as a protein source in aquaculture/mariculture is proposed. The results on macro-algae can be considered for utilization in various fields.

10. Technical Programme: 1. Isolation and identification of protein rich species of micro-algae from the backwater and coastal areas of west coast. 2. Studies on their growth pattern and identifying the ECP in experimental cultures. 3. Qualitative and quantitative study of the proteins. 4. Mass culture of the isolated species after identification and study of growth pattern. 5. Identification of suitable inorganic nutrients for the quality SCP production. 6. Utilization of the sewage effluents for the culture of the organism and comparing their suitability again in the nutrient enriched media. 7. Development of harvesting technique and storage of SCP. 8. Estimation of ATP in the phytoplankton. 9. Estimation of protein, carbohydrates, lipids, polysaccharides etc in macro-algae.

Work done: Four species of microalgae were isolated locally from the estuarine and inshore regions of Cochin and grown in the laboratory under axenic conditions and the total protein content was estimated. The work was also incorporated in a thesis submitted for Ph.D by a CAS scholar.

Work envisaged: Screening of edible macro algae and selected macro algae for protein, lipid, carbohydrate, polysaccharide and other chemical constituents.

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11. Date of start: 1988 12. Likely date of completion: 1987

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13. Estimated man-months : man months/year

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14. Facilities required:

i)	Land - No	v)	Fish ponds - No
ii)	Labour - No	vi)	Foreign exchange - No
iii)	Special equipment - Yes	vii)	Other items - No
iv)	Animal sheds - No	viii)	Total estimated cost - Institute's Budget

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15. If financed by an organisation other than the Institute : No

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16. Approximate cost:

a) Salary of Scientific staff
b) Salary of Technical staff
c) Salary of Supporting staff, if any
d) Casual Labour cost, if any
e) Cost of equipment, facility etc.
f) Contingencies, such of chemicals, fertilizers, seed, animals, feeds, sprayers etc.
g) Total cost - Institute's Budget

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17. Signatures of:

Sd/-	Sd/-	Sd/-
Project Leader	Head of Division	Director

1. Institute Code No. FED/SW/1.4 2. I.C.A.R. Code No.

3. Name and Address of Research Institute : C.M.F.R. Institute, Cochin

4. Title of Project : Seaweed Resources Investigations

5. Title of Sub-Project : Selection and Genetic Improvement of seaweeds

6. Name and designation of Project Leader : Geetha Bharathan, S-1

7. Name(s) and Designation(s) of Project Leader and Project Associates together with time proposed to be spent and work to be done

Centre	Name	Designation	Time to be spent (%)	Work to be done
Mandapam	N. Kaliaperumal	S-2		1-8
Madras	Geetha Bharathan	S-1		"
Mandapam	Prebhakar	S-1		

Technical Assistance: S. Kalimuthu (Mandapam)

8. Location of the Research Project : Mandapam, Madras

9. (a) Objectives: 1. Screening, evaluation and genetic characterisation of different natural populations. 2. Generation of genetic variability by mutagenesis, polyploidy, hybridisation. 3. Selection of desirable characters based on the above, for use in further genetic manipulation and improvement.

(b) Practical Utility: The commercial exploitation of seaweeds is hampered by factors like indiscriminate harvesting, the variable and uncertain quality of the raw material. Cultivation of seaweeds of economic importance is already commercially viable in many countries and is being introduced in India also. The availability of high-yielding, fast growing strains of uniform quality would be a great asset to this enterprise, benefitting the cultivator as well as the industrialist who uses the raw material.

Planned genetic selection and improvement of desirable seaweeds can yield accelerated results. This project will undertake a preliminary screening of available material for identifying potentially useful varieties. Attempts will be made to generate new variability in order to widen the base of variation, especially in some vegetatively propagated material. This will be done by adopting different strategies depending upon the species involved. The aim will also be the establishment of a knowledge base which would help in future scientific breeding programmes.

10. Technical Programme: 1. Collection of material from different populations. 2. Study of variation in yield, quality, biomass and characteris of genetic significance like chromosomes and patterns of protein banding by electrophoresis. 3. Evaluation of growth characteristics of these populations under cultivation. 4. Induction of mutations by use of chemical mutagens like EMS. 5. Induction of polyploidy by use of chemicals like colchicine and cytochalasin B. 6. Attempts at interspecific and intergeneric hybridisation between different taxa. 7. Evaluation of results of 4, 5, 6 in terms of 2 and 3. 8. Identification and selection of desirable characters and individuals/strains bearing them.

Work done: Different populations of the two species, Gracilaria Verrucosa and G. edulis were sampled. Screening for variation in growth of G. edulis revealed no significant variation in the growth of three populations collected from different areas around Mandapam. Attempts were made to study the chromosomes, as part of the programme to understand the genetic structure of Gracilaria. Practical applicability will also be studied.
Work envisaged: Technical programme 1 and 2.

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11. Date of start: 1984 12. Likely date of completion: 1989

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13. Estimated man-months: man-months/year

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14. Facilities required:

i) Land	- No	v) Fish ponds	- No
ii) Labour	- No	vi) Foreign exchange	- No
iii) Special equipment	- No	vii) Other items	- No
iv) Animal sheds	- No	viii) Total estimated cost	- Institute's Budget

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15. If financed by an organisation other than the Institute : No

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16. Approximate cost:

a) Salary of Scientific staff
b) Salary of Technical staff
c) Salary of Supporting staff, if any
d) Casual Labour cost, if any
e) Cost of equipment, facility etc.
f) Contingencies, such of chemicals, fertilizers, seed, animals, feeds, sprayers etc.
g) Total cost - Institute's Budget

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17. Signatures of:

Sd/-	Sd/-	Sd/-
Project Leader	Head of Division	Director

RESEARCH PROJECT - 1985-86

1. Institute Code No. FED/Misc/7 — 2. I.C.A.R. Code No.

3. Name and address of Research Institute: C.M.F.R. Institute, Cochin

4. Title of Project : Investigation on sediment fertility

5. Title of Sub-Project: Evaluation of Macro and Micro nutrients in the sediment and fertility of culture systems

6. Name and designation of Project Leader : P.V. Ramachandran Nair, S-3

7. Name(s) and designation(s) of Project Leader and Project Associates together with time proposed to be spent and work to be done

Centre	Name	Designation	Time to be spent (%)	Work to be done
Cochin	P.V. Ramachandran Nair	S-3	25	
	C.P. Ramamirtham	S-2(APL)	30	
	A.G. Ponniah	S-2	30	
	R.V. Singh	T-6	100	
	I. David Raj	S-1	15	
	S. Banik	S-1		

Technical Assistance: V.K. Balachandran, K.K. Valsala (Cochin)

8. Location of the research project : Cochin

9. (a) Objectives: 1. To provide general and quantitative information on the mineralogical and chemical composition of Marine sediment. 2. To evaluate the nutrients availability in sediment samples in relation to fertility of selected aquatic regions. 3. To estimate the amounts of trace elements and to assess their role in productivity of the regions concerned. 4. To establish baseline levels of biologically toxic heavy metals in the sediment and define areas of heavy metal pollution.

(b) Practical Utility: 1. The essential nutrients and trace elements in water are usually taken from the sediment and thus the sediments in aquatic regions are generally a good store house of nutrients and trace elements. As such, the analysis of sediment becomes significant while studying the productivity of the ecosystems. 2. A knowledge of macro and micro gradients in sediment will greatly help in understanding of the geochemical mass balance of elements in the marine ecosystem.

10. Technical Programme:

1. Collection of sediment samples from selected regions once in a season.
2. Analysis of collected samples for macro nutrients i.e. Ca, Mg, Na, K, SO_4, PO_4, NO_3, NO_2, SiO_2 and organic carbon.
3. Analysis for micro elements i.e. Co, Cu, Li, Ni, Ph, Zn, Cd, Hg, Ba, Cr, Sr, Mo, Al, Mn, Fe.

Work done: The project was initiated in 1984 and samples of sediments collected from inshore regions, mud banks and aquaculture fields have been analysed for macro and micro nutrients. Results indicate soil conditions which require liming.
Work envisaged: Intensification of the study from clusters of ponds near Puri around Chilka lake under ERRP programme.

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11. Date of start: 1984-85 12. Likely date of completion: 1987-88

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13. Estimated man-months: man months/year

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14. Facilities required:

i)	Land - No	v)	Fish ponds - No
ii)	Labour - No	vi)	Foreign exchange - No
iii)	Special equipment - No	vii)	Other items - No
iv)	Animal sheds - No	viii)	Total estimated cost - Institute's Budget

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15. If financed by an organisation other than the Institute : No

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16. Approximate cost:

a) Salary of Scientific staff
b) Salary of Technical staff
c) Salary of Supporting staff, if any
d) Casual Labour cost, if any
e) Cost of equipment, facility etc.
f) Contingencies, such of chemicals, fertilizers, seed, animals, feeds, sprayers etc.
g) Total cost - Institute's Budget

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17. Signatures of:

Sd/-	Sd/-	Sd/-
Project Leader	Head of Division	Director

RESEARCH PROJECT - 1985-86

1. Institute Code No. FED/Misc/8	2. I.C.A.R. Code No.
3. Name and address of Research Institute:	C.M.F.R. Institute, Cochin
4. Title of Project :	Bio-active agents from marine organisms
5. Title of Sub-Project :	
6. Name & designation of Project Leader :	D. Sadananda Rao, S-3

7. Name(s) and designation(s) of Project Leader and Project Associates together with time proposed to be spent and work to be done

Centre	Name	Designation	Time to be spent (%)	Work to be done
Cochin	D. Sadananda Rao	S-3		as per
Madras	R. Parvesan	S-2		Technical
	D.B. James	S-2		Programme
	K.G. Girijavallabhan	S-1		
Vizhinjam	C.S. Gopinadha Pillai	S-2		
	P.A. Thomas	S-2		
	K.K. Appukuttan	S-1		
Tuticorin	C.P. Gopinathan	S-2		
Cochin	S. Muthusamy	S-1		

Technical Assistance: S. Kalimuthu, M. Najmuddin (Mandapam), N.P. Kunhikrishnan, P.M. Aboobaker (Cochin).

8. Location of the Research Project: Madras, Vizhinjam, Mandapam, Tuticorin and Cochin

9. (a) Objectives: To make a critical study of the bioactive agents from marine organism, to undertake a resource survey on such agents and also to conduct mariculture trials on such organisms.

(b) Practical Utility: The knowledge obtained from these studies will have the following application:

(1) in assaying the marine food organisms for toxins
(2) in understanding the effects of blooms of toxic organisms
(3) in the culture of certain economically important bioactive organisms

10. Technical Programme: 1. Ecological survey of important corals, alcyonarians, echinoderms, unicellular and higher algae which are prone to be toxic. 2. Collection, preservation, storage and

screening for bio-activity. 3. Determination of the chemical and physiological nature of the bio-active substances and toxins. Quantification and identification of the compounds by HPLC and MS in the organisms. 4. Animal assay to determine tolerance levels. 5. Mariculture of the economically important toxic organisms.

Work done: Bioactive agents present in certain unicellular algae and marine animals are being isolated. Preliminary experiments on the bioassay of the same are in progress. For qualitative determination and quantification and assay infrastructure is being built up.

Work envisaged: Technical Programme 1 to 5

11. Date of start: 1984 12. Likely date of completion: 1987

13. Estimated man-months : man-months/year

14. Facilities required:

i) Land - No
ii) Labour - for collection of specimen
iii) Special equipment - HPLC & Mass Spectra
iv) Animal sheds - for keeping test animals, like mouse rabbits etc.
v) Fish ponds - No
vi) Foreign exchange - for HPLC & Mass Spectra
vii) Other items - No
viii) Total estimated cost - Institute's Budget

15. If financed by an organisation other than the Institute : No

16. Approximate cost:

a) Salary of Scientific staff
b) Salary of Technical staff
c) Salary of Supporting staff, if any
d) Casual Labour cost, if any
e) Cost of equipment, facility etc.
f) Contingencies, such of chemicals, fertilizers, seed, animals, feeds, sprayers etc.
g) Total cost - Institute's Budget

17. Signatures of:

Sd/-
Project Leader

Sd/-
Head of Division

Sd/-
Director

RESEARCH PROJECT - 1985-86

1. Institute Code No. FEMD/Misc/85 2. I.C.A.R. Code No.

3. Name and address of Research Institute: C.M.F.R. Institute, Cochin

4. Title of Project : Cataloguing of Tools/Equipment in Fishery Environmental study

5. Title of Sub-Project : Observation of west coast of Kerala

6. Name and designation of Project Leader: B.S. Ramachandrudu, Farm Engineer

7. Name(s) and designation(s) of Project Leader and Project Associates together with time proposed to be spent and work to be done.

Centre	Name	Designation	Time to be spent (%)	Work to be done
Cochin	B.S. Ramachandrudu	Farm Engineer	60	Data collection, execution, preparation of drawings etc.
	P.V.R. Nair	S-3	10	Supervision & Plan of work

Technical Assistance: at Calicut, Cochin, Vizhinjam etc.

8. Location of the research Project : Cochin

9. (a) Objectives: To identify different types of tools and equipment that are used in construction and maintenance of bunds, structures, rafts etc. before, during and after aquaculture and catalogue them.

   (b) Practical Utility: The work study will reveal the areas that require improvement in construction, and culture methods and also publicize the need based technology developed by farmers at various areas and places. This will give room to improve upon the existing tools and equipment that are in vogue. This is useful to introduce in teaching work also.

10. Technical Programme:

1. The area of coastal Kerala commencing from near Kasargod to near Vizhinjam will bes studied at specific locations.
2. The data will be collected either by primary or secondary observation or both as the case may be.

3. Information to be collected on equipment & tool/Farmers.

ON TOOLS

a) Working principle
b) Type of material
c) Method of fabrication/construction
d) Cost
e) Efficiency etc.
as per the requirement to each tool/ equipment/accessory etc.

ON FARMERS

(i) Extent of Land
(ii) Family background
(iii) Financial support
(iv) Educational background etc.

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11. Date of start: 1985 12. Likely date of completion: 1988

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13. Estimated man-months

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14. Facilities required:

i) Land - No
ii) Labour - No
iii) Special equipment - No
iv) Animal sheds - No
v) Fish ponds - No
vi) Foreign exchange - No
vii) Other items -
viii) Total estimated cost - Institute's Budget

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15. If financed by an organisation other than the Institute : No

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16. Approximate cost:

a) Salary of Scientific staff
b) Salary of Technical staff
c) Salary of Supporting staff, if any
d) Casual Labour cost, if any
e) Cost of equipment, facility etc.
f) Contingencies, such of chemicals, fertilizers, seed, animals, feeds, sprayers etc.
g) Total cost - Institute's Budget

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17. Signatures of:

Sd/-
Project Leader

Sd/-
Head of Division

Sd/-
Director

1. Institute Code No. FEMD/LL/1 2. I.C.A.R. Code No.

3. Name and address of Research Institute: C.M.F.R. Institute, Cochin

4. Title of Project : Field Culture of Lab-Lab

5. Title of Sub-Project : Manuring/Fertilization of ponds for production of Lab-Lab composed of blue-green algae

6. Name and Designation of Project Leader: P. Bensam, S-2

7. Name(s) and Designation(s) of Project Leader and Project Associates together with time proposed to be spent and work to be done

Centre	Name	Designation	Time to be spent (%)	Work to be done
Mandapam	P. Bensam	S-2		

Technical Assistance:

8. Location of the Research Project : Mandapam

9. (a) Objectives: To produce blue-green algae with a view to use them as food of Chanos mullets etc. under cultivation.

(b) Practical Utility: It has been found that one of the constraints for adequate growth and production of herbivorous fishes like Chanos and mullet is the lack of sufficient quantities of Lab-Lab in culture ponds, thus leading to supplementary feeding with rice-bran, oilcake, etc. If a continuous supply of Lab-Lab is provided for the fishes their growth and production are bound to increase, as has been reported from south-east Asian countries.

10. Technical Programme: 1. Manuring/Fertilization of ponds for enhancing the growth of Lab-Lab; assessment of different agents for optimum growth. 2. Feeding of culture stocks with the Lab-Lab- grawn. 3. Monitoring of the growth of fishes in relation to expenditure involved.

11. Date of start: 1985 12. Likely date of completion: 1987.

13. Estimated man-months : 12 man-months/year

14. Facilities required:

i) Land	- No	v) Fish ponds	- Yes
ii) Labour	- No	vi) Foreign exchange	- No
iii) Special equipment	- No	vii) Other items	- No
iv) Animal sheds	- No	viii) Total estimated cost	- Institute's Budget

15. If financed by an organisation other than the Institute : No

16. Approximate cost :

a) Salary of Scientific staff
b) Salary of Technical staff
c) Salary of Supporting staff, if any
d) Casual Labour cost, if any
e) Cost of equipment, facility etc.
f) Contingencies, such of chemicals, fertilizers, seed, animals, feeds, sprayers etc.
g) Total Cost - Institute's Budget

17. Signatures of:

Sd/-	Sd/-	Sd/-
Project Leader	Head of Division	Director

RESEARCH PROJECT - 1985-86

Institute Code No. PNP/3	2. ICAR Code No.
3. Name and address of Research Institute:	C.M.F.R. Institute Cochin
4. Title of project	Reproductive physiology of fishes and shellfishes
5. Title of sub-project	Controlled breeding of grey mullets
6. Name and designation of Project Leader	L. Krishnan S-2

7. Name(s) and Designation(s) of Project Leader and Project Associates together with time proposed to be spent and work to be done

Centre	Name	Designation	Time to be spent (%)	Work to be done
Narakkal	L. Krishnan	S-2	25	Tech. Prog. 1-3 of mullets
"	M.K. George	S-1	25	"

Technical Assistance: To be posted

8. Location of the Research Project : Narakkal

9. a) Objectives: 1. To develop techniques for inducing maturation and spawning of the grey mullet Mugil cephalus.

2. To study the female reproductive physiology of the species.

b) Practical Utility:

The project aims at development of techniques, using controlled environmental conditions such as Photoperiodicity, temperature, salinity and pH for maturation and spawning of the grey mullet. The information would be useful in brood stock management.

10. Technical Programme

1. Induced breeding and standardization of techniques.
2. Development of broodstock by manipulation of environmental parameters for production of viable eggs.
3. Critical examination of development of gonads of fish under experimental control and to study the details on gonad development through histological and histochemical methods.

Work done:

In Mugil cephalus, induced breeding experiments and maintenance of breeders with water quality management were carried out. However, viable technology of controlled breeding is yet to be achieved. Different maturity stages of the ova were studied.

Work envisaged

Experiments will be carried out on induced breeding of Mugil cephalus. Studies on the reproductive physiology of the fish will be intensified.

11. Date of start: 1982-83 12. Likely date of completion : 1985-86

13. Estimated man-months : 6 man-months/year

14. Facilities required:

i.	Land - No	v. Fish ponds	- Yes
ii.	Labour - No	vi. Foreign Exchange	- No
iii.	Special Eqpt. Yes	vii. Other items	- No
iv.	Animal sheds-No	viii. Total estimated cost:	Institute's budget

15. If financed by an organisation other than the Institute: Nil

16. Approximate cost:
a) Salary of Scientific staff:
b) Salary of Technical staff:
c) Salary of supporting staff:
d) Casual labour cost, if any:
e) Cost of equipment, facility etc.
f) Contingencies, such as chemicals, fertilizers, seed, animals, feeds, sprayers, etc.
g) Total cost: Institute's Budget

17. Signatures of

Sd/-	Sd/-	Sd/-
Project Leader	Head of Division	Director

RESEARCH PROJECT - 1985-86

1. Institute Code No. PNP/6 2. I.C.A.R. Code No.

3. Name and address of Research Institute : C.M.F.R. Institute, Cochin

4. Title of Project : Finfish nutrition

5. Title of Sub-project : Nutritional requirements of fry and fingerlings of the milkfish Chanos chanos and mullets

6. Name and designation of Project Leader : R. Paul Raj, S-2

7. Name(s) and designation(s) of Project Leader and Project Associates together with time proposed to be spent and work to be done

Centre	Name	Designation	time to be spent (%)	work to be done
Cochin	R. Paul Raj	S-2	20	1. Planning of experiments 2. conduct of tech. programmes
"	D.C.V. Easterson	S-2	20	conduct of experiments
Tuticorin	D. Kandasami	S-1	20	

Technical Assistance : To be posted

8. Location of the Project : Cochin and Tuticorin

9. a) Objectives:

1. To study the protein, lipid, carbohydrate, energy, vitamins and mineral requirements of the fry and fingerlings of mullets and the milkfish, Chanos chanos.

2. Formulation and preparation of compounded feeds including microparticulate diets for mullet hatchlings.

b) Practical Utility:

Increasing interest is evinced on the culture of milkfish and mullets in the coastal waters of our coast. In the brackishwater farming carried out at present supplementary feeds are provided in certain cases based on empirical knowledge. However, considerable amount of wastage of certain nutrients as well as absence of essential nutrients in the desired levels required for optimum growth

has been noticed. It is imperative, therefore, to understand the total nutritional requirements for evolving suitable feed particularly for the fry and fingerlings of these species.

10. Technical Programme:

1. Statistically designed experiments will be conducted using standard test diets prepared from purified nutritional biochemicals to define the optimum requirements.

2. Isocaloric and isonitrogenous diets will be prepared to define the essential amino acids, vitamins and minerals based on the deletion technique and also for determining their optimum requirements for Chanos chanos and Liza macrolepis.

Work done: Feeding experiments were conducted to define the optimum protein requirements of Liza macrolepis fry and the results showed that 40% protein to be optimum for growth, survival and protein retention. Studies on the lipid requirements of Chanos chanos fry showed that a lipid level of 6% is optimum, under the experimental conditions. Data on the lipid requirement and carbohydrate requirement studies on Liza macrolepis are being processed.

Work envisaged : 1. Evaluation of the nutritive value of natural lipid sources for the fry of Chanos chanos and Liza macrolepis. 2. Experiments on minerals and vitamin supplements in the diets of Chanos chanos and Liza macrolepis fry. 3. Evaluation of compounded feeds for the two species.

11. Date of start : 1982-83 12. Likely date of completion : 1985-86

13. Estimated man-months : 6 man-months /year

14. Facilities required:

i.	Land - No	v.	Fish ponds - No
ii.	Labour - Yes	vi.	Foreign exchange - Yes
iii.	Special Eqpt. Available	vii.	Other items - No
iv.	Animal sheds - Yes	viii.	Total estimated cost. Institute's budget

15. If financed by an organisation other than the Institute - Nil

16. Approximate cost:

a) Salary of scientific staff
b) Salary of technical staff
c) Salary of supporting staff
d) Casual labour cost if any
e) Cost of equipment, facility etc.
f) Contingencies, such as chemicals fertilizers, seed, animals, feeds, sprayers etc.
g) Total cost: Institute's budget

17. Signatures of

Sd/-	Sd/-	Sd/-
Project Leader	Head of Division	Director

RESEARCH PROJECT - 1985 - 86

1. Institute Code No. PNP/9 2. I.C.A.R. Code No.

3. Name and address of Research Institute : C.M.F.R. Institute, Cochin

4. Title of Project : Crustacean Nutrition

5. Title of Sub-project : Nutritional requirements of penaeid prawn larvae

6. Name and designation of Project Leader : Syed Ahamed Ali S-1

7. Name(s) and designation(s) of Project Leader and Project Associates together with time proposed to be spent and work to be done

Centre	Name	Designation	Time to be spent (%)	Work to be done
Narakkal (Cochin)	Syed Ahamed Ali	S-1	50	Tech. Prog. 1 - 6
Madras (Kovalam)	M. Vijayakumaran	S-2	25	"

Technical Assistance : To be posted

8. Location of the Research Project : Cochin and Madras

9. a) Objectives:

To obtain data on the dietary requirement of energy protein, lipids, carbohydrates, minerals and vitamins of the larvae of the cultivable species of penaeid prawns, with a view to evolve suitable artificial diets for hatchery production of seed.

b) Practical utility:

There is only fragmentary data available on the total nutritional requirements of larvae of penaeid prawns such as P. indicus and P. monodon in the hatchery culture at present. The results of the project would help to understand the basic aspects of nutritional requirements of the younger stages and formulate suitable artificial feed for large scale production of seed in the hatchery.

10. Technical Programme:

1. Formulation and preparation of approximate test diets with different nutrient levels for studying the nutritional requirements of larvae.
2. Feeding experiments with prepared diets and collection of data on maximum and optimum nutrient requirement level for different larval stages.

Work done:

Purified diet using egg albumen protein source prepared and offered to Penaeus indicus larvae. The larvae were found to develop up to P- II stage. Thereafter it was found that the feed was not available to larvae as the particles settled down on the container. Further experiments were conducted with the artificial feed prepared from Squilla protein resource with some encouraging results.

Work envisaged:

Feeding experiments on micro-particulate feed compound with different composition will be carried out.

11. Date of start: 1982-83 12. Likely date of completion: 1986-87

13. Estimated man-months : 18 man-months/year

14. Facilities required:

i.	Land	: No	v.	Fish ponds	:No
ii.	Labour	: Yes	vi.	Foreign exchange	:No
iii.	Special equipment	:Yes			
iv.	Animal sheds	: No	vii.	Other items	:No
			viii.	Total estimated cost:	Institute's budget

15. If financed by an organisation other than the Institute: Nil

16. Approximate cost:
a) Salary of scientific staff
b) Salary of technical staff
c) Salary of supporting staff
d) Casual labour cost, if any
e) Cost of equipment, facility etc.
f) Contingencies, such as chemicals, fertilizers, seed, animals, feeds sprayers etc.
g) Total cost:

17.

Signatures of:

Sd/-	Sd/-	Sd/-
Project Leader	Head of Division	Director

RESEARCH PROJECT - 1985-86

1. Institute Code No. PNP/10 2. I.C.A.R. Code No.

3. Name and address of Research Institute : C.M.F.R. Institute, Cochin

4. Title of Project: Crustacean nutrition

5. Title of sub-project : Nutritional requirements of spiny lobsters (Panulirus spp)

6. Name and designation of Project Leader : M. Vijayakumaran S-2

7. Name(s) designation(s) of Project Leader and Project Associates together with time proposed to be spent and work to be done

Centre	Name	designation	time to be spent (%)	work to be done
Madras	M. Vijayakumaran	S-2	25	Tech. Prog. 1- 3
Madras	E.V. Radhakrishnan	S-2	20	3
Technical Assistance:				
	M. Shahul Hameed	T-1		

8. Location of the research project : Kovalam and Madras

9. a) Objectives:

Study of dietary protein, lipid, carbohydrate, mineral and vitamin requirements of spiny lobsters.

b) Practical Utility:

Preliminary investigations on the rearing of phyllosoma larvae and culture of early juveniles of palinurids, to marketable size under controlled conditions have provided encouraging results. However, one of the constraints encountered is on the selection of suitable feed in the perfection of the technology. The present project would greatly help to overcome this by providing data for the development of nutritionally balanced compounded diet for different stages of spiny lobsters.

10. Technical Programme:

1. Formulation and preparation of test diets with different combinations of nutrients.
2. Biochemical evaluation of test diets.
3. Biological evaluation of test diets through feeding experiments

Work done:

Experiments were carried out with diets having protein ranging from 0 to 60%. Initial trials indicated that the diets with 45-60% protein gave better growth rates.

Work envisaged

Feeding experiments with semi synthetic test diets to increase stability as well as acceptability of the diets will be planned and conducted.

11. Date of start: 1982-83 12. Likely date of completion: 1985-86

13. Estimated man-months : 4 man-months

14. Facilities required:

i.	Land	: No	v.	Fish ponds	: No
ii.	Labour	: Yes	vi.	Foreign exchange	: No
iii.	Special eqpt.	: Yes	vii.	Other items	: No
iv.	Animal sheds	: No	viii.	Total estimated cost: Institute's budget	

15. If financed by an organisation other than the Institute: Nil

16. Approximate cost:

a) Salary of Scientific staff
b) Salary of technical staff
c) Salary of supporting staff, if any
d) Casual labour cost, if any
e) Cost of equipment, facility etc.
f) Contingencies, such as chemicals, fertilizers, seed, animals, feeds sprayers etc.
g) Total cost : Institute's budget

17. Signatures of

Sd/-	Sd/-	Sd/-
Project Leader	Head of Division	Director

RESEARCH PROJECT - 1985-86

1. Institute Code No. PNP/11 2. I.C.A.R. Code No.

3. Name and address of Research Institute : C.M.F.R. Institute

4. Title of Project : Molluscan Nutrition

5. Title of sub-project : Development of artificial diet for rearing of bivalve larvae and spat

6. Name and designation of Project Leader : D. Kandasami S-1

7. Name (s) and designation(s) of Project Leader and Project Associates together with the proposed time to be spent and work to be done

Centre	Name	Designation	Time to be spent (%)	Work to be done
Tuticorin	D. Kandasami	S-1	25	Tech. Prog. I
-do-	P. Muthiah	S-1	25	"
-do-	S. Dharmaraj	S-1	25	"
	Technical Assistance:	To be posted		

8. Location of the research project : Tuticorin

9. a) Objectives:

To develop artificial feed for bivalve larvae and spat and evaluate their nutritional efficiency.

b) Practical Utility:

In the hatchery production of seed of oyster, mussel and pearl oyster, success depends on providing appropriate feed to the different stages of larvae until spat settling. Feeding with live microalgal requires maintenance of an elaborate and continuous live algal culture system. Development of suitable artificial feed to appropriate particle size acceptable to larvae would not only ensure supply of feed as and when required, but also help in hatchery production of seed.

10. Technical Programme:

1. Evaluation of nutritional value of microencapsulated diets by analytical and feeding experiments.

Work done:

Experiments were conducted with microencapsulated diet of less than 10 /u using gelatin and their acceptability by the larvae were studied. In continuation of this work the project is proposed to evaluate the nutritional value of the diet.

Work envisaged

Nutritional value of microencapsulated diet will be studied by estimating the nutrients such as protein, carbohydrate and lipid by the standard analytical techniques.

Feeding experiments with the diet will be conducted to study the growth rate of larvae and spat.

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11. Date of start: 1982-83 12. Likely date of completion: 1986-87

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13. Estimated man-months : 24 man-months

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14. Facilities required:

i.	Land	- No	v.	Fish ponds	- No
ii.	Labour	- Yes	vi.	Foreign exchange	- Yes
iii.	Special eqpt.	- Yes	vii.	Other items	- No
iv.	Animal sheds	- No	viii.	Total estimated cost : Institute's budget	

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15. If financed by an organisation other than the Institute - Nil

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16. Approximate cost:

a) Salary of scientific staff
b) Salary of technical staff
c) Salary of supporting staff
d) Casual labour cost, if any
e) Cost of equipment, facility etc.
f) Contingencies, such as chemicals, fertilizers, seed, animals, feeds, sprayers etc.
g) Total cost : Institute's budget

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17. Signatures of:

Sd/-	Sd/-	Sd/-
Project Leader	Head of Division	Director

RESEARCH PROJECT 1985-86

1. Institute code No. PNP/14 2. ICAR Code No.

3. Name and address of Research Institute : CMFR Institute, Cochin

4. Title of the Project : Fish and shellfish diseases

5. Title of the Sub-project : Studies on the pathobiology of soft prawns

6. Name and designation of Project Leader : P. Vedavyasa Rao, S-3

7. Name(s) and designation(s) of Project Leader and Project Associates together with time proposed to be spent and work to be done

Centre	Name and designation		Time to be spent (%)	Work to be done
Cochin	P. Vedavyasa Rao	S-3	20	Tech. Prog. 3
-do-	M.S. Muthu	S-3	25	" 1 & 2
-do-	N. Neelakanta Pillai	S-2	25	" 1 & 2
-do-	A. Lakshminarayana	S-2	25	" 1 & 2
-do-	V.S. Kakati	S-1	25	" 3
	Technical Assistance : to be posted			

8. Location of the Research Project : Cochin (Narakkal)

9. a) Objectives

To understand the phenomenon of inducement and manifestation of 'soft' condition in the penaeid prawns particularly in the stocked population in the culture by systems through ecological, pathobiological and physiological investigations and to suggest control/ prophyltic measures.

b) Practical utility:

Considerable loss of stocked population and in turn the yield occurs in the prawns cultured in the grow-out systems due to the abnormal conditions known as 'soft' prawns. Results of this multidisciplinary investigation would help to explain the reasons how this conditions is brought about and to suggest ways and means of its arrestation/control.

10. Technical Programme:

1. The studies will be carried out in the selected ponds at Narakkal and the data on the redox-potential and pH of the pond soil will be collected.
2. The above data will be correlated with the distribution of prawn in the pond and the incidence of 'soft' condition.
3. Ecophysiological studies on copper fluctuation will be continued.

Work done

The studies carried out during the last two years have indicated that the abnormal condition of the prawn is mainly due to ecological imbalance brought out by the poor bottom soil conditions of the pond.

Work envisaged

Collection of data/conduct of experiments as proposed in the technical programme.

11. Date of start: 1982-83 12. Likely date of completion : 1985-86

13. Estimated man-months : 50 man-months

14. Facilities required:

i.	Land	- No	v.	Fish ponds	- Yes
ii.	Labour	- Yes	vi.	Foreign exchange	- Yes
iii.	Special Eqpt.	- Yes	vii.	Other items	- Nil
iv.	Animal sheds	- No	viii.	Total estimated cost- Institute's budget	

15. If financed by an organisation other than the Institute: Nil

16. Approximate cost:

a) Salary of scientific staff :
b) Salary of Technical staff :
c) Salary of supporting staff:
d) Casual labour cost, if any:
e) Cost of equipment, facility etc.
f) Contingencies, such as chemicals, fertilizers, seed, animals, feeds sprayers, etc.
g) Total cost:

17. Signatures of:

Sd/-	Sd/-	Sd/-
Project Leader	Head of Division	Director

1. Institute Code No. PNP/15 2. I.C.A.R. Code No.

3. Name and address of Research Institute : C.M.F.R. Institute, Cochin

4. Title of Project : Physiology of crustacea

5. Title of Sub-project : Studies on the hepato-pancreas of penaeids

6. Name and designation of Project Leader : D.C.V. Easterson S-2

7. Name(s) and designation(s) of Project Leader and Project Associates together with the time proposed to be spent and work to be done

Centre	Name	Designation	Time to be spent (%)	Work to be done
Cochin	D.C.V. Easterson	S-2	25	Tech. Prog. 1 - 4
Tuticorin	D. Kandasami	S-1	25	"

Technical Assistance : To be posted

8. Location of the research project : Cochin and Tuticorin

9. a) Objectives:

To study the morphology, histology and histochemistry of the hepatopancreas alongwith the biochemical composition, carotenoids and the change with feeding and physiological conditions. Investigations will also be carried out on the physiology and metabolism of hepatopancreas.

b) Practical utility:

Hepatopancreas is a very important organ involved in various metabolic activities of the decapods especially in the synthesis and secretion of enzymes and uptake of nutrients. The state of hepatopancreas can indicate the physiological well being of the animal. To understand the nutritional physiology of crustaceans understanding of hepatopancreas is vital.

10. Technical Programme

1. Study of gross morphology
2. Histology of hepatopancreas in normal and under various physiological conditions.
3. Isolation and identification of carotenoids
4. Study of various biochemical constituents

Work done:

Observations on the colouration, weight of hepatopancreas of Penaeus indicus and P. semisulcatus were made. The carotenoid content, the composition of metals, copper and Manganese were also analysed.

Work envisaged

1. Thinlayer chromatograph separation of carotenoids.
2. The composition of different minerals in the tissue in relation to various physiological status will be studied.

11. Date of start: 1983-84 12. Likely date of completion: 1985-86

13. Estimated manmonths = four manmonths

14. Facilities required

i.	Land	: No	v.	Fish ponds	: No
ii.	Labour	: Yes	vi.	Foreign exchange	: Yes
iii.	Special eqpt.	: Yes	vii.	Other items	: No
iv.	Animal sheds	: No	viii.	Total estimated cost: Institute's budget	

15. If financed by an organisation other than the Institute: Nil

16. Approximate cost:

a) Salary of scientific staff
b) Salary of technical staff
c) Salary of supporting staff if any
d) Casual labour cost, if any
e) Cost of equipment, facility etc.
f) Contingencies such as chemicals, fertilizers, seed, animals, feeds, sprayers etc.
g) Total cost:

17. Signatures of:

Sd/-	Sd/-	Sd/-
Project Leader	Head of Division	Director

RESEARCH PROJECT - 1996-97

1. Institute Code No. PNP/19 2. I.C.A.R. Code No.

3. Name and address of Research Institute : C.M.F.R. Institute, Cochin

4. Title of Project : Crustacean Nutrition

5. Title of Sub-project : Nutritional requirements of the mud crab (Scylla serrata) larvae and juveniles

6. Name and designation of the Project Leader: D. Kandasami, S-1

7. Name(s) and designation(s) of Project Leader and Project Associates together with time proposed to be spent and work to be done

Centre	Name	Designation	time to be spent (%)	work to be done
Tuticorin	D. Kandasami	S-1	25	Tech. Prog. 1 - 3
"	R. Marichami	S-2	25	1 - 3
	Technical Assistance : To be posted			

8. Location of the Research Project : Tuticorin

9. a) Objectives:

To obtain data on the total nutritional requirements of the larvae and juveniles of the mud crab Scylla serrata to evolve suitable artificial diet for the hatchery production of seed and nursery rearing of the species.

b) Practical Utility:

The mud crab Scylla serrata, is one of the important cultivable crustaceans. Preliminary experiments carried out on the culture of the species have indicated feasibility of culture of the species in large scale. There is only negligible data available on the rearing of the larvae and juveniles of the species with artificial diet. The project would help to understand the basic aspects of nutritional requirements of the younger stages and formulate suitable artificial diet for large scale production of seed in the hatchery and nursery management.

10. Technical Programme:

1. Formulation and preparation of test diets with different nutrient levels.
2. Feeding experiments with the test diets and collection of data on the optimum nutrients requirement, levels for the different larvae and juvenile stage.
3. Evaluation of protein efficiency ratio (PER), digestibility, Net Protein Utilisation (NPU), Net Protein Requirement (NPR), feeding efficiency and growth rates.

Work done:

Artificial test diets to find out protein requirement of the larvae were prepared. The diets were prepared with protein varying from 25 to 65%.

Work envisaged:

Test diet formulation and conducting feeding experiments.

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11. Date of start: 1984-85 12. Likely date of completion: 1986-87

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13. Estimated man-months : 6 man-months

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14. Facilities required:

i.	Land	: No	v.	Fish ponds	: Yes
ii.	Labour	: Yes	vi.	Foreign exchange	: Yes
iii.	Special eqpt.	: Yes	vii.	Other items	: Nil
iv.	Animal shed	: No	viii.	Total estimated cost: Institute's budget	

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15. If financed by any organisation other than the Institute : Nil

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16. Approximate cost

a) Salary of scientific staff
b) Salary of technical staff
c) Salary of supporting staff
d) Casual labour cost, if any
e) Cost of equipment, facility etc.
f) Contingencies such as chemicals, fertilizers, seed, animals, feeds sprayers etc.
g) Total cost

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17. Signatures of

Sd/-	Sd/-	Sd/-
Project Leader	Head of Division	Director

RESEARCH PROJECT - 1985-86

1. Institute Code No. PNP/20 2. I.C.A.R. Code No.

3. Name and address of Research Institute : C.M.F.R. Institute, Cochin

4. Title of Project : Reproductive physiology of fishes and shell-fishes

5. Title of sub-project : Controlled breeding of milk fish

6. Name and designation of Project Leader : M.K. George, S-1

7. Name(s) and designation(s) of Project Leader and Project Associates together with time proposed to be spent and work to be done

Centre	Name and designation	Time to be spent (%)	work to be done
Narakkal	M.K. George S-1	50	Tech. Prog. 1- 5
"	A.R. Thirunavukkarasu S-2	25	1- 5
	Technical Assistance : To be posted		

8. Location of the Research Project : Narakkal

9. a) Objectives: Maturation and spawning of pond reared milkfish under controlled conditions

b) Practical utility: The scientific data on the maturation and spawning of milk fish are essential prerequisites for developing suitable technology for seed production on large scale. The project envisages to obtain information on these aspects with a view to develop viable seed production technology and culture of this most important cultivable fish.

10. Technical Programme:

1. The milk fish specimens collected from the pond would be maintained under laboratory conditions.
2. They will be fed with diets containing above 40% protein and vitamin E.
3. Gonadotropin/pituitary extract HCG will be administered alone or in combination to induce gonadial maturation and spawning.

4. Selected environmental parameters such as temperature, salinity and pH will be maintained, and if required, manipulated to facilitate maturation and spawning.

5. Certain physiological parameters such as serum protein during maturation process will be studied.

Work done: Chanos chanos collected from the pond were maintained in the laboratory. Experiments to induce maturation were carried out

Work envisaged:

---------- Technical programme 1- 5.

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11. Date of start: 1984-85 12. Likely date of completion: 1985-86

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14. Facilities required:

i.	Land	- No	v.	Fish ponds	- No
ii.	Labour	- Yes	vi.	Foreign exchange	- Yes
iii.	Special eqpt.	- Yes	vii.	Other items	- No
iv.	Animal sheds	- No	viii.	Total estimated cost: Institute's budget	

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15. If financed by any organisation other then the Institute - Nil

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16. Approximate cost:

a) Salary of Scientific staff
b) Salary of technical staff
c) Salary of supporting staff
d) Casual labour cost, if any
e) Cost of equipment, facility etc.
f) Contingencies such as chemicals, fertilizers, seed, animals, feeds sprayers etc.

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17. Signatures of

Sd/-	Sd/-	Sd/-
Project Leader	Head of Division	Director

RESEARCH PROJECT PROPOSAL 1985-86

1. Institute Code No. 21 — 2. I.C.A.R. Code No.

3. Name and address of Research Institute : C.M.F.R. Institute, Cochin

4. Title of Project : Crustacean Nutrition

5. Title of Sub-project : Studies on the effect of food additives as attractants for larvae, juvenile and adult prawns

6. Name and designation of project leader : R. Paul Raj, S-2

Centre	Name and designation		time to be spent (%)	Work to be done
Cochin	R. Paul Raj	S-2	10	Planning of Project; formulation of feeds and conduct of experiments
Narakkal	N.N. Pillai	S-2	10	Experimental trials
Narakkal	A.R. Thirunavukkarasu	S-2	10	-do-

8. Location of the research project : Cochin/Narakkal

9. Objectives:

a) To study the effect of supplementation of additives such as tissue extracts from marine animals, carotenoid pigments, molasses, steroid hormones, extracts from plants, lipid extracts, enzymes, yeast and flavouring agents on growth and survival of larvae and food intake, growth and feed efficiency of juvenile and adult prawns.

b) Practical Utility:

Earlier studies in finfishes as well as in crustaceans have shown that inclusion of certain additives help stimulate feeding and resulted in increased survival, growth and feed efficiency. The present study would help identify suitable feeding stimulants for different stages of Penaeus indicus.

10. Technical Programme:

Compounded feeds will be prepared using natural ingredients supplemented with the additives in different levels and the feeds will be fed to larvae, juveniles and adults for a stipulated period of time. Data on survival, food intake, growth and feed efficiency will be collected based on statistically designed experiments. If suitable additives are identified, trial experiments will be conducted for their application during the second year.

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11. Date of start: 1985-86 12. Likely date of completion : 1986-87

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13. Estimated man-months : 4 man-months/year

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14. Facilities required:

i.	Land	: Nil
ii.	Labour	: One casual labour
iii.	Special equipment	: Already available
iv.	Animal sheds	: Yes
v.	Fish Ponds	: No
vi.	Foreign exchange	: No
vii.	Other items	: No
viii.	Total estimated cost	: To be met from Institute's budget

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15. If financed by an organisation other than the Institute : Nil

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16. Approximate cost:

a) Salary of Scientific staff
b) Salary of Technical staff
c) Salary of Supporting staff
d) Casual labour cost if any
e) Cost of equipment, facility etc.
f) Contingencies, such as chemicals, fertilizers, seed, animals, feeds, sprayers etc.
g) Total cost : Institute's budget

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17. Signatures of:

Sd/-	Sd/-	Sd/-
Project Leader	Head of Division	Director

RESEARCH PROJECT 1985-86

1. Institute code No. PNP/22 2. I.C.A.R. Code No.

3. Name and address of Research Institute : C.M.F.R. Institute, Cochin

4. Title of Project : Crustacean Nutrition

5. Title of sub-project : Acceleration of maturation of penaeid prawn by nutritional improvement and appropriate feeding strategies

6. Name and designation of Project Leader : Syed Ahamed Ali, S-2

7. Name(s) and designation(s) of Project Leader and Project Associates together with time proposed to be spent and work to be done

Centre	Name	Designation	Time to be spent (%)	work to be done
Narakkal (Cochin)	Syed Ahamed Ali	S-2	50	Tech Prog. 1 - 5
"	M.S. Muthu	S-3	25	2,4 & 5
"	A. Laxminarayana	S-2	25	2,4 & 5
	Technical Assistance : to be posted			

8. Location of the research project : Narakkal

9. a) Objectives:

1. To study the influence of nutritive quality of the feed on maturation of gonads, fecundity and viability of the eggs produced by brood stock prawns in captivity.
2. To develop suitable feed using locally available food materials for the development of brood stock of prawns through feeding strategies.

b) Practical utility:

Penaeid prawns such as Penaeus indicus and P. monodon are successfully induced to mature in captivity, through unilateral eye stalk ablation. By understanding the influence of nutritional quality of the feed on the maturation process in the brood stock prawns will help to improve the fecundity and viability of the eggs spawned.

10. Technical Programme

1. Determination of the amino-acid and fatty acid profiles of the various tissues of mature female and male penaeid prawns.
2. Screening of selected food organisms for their nutritive quality (amino acids and fatty acid profiles) to facilitate preparation of artificial feed and find out the suitability for the maturation of gonad in penaeid prawns.
3. Formulation and preparation of pelletized feeds using available feed materials.
4. Feeding brood stock prawns with prepared feed and make observations on spawning and hatching characteristics.
5. Incorporation of tocopherol (Vit E) steroid hormones and other substances stimulating maturation in feed and their effect on maturation in both ablated and unablated prawns.

Work envisaged: Technical programme 1 to 5.

11. Date of start: 1985-86 12. Likely date of completion: 1987-88

13. Estimated man-months: 36 man-months/year

14. Facilities required:

i.	Land - No	v.	Fish ponds - No
ii.	Labour - Yes	vi.	Foreign exchange - No
iii.	Special equipment - Yes	vii.	Other items - No
iv.	Animal sheds - No	viii.	Total estimated cost: Institute's budget

15. If financed by an organisation other than the Institute : Nil

16. Approximate cost:

a) Salary of scientific staff:
b) Salary of technical staff:
c) Salary of supporting staff:
d) Casual labour cost, if any:
e) Cost of equipment, facility etc.
f) Contingencies, such as chemicals, fertilizers, seed, animals, feeds sprayers etc.
g) Total cost: Institute's budget

17. Signatures of:

Sd/-	Sd/-	Sd/-
Project Leader	Head of Division	Director

RESEARCH PROJECT - 1985-86

1. Institute Code No. PFP/23 2. I.C.A.R. Code No.

3. Name and address of the Research Institution : C.M.F.R. Institute, Cochin

4. Title of Project : Physiology of crustacea

5. Title of Sub-project : A comparison of the capabilities of juvenile and adult Penaeus monodon to regulate osmolality concentration in the haemolymph

6. Name and designation of Project Leader : A.D. Diwan S- 2

7. Name(s) and designation(s) of Project Leader and Project Associates together with the time proposed to be spent and work to be done

Centre	Name	Designation	Time to be spent (%)	work to be done
Cochin	A.D. Diwan	S-2	25	Tech. Prog. 1 and 2
Narakkal	A. Laxminarayana	S-2	25	-do-
Cochin	V.S. Kakati	S-1	25	-do-
	Technical Assistance : To be posted			

8. Location of the Research Project: Cochin and Narakkal

9. a) Objectives:

To study the osmotic responses in juveniles and adult stages of P. monodon/spends its life in/ that different environment.

b) Practical utility:

By understanding the osmoregulatory capabilities and limitation of the prawn, the production of cultured prawns from grow-out systems can be enhanced by judiciously utilising the seasonal salinity variations in the pond environment.

10. Technical Programme:

1. Live prawns of juvenile and adult stages will be collected from backwaters of Cochin and acclimatised to hypo and hyper saline medium under experimental conditions.

2. Osmolality values of the haemolymph of wild and acclimatised prawns will be determined by using osmometer.

Work done : New project

Work envisaged: As given in technical programme

11. Date of start: April 1985

12. Likely date of completion: 1986

13. Estimated man-months : 8 man-months

14. Facilities required:

i.	Land	- No	v.	Fish ponds	- Yes
ii.	Labour	- Yes	vi.	Foreign exchange	- No
iii.	Special equipment	- No	vii.	Other items	- No
iv.	Animal sheds	- No	viii.	Total estimated cost - Institute's budget	

15. If financed by an organisation other than the Institute: No

16. Approximate cost:

a) Salary of scientific staff
b) Salary of Technical staff
c) Salary of supporting staff
d) Casual labour cost, if any
e) Cost of equipment, facility etc.
f) Contingencies, such as chemicals, fertilizers, seed, animals, feeds, sprayers etc.
g) Total cost: Institute's budget

17. Signatures of:

Sd/-	Sd/-	Sd/-
Project Leader	Head of Division	Director

RESEARCH PROJECT - 1985-86

1. Institute Code No. PNP/24 2. ICAR Code No.

3. Name and address of the Research Institute : C.M.F.R.Institute, Cochin

4. Title of Project : Physiology of Crustacea

5. Title of Sub-Project : Distribution of Phenol oxidase enzyme and its role in hardening of the cuticle in Penaeid prawns

6. Name and designation of Project leader : Dr. A.D. Diwan S-2

7. Name(s) and designation(s) of Project Leader and Project Associates together with time proposed to be spent and work to be done

Centre	Name	Designation	Tiem to be spent (%)	work to be done
Cochin	Dr. A.D. Diwan	S-2	25	Tech. Prog. 1 - 3
"	N. Sridhar	S-1	100	-do-

Technical Assistance : To be posted

8. Location of the Project: Cochin

9. a) Objectives

To ascertain the role of the enzyme Phenol oxidase and its activity in different regions of the exoskeleton, telson and in tissues such as haemolymph and muscle in relation to intensity of hardening of the cuticle.

b) Practical utility

The above studies may unravel the physiological mechanism involved in hardening of the cuticle during the process of moulting which may further help in understanding the intensity of the effect of different environmental parameters on the growth of the animal in culture system.

10. Technical Programme:

a)
1. Collection of animals (Penaeus indicus) from grow-out ponds.
2. Analysis of Phenol oxidase activity in different parts of the exoskeleton in relation to hardening intensity of the cuticle. by standardised methods.
3. Interpretation of the data collected.

b) Work done: New project

c) Work envisaged in the current year:

1. Standardisation of phenol oxidase activity using different substrates.
2. Estimation of enzyme activity in different parts of the exoskeleton under normal conditions.

11. Date of start: 1985 12. Date of completion: 1987

13. Estimated man-months : 30 man-months

14. Facilities required:

i.	Land -	v.	Fish ponds -
ii.	Labour -	vi.	Foreign exchange -
iii.	Special equipment -	vii.	Other items -
iv.	Animal sheds-	viii.	Total estimated cost: Institute's budget

15. If financed by an organisation other than the Institute: No

16. Approximate cost:

a) Salary of scientific staff:
b) Salary of Technical staff:
c) Salary of supporting staff:
d) Casual labour cost if any:
e) Cost of equipment, facility etc.
f) Contingencies such as chemicals, fertilizers, seed, animals, feeds sprayers etc.
g) Total cost: Institute's budget.

17. Signatures of:

Sd/-	Sd/-	Sd/-
Project Leader	Head of Division	Director

RESEARCH PROJECT - 1985 - 86

1. Institute Code No. LD/D1/1.1 — 2. I.C.A.R. Code No.

3. Name and address of Research Institute : CMFR INSTITUTE, COCHIN

4. Title of Project : Documentation and Information Services

5. Title of Sub-Project : Management of Fisheries Information Services

6. Name and designation of Project Leader : K.N. Krishna Kartha, Scientist S-3

7. Name(s) and designation(s) of Project Leader and Project Associates together with time proposed to be spent and work to be done.

(a) Documentation & Information Service.

Centre	Name	Designation	Time to be spent (%)	work to be done
Cochin	K.N. Krishna Kartha	S-3	20%	Development of the information Centre at Headquarters at out stations in support of R & D
	Technical Assistance:			
Cochin	K. Kanakasabapathi	T-5		
"	E. Johnson	T-4		
"	S. Girijakumari	TII-3		
Mandapam	Edwin Joseph	T-2		
Calicut	Lalitha Sekharan	T-1		
Cochin	L.R. Khambhadkar	T-2		
	(b) Publications			
Cochin	K.N. Krishna Kartha	S-3	80%	IJF
"	M.J. George	S-3		MFIS
"	K.J. Mathew	S-2		MFIS
"	G. Nandakumar	S-2		MFIS
"	Jancy Jacob	S-1		MFIS
"	M.S. Rajagopalan	S-3		Annual Report
"	Krishna Srinath	S-1		Newsletter

8. Location of the Research Project: Cochin, Mandapam, Calicut

9. 1. Objectives: Collection, processing, storage and dissemination of scientific literature on marine fisheries, mariculture and allied topics.
   2. Selection, reproduction and dissemination of information on current developments in capture and culture fisheries, among those involved in the respective fields.
   3. Collection of complete literature on priority subjects

b. Practical utility: Documentation and information dissemination keep the research personnel abreast of developments in their respective fields. The publications issued extend information on technologies developed and research findings to the concerned people in the industry and trade.

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10. Technical programme:
1. Monthly Current Awareness Service to circulate the list of latest additions to the library.
2. Publication of Indian Journal of Fisheries, Marine Fisheries Information Service, Bulletins, Special Publications, Newsletter, and Annual Report.
3. Selective dissemination of information, by preparing and distributing brief accounts based on current periodicals, technical reports etc.
4. Collection of complete literature/originals, photocopies or microfilms/ on prawns.
5. Preparation of complete holdings of the library.

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11. Date of Start : 1982 12. Likely date of completion: continuing

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13. Estimated man months : 64 man months/year

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14. Facilities required :

i.	Land	: No	v.	Fish ponds	: No
ii.	Labour	: No	vi.	Foreign exchange	: No
iii.	Special equipment	: Yes	vii.	Other items	: --
iv.	Animal sheds	: No	viii.	Total estimated cost	: Institute's budget.

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15. If financed by an organisation other than the Institute : No

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16. Approximate cost:
a) Salary of Scientific staff
b) Salary of Technical staff.
c) Salary of supporting staff, if any
d) Casual Labour cost, if any
d) cost of equipment, facility etc.
f) Contingencies, such of chemicals, Fertilizers, seed, animals, feeds sprayers etc.
g) Total cost : Institute's Budget.

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17. Signature of :

Sd/- sd/-
Project Leader Head of Division. Director

RESEARCH PROJECT - 1985-86

1. Institute Code No. CMFRI/IDP/16. 2. ICAR Code No.

3. Name and address of Research Institute : CMFR INSTITUTE, COCHIN

4. Title of project : National programme of tagging commercial prawns and fishes.

5. Title of sub-project : Population studies by mark release experiments on commercially important prawns and fishes (Sardines and mackerel)

6. Name and designation of Project Leader. : A. Noble, S-3.

7. Name(s) and designation(s) of Project Leader and Project Associates together with the time proposed to be spent and work to be done

Centre	Name	Designation	Time to be spent	Work to be done
Chilka estuary Godavery estuary Krishna estuary Pulikat lake Muttukkad estuary	A. Noble D.S. Rao G. Sudhakara Rao	S-3 (Pr. Ldr.) S-3 (Ass. Pro. Ldr) S-2.	Prawns tagging.	Organisation and execution of the project. Organisation of drift bottle experiment.
Calicut Mangalore	M. Kumaran Madan Mohan	S-3 S-2	Sardine tagging	
Karwar Calicut Vizhinjam	M.H. Dhulkhed T.M. Yohannan N.G. Pillai	S-3 S-2 S-2	Mackerel tagging.	

Technical Assistance: For tagging:- Scientific staff above mentioned are the points of contact who will mobilise the necessary personnel for the team at respective centres and technical assistants available at the different CMFRI centres nearest to the tagging centres will constitute the tagging team of the respective tagging centres.

For drift bottle experiments: from the members of the Environmental Division.

8. Location of Research Project : Cochin

9. Objectives:
   1. To study the migration of prawns in the east coast of India.
   2. To study the seasonal changes in the coastal currents of the sea with particular emphasis on the role of currents in the migration of prawns along the east coast.

10. Technical programme:

Tagging: 5000 prawns of subadult stage to be tagged from each of the following centres: Chilka estuary in July, Godavery and Krishna estuaries in August, Pulikat estuary in September and Muttukkad estuary in October. The tagging operations at each of the centres will be of about ten days duration.
50000 sardines and mackerel to be tagged at each centre.

Drift bottle experiment: From the following centres 100 bottles are to be released every alternate month starting with June; Karwar, Mangalore, Calicut, Cochin, Vizhinjam, Kanyakumari, Mandapam, Tuticorin, Madras, Waltair, Kakinada and Puri.

D.S. Rao of the environmental division will organise the drift bottle experiments in consultation with the Project Leader

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11. Date of start: 1982 12. Likely date of completion : 1986

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13. Estimated man months : Man-months/year

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14. Facilities required:

i. Land	: Nil	v. Fish ponds	: Nil
ii. Labour	: Nil	vi. Foreign exchange	: Nil
iii. Special equipment	: Nil	vii. Other items	: Nil
iv. Animal sheds	: Nil	viii. Total estimated cost	: Institute's Budget.

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15. If financed by an organisation: No other than the Institute.

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16. Approximate cost:

a) Salary of Scientific staff
b) Salary of Technical staff
c) Salary of Supporting staff, if any
d) Casual Labour cost, if any
e) Cost of equipment, facility etc.
f) Contingencies, such of chemicals, fertilizers, seed, animals, feeds, sprayers, etc.
g) Total cost : Institute's Budget.

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17. Signatures of:

Sd/-	Sd/-	Sd/-
(Project Leader)	(Head of Division)	(Director)

RESEARCH PROJECT - 1985-86

1. Institute Code No. CMFRI/IDP/17 2. I.C.A.R. Code No.

3. Name and address of Research Institute: C.M.F.R. Institute, Cochin

4. Title of Project: Remote Sensing in Fisheries

5. Title of Sub-Project : Application of Remote Sensing Technology in Marine Fisheries

6. Name and designation of Project Leader : G. Subba Raju, S-3

7. Name(s) and designation(s) of Project Leader and Project Associates together with time proposed to be spent and work to be done

Centre	Name	Designation	Time to be spent (%)	Work to be done
Cochin	G. Subba Raju	S-3		1-4
	P.V.R. Nair	S-3		"
	A.G. Bennaith	S-2		"

Technical Assistance: N.P. Kunhikrishnan, V.K. Balachandran (Cochin)

8. Location of the Research Project : Cochin

9. (a) Objectives: 1. To locate fish schools by aerial photography. 2. To delineate areas of high productivity by scanning chlorophyll patterns. 3. To develop the infrastructural facilities for interpretation of satellite imageries and aerial photos of fish schools.

(b) Practical Utility: To identify the areas of high productivity from ocean colour scanning from Remote Sensing Satellites and also to assess the size and distribution of schools and thereby the biomass of pelagic fishes. 2. To monitor pollution prone areas and studies of circulation and upwelling.

10. Technical Programme: 1. Acquisition of landsat and similar imageries for the coastal zones. 2. Establishment of photo interpretation facilities. 3. Acquisition of CCT's for specific areas suitable for aquaculture and also pollution prone areas. 4. Study the distribution of suspended matters and chlorophyll in the coastal zone from satellite picture of suitable wave length. 5. Chlorophyll scanning by Air borne CCR. 6. Super-impose the fish distribution data on the distribution patterns of TSS and chlorophyll. 7. Measurement of sea truth data and computer analysis of the parameters to derive the possible relationship.

Work done: The application of Remote Sensing Technology in resource estimation in two areas on the west coast has been tested in collaboration with Space Applications Centre and National Remote Sensing Agency. Landsat imageries and instrumentation for chlorophyll scanning have been procured and a Remote Sensing Cell for the utilization of IRS data is in the process of development.

Work envisaged: 1. Coverage for sea truth data in the Cochin-Calicut sector to co-incide with Landsat and Nimbus-7 overpasses. 2. Development of IRS Utilization Programme.

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11. Date of start: 1985 12. Likely date of completion: 1988

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13. Estimated man-months: man months/year

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14. Facilities required:

i) Land	- No	v) Fish ponds	- No
ii) Labour	- No	vi) Foreign exchange	- No
iii) Special equipment	- No	vii) Other items	- No
iv) Animal sheds	- No	viii) Total estimated cost	- Institute's Budget

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15. If financed by an organisation other than the Institute: No

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16. Approximate cost:

a) Salary of Scientific staff
b) Salary of Technical staff
c) Salary of Supporting staff, if any
d) Casual Labour cost, if any
e) Cost of equipment, facility etc.
f) Contingencies, such of chemicals, fertilizers, seed, animals, feeds, sprayers etc.
g) Total cost - Institute's Budget

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17. Signatures of:

Sd/-	Sd/-	Sd/-
Project Leader	Head of Division	Director

RESEARCH PROJECT - 1985-86

1. Institute Code No. CMFRI/IDP/20 2. I.C.A.R. Code No.

3. Name and address of Research Institute : C.M.F.R. Institute, Cochin

4. Title of Project : Mariculture - Culture of molluscs

5. Title of Sub-Project : Mass culture of micro-algae for use as feed for the bivalve larvae in hatcheries

6. Name and designation of Project Leader : C.P. Gopinathan, S-2

7. Name(s) and designation(s) of Project Leader and Project Associates together with time proposed to be spent and work to be done

Centre	Name	Designation	Time to be spent (%)	Work to be done
Tuticorin	C.P. Gopinathan	S-2		As per Col. 10
	P. Muthiah	S-2		
	A. Chellam	S-2		
	S. Dharmaraj	S-1		

Technical Assistance: K. Ramachandran Nair (Vizhinjam), J.X. Rodrigo (Tuticorin)

8. Location of the Research Project : Tuticorin, Vizhinjam

9. (a) Objectives: 1. To isolate phytoflagellates and other nannoplankters from the plankton off Tuticorin waters. 2. To determine the acceptability of the micro-algae as diet by the bivalve larvae. 3. Mass culture of micro-algae in different culture media and study of the growth kinetics and nutritional aspects.

(b) Practical Utility: The above investigations will help for the large scale production of cultivable molluscs in hatcheries.

10. Technical Programme: 1. To isolate micro-algae, especially the phytoflagellates measuring less than 10 microns occurring in the plankton by different methods and maintain the stock culture of these organisms. 2. Mass culture of the required species of micro-algae and feeding the same to the bivalve larvae. 3. To study

the growth kinetics and nutritional aspects of the micro-algae.

Work done: Several species of micro-algae especially phytoflagellates belong to the Classes, Chrysophyceae and Haptophyceae, have been isolated and maintained in good condition in the phycological laboratory, adjacent to the oyster hatchery at Karapad, Tuticorin. Regular mass culture of the required species were done and supplied to the hatchery for rearing the larvae of oysters. On an average, daily 200 l of the pure culture of the Haptophycean flagellate, Isochrysis galbana has been supplied to the hatchery for feeding the edible and pearl oyster larvae.

Work envisaged: Efforts will be made to isolate some more forms of phytoflagellates from the nearby environment of the hatchery and the mass culture of the same for meeting the algal food requirements while rearing the larvae of oysters, will be undertaken.

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11. Date of start: 1982 12. Likely date of completion: 1985-86

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13. Estimated man months : man months/year

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14. Facilities required:

i) Land - No
ii) Labour - No
iii) Special equipment-No
iv) Animal sheds- No
v) Fish ponds - No
vi) Foreign exchange - No
vii) Other items -
viii) Total estimated cost - Institute's Budget

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15. If financed by an organisation other than the Institute: No

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16. Approximate cost:

a) Salary of Scientific staff
b) Salary of Technical staff
c) Salary of Supporting staff, if any
d) Casual Labour cost, if any
e) Cost of equipment, facility etc.
f) Contingencies, such as chemicals, fertilizers, seeds, animals, feeds, sprayers etc.
g) Total cost - Institute's Budget

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17. Signatures of:

Sd/-
Project Leader

Sd/-
Head of Division

Sd/-
Director

RESEARCH PROJECT - 1985-86

1. Institute Code No. CMFRI/IDP/22 2. I.C.A.R. Code No.

3. Name and address of Research Institute : C.M.F.R. Institute, Cochin

4. Title of Project : Water Quality Management

5. Title of Sub-Project : Water quality management in relation to growth of marine prawns in controlled ecosystems

6. Name and designation of Project Leader : V. Kunjukrishna Pillai, S-2

7. Name(s) and designation(s) of Project Leader and Project Associates together with time proposed to be spent and work to be done

Centre	Name	Designation	Time to be spent (%)	Work to be done
Cochin	V. Kunjukrishna Pillai	S-2	10	1
	N.N. Pillai	S-2	10	5
	S. Sivakami	S-2 (APL)	100	1,2,3,5,6

Technical Assistance: R.V. Singh (4), K.K. Valsala (4,6) (Cochin), C.S. Sasidharan (3)

8. Location of the Research Project : Narakkal, Cochin

9. (a) Objectives: (1) To study the effect of liming and fertilisation on the quality of water and soil in prawn culture systems. (2) To monitor the growth of prawns in relation to fertilisation. (3) To assess the variations in the plankton and benthic population as well as chemical changes resulting from liming.

(b) Practical Utility: The increase in production resulting from fertilisation is well known in aquaculture. However, experimental evidence in this lime on shrimp culture from this region is almost lacking. This programme envisages to bring out the advantages of liming and fertilisation in increasing the production as well as in maintaining better water quality in prawn culture systems. The study will be useful in evaluating the various types of fertilisers and in formulating appropriate dosages of the various components so as to obtain maximum yield from prawn culture. The experiments can also throw light on the effect of certain environmental changes resulting from the production of hydrogen sulfide on prawns and enable us to bring out suitable remedial measures.

10. Technical Programme: 1. Planning, experiment design and developing the infrastructure. 2. Conducting the experiment at the field laboratory. Manuring with organic and inorganic fertilizers; estimation of Meiofauna. 3. Weekly/fortnightly collection of water samples for estimation of temperature, dissolved oxygen, pH, Eh, Salinity, sulphide, phosphate, nitrate, nitrite, ammonia. 4. Fortnightly sampling of sediment and estimation of total phosphorus. 5. Monitoring of growth and estimation of plankton. 6. Fortnightly estimation of chlorophyll a from the experimented pools.

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11. Date of start: 1985 12. Likely date of completion: 1987

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13. Estimated man-months: man months/year

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14. Facilities required:

i) Land	- No	v) Fish ponds	- Yes
ii) Labour	- No	vi) Foreign exchange	- No
iii) Special equipments	- Yes	vii) Other items	- No
iv) Animal shed	- No	viii) Total estimated cost	- Institute's Budget

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15. If financed by an organisation other than the Institute: No

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16. Approximate cost:

a) Salary of Scientific staff
b) Salary of Technical staff
c) Salary of Supporting staff, if any
d) Casual Labour cost, if any
e) Cost of equipment, facility etc.
f) Contingencies, such of chemicals, fertilizers, seed, animals, feeds, sprayers etc.
g) Total cost : Institute's Budget

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17. Signatures of:

Sd/-	Sd/-	Sd/-
Project Leader	Head of Division	Director

RESEARCH PROJECT 1985-86

1. Institute Code No. CMFRI/TR/2 2. I.C.A.R Code No.

3. Name and address of Research Institute : CMFR INSTITUTE, COCHIN

4. Title of Project : Training programmes in marine fisheries research

5. Title of Sub-project : Training in pearl culture

6. Name and designation of Project Leader : K. Alagarswami, S-3

7. Name(s) and designation(s) of Project Leader and Project Associates together with time proposed to be spent and work.

Centre	Name	Designation	Time to be spent (%)	Work to be done
	K. Alagarswami	S-3	5	As in col. 10
Tuticorin	A. Chellam (APL)	S-2	10	
	A.C.C. Victor	S-2	10	
	S. Dharmaraj	S-2	10	
	T.S. Velayudhan	S-1	10	

Technical Assistance: J. Antony Pitchai, Dasman Fernando, Soosai V. Rayen.

8. Location of the Research Project : Tuticorin

9. a) Objectives: The Institute has the technical knowhow on pearl culture and many maritime States/private firms have shown keen interest in acquiring the know-how. The Institute has conducted training courses for the benefit of the fisheries departments of the States and Agricultural Universities. The present project aims at continuing the training programme. There is demand for vocational training from the universities and this need will also be met.

b) Practical Utility: The transfer of technology to the end users through this project would help the States/Research organisation/ private enterprise to take up pearl culture in their areas either on commercial lines or for development purposes. This is the only centre which offers such organised training in pearl culture in India.

10. Technical Programme: The curriculum of different types of training courses namely long term, short-term and vocational courses differ in content to meet the expected levels of attainments of managerial and technical personnel. Training is imparted on the development of pearl oyster resource, farm maintenance, pearl production through surgery and post-operative culture, harvesting techniques and management, The course will be organised based on specific requirements of States etc. and on their sponsoring candidates.

Work done: One long-term and three short-term training courses already conducted. Refresher training was given.

Work envisaged in current year: Short-term training programme will be organised.

11. Date of start: 1978 12. Likely date of completion: 1988-90

13. Estimated man-months : -

14. Facilities required:

i.	Land	: ---	V.	Fish ponds	: Pearl farm
ii.	Labour	: ---	vi.	Foreign exchange	: -
iii.	Special equipment	: ---	vii.	Other items	: Surgery laboratory
iv.	Animal sheds	: ---	viii.	Total estimated cost	: Institute's budget

15. If financed by an organisation other than the Institute : -

16. Approximate cost: a) Salary of Scientific staff; b) Salary of Technical staff c) Salary of Supporting staff, if any; d) Casual labour cost, if any, e) Cost of equipment, facility etc. f) Contingencies, such of chemicals, fertilisers, seed, animals, feeds sprayers etc; g) Total cost: Institute's budget.

17. Signature of:

Sd/-	Sd/-	Sd/-
Project Leader	Head of Division	Director

RESEARCH PROJECT 1985-86

1. Institute Code No. CMFRI/TR/3 2. I.C.A.R. Code No.

3. Name and address of Research Institute : CMFR INSTITUTE, COCHIN

4. Title of Project : Training programme in Marine Fisheries Resources

5. Title of Sub-project : Training in Edible oyster culture

6. Name and designation of Project Leader : K. Nagappan Nayar, S-3

7. Name(s) and Designation(s) of Project Leader and Project Associates together with time proposed to be spent and work to be done

Centre	Name and Designation		Time to be spent (%)	Work to be done
Tuticorin	K. Nagappan Nayar	S-3	10	Tech.Prog. 1-7
	K. Satyanarayana Rao	S-3	10	
	P. Muthiah	S-2	10	
	M.E. Rajapandian	S-2	10	

Technical Assistance:

8. Location of the Research Project : Tuticorin

9. a) Objectives: The technique of culture of edible oysters has been developed by the Institute. Conducting of training programmes in the methods to be adopted in oyster farming is very essential. It is proposed to organize short term training courses in the subject to give practical training to technical personnel and others who are interested.

b) Practical Utility: The technical know-how of oyster culture will be transferred to the en-user through training programmes. Based on the training, farmers will be able to take up oyster culture on a commercial scale.

10. Technical Programmes: Training in:-

1. Selection of farm sites
2. Various methods of farming
3. Construction of racks for culture purposes
4. Collection methods of oyster spat
5. Growing oyster spat
6. Farm management
7. Harvesting and purification techniques.

Work done: One batch of personnel from maritime States have been given training in oyster culture in a four-week training courses in January-February, 1983.

Work envisaged in current year: Training of technical people in farming will be done

11. Date of start: 1978 12. Likely date of completion: 1989-90

13. Estimated man-months : man months/year

14. Facilities required:

i.	Land	: No	v.	Fish ponds	: Oyster farm
ii.	Labour	: Yes	vi.	Foreign exchange	: No
iii.	Special equipment	: Yes	vii.	Other items	: No
iv.	Animal sheds	: No	viii.	Total estimated cost	: Institute's budget

15. If financed by an organisation other than the Institute: No

16. Approximate cost: a) Salary of scientific staff; b) Salary of Technical staff, c) Salary of Supporting staff, if any, d) Casual labour cost, if any; e) Cost of equipment, facility etc. f) Contingencies, such as chemicals, fertilisers, seed, animals, feeds, sprayers etc. g) Total cost: Institute's budget

17. Signature of:

Sd/-	Sd/-	Sd/-
Project Leader	Head of Division	Director

RESEARCH PROJECT 1985-86

1. Institute Code No. CMFRI/TR/4 2. I.C.A.R. Codes No.

3. Name and address of Research Institute : CMFR INSTITUTE, COCHIN

4. Title of Project : Training Programme in marine fisheries research

5. Title of Sub-project : Training in underwater investigations by SCUBA-diving

6. Name and designation of Project Leader : S. Mahadevan, S-3

7. Name(s) and designation(s) of Project Leader and Project Associates together with time proposed to be spent and work to be done

Centre	Name	Designation	Time to be spent (%)	Work to be done
Tuticorin Mandapam	K. Nagappan Nayar	S-3	10	
	S. Mahadevan	S-3	10	
	K. Ramadoss	S-2	10	

Technical Assistance: J. Antony Pitchai, D. Fernando, S.V. Rayen (Tuticorin).

8. Location of the research Project : Tuticorin, Mandapam Camp

9. a) Objectives: Training in SCUBA-diving will be imparted to scientific and technical personnel who desire to carry out underwater scientific investigations.

b) Practical Utility: This will meet the growing need of research and development agencies for expertise for carrying out direct underwater observations on populations, behaviour, ecology of sea bed, sea farming etc.

10. Technical Programme:

1. Suitable scientific and technical personnel from various research centres or sponsored candidates will be given training in SCUBA-diving.
2. Candidates for short-term sessions will be trained for a period of 8 weeks.
3. Training includes practical lessons in various methods of swimming in open sea, snorkelling, use of masks-while swimming with fins, class room lessons on principles of squalung diving, precautions to be followed while engaged in under-water work. The training imparted in sea trips and aqualung diving will be to the level of achieving proficiency in SCUBA-diving.

Work done: Two training courses have been conducted.

Work envisaged in current year: Need based programme will be taken up.

11. Date of start: 1978 12. Likely date of completion: 1989-90

13. Estimated man-months : -

14. Facilities required:

i. Land	: -	v. Fish ponds	: -
ii. Labour	: -	vi. Foreign exchange	: -
iii. Special equipment	: yes	vii. Other items	: -
iv. Animal sheds	: -	viii. Total estimated cost	: Institute's budget

15. If financed by an organisation other than the Institute : -

16. Approximate cost: a) Salary of Scientific staff, b) Salary of Technical staff; c) Salary of Supporting staff, if any; d) Casual Labour cost, if any; e) Cost of equipment, facility etc. f) Contingencies, such of chemicals , fertilisers, seed, animals, feeds sprayers, etc, g) Total cost: Institute's budget

17. Signature of:

Sd/-	Sd/-	Sd/-
Project Leader	Head of Division	Director

RESEARCH PROJECT - 1985-86

1. Institute Code No. TR/6	2. I.C.A.R. Code No.
3. Name and address of Research Institute:	C.M.F.R.Institute, Cochin
4. Title of Project:	Training programme in Marine Fishery Research.
5. Title of sub-project:	Training in Fisheries Resources Assessment including population Dynamics.
6. Name and designation of Project Leader:	K. Alagaraja, S-3.

7. Name(s) and designation(s) of Project Leader and Project Associates together with time proposed to be spent and work to be done.

Centre	Name	Designation	Time to be spent (%)	Work to be done
Cochin	K.Alagaraja	S-3	30	Organising training programme, delivering lectures and assessment of response.
	T. Jacob	S-3	15	
	S.K.Dharma Raja	S-3	20	
	K.Narayana Kurup	S-2	20	
	K. Balan	S-1	20	
	M. Srinath	S-1	20	
	K.S. Scariah	S-1	20	
	K.Vijayalekshmi	S-1	15	

Technical Assistance: U.K.Satyavan, G.Balakrishnan, Varughese Philipose, G.Krishnankutty Nair, Varughese Jacob, P.Sivaraman, V.Rajendran, V.P.Annam, A.Kanakkan, S.Haja Najumuddin, C.J.Prasad, P.L.Ammini, K.C.Yohannan, Abha Kant, Joseph Andrews, P.K.Mahadevan Pillai.

8. Location of the research project: Cochin

9.a) Objectives: To impart the above training to research, technical and field staff of various Research Institutes, State Fisheries Departments and Corporations, Universities, Fishing Industry and other interested organisations.

b) Practical utility: To enable i. research/technical staff to plan their experiments/research programmes well in advance so as to obtain data amenable for statistical analysis and ii. field staff to collect data on fish landings and other related aspects more efficiently to increase the quality of data and reduce non sampling errors to the minimum.

10.Technical Programme:

1. Senior level training for those who are involved in R & D Programme in fishing: Training in theory and practicals covering i) basic statistics including probability, distributions and inference ii) Univeriate, bivariate and multivariate analysis iii) growth curves iv) stock assessment and v) sample survey designs for arriving at estimates of marine fish landings etc. Six weeks duration including field trips.

2. Training for State Department Personnel:Training in selection of units of observations, identification of species, gears and crafts, collection of species-wise, gear-wise catch and effort data, simple sampling techniques and their utility - two weeks duration including field trips.

   Work done: A training programme was conducted by the F.R.A.Division from 18th to 28th July 1984 for the officials of State Fisheries Department and Union Territories on the methods of collection of marine fish catch statistics as developed by this Institute.

   Work envisaged in the current year: The above training Programmes will be conducted during 1985-86.

11.Date of start: April 1985 12. Likely date of completion: March 1990

13.Estimated man-months: 19 man months/year

14.Facilities required:

i) Land	:No	v) Fish ponds	:No
ii) Labour	:No	vi) Foreign exchange	:No
iii) Special equipment	:No	vii) Other items	:No
iv) Animal sheds	:No	viii) Total estimated cost: Institute's budget.	

15.If financed by an organisation other than the Institute: No.

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16. Approximate cost:

a) Salary of Scientific staff
b) Salary of Technical staff
c) Salary of Supporting staff, if any
d) Casual labour cost, if any
e) Cost of equipment, facility etc.
f) Contingencies, such of chemicals, fertilizers, seeds, animals, feeds sprayers etc.
g) Total cost: Institute's budget.

17. Signature of:

Sd/-	Sd/-	Sd/-
Project Leader	Head of Division	Director

RESEARCH PROJECT 1985-86

1. Institute Code No. CMFRI/TR/10 2. I.C.A.R. Code No.

3. Name and address of Research Institute : CMFR INSTITUTE, COCHIN

4. Title of Project : Training Programme in Marine Fisheries Resources

5. Title of Sub-project : Training in pearl oyster hatchery technology

6. Name and designation of Project Leader : K. Alagarswami, S-3

7. Name(s) and designation(s) of Project Leader and Project Associates together with time proposed to be spent and work to be done

Centre	Name	Designation	Time to be spent (%)	Work to be done
	K. Alagarswami	S-3	5	As per Tech.prog.
Tuticorin	A. Chellam	S-2	"	
	S. Dharmaraj	S-2	"	
	T.S. Velayudhan	S-2	"	

Technical Assistance:

8. Location of the research project : Tuticorin

9. a) Objectives: Transfer of pearl oyster hatchery technology for the benefit of maritime States in production of pearl oyster spat for pearl culture.

b) Practical Utility: The technology has been developed and is available only at this Institute. Pearl culture has already been established as an industry in the country, based on the Institute's technology. The natural resource of pearl oyster fluctuates with decades of unproductive spells. The technology proposed to be transferred under this project would help in ensuring sustained production of pearl oyster in hatchery for use by the industry. This programme would be a complement to the Project CMFRI/TR/2-Training in Pearl Culture.

10. Technical Programme: Short-term practical training of 6 week duration in:

Pearl oyster hatchery lay out
Breeding of pearl oyster
Induced spawning
Larval rearing
Water quality management
Microalgal production and larval feeding
Disease control
Spat settlement
Juvenile rearing
Mother-oyster culture

Work done: New project in 1985-86

Work envisaged in current year: A short-term Training Course is planned to be organised.

11. Date of start : 1985-86 12. Likely date of completion: 1989-90

13. Estimated man-months : -

14. Facilities required:

i.	Land :	v.	Fish ponds :	
ii.	Labour :	vi.	Foreign exchange:	
iii.	Special : equipment	vii.	Other items :	
iv.	Animal : sheds	viii.	Total estimated : cost	Institute's budget

15. If financed by an organisation : - other than the Institute

16. Approximate cost: a) Salary of Scientific staff; b) Salary of Technical staff; c) Salary of Supporting staff, if ary; d) Casual labour cost, if ary; e) Cost of equipment, facility etc.; f) Contingencies, such of chemicals, fertilisers, seed, animals, feeds sprayers etc. g) Total cost: Institute's budget.

17. Signature of:

Sd/-	Sd/-	Sd/-
Project Leader	Head of Division	Director