केन्द्रीय समुद्री मात्स्यिकी अनुसंधान संस्थान, कोचीन

Central Marine Fisheries Research Institute, Cochin

अनुसंधान परियोजनायें 1994 - '95

Research Projects 1994-'95

भारतीय कृषि अनुसंधान परिषद्
INDIAN COUNCIL OF AGRICULTURAL RESEARCH

CENTRAL MARINE FISHERIES RESEARCH INSTITUTE

RESEARCH PROJECTS FOR 1994-95

COLLABORATIVE/SPONSORED RESEARCH PROGRAMMES

1. Pilot project on Oyster culture - partially funded by NABARD.
2. Survey and assessment of Marine Ornamental Fishes of Lakshadweep - funded by the Dept. of Agriculture and Co-operation, Ministry of Agriculture, Govt. of India.
3. Intensive seed production and sea ranching of sea-cucumbers - funded by MPEDA.
4. Hatchery production of clams and ranching them in coastal waters - funded by MPEDA
5. Genetic studies on marine penaeid prawns - funded by USIF.

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RESEARCH PROJECT 1994-'95

1. Institute Code No.FSS/FRA/1.1 2. ICAR Code No.

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

4. Title of Project : Assessment of exploited marine fishery resources

5. Title of Sub-project : Assessment of exploited marine fishery resources

6. Name and Designation of Project Leader : K. Balan, Scientist (SG)

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. Balan	S (SG)	25	1-5 & 6.(ii)
"	K. Alagaraja	P.S.	25	1-5 & 6.(i)
"	K.S. Scariah	Sr. S.	25	1-5 & 6.(iii)
"	K.Vijayalekshmi	S	25	1-5 & 6.(iv)
"	T.V.Sathianandan	S	25	1-5 & 6.(v)

Technical Assistance: S.S.Dan, G.Balakrishnan, Varughese Philipose, P.K.Mahadevan Pillai, V.Rajendran, Varughese Jacob, K.C. Yohannan, G.Krishnankutty Nair, V.P.Annam, P.Karunakaran Nair, Joseph Andrews, S.Haja Najeemudeen, C.J.Prasad, P.L.Ammini, V.Radhakrishnan Nair, K.Remani, D.Pughazenthi, M.B.Seynudeen, M.R. Beena, P.P.Pavithran, K.P.George, P.T.Mani, M.Ramachandran, K. Anandan, Lata L.Khambadker, G.Subbaraman and 106 Field Staff posted at different Centres.

8. Location of the Research Project : Cochin

9. (a) Objectives: To estimate the marine fish production in India and fishing effort expended and to assess the resource-wise/gear-wise components in the total production.

(b) Practical Utility: Data generated and the information obtained therefrom are essential inputs to assess the current status of marine fishery resources and also for studying the dynamics of the fish stocks exploited. The results would go as inputs for other important research projects of the Institute as well.

10. Technical Programme: 1) Planning the Sample Survey 2) Making suitable modifications of the sampling design wherever required 3) Execution of field observation 4) Co-ordination of field work and supervision 5) Processing of survey data 6) Analysis of data and publication of the results for the States of i) Maharashtra ii) Kerala and Karnataka iii) Gujarat and Orissa 1v) Goa and West Bengal v) Tamil Nadu, Pondicherry and Andhra Pradesh.

Work done: Survey following a multistage stratified random sampling design was carried out for estimating marine fish production in the country during 1993

Work envisaged: Sample survey for estimating marine fish production in the country during 1994 will be undertaken.

11. Date of start : 1-4-1991.

12. Likely date of completion : 31-3-1995.

13. Estimated man-months : 1433.4 Man months/year

14. Facilities required

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

. Nil

15. If financed by an organisation other than the Institute : Nil
(a) Name of the financing organisation.
(b) Title of the project

16. Approximate cost:

(a)	Salary of Scientific staff	:Rs: 1,73,000/-
(b)	Salary of Technical Staff	:Rs:79,94,000/-
(c)	Salary of supporting staff	:
(d)	Casual labour cost, if any	:
(e)	Cost of equipment, facility etc.	:
(f)	Contingencies, such as chemicals, fertilisers, seeds, animals, feeds, sprayers etc.	:Rs: 25,000/-
	Maintanence of the computer system	:
(g)	T.A.	:Rs:11,76,000/-
	Total cost	:Rs:93,68,000/-

17. Signature of:

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

RESEARCH PROJECT 1994 -'95

1. Institute Code No:FSS/FRA/1.3 2. ICAR Code No.

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

4. Title of Project : Assessment of exploited marine fishery resources.

5. Title of Sub-project : Stock Assessment Techniques in Marine Fish and Shell Fish Resources and Management.

6. Name and Designation of Project Leader : K. Alagaraja, Principal Scientist.

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	P.S.	25	i
"	K.Balan	S (SG)	25	iii
"	K.S.Scariah	Sr.S	25	iv
"	T.V.Sathianandan	S	25	ii
"	K.Vijayalekshmi	S	25	*

Technical Assistance: Nil

8. Location of the Research Project : Cochin

9. (a) Objectives: To review the existing models and improve/ develop suitable models for marine fish stock assessment and management.

(b) Practical Utility: Assessment of exploited fish stocks and effect of fishing and environmental factors on them is essential for their rational exploitation and judicious management.

* Relieved from the Project as per her request.

10. Technical Programme: i) Development of methods for stock assessment based on length frequency data using growth models other than Bertalanffy's model. ii) Robustness of estimates of growth and mortality rates with reference to lenfth class interval. iii) Selection of appropriate method of estimation of modes. iv) Determination of suitable sampling procedure for obtaining representative samples of exploited fish stocks for stock assessment studies.

Work done: Suitability of Gompert's growth model for stock assessment studies has been tested. Simulation model for simulation of length frequency samples was modified and tested for its suitability. Simulation of samples is in progress by using the estimates of parameters of oil sardine.

Work envisaged: As per the technical programme.

11. Date of start : 1-4-1991. 12. Likely date of completion : 31-3-1995

13. Estimated man-months : 15 Man months/year

14. Facilities required : Nil

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

15. If financed by an organisation other than the Institute : Nil
(a) Name of the financing organisation.
(b) Title of the project.

16. Approximate cost:

(a)	Salary of Scientific staff	:	Rs.1,73,000/-
(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, seeds, animals, feeds, sprayers etc. Maintenence of the computer system	:	Rs.25,000/-
(g)	T.A.	:	
	Total cost	:	Rs.1,98,000/-

17. Signature of:

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

RESEARCH PROJECT 1994 -'95

1. Institute Code No:FSS/FRA/1.19 2. ICAR Code No.

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

4. Title of Project : Assessment of exploited marine fishery resources.

5. Title of Sub-project : Evaluation of change in the pattern of catch and composition of marine fishery resources in India.

6. Name and Disignation of Project Leader : K.S. Scariah, Sr. Scientist

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.S. Scariah	Sr.S	25	iii
"	K. Alagaraja	P.S.	25	i
"	K. Balan	S (SG)	25	ii
"	K. Vijayalekshmi	S	25	iv
"	T.V. Sathianandan	S	25	v

Technical Assistance:
G.Balakrishnan, Varughese Philipose, V.Rajendran, Varughese Jacob, K.C.Yohannan, G.Krishnankutty Nair, V.P.Annam, P.Karunakaran Nair, Joseph Andrews, S.Haja Najeemudeen, C.J.Prasad, P.L.Ammini, V.Radhakrishnan Nair, K. Ramani, D.Pughazendhi, M.B.Seynudeen, M.R. Beena, P.P.Pavithran, K.P.George, P.T.Mani, M.Ramachandran, K.Anandan, Lata L.Khambadkar, G.Subbaraman.

8. Location of the Research Project : Cochin

9. (a) Objectives: The project aims at evaluating the changes that have taken place in the catch and composition of marine fishery resources and other related aspects in India vis-a-vis the technological change that have taken place over the years in order to advise the state fisheries departments of maritime states in conservation and management of the exploited marine fishery resources of their regions.

(b) Practical Utility: The resulting information would be useful in better management of the marine fishery resources of the country in the context of technological innovations.

. Technical Programme: The data collected through the sample survey on exploited marine fishery resources of India except Kerala during the past three decades will be critically studied and the results will be published in respect of the maritime state of i) Maharashtra and Orissa ii) West Bengal and Gujarat iii) Karnataka iv) Tamil Nadu and Pondicherry v) Andhra Pradesh and Goa.

Work done: The evaluation on the changing pattern of catch composition, effort and methods of harvest of the past three decades of marine fishery resources have been studied in respect of Tamil Nadu and Kerala and project report for Kerala was submitted for publication. Similer work for Karnataka is in progress.

Work envisaged: As per the technical programme.

1. Date of start : 1-4-1991. 12. Likely date of completion : 31-3-1995

3. Estimated man-months : 115.8 Man months/year

14. Facilities required : Nil

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

15. If financed by an organisation other than the Institute : Nil
(a) Name of the financing organisation.
(b) Title of the project.

16. Approximate cost;

(a)	Salary of Scientific staff	:	Rs.1,73,000/-
(b)	Salary of Technical staff	:	Rs.5,65,000/-
(c)	Salary of Supporting staff	:	
(d)	Casual labour cost, if any	:	
(e)	Cost of equipment, facility etc.	:	
(f)	Contingencies, such as chemicals, fertilisers, seeds, animals, feeds, sprayers etc. Maintanence of the computer system	:	Rs. 25,000/-
(g)	T.A.	:	
	Total cost	:	Rs.7,63,000/-

17. Signature of:

Sd/-
Project Leader

Sd/-
Head of Division

Sd/-
Director

RESEARCH PROJECT 1994-'95

1. Institute Code No:FSS/FRA/ST.1 2. ICAR Code No.

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

4. Title of Project : Assessment of exploited marine fishery resources

5. Title of Sub-project : Management Information Systems in Marine Fisheries

6. Name and Designation of Project Leader : T.V. Sathianandan, Scientist

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.V.Sathianandan	S	25	As per technical programme
"	K. Alagaraja	P.S.	25	
"	K. Balan	S (SG)	25	
"	K.S. Scariah	Sr. S	25	
"	K. Vijayalekshmi	S	25	

Technical Assistance: Varughese Jacob, G.Krishnankutty Nair, V.P.Annam, P.L.Ammini, Joseph Andrews, C.J. Prasad, V.Radha-Krishnan Nair, K. Remani, D.Pughazenthi, P.P.Pavithran, M.B.Seynu-deen, K.P.George, M.Ramachandran, K.Anandan, G.Subbaraman, P.T. Mani, M.R. Beena and Lata L. Khambadkar.

8. Location of the Research project : Cochin

9. (a) Objectives: Strengthening and management of marine living resources information system.

(b) Practical Utility: Provides computer aided in-depth analysis of marine fisheries data and acts as a store house of a wide range of information on marine fisheries essential for Research and Development.

10. Technical Programme: 1) To develop suitable software and database for marine fishery information system. 2) Provide facilities for analysis of data on fishery biology, environmental, economic and other related aspects. 3) Storage of primary data collected by the Institute in appropriate formats. 4) Dissemination of relevant information to the end users. 5) To analyse further and interpret the data available with the information system using proper statistical tools.

Work done: Software for storage and retrieval of information and for statistical analysis of data have been developed. Computer facility has been extensively used for data analysis, retrieval and dissemination of information on marine fishery resources. Data on length, weight, sex, maturity and stomech condition of fish samples collected for the past many years at Mangalore and Vizhinjam research centres was stored in the form of a database.

Work envisaged: Software development, in-depth analysis of data, storage and retrieval of information on marine fishery resources and dissemination to end users. Storage of data collected by other Divisions and Research Centres and Computerisation of the same.

11. Date of start: 1-4-1992. 12. Likely date of completion: 31-3-1995

13. Estimated man-months : 79.8 Man months/year

14. Facilities required : Nil

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

15. If financed by an organisation other than the Institute : Nil
   (a) Name of the financing organisation.
   (b) Title of the project

16. Approximate cost:

(a)	Salary of Scientific staff	: Rs.1,73,000/-
(b)	Salary of Technical staff	: Rs.3,74,000/-
(c)	Salary of Supporting staff	:
(d)	Casual Labour cost	:
(e)	Cost of equipment, facility etc.	: Rs.1,00,000/- (software)
(f)	Contingencies, such as chemicals, fertilisers, seeds, animals, feeds, speayers etc.	: Rs. 25,000/-
	Maintanence of the computer system	: Rs.2,00,000/-
(g)	T.A.	:
	Total cost	: Rs.8,72,000/-

17. Signature of:

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

RESEARCH PROJECT 1994-95

1. Institute Code No. PF/RE/1.1 2. I.C.A.R. Code No.

Name and Address of Research Institute	:	CMFR Institute, Cochin
Title of Project	:	Investigations on clupeoid fishes
Title of Sub-Project	:	Fishery and Resource characteristics of Sardines (Sardinella spp.)
Name and Designation of Project Leader	:	A.A. Jayaprakash, Scientist (S.G.)

4. 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 (Tech.Programme)
Karwar	K. Preetha	S	40	1-4
Mangalore	Prathibha Rohit	S	40	1-4
Cochin	A.A. Jayaprakash	S(S.G.)(PL)	50	1-4
Madras	N.S. Radhakrishnan	S(S.G.)	50	1-4

Technical Assistance: N. Chennappa Gawda (Karwar), Uma S. Bhat (Mangalore), V.K. Janaki (Calicut), V.R. Arunachalam (Cochin), G. Arumugam (Tuticorin), A. Shanmughavel (Mandapam Camp), G. Srinivasan (Madras), M.V. Somaraju and M.S. Sumithrudu (Visakhapatnam)

8. Location of the Research Project : Karwar, Mangalore, Calicut, Cochin, Tuticorin, Mandapam Camp, Madras and Visakhapatnam

9. a) Objectives: Detailed species-wise estimation of the Sardinella spp. in the commercial landings and study the important biological parameters of major species aiming at assessment of the stock and to study the impact of the fishing pressure on the resource.

b) Practical Utility: On an average 1,90,000 t of oil sardine and 83,000 t of lesser sardines are landed along the Indian coasts. Of late, the oil sardine has established as a fishery along the east coast. The results of the project would help in understanding the resource characteristics in relation to change in the fishing pattern, their movement and availability in the fishing grounds.

10. Technical Programme: 1. Collection and analysis of data on effort, catch and species composition of Sardinella spp. landed by different gears.
2. To collect data on the size distribution, sex ratio, maturity, spawning

and recruitment of different species. 3. Estimation of growth, mortality and assessment of the stock. 4. Analysis and interpretation of data collected and submission of periodical reports.

Work done: Data on catch, effort and biological aspects of important species have been collected from different centres and the status of the fishery studied. Stock assessment of Sardinella longiceps and Sardinella gibbosa has been done based on past data.

Work envisaged: Work will be continued as per the technical programme.

11. Date of start: April '92 12. Likely date of completion: March '96

13. Estimated man-months : 22 man months/year

14. Facilities required:

i)	Land :	v)	Fish ponds :
ii)	Labour :	vi)	Foreign exchange :
iii)	Special require-ment :	vii)	Other items :
iv)	Animal shed :	viii)	Total estimated cost :

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

a) Name of the financing organisation :

b) Title of the Project :

16. Approximate cost:

a)	Salary of scientific staff:	Rs.1,64,400
b)	Salary of technical staff :	Rs.2,11,600
c)	Salary of supporting staff:	
d)	Casual labourer cost, if any :	
e)	Cost of equipment, facility etc.:	
f)	Contingencies such as chemicals, fertilisers, seed, animals, feeds, sprayers etc. :	Rs. 36,000
g)	TA/DA :	Rs. 70,000
h)	Total cost :	Rs.4,82,000

17. Signatures of:

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

RESEARCH PROJECT 1994-95

1. Institute Code No. PF/RE/1.2 2. I.C.A.R. Code No.

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

4. Title of Project : Investigations on clupeoid fishes

5. Title of Sub-Project : Fishery and Resource characteristics of Anchovies

6. Name and Designation of Project Leader : N.S. Radhakrishnan, Scientist (S.G.)

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 (Tech.Programme)
Bombay	M. Zaffar Khan	S(S.G.)	50	1-5
Mangalore	Prathibha Rohit	S	30	1-5
Cochin	A.A. Jayaprakash	S(S.G.)	50	1-5
Vizhinjam	G. Gopakumar	S(S.G.)	30	1-5
Madras	N.S. Radhakrishnan	S(S.G.)(PL)	50	1-5

Technical Assistance: J.D. Sarang (Bombay), Vaman Naik (Mangalore), M.N.K. Elayathu, V.R. Arunachalam (Cochin), A.K. Velayudhan (Vizhinjam), G. Srinivasan (Madras)

8. Location of the Research Project : Bombay, Mangalore, Cochin, Vizhinjam, Madras

9. a) Objectives: The project aims to evaluate the relative abundance of the resource along the east and west coasts, to collect the fishery and biological characteristics of the commercially important species and to assess the potential of the resource and effect of fishing on the stock.

b) Practical Utility: Whitebaits form an important fishery in India. As there are indications of the resource being subjected to heavy fishing pressure in the inshore fishing grounds, a detailed study of various biological aspects and assessment of the resource is necessary for the proper management of the fishery.

10. Technical Programme: 1. Monitoring of exploited resources through the data on the effort, catch and species composition from different gears along the Indian coasts. 2. Collection of data on the length composition

of different species. 3. To study the biological aspects such as sex-ratio, maturity, spawning and recruitment. 4. Estimation of growth and mortality parameters and stock assessment. 5. Critical evaluation of the results and submission of periodical reports.

Work done: Data on catch, effort and biological aspects of whitebaits Stolephorus devisi and S. bataviensis were collected from some of the centres in the past and the status of the fishery studied. Stock assessment of the above two species has been done based on the earlier data.

Work envisaged: Work as per technical programme will be carried out.

11. Date of start: April '92 12. Likely date of completion: March '96

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

14. Facilities required:

i)	Land :	v)	Fish ponds :
ii)	Labour :	vi)	Foreign exchange :
iii)	Special requirement :	vii)	Other items :
iv)	Animal shed :	viii)	Total estimated cost:

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

a) Name of the financing organisation :

b) Title of the Project :

16. Approximate cost:

a)	Salary of scientific staff	:	Rs.1,96,000
b)	Salary of technical staff	:	Rs.1,12,000
c)	Salary of supporting staff	:	
d)	Casual labourer cost, if any	:	
e)	Cost of equipment, facility etc.	:	
f)	Contingencies such as chemicals, fertilisers, seed, animals, feeds, sprayers etc	:	Rs. 40,000
g)	TA/DA	:	Rs. 70,000
h)	Total cost	:	Rs.4,18,000

17. Signatures of:

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

RESEARCH PROJECT 1994-95

Institute Code No. PF/RE/2.1	2. I.C.A.R. Code No.	
Name and Address of Research Institute	:	CMFR Institute, Cochin
Title of Project	:	Investigations on Scombroid fishes
Title of Sub-Project	:	Fishery and Resource characteristics of Seerfishes
Name and Designation of Project Leader	:	C. Muthiah, Scientist (S.G.)

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 (Tech.Programme)
Veraval	K.P. Said Koya	S	30	1-4
Bombay	Alexander Kurian	Sr.S	40	1-4
Mangalore	C. Muthiah	S(S.G.)(PL)	30	1-4
Cochin	N.G.K. Pillai	Sr.S	45	1-4
Tuticorin	H. Mohamed Kasim	Sr.S	30	1-4

Technical Assistance: H.K. Dhokia (Veraval), J.D. Sarang (Bombay), S. Kemparaju (Mangalore), K.K. Balasubramaniam and M.M. Bhaskaran (Calicut), M.N.K. Elayathu (Cochin), T.S. Balasubramaniam (Tuticorin), P.K. Mahadevan Pillai (Madras)

Location of the Research Project	:	Veraval, Bombay, Mangalore, Calicut, Cochin, Tuticorin, Madras

a) Objectives: To study species-wise abundance of seerfishes, their resource characteristics such as size distribution and age composition in the commercial fishery, to estimate their growth and mortality parameters and to understand the effect of exploitation on the resource.

b) Practical Utility: To resource is well exploited from the inshore areas and the estimated average annual catch for 1988-92 was 37,520 t. But, with the expansion of off-shore fishing, studies on resource characteristics would be essential for a rational exploitation and for formulating necessary management policy.

10. Technical Programme: 1. Collection of data on gear-wise effort, catch and species composition; length distribution of different species and the juvenile and young fish component in the commercial catch. 2. Observations on the change in fishing pattern in different centres.

3. Estimation of the age composition in the commercial catch and growth and mortality parameters of the resource, and 4. Interpretation of the results and submission of periodical reports

Work done: The exploited resources of seerfishes along the west and east coasts of India were monitored. Applying the length based model the stock assessment of Scomberomorus commerson was made.

Work envisaged: Work as per the technical programme will be continued.

. Date of start: April '92 12. Likely date of completion: March '96

. Estimated man-months : 21 man-months/year

. Facilities required:

i)	Land :	v)	Fish ponds :
ii)	Labour :	vi)	Foreign exchange :
iii)	Special require-: ment	vii)	Other items :
		viii)	Total estimated cost:
iv)	Animal shed :		

5. If financed by an organisation other than the Institute :

a) Name of the financing organisation :

b) Title of the Project :

6. Approximate cost:

a)	Salary of scientific staff :	Rs.2,68,000
b)	Salary of technical staff :	Rs.1,48,500
c)	Salary of supporting staff :	
d)	Casual labourer cost, if any :	
e)	Cost of equipment, facility, etc. :	
f)	Contingencies such as chemicals, fertilisers, seed, animals feeds, sprayers etc. :	Rs. 40,000
g)	TA/DA :	Rs. 40,000
h)	Total cost :	Rs.4,96,500

17. Signatures of:

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

RESEARCH PROJECT 1994-95

Institute Code No.: PF/RE/2.2 2. I.C.A.R. Code No.

Name and Address of Research Institute	: CMFR Institute, Cochin
Title of Project	: Investigations on Scombroid fishes
Title of Sub-Project	: Fishery and Resource characteristics of tunas, tuna live-baits and billfishes
Name and Designation of Project Leader	: P.P. Pillai, Principal Scientist

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 (Tech. Programme)
Veraval	K.P. Said Koya	S	40	1,3,4 & 7
Mangalore	C. Muthiah	S(S.G.)	40	1,3,4 & 7
Cochin	P.P. Pillai	PS(PL)	50	1,3,4 & 7
	N.G.K. Pillai	Sr.S	30	1,3,4 & 7
Vizhinjam	G. Gopakumar	S(S.G.)	40	1,3,4 & 7
Tuticorin	H. Mohamed Kasim	Sr.S	40	1,3,4 & 7
Minicoy	M. Sivadas	S	100	1-4, 6 & 7
	A.K.V. Nasser	S	100	5 & 7

Technical Assistance: H.K. Dhokia (Veraval), S. Kemparaju (Mangalore), K.K. Balasubramaniam and M.M. Bhaskaran (Calicut), M.N.K. Elayathu and G. Sampath Kumar (Cochin), P.S. Sadasiva Sharma (Vizhinjam), T.S. Balasubramaniam (Tuticorin), A. Anasukoya and A. Kunhikoya (Minicoy)

Location of the Research Project : Veraval, Mangalore, Calicut, Cochin, Vizhinjam, Tuticorin, Minicoy

a) Objectives: To assess the magnitude of exploited resources of tunas, baitfishes and billfishes; to estimate the relative composition and species-wise abundance; and to study the biological characteristics of major species in different gears to understand the effect of exploitation on these resources.

b) Practical Utility: Potential for the development of tuna and billfish fishery and their industrial applications are of significance in view of the recent developments in the exploitation of these resources from the oceanic waters. The live-bait fish resources play a significant role in the pole and line fishery for tunas in Lakshadweep. Longtail, yellowfin

and skipjack tunas along with other species have got extensive domestic and export markets. Estimation of the resource potential of these species is a prerequisite for suggesting developmental programmes of tuna fishery in India.

Technical Programmes: 1. Collection and analysis of data on effort, catch and species composition of tunas and billfishes taken by different gears along the west and east coasts of India and from Minicoy (Lakshadweep). 2. Estimation of catch per bait of tunas (CPUB) at Minicoy. 3. Collection of data on gear-wise length distribution of different species of tunas for the estimation of growth, mortality parameters and stock assessment. 4. Collection of data on the juvenile and young fish components of tunas taken in different gears. 5. Collection and analysis of data including qualitative and quantitative abundance, methods and duration of fishing and biological characteristics of different species of live-baits and the impact of their fishery on the coral reef ecosystem at Minicoy, Agatti and Kawarathi Islands. 6. Experiment on breeding and survival rate of selected species of live-baits in captivity at Minicoy. 7. Analysis and critical evaluation of the results and submission of periodical reports.

Work done: The abundance of tuna resources was monitored along the Indian coasts and the status of the fishery studied. Pole and line fishery for tuna in relation to baitfishes was studied at Minicoy (Lakshadweep). Stock assessment of Euthynnus affinis, Auxis thazard, Thunnus tonggol, T. albacares and Katsuwonus pelamis has been made.

Work envisaged: Work as per technical programme will be carried out.

Date of start: April '92 12. Likely date of completion: March '96

Estimated man-months : 38 man-months/year

Facilities required:

i)	Land :	v)	Fish ponds :
ii)	Labour :	vi)	Foreign exchange :
iii)	Special requirement :	vii)	Other items :
		viii)	Total estimated cost:
iv)	Animal shed :		

If financed by an organisation other than the Institute :

a) Name of the financing organisation :

b) Title of the Project :

Approximate cost:

a)	Salary of scientific staff :	Rs.4,11,000
b)	Salary of technical staff :	Rs.2,45,280
c)	Salary of supporting staff :	Rs. 16,000
d)	Casual labourer cost, if any :	Rs. 25,000
e)	Cost of equipment, facility etc:	Rs. 20,000
f)	Contingencies such as chemicals, fertilisers, seed, animals, feeds, sprayers etc. :	Rs. 50,000
g)	TADA :	Rs.1,50,000
h)	Total cost :	Rs.9,17,280

Signatures of:

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

RESEARCH PROJECT 1994-95

1. Institute Code No. : PF/RE/2.3 2. I.C.A.R. Code No.

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

4. Title of Project : Investigations of Scombroid fishes

5. Title of Sub-Project : Fishery and resource characteristics of mackerel

6. Name and Designation of Project Leader : G. Gopakumar, Scientist (S.G.)

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 (Tech.Programme)
Karwar	K. Preetha	S	30	1-5
Mangalore	Prathibha Rohit	S	30	1-5
Cochin	P.P. Pillai	PS	25	1-5
	P.N.R. Nair	Sr.S	40	1-5
Vizhinjam	G. Gopakumar	S(S.G.)(PL)	30	1-5
Tuticorin	H. Mohamed Kasim	Sr.S	30	1-5
Visakhapatnam	G. Luther	PS	30	1-5

Technical Assistance: N. Chennappa Gawda (Karwar), Alli C. Gupta (Mangalore), K.K. Balasubramaniam, V.K. Janaki (Calicut), G. Sampath Kumar, K.V. Rema (Cochin), A.K. Velayudhan (Vizhinjam), T.S. Balsubramaniam (Tuticorin), N. Ramamurthy (Mandapam), M.V. Somraju, M.S. Sumitrudu (Visakhapatnam)

8. Location of the Research Project : Karwar, Mangalore, Calicut, Cochin, Vizhinjam, Tuticorin, Mandapam, Visakhapatnam

9. a) Objectives: Estimation of the exploited resource of mackerel along the west and east coasts of India by different gears; to study the variation in the biological and population characteristics of the species at different localities; to interpret the fluctuation in abundance with reference to spawning and recruitment, and to study the change in fishing pattern and its impact on the mackerel fishery.

b) Practical Utility: The average catch of mackerel during 1988-92 was estimated around 1,65,500 t. In recent years it has emerged as a substantial fishery along the east coast. The proposed project is aimed at understanding the resource characteristics of mackerel along both the coasts of India in the light of changes in fishing pattern and abundance.

10. Technical Programme: 1. Collection and analysis of data on the effort and catch of mackerel by different gears along both the coasts of India. 2. Collection of data on size distribution, sex ratio, spawning and recruitment of mackerel in different gears. 3. Estimation of growth, mortality and assessment of stock. 4. Collection of information on the changes in the fishing pattern. 5. Analysis and interpretation of the data and submission of periodical reports.

Work done: Data on the catch, effort and biological aspects of mackerel at different centres were collected and the status of the fishery studied. Stock assessment of Rastrelliger kanagurta was made based on the past data.

Work envisaged: Work as per technical programme will be carried out.

11. Date of start: April '92 12. Likely date of completion: March '96

13. Estimated man-months : 29 man-months/year

14. Facilities required:

i)	Land :	v)	Fish ponds :
ii)	Labour :	vi)	Foreign exchange :
iii)	Special requirement :	vii)	Other items :
		viii)	Total estimated cost :
iv)	Animal shed :		

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

a) Name of the Financing organisation :

b) Title of the Project :

16. Approximate cost:

a)	Salary of scientific staff :	Rs.2,67,300
b)	Salary of technical staff :	Rs.2,70,600
c)	Salary of supporting staff :	
d)	Casual labourer cost, if any :	
e)	Cost of equipment, facility etc. :	
f)	Contingencies such as chemicals, fertilisers, seed, animals, feeds, sprayers etc. :	Rs. 40,000
g)	TA/DA :	Rs. 40,000
h)	Total cost :	Rs.6,17,900

17. Signatures of:

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

RESEARCH PROJECT 1994-95

1. Institute Code No.: PF/RE/3 2. I.C.A.R. Code No.

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

4. Title of Project : Investigations on Bombay duck

5. Title of Sub-Project : Fishery and Resource characteristics of Bombay duck

6. Name and Designation of Project Leader : Alexander Kurian, Senior Scientist

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 (Tech. Programme)
Veraval	K.P. Said Koya	S	30	1-4
Bombay	Alexander Kurian	Sr.S(PL)	60	1-4

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

8. Location of the Research Project : Veraval, Bombay

9. a) Objectives: 1. To assess the magnitude of the Bombay duck resource and to study the abundance in space and time along the north west coast of India. 2. To study biological and population parameters to estimate the MSY so as to recommend management measures.

b) Practical Utility: The annual average (1988-92) landings of Bombay duck is 1,16,000 t. The proposed study will help in formulation of management policies for the rational exploitation of this resource which is presently subjected to heavy fishing pressure.

10. Technical Programme: 1. Collection and analysis of resource data on catch and effort from different gears. 2. Collection of size distribution and biological data to workout the age, growth, sex-ratio, maturity, spawning and recruitment. 3. Stock assessment and recommendations for optimum exploitation. 4. Analyses of data, critical review and submission of periodical reports.

Work done: The fishery and biological data of Bombay duck have been collected and analysed at Bombay and Veraval centres. Stock assessment of *Harpodon nehereus* along the north west coast was made.

Work envisaged: Work will be continued as per technical programme.

11. Date of start : April '92 12. Likely date of completion: March '96

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

14. Facilities required:

i)	Land :	v)	Fish ponds :
ii)	Labour :	vi)	Foreign exchange :
iii)	Special requirement:	vii)	Other items :
iv)	Animal shed :	viii)	Total estimated cost :

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

a) Name of the financing organisation :

b) Title of the Project :

16. Approximate cost:

a)	Salary of scientific staff	: Rs.	91,800
b)	Salary of technical staff	: Rs.	25,200
c)	Salary of supporting staff	:	
d)	Casual labourer cost, if any	:	
e)	Cost of equipment, facility etc.	:	
f)	Contingencies such as chemicals, fertilisers, seed, animals, feeds, sprayers etc.	: Rs.	14,000
g)	TA/DA	: Rs.	20,000
h)	Total cost	: Rs.	1,51,000

17. Signatures of:

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

RESEARCH PROJECT 1994-95

1. Institute Code No.: PF/RE/4 2. I.C.A.R. Code No.

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

4. Title of Project : Fishery and Resource characteristics of Ribbon fishes

5. Title of Sub-Project :

6. Name and Designation of Project Leader : P.N.Radhakrishnan Nair, Senior Scientist

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 (Tech.Programme)
Veraval	K.K. Joshi	S	25	1-4
Bombay	M. Zaffar Khan	S(S.G.)	50	1-4
Karwar	K. Preetha	S	30	1-4
Mangalore	C. Muthiah	S(S.G.)	30	1-4
Cochin	P.N.Radhakrishnan Nair	Sr.S (PL)	60	1-4
Vizhinjam	S. Lazarus	Sr.S	25	1-4

Technical Assistance: H.K. Dhokia (Veraval), J.D. Sarang (Bombay), N. Chennappa Gawda (Karwar), S. Kemparaju (Mangalore), V.R. Arunachalam (Cochin), A.K. Velayudhan (Vizhinjam), M.V. Somaraju (Visakhapatnam)

8. Location of the Research Project : Veraval, Bombay, Karwar, Mangalore, Cochin, Vizhinjam, Visakhapatnam

9. a) Objectives: To evaluate the characteristics of the ribbonfish resource in its areas of abundance which include studies on the seasonal fluctuation, magnitude of exploitation by different gears, species composition and biological characteristics of the dominant species. These are aimed at understanding the impact of exploitation on the resource.

b) Practical Utility: The average annual exploitation of ribbonfish in India during 1988-92 is estimated at 82,900 t forming 7% of the total pelagic catch. The fishery is characterised by its abundance on the west coast than on the east coast and also by its predominance on the northern sectors than on the southern sectors of both the coasts. The fishery is also influenced to some extent by the monsoon conditions. The proposed research project is aimed at studying these aspects of the resource in detail with respect to time and space.

10. Technical Programme: 1. Collection of data on - (a) effort, catch and species composition, (b) size distribution, sex-ratio, maturity, spawning and recruitment of the major species. 2. Estimation of growth and mortality parameters of the species and assessment of its stock in an all India basis. 3. Analysis and interpretation of data in relation to monsoon and change in fishing pattern. 4. Critical evaluation of the findings and submission of periodical reports.

Work done: Data on the abundance of ribbon fishes in space and time along the Indian coasts were collected and analysed. Stock assessment of Trichiurus lepturus has been made.

Work envisaged: Work will be continued as per technical programme.

11. Date of start: April '92 12. Likely date of completion: March '96

13. Estimated man-months : 26 man-months/year

14. Facilities required:

i)	Land	:	v)	Fish ponds	:
ii)	Labour	:	vi)	Foreign exchange	:
iii)	Special requirement	:	vii)	Other items	:
			viii)	Total estimated cost	:
iv)	Animal shed	:			

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

a) Name of the financing organisation :

b) Title of the Project :

16. Approximate cost:

a)	Salary of scientific staff	:	Rs.2,24,400
b)	Salary of technical staff	:	Rs.1,07,400
c)	Salary of supporting staff	:	
d)	Casual labourer cost, if any	:	
e)	Cost of equipment, facility etc	:	
f)	Contingencies such as chemicals, fertilisers, seed, animals, feeds, sprayers etc.	:	Rs. 36,000
g)	TA/DA	:	Rs. 40,000
h)	Total cost	:	Rs.4,07,800

17. Signatures of:

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

RESEARCH PROJECT 1994-95

1. Institute Code No. DF/RE/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 characteristics of major exploited demersal finfish resources for judicious management.

5. Title of Sub-project : Resources characteristics of elasmobranchs.

6. Name and Designation of Project Leader : P. Devadoss, Senior Scientist

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
Veraval	To be posted		
Bombay	S.G. Raje, S (SG)	40	(a) - (d)
Mangalore	To be posted		
Calicut	To be posted		
Cochin	Grace Mathew, S (SG)	40	(a) - (d)
Tuticorin	K.M.S.A. Hamsa, S (SG)	40	(a) - (d)
Mandapam	V. Gandhi, S (SG)	25	(a) - (d)
Madras	P. Devadoss, SS	50	(a) - (d)

Technical assistance: B.B. Chavan, K.M. Venugopalan, M.Badrudeen, M. Rajapackiam and S.K. Balakumar.

8. Location of the Research Project : Veraval, Bombay, Mangalore, Calicut, Cochin, Tuticorin, Mandapam and Madras.

9. (a) Objectives: To assess the effect of exploitation on the resource in various bathymetric zones and to impart management advice for rational exploitation.

(b) Practical Utility: The project aims at understanding the effect of exploitation on total biomass, recruitment and MSY so that suitable management measures can be suggested. The study will help to understand the variations in availability and abundance in various bathymetric zones.

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10. Technical programme: (a) Estimation of catch and species composition by different gears in various bathymetric zones and calculation of catch per unit effort; (b) Collection of data on length of sharks, skates and rays; (c) Samples to be examined for maturity conditions and feeding preferences; (d) Collection of data for estimation of population dynamics such as recruitment, mortality, total biomass and yield per recruit.

Work done: The resource has been monitored for the species-wise and gear-wise production trends; and biological data on commercially important species have been gathered.

Work envisaged: The project aims at collection and analyses of data on various aspects of population dynamics, total biomass, yield per recruit, M S Y, maturity conditions and feeding preferences of the important species, so that the data can be utilised in order to impart management advice for judicious exploitation.

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11. Date of start : 1993-94 12. Likely date of completion : 1995-96

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13. Estimated man-months : 24

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14. Facilities required:

i)	Land :	v)	Fish pond :
ii)	Labour :	vi)	Foreign exchange :
iii)	Special requirements:	vii)	Other items :
iv)	Animal shed :	viii)	Total estimated cost :

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

a) Name of the financing organisation :

b) Title of the project :

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16. Approximate cost:

a)	Salary of Scientific Staff	: Rs.	2,40,000
b)	Salary of Technical Staff	: Rs.	73,000
c)	Salary of Supporting Staff	:	
d)	Casual labourer cost if any	:	
e)	Cost of equipment, facility etc.	:	
f)	Contingencies such as chemicals, fertilizers, seed, animals, feeds, sprayers etc.	: Rs.	18,000
g)	TA/DA	: Rs.	20,000
h)	Total cost	: Rs.	3,51,000

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17. Signatures of:

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

RESEARCH PROJECT 1994-95

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

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

4. Title of Project : Investigations on the characteristics of major exploited demersal finfish resources for judicious management.

5. Title of Sub-project : Studies on the biology and resource characteristics of major perches (Epinephelids, Lutjanids, Lethrinids).

6. Name and Designation of Project Leader : S. Lazarus, Senior Scientist

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
Veraval	To be posted		
Bombay	S.K. Chakraborty, SS	30	(a) and (b)
Cochin	Grace Mathew, S (SG)	35	(a) and (b)
Vizhinjam	S. Lazarus, SS	50	(a) and (b)
Tuticorin	K.M.S.A. Hamsa, S (SG)	35	(a) and (b)

Technical Assistance: Thakur Das, K.M. Venugopalan, S.G. Vincent, M. Rajapackiam.

8. Location of the Research Project : Veraval, Bombay, Cochin, Vizhinjam and Tuticorin.

9. (a) Objectives : To understand the biological and fishery characteristics as well as to estimate the maximum sustainable yield of epinephelids, lutjanids, lethrinids and similar resources.

(b) Practical Utility: (1) The project aims at understanding the effect of exploitation, so that suitable regulatory measures can be suggested; (2) The study will help in understanding the variations in abundance in relation to the biological characters of the species so that suitable management strategies can be formulated.

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10. Technical Programme: (a) Collection and analyses of data for the estimation of parameters relating to recruitment, mortality, MSY, total biomass, spawning biomass and yield per recruit, in respect of Snappers, Rock cods and Pigface breams from different grounds; (b) Collection of biological data including mean length, food preference, age, maturity composition and fecundity estimation of major species for relating to the strength of the year classes.

Work done: Data on gear-wise and species-wise catch of major perches have been collected; and attempts were made to study the breeding biology and age composition of the dominant species.

Work envisaged: Studies will be conducted on aspects of population dynamics such as recruitment, total biomass, MSY, maturity, spawning biology and feeding preferences in the case of important species.

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12. Date of start : 1992-93 12. Likely date of completion : 1995-96

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13. Estimated man-months : 29

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14. Facilities required:

i)	Land :	v)	Fish ponds :
ii)	Labour :	vi)	Foreign exchange:
iii)	Special requirements :	vii)	Other items :
iv)	Animal shed :	viii)	Total estimated cost :

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

a) Name of the financing organisation :

b) Title of the project :

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16. Approximate cost:

a)	Salary of Scientific Staff	: Rs.	1,80,000
b)	Salary of Technical Staff	: Rs.	79,000
c)	Salary of Supporting Staff	:	
d)	Casual labourer cost, if any	:	
e)	Cost of equipment, facility, etc.	:	
f)	Contingencies such as chemicals, fertilizers, seed, animals, feeds, sprayers etc.	: Rs.	18,000
g)	TA/DA	: Rs.	10,000
h)	Total cost	: Rs.	2,87,000

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17. Signatures of:

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

RESEARCH PROJECT 1994-95

1. Institute Code No. DF/RE/3 2. I.C.A.R. Code No.

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

4. Title of Project : Investigations on the characteristics of major exploited demersal finfish resources for judicious management.

5. Title of Sub-project : Studies on the resource management of catfishes

6. Name and Designation of Project Leader : N.G. Menon, Senior Scientist

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
Bombay	S.G. Raje, S (SG)	25	(a) - (e)
Cochin	N.G. Menon, SS	25	(a) - (e)
Visakhapatnam	Y. Appanna Sastry, S(SG)	50	(a) - (e)

Technical Assistance: B.B. Chavan, K. Balachandran and K. Narayana Rao.

8. Location of the Research Project : Bombay, Cochin and Visakhapatnam.

9. (a) Objectives: To assess the effect of exploitation on the resource and to understand the causes for the dwindling fisheries and species replacement.

(b) Practical Utility: The production of catfishes showed a gradual decline with special emphasis along the south west and east coasts. Many migrating species are slowly replaced by resident populations of less migrant species. The project aims at understanding the effect of exploitation on declining production, so that suitable regulatory measures can be suggested. The study also helps in understanding the variations in abundance with reference to bathymetry and seasons.

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10. Technical programme: (a) Estimation of gearwise and species wise catfish catch; (b) Collection of biological data such as growth and spawning of dominant species; (c) Estimation of total biomass and spawning biomass in shallow waters as well as deeper areas; (d) Estimation of juvenile, spawners and brooders landed by major gears; (e) Analyses of past data to study the causes for decline in production and species replacement.

Work done : Stock assessment studies on the dominant species have been undertaken.

Work envisaged: The continuously declining production trend of major migratory and shoaling species needs detailed analyses to find out the causes for the same as well as species replacement.

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11. Date of start : 1992-93 12. Likely date of completion : 1995-96

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13. Estimated man-months : 12

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14. Facilities required :

i) Land	:	v) Fish ponds	:
ii) Labour	:	vi) Foreign exchange	:
iii) Special requirements	:	vii) Other items	:
iv) Animal shed	:	viii) Total estimated cost	:

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

a) Name of the financing organisation :

b) Title of the project :

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16. Approximate cost:

a)	Salary of Scientific Staff	:	Rs. 1,20,000
b)	Salary of Technical Staff	:	Rs. 66,000
c)	Salary of Supporting Staff	:	
d)	Casual labourer cost if any	:	
e)	Cost of equipment, facility etc	:	
f)	Contingencies such as chemicals, fertilizers, seeds, animals, feeds, sprayers, etc.	:	Rs. 10,000
g)	TA/DA		Rs. 18,000
h)	Total Cost	:	Rs. 2,14,000

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17. Signatures of:

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

RESEARCH PROJECT 1994-95

1. Institute Code No. DF/RE/4 2. I.C.A.R. Code No.

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

4. Title of Project : Investigations on the characteristics of major exploited demersal finfish resources for judicious management.

5. Title of Sub-project : Stock assessment of Threadfin breams and Silver bellies

6. Name and Designation of Project Leader : E. Vivekanandan, Senior Scientist

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
Veraval	P.P. Manoj Kumar, S	30	(a) - (d)
Bombay	S.K. Chakraborty, SS	30	(a) - (d)
Karwar	P. Livingston, S (SG)	30	(a) - (d)
Mangalore	P.U. Zacharia, S	30	(a) - (d)
Cochin	N.G. Menon, SS	40	(a) - (d)
Tuticorin	V.S. Rengaswamy, S, S-2	30	(a) - (d)
Mandapam	V. Gandhi, S (SG)	35	(a) - (d)
Madras	E. Vivekanandan, SS	50	(a) - (d)
Kakinada	A. Raju, S (SG)	40	(a) - (d)
Visakhapatnam	G. Mohanraj, S (SG)	40	(a) - (d)

Technical Assistance: H.K. Dhokia, Takur Das, V.M. Dhareshwar, H.S. Mahadevaswamy, R. Reghu, K. Balachandran, J. Narayanaswamy, M. Rajapackiam, M. Badrudeen, S.K. Balakumar, A.C. Sekhar, P. Ramalingam and C.V. Seshagiri Rao.

8. Location of Research Project : Veraval, Bombay, Karwar, Mangalore, Cochin, Tuticorin, Mandapam, Madras, Kakinada and Visakhapatnam.

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9. (a) Objectives: To study the biology such as growth, spawning, fecundity and food preferences; and to estimate the fishery characteristics, mortality, recruitment Maximum Sustainable Yield, spawning stock biomass, and total biomass in inshore fishing grounds as well as deeper waters.

(b) Practical Utility: (1) An estimated annual average of 90,000 tonnes of threadfin bream and Silver bellies are landed in India. The project aims at understanding the effect of exploitation, so that suitable regulatory measures can be suggested. (2) The study helps in understanding the variations in abundance with reference to depth zones and seasons so that suitable projections can be made.

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10. Technical Programme: (a) Collection of data on effort, catch and species composition of threadfin breams and Silver bellies; (b) Collection of length data on dominant species of Threadfin breams and Silver bellies; (c) (c) Estimation of biological parameters like growth, spawning periodicity and seasons, fecundity, spawning stock biomass and food preference; (d) Stock assessment of various species and estimation of MSY.

Work done: Studies has been carried out on two important species of Threadfin breams and three species of Silver bellies.

Work envisaged: The seasonal and bathymetric availability and abundance of the major threadfin breams and their stock position in deeper waters will be assessed. The other species of Silver bellies available in the inshore waters will receive attention for similar studies.

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11. Date of start : 1992-93 12. Likely date of completion : 1995-96

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13. Estimated man-months : 36

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4. Facilities required:

i)	Land :	v)	Fish ponds :
ii)	Labour :	vi)	Foreign exchange :
iii)	Special requirements :	vii)	Other items :
iv)	Animal shed :	viii)	Total estimated cost :

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5. If financed by an organisation other than the Institute :

a) Name of financing organisation :

b) Title of Project :

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6. Approximate cost:

a)	Salary of Scientific Staff	:	Rs.2,85,000
b)	Salary of Technical Staff	:	Rs.1,76,000
c)	Salary of Supporting Staff	:	
d)	Casual labourer cost, if any	:	
e)	Cost of equipment, facility etc.	:	
f)	Contingencies, such as chemicals, fertilizers, seed, animals, feeds, sprayers, etc.	:	Rs. 25,000
g)	TA/DA	:	Rs. 48,000
h)	Total cost	:	Rs.5,34,000

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17. Signatures of:

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

RESEARCH PROJECT 1994-95

1. Institute Code No. DF/RE/5. 2. I.C.A.R. Code No.

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

4. Title of Project : Investigations on the characteristics of major exploited demersal finfish resources for judicious management.

5. Title of Sub-Project : Stock assessment of Croakers

6. Name and Designation of Project Leader : S.K. Chakraborty, Senior Scientist

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
Veraval	P.P. Manoj Kumar, S	40	(a) - (c)
Bombay	S.K. Chakraborty, SS	40	(a) - (c)
Karwar	P. Livingston, S (SG)	40	(a) - (c)
Calicut	M. Feroz Khan, S	35	(a) - (c)
Cochin	S. Sivakami, SS	50	(a) - (c)
Tuticorin	V.S. Rengaswamy, S, S-2	30	(a) - (c)
Mandapam	V. Gandhi, S (SG)	40	(a) - (c)
Madras	P. Devadoss, SS	25	(a) - (c)
Kakinada	A. Raju, S (SG)	35	(a) - (c)
Visakhapatnam	Y. Appanna Sastry, S (SG)	50	(a) - (c)

Technical Assistance: H. K. Dhokia, Thakur Das, V.M. Dhareshwar, K. Nandakumaran, P.K. Seetha, M. Rajapackiam, M. Badrudeen, P. Ramadoss, P. Ramalingam, C.V. Seshagiri Rao.

8. Location of the Research Project : Veraval, Bombay, Karwar Calicut, Cochin, Tuticorin, Mandapam, Madras, Kakinada and Visakhapatnam.

9. (a) Objectives: To study the effect of exploitation on the resource at coastal and deeper habitats, to understand the biological aspects like age, maturation, spawning, fecundity and food preference of economically important species and to estimate their total biomass and Maximum Sustainable Yield. The probable causes for the decline in production of " Ghol " and " Koth", will be examined.

(b) Practical Utility: The project aims at understanding the effect of exploitation, so that suitable regulatory measures can be suggested. The study will help in understanding the variations in abundance with reference to season and bathymetry.

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10. Technical Programme: (a) Collection and analyses of fishing effort, catch, mesh size and species composition; (b) Collection of data on length composition, mean length age, sex, maturity, fecundity and feeding habits of major species obtained from different gears; (c) Estimation of growth, mortality rates, yield per recruit, spawning stock biomass, total biomass and MSY.

Work done: The resource has been monitored for production trends and biological parameters; and a few species have received attention for stock assessment studies.

Work envisaged: The available stocks in the coastal fishing grounds and deeper waters will be studied for their availability and abundance in space and time; as well as for their population parameters. The past data will be analysed to find out the causes for the depletion of the populations of " Ghol " and " Koth " , along the north-west coast.

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11. Date of start : 1992-93 12. Likely date of completion: 1995-'96

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13. Estimated man-months : 50

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14. Facilities required:

i)	Land :	v)	Fish ponds :
ii)	Labour :	vi)	Foreign exchange :
iii)	Special requirements :	vii)	Other items :
iv)	Animal shed :	viii)	Total estimated cost :

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

a) Name of financing organisation :

b) Title of Project :

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16. Approximate cost:

a)	Salary of Scientific Staff :	Rs.	4,68,000
b)	Salary of Technical Staff :	Rs.	1,62,000
c)	Salary of Supporting Staff :		
d)	Casual labourer cost if any :		
e)	Cost of equipment, facility etc. :		
f)	Contingencies, such as chemicals, fertilizers, seed, animals, feeds, sprayers etc. :	Rs.	33,000
g)	TA/DA :	Rs.	50,000
h)	Total cost :	Rs.	7,13,000

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17. Signatures of :

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

RESEARCH PROJECT 1994- 95

1. Institute Code No. DF/RE/6 2. I.C.A.R. Code No.

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

4. Title of Project : Minor demersal finfish resources assessment.

5. Title of Sub-Project : Biology and resources characteristics of lizard fishes Polynemids and flat heads.

6. Name and Designation of Project Leader : S. Sivakami, Senior Scientist

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
Veraval	P.P. Manoj Kumar, S	30	(a) - (g)
Bombay	S.G. Raje, S (SG)	35	(a) - (g)
Calicut	M. Feroz Khan, S	30	(a) - (g)
Cochin	S. Sivakami, SS	50	(a) - (g)
Madras	E. Vivekanandan, SS	25	(a) - (g)
Visakhapatnam	G. Mohanraj, S (SG)	30	(a) - (g)

Technical Assistance: H.K. Dhokia, B.B. Chavan, K. Nandakumaran, P.K. Seetha, S.K. Balakumar and K. Narayana Rao.

8. Location of the Research Project : Veraval, Bombay, Calicut, Cochin, Madras and Visakhapatnam.

9. (a) Objectives: To understand the biological and fishery characteristics and to estimate the maximum sustainable yield of the resources; as well as to assess the causes for the decline in the production of " Dara " (*P. indicus*, *P. heptadactylus*) in the north-west coast.

(b) Practical Utility: (1) The project aims at understanding the availability and abundance as well as the effect of exploitation of lizard fishes threadfin and flat heads, so that suitable regulatory measures can be suggested. (2) The study helps in understanding the recruitment in relation to the spawning stock biomass, fecundity and to estimate the population parameters.

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10. Technical programme: (a) Estimation of the catch and effort data from all gears including mesh sizes; (b) Collection of biological data such as length composition, mean length, sex and maturity; (c) Determination of spawning periodicity, fecundity and spawning season; (d) Estimation of growth parameters using length data and growth checks on hard parts; (e) Collection of data on food habits and feeding preference; (f) Estimation of total stock biomass and spawning stock biomass; (g) Evaluation of the relationship between the adult stock and recruitment.

Work done: The general fisheries for the resources have been monitored and attempts were made to study the biology of major species.

Work envisaged: Data will be fgathered and utilised for the stock assessment of commercially important species. Attempts will be made to explain the causes for the decline of " Dara ".

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11. Date of start : 1992-93 12. Likely date of completion : 1995-96

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13. Estimated man-months : 24

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14. Facilities required:

i)	Land :	v)	Fish ponds :
ii)	Labour :	vi)	Foreign exchange:
iii)	Special requirements :	vii)	Other items :
iv)	Animal shed :	viii)	Total estimated cost :

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

a) Name of financing organisation :

b) Title of Project :

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16. Approximate cost :

a)	Salary of Scientific Staff	:	Rs. 2,26,000
b)	Salary of Technical Staff	:	Rs. 1,32,000
c)	Salary of Supporting Staff	:	
d)	Casual labourer cost if any	:	
e)	Cost of equipment, facility etc	:	
f)	Contingencies, such as chemicals, fertilizers, seed, animals, feeds, sprayers, etc.	:	Rs. 18,000
g)	TA/DA	:	Rs. 15,000
h)	Total cost		Rs. 3,91,000

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17. Signatures of:

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

RESEARCH PROJECT 1994-95

1. Institute Code No. DF/RE/7 2. I.C.A.R. Code No.

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

4. Title of Project : Minor demersal finfish resources assessment.

5. Title of Sub-project : Biology and fishery of flat fishes a Goat fishes and White fish.

6. Name and Designation of Project Leader : P. Bensam, Principal Scientist

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
Mangalore	P.J. Zacharia, S	30	(a) - (g)
Calicut	M. Feroz Khan, S	35	(a) - (g)
Cochin	P. Bensam, PS	25	(a) - (g)
	Grace Mathew, S (SG)	25	(a) - (g)
Vizhinjam	S. Lazarus, SS	25	(a) - (g)
Tuticorin	K.M.S.A. Hamsa, S (SG)	25	(a) - (g)
Mandapam	P. Jayasankar, S	25	(a) - (g)
Madras	P. Devadoss, SS	25	(a) - (g)
Visakhapatnam	G. Mohanraj, S (SG)	30	(a) - (g)

Technical Assistance: H.S. Mahadevaswamy, K. Nandakumaran, R. Reghu, K. Balachandran, J. Narayanaswamy, K.M. Venugopalan, S.G. Vincent, M. Rajapackiam and P. Ramadoss.

8. Location of the Research Project : Mangalore, Calicut, Cochin, Vizhinjam, Tuticorin, Mandapam, Madras and Visakhapatnam.

9. (a) Objectives: To estimate the total stock biomass, spawning stock biomass, fecundity and recruitment and to study the population dynamics. The probable causes for the decline in the production of Whitefish will be assessed.

(b) Practical Utility: The project aims at understanding the effect of exploitation, so that suitable regulatory measures can be suggested, for judicious management of the resources.

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10. Technical Programme: (a) Estimation of total catch and effort from all gears including mesh sizes of gears and from various depth zones; (b) Collection of data on length composition, sex, maturity, spawning periodicity, fecundity and food preferences; (c) Estimation of growth parameters (including the data from scales, Otoliths and other hard parts) and mortality rates; (d) Evaluation of mean length and catch per unit of effort to determine the fishing levels; (e) Study of the relationship between the adult stock and recruitment; (f) Estimation of total biomass and spawning stock biomass; (g) Evaluation of the probable causes for the variations in production, in relation to the comparable period(s) of previous years.

Work done: The resources have been monitored for their fisheries and data have been gathered on the biological parameters such as age and reproductive biology in the case of important species.

Work envisaged: The relevant data will be gathered and utilised for the estimation of the stocks of the important species. The production trends will be monitored and the data will be used to explain the causes for the fluctuations in production.

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11. Date of start : 1992-93 12. Likely date of Completion : 1995-96

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13. Estimated man-months : 33

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14. Facilities required:

i)	Land :	v)	Fish ponds :
ii)	Labour :	vi)	Foreign exchange :
iiii)	Special requirements :	vii)	Other items :
iv)	Animal sheds	viii)	Total estimated cost :

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

a) Name of financing organisation :

b) Title of Project :

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16. Approximate cost:

a)	Salary of Scientific Staff :	Rs.	3,26,000
b)	Salary of Technical Staff :	Rs.	2,30,000
c)	Salary of Supporting Staff		
d)	Casual labourer cost, if any :		
e)	Cost of equipment, facility		
f)	Contingencies, such as etc. : chemicals, fertilizers, seeds, animals, feeds, sprayers etc. :	Rs.	33,000
g)	TA/DA :	Rs.	25,000
h)	Total cost :	Rs.	6,14,000

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17. Signatures of:

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

RESEARCH PROJECT 1994-95

1. Institute Code No. DF/TR/1 — 2. I.C.A.R. Code No.

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

4. Title of Project : Effect of bottom trawling on demersal finfish resources.

5. Title of Sub-project : Investigations on the effect of coastal bottom trawling on juvenile and spawning populations of demersal finfishes and on benthic biota.

6. Name and Designation of Project Leader : N.G. Menon, Senior Scientist.

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
Karwar	P. Livingston, S (SG)	30	(a) - (f)
Mangalore	P.J. Zacharia, S	40	(a) - (f)
Cochin	P. Bensam, PS	25	(a) - (f)
	N.G. Menon, SS	35	(a) - (f)
Mandapam	P. Jayasankar, S	25	(a) - (f)
Madras	E. Vivekanandan, SS	25	(a) - (f)
Kakinada	A. Raju, S (SG)	25	(a) - (f)

Technical Assistance: V.M. Dhareshwar, H.S. Mahadevaswamy, R. Reghu, K. Balachandran, J. Narayanaswamy, K.M. Venugopalan, P.K. Seetha, A. Shanmughavelu, S.K. Balakumar and P. Ramalingam.

8. Location of the Research Project : Karwar, Mangalore, Cochin, Mandapam, Madras and Kakinada.

9. (a) Objectives: (i) To study the impact of bottom trawling including out board motor trawlers wherever operated on the mortality of juveniles, subadults and spawners. (ii) To evaluate the qualitative and quantitative composition of the benthic biota dislocated by trawling. (iii) To estimate the loss of finfishes and benthic biomass, habitat alterations and their impact on recruitment.

(b) Practical Utility: The demand for certain targetted resources which fetch high prices has paved the way for the indiscriminate wastage of the low-value-high-volume by-catches, especially from the coastal grounds, composed of a wide spectrum of edible and non-edible components. If this will be continued indefinitely, it will lead to recruitment hazards as well as adversely affect the benthic habitat vital for the well-being of the stocks. The present study will help to formulate management strategies to control the above factors.

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10. Technical Programme: (a) Collection of species-wise data on the juveniles/subadults and spawners of major demersal groups that are harvested from different bathymetric zones (less than 50 m and above 50 m); (b) Estimation of the monthly numbers of major species in the above category at different size classes; (c) Qualitative and quantitative estimation of the benthic biota discarded/destroyed by trawling; (d) Collection of data by experimental trawling of Cadalmin vessels wherever available; (e) Analyses of the data in the light of the catch and effort particulars of trawlers (from FRA Division); (f) Formulation of strategies for imparting management advice.

Work done: A preliminary investigation has been carried out to estimate the dislocation of the benthic biota by coastal bottom trawlers.

Work envisaged: Data will be gathered to estimate the post-harvest loss of low-value - high-volume fish and benthic biota. The project also aims at estimating the juvenile fishes and spawners that are removed by bottom trawling.

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11. Date of start : 1994-95 12. Likely date of Completion : 1995-96

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13. Estimated man-months : 25

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14. Facilities required:

i)	Land	:	v)	Fish ponds	:
ii)	Labour	:	vi)	Foreign exchange	:
iii)	Special requirements	:	vii)	Other items	:
iv)	Animal shed	:	viii)	Total estimated cost	:

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

a) Name of the financing organisation:

b) Title of the project :

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16. Approximate cost :

a)	Salary of Scientific staff	:	Rs.	2,42,000
b)	Salary of Technical staff	:	Rs.	1,46,000
c)	Salary of Supporting staff	:		
d)	Casual labourer cost, if any	:		
e)	Cost of equipment, facility etc.	:		
f)	Contingencies such as chemicals, fertilizers, seed, animals, feeds, sprayers etc.	:	Rs.	23,000
g)	TA/DA	:	Rs.	45,000
h)	Total cost	:	Rs.	4,56,000

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17. Signatures of:

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

RESEARCH PROJECT 1994-95

1. Institute Code No. DF/CUL/3 2. I.C.A.R. Code No.

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

4. Title of Project : Finfish Seed production

5. Title of Sub-project : Broodstock development of Seabass and selected species of perches.

6. Name and Designation of Project Leader : P. Nammalwar, Senior Scientist

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
Mandapam	P. Nammalwar, SS	100	(a) - (d)
	P. Jayasankar, S	50	(a) - (d)
Tuticorin	R. Marichamy, PS	50	(a) - (d)
	V.S. Rengaswamy, S.S-2	40	(a) - (d)

Technical Assistance: M.R. Arputharaj, N. Palanichamy, S. Rajapackiam and two more personnel one each at Mandapam and Tuticorin to be assigned by the Officer-in-Charge.

8. Location of the Research Project : Mandapam and Tuticorin

9. (a) Objectives To develop and maintain a brood stock of Seabass, Groupers and Red Snappers, in order to undertake induced breeding experiments.

(b) Practical Utility: Seabass, Groupers and Red Snappers are prime quality fishes, successfully bred and cultured

in Thailand, Singapore and Philippines. Developing and maintaining their broodstocks would enable to undertake induced breeding experiments and pave the way for seed production.

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10. Technical programme: (a) Collection of mature specimens and spawners as well as juveniles at Mandapam and Tuticorin; (b) Acclimatisation, conditioning and transportation of the specimens; (c) Maintenance and feeding of the specimens in ponds and net cages; (d) Administration of hormones to enhance maturity of the adult specimens as well as raising them to reach the stage for conducting induced breeding experiments.

Work done: Attempts have been made to collect live fishes of Seabass from the wild for utilisation in induced breeding experiments.

Work envisaged: Live fishes of Seabass, Groupers and Red Snappers will be collected, acclimatised and reared in ponds and net cages; and efforts will be made to enhance their maturity so that induced breeding experiments can be undertaken.

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11. Date of start : 1992-93 12. Likely date of completion: 1995-96

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13. Estimated man-months : 25

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14. Facilities required:

i) Land	:	v) Fish ponds	:
ii) Labour	:	vi) Foreign exchange	:
iii) Special requirements	:	vii) Other items	:
iv) Animal shed	:	viii) Total estimated cost	:

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

a) Name of the financing organisation :

b) Title of the project :

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16. Approximate cost:

a)	Salary of Scientific Staff	:	Rs.	2,48,000
b)	Salary of Technical Staff	:	Rs.	1,44,000
c)	Salary of Supporting Staff	:	Rs.	
d)	Casual labourer cost, if any	:	Rs.	60,000
e)	Cost of equipment, facility etc.	:		
f)	Contingencies such as chemicals, fertilizers, seed, animals, feeds, sprayers, etc.	:	Rs.	33,000
g)	TA/DA	:	Rs.	10,000
h)	Total cost	:	Rs.	4,95,000

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17. Signatures of:

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

RESEARCH PROJECT 1994-95

1. Institute Code No.CF/RE/1.11 2. I.C.A.R. Code No.

3. Name and address of Research Institute : CMFR Institute, Kochi-14.

4. Title of Project : Investigations on the exploitation, management and conservation of penaeid prawn resources of west coast of India

5. Title of Sub-project : Nil

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

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	K.K.Philippose	S	40	i,ii,iii,vii
Bombay	V.D.Deshmukh	Sr.Sci.	25	i,ii,iii,vi, vii
	M.Aravindakshan	S	50	i,ii,iii,vii
Karwar	V.S.Kakati	Sr.Sci.	50	i,ii,iii,vii
Cochin	C.Suseelan	Sr.Sci	40	i,iv,v,vii
	K.N.Rajan	SG	100	i,ii,iii,vii
	K.R.Manmadhan Nair	SG	50	i,ii,iii,v, vi,vii
	Mary K.Manissery	SG	50	i,ii,iii,vii
	P.E.Sampson Manickam	SG	50	i,ii,iii,vii
	G.Nandakumar	SG	100	i,ii,iii,vi, vii
Vizhinjam	K.K.Philippose	S		

Technical Assistance: B.P.Thumber (Veraval), A.D.Sawant, A.Y.Mestry (Bombay), C.K.Dinesh (Karwar), Sreedhara B., Y.Muniappa (Mangalore), K.Koumudi Menon, S.Lakshmi (Calicut), K.N.Gopalakrishnan, C.Nalini, K.Chellappan, P.K.Baby (Cochin), K.Sasidharan Pillai (Vizhinjam).

8. Location of the Research Project : Veraval, Bombay, Karwar, Mangalore, Calicut, Cochin, Vizhinjam.

a) Objectives:

i. To study the distribution pattern, abundance and population characteristics of important species of penaeid prawns in space and time along the west coast of India.

ii. To assess the trend of production, sustainable yield levels and the effect of operation of different fishing gears on the resource.

iii. To study the stock-recruitment relationship and identify conservation needs of important species.

iv. To study the qualitative and quantitative abundance of pelagic shrimps on the west coast of India.

b) Practical Utility:

The study will help in better management and conservation of the penaeid prawn resources which form the backbone of the seafood export industry of the country. The data generated would form a strong scientific base to settle disputes between the mechanised and artisanal sectors involved in the exploitation of penaeid prawns and other management problems arising in different regions of the west coast. Pelagic shrimps form an important forage of pelagic fish occurring in the offshore waters and can be used as an index for the abundance of pelagic fishes. Further, pelagic shrimps have same utility as in the case of krill.

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0. Technical Programme:

i. Collection of gear-wise data on catch, effort and species composition of penaeid-prawn fishery at Veraval, Bombay, Karwar, Mangalore, Calicut, Cochin, Neendakara and Vizhinjam along the west coast of India, separately for mechanised motorised and non motorised sectors including nursery areas.

ii. Collection of data on mesh sizes and other gear and craft particulars.

iii. Collection of data on various biological aspects such as size, sex and maturity of the constituent species in the fishery and study population characteristics of major species.

iv. Collection of depth wise information on abundance by conducting experimental shrimp trawling using cadalmin and study the population characteristics.

v. Analysis of pelagic and midwater shrimp collections made by the past exploratory surveys.

. Estimate the reproduction potential of Metapenaeus dobsoni (at Cochin) and Metapenaeus affinis (at Bombay).

. Comprehensive analysis of all the data as collected above for writing reports and scientific papers.

k done: Data on catch, effort and biological aspects of important cies have been collected from some of the centres in the past and tly analysed and the status of the fishery, studied from time to e. The changing pattern of the fishery in the traditional as well trawl sector was critically examined and stock assessment of onoceros and M.dobsoni made.

k envisaged in the current year: As per the technical programmes

. Date of start : 1992-93 12. Likely date of completion : 1997-98

. Estimated man-months: man months/year - 67

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

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

. Approximate cost:

a.	Salary of scientific staff	.. ..	5,91,500
b.	Salary of technical staff	.. ..	3,18,000
c.	Salary of supporting staff		
d.	Casual labourer cost, if any		
e.	Cost of equipment, facility etc.	.. ..	7,000
f.	Contingencies, such as chemicals, fertilizers, seed, animals, feeds, sprayers etc.	.. ..	44,900
g.	T.A.	.. ..	66,300
h.	Total cost	.. ..	10,27,700

7. Signatures of:

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

RESEARCH PROJECT 1994-95

. Institute Code No. CF/RE/1.12 2. I.C.A.R Code No.

. Name and address of Research Institute : CMFR Institute, Kochi-14.

. Title of Project : Investigations on the exploitation, management and conservation of penaeid prawn resources of east coast of India

. Title of Sub-project : Nil

. Name and designation of Project Leader : Dr.G.Sudhakara Rao, Senior Scientist.

. 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
Visakhapatnam	G.Sudhakara Rao	Sr.Sci.	100	i to vi
Madras	V.Thangaraj Subramanian	Sr.Sci	75	i to vi
Kakinada	K.N.Saleela	S	50	i to vi
Mandapam Camp	G.Maheswarudu	S	25	i to vi
Tuticorin	M.Rajamani	Sr.Sci.	50	i to vi

Technical Assistance:

P.V.Krishna Rao (Puri), J.B.Varma (Visakhapatnam), K.Dhanaraju (Kakinada), P.Thirumilu, K.Shahul Hameed, M.M.Sultan and K.S.Krishna (Madras), S.Mohan, A.Ramakrishnan (Mandapam), M.Manickaraja (Tuticorin)

8. Location of the Research Project : Puri, Visakhapatnam, Kakinada, Madras, Mandapam, Tuticorin.

9. (a) Objectives:

1. To study the distribution pattern, abundance and population characteristics of important species of penaeid prawns in space and time along the east coast of India.

2. To assess the trend of production, sustainable yield levels and the effect of operation of different fishing gears on the resource.

3. To study the stock recruitment relationship and identify conservation needs of important species.

(b) Practical Utility:

The study will help in better management and conservation of the penaeid prawn resource which forms the back bone of the seafood export industry of the country. The data generated would form a strong scientific base to settle disputes between the mechanised and artisanal sectors involved in the exploitation of penaeid prawns and other management problems arising in different maritime states of east coast of India.

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10. Technical Programme:

i. Collection of gear-wise data on catch, effort and species composition of penaeid prawn fishery at selected centres viz. Puri, Visakhapatnam, Kakinada, Madras, Mandapam and Tuticorin along the east coast of India separately for mechanised, motorised and non-motorised sectors including nursery areas.

ii. Collection of data on mesh sizes and other gear and craft particulars.

iii. Collection of data on various biological aspects such as length, sex and maturity of major constituent species in the fishery.

iv. Collection of depth-wise information on abundance from large trawlers.

v. Study the population characteristics of major species.

vi. Participation and collection of data from the north eastern region using Sagar Sampada facility (special cruise).

vii. Comprehensive analysis of all the data as collected above for writing reports and scientific papers.

Work done:

Data on catch, effort and biological aspects of important species have been collected from some of the centres in the past and partly analysed and the status of the fishery studied from time to time. A bioeconomic analysis of the shrimp fishery of the north east coast of India was undertaken with the assistance of FAO Expert. The stock assessment of P.indicus, P.monodon and P.semisulcatus was made.

Work envisaged in current year: As per the technical programmes.

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11. Date of start : 1992-93 12. Likely date of completion : 1997-98

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

14. Facilities required:

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

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

16. Approximate cost:

a.	Salary of scientific staff	.. ..	3,12,300
b.	Salary of technical staff	.. ..	2,88,100
c.	Salary of supporting staff		
d.	Casual labourer cost, if any		
e.	Cost of equipment, facility etc.	.. ..	3,000
f.	Contingencies such as chemicals, fertilizers, seed, animals, feeds, sprayers etc.	.. ..	18,000
g.	T.A.	.. ..	32,400
h.	Total cost	.. ..	6,53,800

17. Signatures of:

Sd/-
Project Leader

Sd/-
Head of Division

Sd/-
Director

RESEARCH PROJECT 1994-95

1. Institute Code No. CF/RE/1.13 2. I.C.A.R.CODE No.

3. Name and address of Research Institute : C.M.F.R. Institute Kochi-14.

4. Title of Project : Investigations on the exploitation, management and conservation of non penaeid prawn resources of north west coast of India

5. Title of Sub-project : Nil

6. Name and designation of Project Leader : Dr. V.D.Deshmukh, Senior Scientist.

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	K.K.Philippose	S	35	i-v
Bombay	V.D.Deshmukh	Sr.Sci.	50	i-v
	M.Aravindakshan	S	50	i-v

Technical Assistance:

B.P.Thumber (Veraval), A.Y.Mestry, A.D.Sawant (Bombay)

8. Location of the Research Project : Veraval, Bombay

9. a) Objectives: 1. Assessment of the magnitude of exploited resources and potential stocks of various non-penaeid prawn species along the Gujarat and Maharashtra coasts. 2. Study of the population characteristics of important species in space and time. 3. Study of the stock-recruitment relationship and conservation needs of the resource.

b) Practical Utility: Non penaeid prawns support a major fishery along Gujarat and Maharashtra coasts. Continuous monitoring of the level of exploitation and assessment of stocks are of vital importance for proper management and conservation of the resource.

10. Technical Programme:

i. Collection of data on catch, effort and species composition of the non-penaeid prawns landings of major gears at Veraval and Bombay.

ii. Collection of data on mesh sizes and other gear particulars.

iii. Collection of data on various biological aspects such as length, sex and maturity stages of the constituent species in the fishery.

iv. Study the population characteristics of the major species.

v. Comprehensive analysis of the data as collected above for writing reports and scientific papers.

Work done: Data on catch, effort and biological aspects of important species have been collected in the past and partly analysed and status of the fishery studied from time to time. Stock assessment of Acetes indicus was carried out for Bombay coast.

Work envisaged in the current year: As per technical programme.

11. Date of start : 1992-93

12. Likely date of completion : 1997-98

13. Estimated man-months: man months/year - 16

14. Facilities required: i. Land ii. Labour iii. Special requirements 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 : Nil

16. Approximate cost:

a.	Salary of scientific staff	.. ..	1,25,760
b.	Salary of technical staff	.. ..	36,950
c.	Salary of supporting staff	.. ..	
d.	Casual labourer cost, if any	.. ..	1,500
e.	Cost of equipment, facility etc.	.. ..	5,000
f.	Contingencies, such as chemicals, fertilizers, seed, animals, feeds, sprayers etc.	.. ..	37,250
g.	T.A.	.. ..	2,06,460
h.	Total cost		

17. Signatures of:

Sd/-
Project Leader

Sd/-
Head of Division

Sd/-
Director

RESEARCH PROJECT 1994-95

. Institute Code No. CF/RE/1.14 2. I.C.A.R. Code No.

. Name and address of Research Institute : CMFR Institute, Kochi-14.

. Title of Project : Studies on exploitation, management and conservation of lobster and crab resources of Indian coast.

. Title of Sub-project : Nil

. Name and designation of Project Leader : Dr. N.Neelakanta Pillai, Senior Scientist.

. 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	K.K.Philippose	S	25	i-vii
Bombay	V.D.Deshmukh	Sr.Sci.	25	i-vii
Karwar	V.S.Kakati	Sr.Sci.	25	iv-viii
Cochin	N.Neelakanta Pillai	Sr.Sci.	25	i & vii
	C.Suseelan	Sr.Sci.	25	i-iii & vii
	Mary K.Manissery	SG	25	iv-vii
Tuticorin	M.Rajamani	Sr.Sci.	50	iv-vii
	D.B.James	Sr.Sci.	25	i- iii & vii
Mandapam	G.Maheswarudu	S	25	i-vii
Madras	V.Thangaraj Subramanian	Sr.Sci.	25	i-vii
Kakinada	K.N.Saleela	S	25	i-vii

Technical Assistance: B.P.Thumber (Veraval), A.D.Sawant, A.Y. Mestry(Bombay), C.K.Dinesh (Karwar), B.Sreedhara, Y.Muniappa, (Mangalore), K.Koumudi Menon, S.Lakshmi (Calicut), K.Chellappan, P.K.Baby (Cochin), K.Sasidharan Pillai (Vizhinjam), D.Gandhi, M.Manickaraja (Tuticorin), A.Ramakrishnan, S.Mohan (Mandapam Camp), P.Thirumilu, K.Shahul Hameed, M.M.Sultan, K.S.Krishnan (Madras), K.Dhanaraju (Kakinada), ~~P.V.Krishna Rao (Puri)~~.

8. Location of the Research Project : Veraval, Bombay, Vizhinjam, Tuticorin Mandapam and Madras for lobsters.

Veraval, Bombay, Karwar, Mangalore, Calicut, Cochin, Mandapam, Madras and Kakinada for Crabs.

9. (a) Objectives: i. To collect resources data on shallow water lobsters and commercially important crabs. ii. To elucidate the important biological aspects such as length, maturity, age and growth, food, seasonal abundance, reproduction, spawning migration and recruitment and assess the stock of commercially important species of crabs and lobsters.

(b) Practical Utility: Lobsters has an important export market and forms one of the export commodities among crustacean landings in India. Crabs also form an important component of the crustacean landings in India contributing mainly to the internal market. Production and biological characteristics of these resources have to be fully determined and the rate of exploitation closely watched in order to avoid overfishing and to implement efficient management measures.

10. Technical Programme:

i. Data on catch and effort (gear-wise) of shallow water lobsters to be collected.

ii. Data on mesh size and other particulars of the gear used and the price structure of the lobsters (head-on and headless) to be recorded regularly.

iii. Detailed studies on species composition and sex-ratio size distribution (sex wise) and maturity stages/ovigerous conditions in the population of the constituent species to be carried out.

iv. Collection of data on catch and effort (gear-wise) of commercially important crabs.

v. Data on mesh size and other particulars of the gear used and the price structure of the commercially important crabs to be recorded regularly.

vi. Studies on species composition and sex-ratio, size-distribution (sex-wise) and maturity stages of the constituent species to be carried out.

vii. Detailed analysis of data collected on the above aspects for stock assessment and preparation of reports and scientific papers.

viii. Brachiuran larval studies based on past exploratory survey collections.

Work done: Data on the fishery and biology of shallow water lobsters and commercially important crabs have been collected at some of the centres. Studies on the various aspects of biology have been partly completed for P.polyphagus. Stock assessment of P.polyphagus was carried out from Bombay coast.

Work envisaged in the current year: All the work as per technical programme will be carried out.

11. Date of start : 1992-93	12. Likely date of completion : 1997-98

13. Estimated man-months: , man months/year - 33

14. Facilities required:

i. Land
ii. Labour
iii. Special requirements
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 : Nil

16. Approximate cost:

a.	Salary of scientific staff	2,94,300
b.	Salary of technical staff	4,46,300
c.	Salary of supporting staff	
d.	Casual labourer cost, if any	
e.	Cost of equipment, facility etc.	4,500
f.	Contingencies, such as chemicals, fertilizers, seed, animals, feeds, sprayers etc.	26,320
g.	T.A.	40,300
h.	Total cost	8,11,720

17. Signatures of:

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

RESEARCH PROJECT 1994-95

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

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

4. Title of Project : Prawn & Fish Seed Resources

5. Title of Sub-project : Investigation on the exploited prawn and other seed resources of Kakinada Coast

6. Name and Designation of Project Leader : G.Subbaraju, Principal Scientist.

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	G.Subbaraju	Pl. Sci.	10	1-5
	G.Syda Rao	Sr.Sci	10	1-5
	A.Raju	Sci(SG)	10	1-5
	K.N.Saleela	Sci.	25	1-5

Technical Assistance: K.Ramasomayajulu, K.Dhanaraju, Ch.E.Thatayya, T.Nageswara Rao, P.V.Ramana, V.Abbulu, P.Achayya, N.Burayya

8. Location of the Research Project : Kakinada

9. (a) Objectives: To assess the species-wise and quantity of exploited prawn seed resources along the Kakinada Coast and their probable impact on the landings of different species of prawn at Kakinada Fisheries Harbour.

(b) Practical Utility: Recently there has been a spurt in the exploitation of P.monodon seed on a commercial scale along the Kakinada Coast. In the process of collection of P.monodon seed other species of commercially important prawn like P.indicus, P.semisulcatus, M.affinis apart from juvenile fish etc are destroyed. Recent preliminary study indicated about 100 million P.monodon seed were exploited during September'93 alone. In order to assess the impact of large scale exploitation of the prawn seed from this area on prawn landings a detailed study is warranted. This investigation will provide much needed information on the qualitative and quantitative aspects of prawn seed in time and space, to take any possible management measures.

). Technical programme: 1) Collection of data on the exploitation of prawn seed from Yanam to Tuni in the East Godavari district of Andhrapradesh. 2) Collection of data on the ecological condition of the places from where prawn seed are collected. 3) Collection of information on the manpower involvement. 4) Collection of information on the implements employed in the collection of prawn seed. 5) Collection of data on the price structure and destination markets.

1. Date of Start : 1994-95 12. Likely date of completion : 1995-96

3. Estimated man-months : ~~13~~ 16

4. Facilities required:
i. Land ii. Labour iii. Special equipment iv. Animal seed v. Fish ponds vi. Foreign exchange vii. Other items iv. Total estimated cost

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

6. Approximate cost:

a)	Salary of Scientific staff	Rs.	~~48,000~~ 28,000
b)	Salary of Technical Staff	Rs.	28,000
c)	Salary of Supporting Staff		
d)	Casual Labourer cost, if any		
e)	Cost of equipment, facility etc.		
f)	Contingencies, such as chemicals, fertilizers, seed, animals, feeds sprayers, etc and TA	Rs.	15,000
g)	Total cost	Rs.	~~91,000~~ 121,000

7. Signature of:

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

RESEARCH PROJECT 1994-95

1. Institute Code No.CF/CUL/1.9 2. I.C.A.R. Code No.

3. Name and address of Research Institute : CMFR Institute, Kochi-14.

4. Title of Project : Seed production, experimental farming and tagging of marine prawns

5. Title of Sub-project : Nil

6. Name and designation of Project Leader : Dr.N.Neelakanta Pillai Senior Scientist

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
Cochin	N.Neelakanta Pillai	Sr.Sci	35	iii, iv, v, vii, viii
	K.R.Manmadhan Nair	SG	50	iii, iv, vii, viii
	P.E.Sampson Manickam	SG	40	iii, iv, v, vii, viii
Karwar	V.S.Kakati	Sr.Sci	25	viii
Mandapam	E.V.Radhakrishnan	Sr.Sci	40	i, ii, iii
	G.Maheswarudu	S	25	i, ii, iii, iv, v
Minicoy	P.T.Sarada	S	50	vi, vii

Technical Assistance: K.N.Gopalakrishnan, K.Chellappan (Cochin), C.K.Dinesh (Karwar), M.R.Arputharaj, S.Mohan, A.Ramakrishnan, Vairamany (Mandapam Camp), A.Anasu Koya, Kunhi Koya (Minicoy).

8. Location of the Research Project : Minicoy, Karwar, Cochin, Mandapam Camp, Kakinada and Visakhapatnam

9. a) Objectives: i. To develop a viable technology for the broodstock management of penaeid prawns.

ii. To carry out transportation trials for survival of eggs and nauplii of penaeid prawns.

iii. To provide consultancy service in shrimp hatchery technology.

iv. To carry out tagging experiments with hatchery reared prawns and monitor their growth and movements.

v. To conduct experimental hatchery operations on penaeid prawns at Minicoy as part of the live bait development for tuna fishery.

vi. To carry out experiments on the farming of certain marine prawns

vii. To study the availability of various crustacean larval resources at Minicoy and attempt to rear some of them.

(b) Practical Utility:

1. As breeders of penaeid prawns are difficult to obtain at the appropriate time, a continuous hatchery operation for penaeid prawns become difficult. To overcome this it is essential to have a brood stock of prawns maintained in the hatchery.

2. In the absence of proper broodstock facility attached to the hatchery, the only alternative is to obtain them from wild which is often difficult in all places. Further transportation of spawner is expensive and it leads to abortion or premature spawning of the breeder due to stress factors. To overcome this it is planned to spawn them at the place of collection, and then transport egg/nauplii to the hatchery site. This would be cheaper and more convenient. The project is aimed at standardising the transportation procedure of egg/ nauplii.

3. CMFRI has perfected a technology for the hatchery rearing of penaeid prawns, suited to Indian condition. With certain location specific modifications, this technology can be adopted to establish shrimp hatcheries in any part of the Indian coast.

4. To study the farming prospects of Penaeus merguiensis (a native species) in the north west coast of India.

5. To use crustacean postlarvae/subadults/adults as a live bait for tuna fishing at Minicoy.

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10. Technical programme:

i. Broodstock development of commercially important shrimps by eyestalk ablation and environmental manipulation.

ii. Spawning and rearing of larvae of Penaeus semisulcatus to seed size under controlled conditions.

iii. Tagging and releasing of hatchery raised juveniles of P.semisulcatus in Palk Bay and monitoring their entry into commercial fishery.

iv. Experimental transportation of spawn and nauplii of Penaeus monodon from ~~Visakhapatnam to Cochin~~ & Mandapam and rearing them under controlled conditions to seed size.

v. Render consultancy service for establishing shrimp hatchery using CMFRI Technology.

vi. Survey of the Minicoy lagoon for crustacean larval resources and rearing the selected species for evaluation as live bait for tuna.

vii. Production of shrimp seed at Minicoy by establishing an experimental hatchery and evaluate its acceptance as live bait for tuna.

viii. Establish an experimental hatchery at Karwar for the seed production of P.merguiensis and study its culture and farming prospects along the Karnataka Konkan coast.

Work done:

1. A viable technology for the larval and nursery rearing of P.semisulcatus developed 37 lakhs of seeds of P.semisulcatus were produced during 1989-93 period of which 27.7 lakhs have been sea ranched.

2. P.semisulcatus and P.indicus were induced to mature under controlled conditions. Domestication experiments carried out were also successful.

3. Farming experiments of P.semisulcatus were carried out at Mandapam Camp using lab reared seeds. Within 4 months they have grown to a TL of 120 mm.

4. 7300 hatchery reared and farm grown juveniles of commercially important shrimps were tagged and released in the Palk Bay during 1993-94. Further observations are in progress.

5. Under consultancy service to Nikky Exports for a 30 million shrimp hatchery, a suitable site has been selected and design has been finalised and handed over. Work is in progress.

Work envisaged in the current year: As shown in the technical programme.

11. Date of start: 1984-85 | 12. Likely date of completion : 1994-95

13. Estimated man months : man months/year ~~35~~ 39

14. Facilities required:

i. Land
ii. Labour
iii. Special requirements
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 : Nil

16. Approximate cost:

a.	Salary of scientific staff	.. ..	2,93,640
b.	Salary of technical staff	.. ..	1,66,050
c.	Salary of supporting staff		
d.	Casual labourer cost, if any	.. ..	2,500
e.	Cost of equipment, facility etc.	.. ..	2,40,000
f.	Contingencies, such as chemicals, fertilizers, seed, animals, feeds, sprayers etc.	.. ..	1,00,000
g.	T A.	.. ..	50,000
h.	Total cost	.. ..	8,52,190

17. Signatures of:

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

RESEARCH PROJECT 1994-95

1. Institute Code No.MF/RE/1 2. ICAR Code No.

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

4. Title of Project : Molluscan Fishery Resources

5. Title of Sub-Project : Investigations on the resource characteristics of cephalopods

6. Name and Designation of Project Leader : M.M. Meiyappan, Scientist (SG)

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	K.K. Joshi	Sci.	50	1-4
Bombay	Kuber Vidyasagar	Sr.Sci.	50	1-4
	K.S. Sundaram	Sci.(SG)	50	1-4
Mangalore	Sunilkumar Mohamed	Sci.	25	1-4
Calicut	G.P.K. Achary	Sci.(SG)	25	1-4
Cochin	K. Prabhakaran Nair	Sci.(SG)	50	1-4
	V. Kripa	Sci.	25	1-4
Vizhinjam	N. Ramachandran	Sci.(S-2)	50	1-4
Mandapam	A.P. Lipton	Sr.Sci.	25	1-4
Madras	M.M. Meiyappan	Sci.(SG)	50	1-4
Kakinada	G. Syda Rao	Sci.(SG)	25	1-4
Visakha-patnam	R. Sarvesan	Sci.(SG)	50	1-4

Technical Assistance: Mangalore: D. Nagaraja, T-I-3; Calicut: V.G. Surendranathan, T-I-3; Cochin: N.P. Ramachandran, T-1; Vizhinjam: T.A. Omana, T-I-3; K.T. Thomas, T-I-3; Mandapam: K. Jayabalan, T-1; Madras: G. Sreenivasan, T-I-3; Kakinada: K.R. Somayajulu, T-4; Visakhapatnam: M. Prasada Rao, T-2.
To be provided: Veraval, Bombay.

8. Location of the Research Project: Veraval, Bombay, Mangalore, Calicut, Cochin, Vizhinjam, Mandapam, Madras, Kakinada, Visakhapatnam.

9. (a) Objectives: To assess the exploited stocks of squid, cuttlefish and octopus of commercial importance; to estimate the potential cephalopod resources in the presently exploited fishing grounds and to study their biological characteristics in relation to fisheries, with special reference to the gaps existing in our knowledge in regard to semelparity, post-spawning mortality and spawning migrations.

(b) Practical utility: Recently the squid, the cuttlefish, and of late, the octopus, have gained greater significance because of their increasing demand in the export market. Though the present production of cephalopods is almost entirely as by-catch, it has increased substantially in recent years. The results of these investigations will indicate the present level of exploitation and its pressure on potential stocks so as to take proper management measures. The biological studies will also help to fill the gaps in our knowledge on semelparous or non-semelparous condition in different species, post-spawning mortality if any, spawning and spawning migration. Since there is very little knowledge on octopus which is emerging as a new resource, the investigations will provide information on its biology, ecology and fishery.

10. Technical programme: (1) Collection of catch and effort data and monitoring of cephalopod production trend and fishery characteristics at major fishing centres. (2) Collection of data on important species of squid and cuttlefish for investigating the relevant biological characteristics. (3) Collection of octopus samples for identification, and for studying the biological aspects. (4) Analysis and interpretation of data for periodic reports and research publications.

Work done: Monitoring of cephalopod production trend and collection of relevant biological data have been done.

Work envisaged: Work will be carried out as per technical programme 1 to 4 during the current year.

11. Date of start : 1992-93 12. Likely date of completion : 1994-95

13. Estimated man-months : 57

14. Facilities required:

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

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

a) Number of financing organisations : No

b) Title of Project :

16. Approximate cost :

a)	Salary of scientific staff	: Rs. 4,06,000/-
b)	Salary of Technical staff	: Rs. 1,35,000/-
c)	Salary of Supporting staff	: -
d)	Casual Labourer cost, if any	: -
e)	Cost of equipment, facility etc.	: -
f)	Contingencies, such as chemicals, fertilizers, seed, animals, feeds, sprayers, etc. and TA.	: Rs. 1,00,000/-
g)	Total cost	: Rs. 6,41,000/-

17. Signature of:

Sd/-
Project Leader

Sd/-
Head of Division

Sd/-
Director

RESEARCH PROJECT 1994-95

1. Institute Code No. MF/RE/2 2. ICAR Code No.

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

4. Title of Project : Molluscan Fishery Resources

5. Title of Sub-Project : Investigations on the resource characteristics of bivalves and gastropods

6. Name and Designation of Project Leader : P.S. Kuriakose, 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
Veraval	K.K. Joshi	Sci.	25 a-e	1-5
Bombay	K. Sundaram	Sci.(SG)	50 a,c	1-5
Karwar	P.K. Asokan	Sci.	50 a,b,c	1-6
Mangalore	Sunilkumar Mohamed	Sci.	25 a,c	1-6
Calicut	P.S. Kuriakose	Sci.(S-3)	25 b	1-5
	K.K. Appukuttan	Sci.(SG)	25 c	1-5
	G.P.K. Achary	Sci.(SG)	25 a	1-6
Cochin	V. Kripa	Sci.	50 a,b	1-6
Vizhinjam	N. Ramachandran	Sci.(S-2)	50 a,b	1-4
Tuticorin	K. Ramadoss	Sci.(SG)	50 a,c,d,e	1-6,7
Mandapam	A.P. Lipton	Sr.Sci.	50 d,e	1-5,7
Madras	P.V. Sreenivasan	Sr.Sci.	50 a,c,e	1-6
	P. Natarajan	Sci.(SG)	50 d,e	1-5
Kakinada	G. Syda Rao	Sr.Sci.	25 a,d,e	1-6
Visakhapatnam	R. Sarvesan	Sci.(SG)	25 a,e	1-6

Technical Assistance: Mangalore: D. Nagaraja, T-I-3; Calicut: V.G. Surendranathan, T-I-3; Cochin: A. Palanichamy, T-1; Vizhinjam: K. Ramakrishnan Nair, T-5; K.T. Thomas, T-I-3, Tuticorin: C.T. Rajan, T-5, A. Dasman Fernando, T-I-3, F. Soosai V. Rayan, T-I-3; Mandapam: K. Jayabalan, T-1; Madras: R. Thangavelu, T-II-3, V. Selvaraj, T-II-3; Kakinada: K.R. Somayajulu, T-4, P. Achayya, T-1; Visakhapatnam: M. Prasada Rao, T-2. P. Poovannan, T-I-3

To be provided: Veraval, Bombay, Karwar.

8. Location of the Research Project : Veraval, Bombay, Karwar, Mangalore, Calicut, Cochin, Vizhinjam, Tuticorin, Mandapam, Madras, Kakinada, Visakhapatnam.

9. (a) Objectives: The project aims at estimating the production and stock position of different resources; studying the methods of exploitation, marketing and utilization; investigating the relevant biological and ecological aspects; and collecting information on growth and migration of chanks by mark-recovery studies.

(b) Practical Utility: (1) Since there are no estimates of the production of different bivalve and gastropod resources, this study will provide the resource characteristics and annual production estimates on a national level. (2) Resources such as chank and mussels are subjected to heavy fishing pressures in some areas due to increasing demand. The results of this project will enable us to suggest suitable management measures. (3) The biological information on aspects like size, maturity, growth and condition factor together with information on ecological aspects, will aid in proper exploitation of the resources and in taking conservation measures, if necessary, and in exploring the possibilities of culture in selected areas. (4) The mark-release and recovery studies will provide the information on the growth and migrations of the sacred chank which is the most important marine gastropod resource.

10. Technical programme: The following groups of molluscs are to be studied: (a) clam (b) mussels (c) oysters (d) chank (e) other gastropods and bivalves of commercial importance. (1) To monitor the catch and effort for estimating the annual production, and assessing stock position on all-India basis. (2) To study the size frequency, maturity, growth and condition factor in relation to the fishery. (3) To gather information on fishing methods, marketing and utilization. (4) To study the seed availability and exploitation, if any, affecting the natural populations. (5) To monitor the environmental parameters in relation to the distribution and abundance of the resources. (6) To study the effect of quarrying subfossil deposits, if any, on the natural clam resources. (7) To study the growth and migration of chank by mark-release experiments.

Work done: Monitoring of bivalve and gastropod resources and collection of relevant biological data have been done.

Work envisaged: Work will be carried out as per technical programme 1 to 7 during the current year.

11. Date of start : 1989-90 12. Likely date of completion : 1994-95

13. Estimated man-months : 69

14. Facilities required:

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

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

a) Number of financing organisation : No

b) Title of Project :

16. Approximate cost:

	Rs.
a) Salary of Scientific staff	: 5,25,000
b) Salary of Technical staff	: 2,25,000
c) Salary of Supporting staff	: -
d) Casual Labourer cost, if any	: -
e) Cost of equipment, facility etc.	: -
f) Contingencies, such as chemicals, fertilizers, seed, animals, feeds, sprayers etc. and TA	:F.1,50,000
g) Total cost	: 9,00,000

17. Signature of :

Sd/-
Project Leader

Sd/-
Head of Division

Sd/-
Director

RESEARCH PROJECT 1994-95

1. Institute Code No. : MF/CUL/4 2. ICAR Code No.

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

4. Title of Project : Seed production and ranching in Coastal waters

5. Title of Sub-project : Development of hatchery technology for experimental/ mass production of the seed of clams, mussel, edible oyster, pearl oyster and chank and ranching of clam and chank seed in coastal waters.

6. Name and Designation of Project Leader : K.A. Narasimham, Principal Scientist.

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	Desig-nation	Time to be spent (%)	Work to be done
Cochin	K.A. Narasimham	Pri.Sci.	50 a	5 & 7
	T.S. Velayudhan	Sci.(SG)	50 a	5 & 7
Tuticorin*	M.E. Rajapandian	Sci.(SG)	50 b	1-4,6,7
	Rani Palaniswamy	Sci.	50 b	1-4,6,7
	K. Ramadoss	Sci.(SG)	25 b	1-4,6,7
*	D. Sivalingam	Sci.(S-2)	100 a	1-3,5,7
	A.C.C. Victor	Sr.Sci.	25 c	1-4,6,7
	A. Chellam	Sci.(SG)	25 c	1-4,6,7
	S. Dharmaraj	Sci.(SG)	50 c	1-4,6,7
Calicut *	P.S. Kuriakose	Sci.(S-3)	50 d	1-3,6,7
	G.P.K. Achary	Sci.(SG)	50 d	1-3,6,7
	K.K. Appukuttan	Sci.(SG)	50 d	1-3,6,7
Mandapam *	A.P. Lipton	Sr.Sci.	25 e	1-3,5,7

* Associate Project Leaders

Technical Assistance: Tuticorin: C.T. Rajan, T-5, A.A.P. Mudaliar, T-5, M. Enose, T-I-3, S.M. Sathakkathulla, T-1, P. Athipandian, T-2, J. Padmanathan, T-1, K. Srinivasagan, T-1-3, N. Jesuraj, T-2, K. Shanmugasundaram, T-2, U. Jayaram, T-1, J.X. Rodrigo, T-II-3 (FEMD), A. Dasman Fernando, T-I-3, F. Soosai V. Rayan, T-I-3, P. Muthukrishnan, T-2; Calicut: V.G. Surendranathan, T-I-3; Mandapam: K. Jayabalan, T-1.

:wo Senior Research Fellows for MPEDA-funded clam hatchery
ınd two Junior Research Fellows for the Environment
)epartment funded Chank hatchery.

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3. Location of the Research Project : Tuticorin, Calicut, Mandapam.

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9. (a) Objectives: (1) To develop appropriate technology for the production of seed of commercially important clams, green mussel and the chank. (2) To standardise the techniques in various phases of hatchery system for mass production of seed of edible oyster and Indian pearl oyster and to work out the economics of seed production. (3) To meet the edible oyster seed requirements of project partly funded by NABARD and also for location testing programmes. (4) To meet the pearl oyster seed requirements of the pearl culture project and also for location testing programmes. (5) To meet the requirements of the seed of clams and chank for ranching in the coastal waters.

(b) Practical Utility: While a moderate level of proficiency has been achieved in the controlled breeding and mass production of the seed of Crassostrea madrasensis and Pinctada fucata, the hatchery techniques required for the production of seed of a number of clams, mussel and the chank are either wanting or are in an early stage of development. The results achieved in this project would help to meet the seed requirements of culture operations and also to initiate/intensify ranching of severel commercial molluscs in coastal waters leading to enhancement of natural stocks.

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10. Technical programme: The following species are identified implementing the technical programme:

a) Paphia malabarica and other clams. (b) Crassostrea madrasensis. (c) Pinctada fucata. (d) Perna viridis and (e) Xancus pyrum.
1) Collection, transportation and maintenance of brood stock; conditioning, induced maturation and spawning; larval rearing and spat production. 2) Study of survival of spat, factors influencing it and evaluation of production cost of seed. 3) Nursery rearing to stockable size. 4) To standardise the techniques for mass production of seed of pearl oyster and edible oyster and to supply seed for NABARD funded project and pearl culture project. 5) Ranching of hatchery produced seed of clams and chank in suitable culture sites in coastal waters. Monitoring of the environmental parameters, growth, survival and effects if any of ranching on the natural populations. 6) To maintain stock cultures of micro-algae and to produce them on mass scale. 7) Planning and execution of project. Analysis and interpretation of data and preparation of reports.

Work done: Basic technology for breeding and seed production of the clam Paphia malabarica has been developed. Also several phases in the operation of the hatchery for mass production of the seed of Crassostrea madrasensis and Pinctada fucata have been standardised.

Work envisaged: In P. viridis hatchery technology is to be developed. Technology of seed production of P. malabarica is to be upgraded for mass production. In C. madrasensis and P. fucata hatchery technology for mass production is to be standardised. Work on the breeding of Xancus pyrum is to be initiated.

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11. Date of start: 1989-90 12. Likely date of completion : 1994-95

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13. Estimated man-months : 69

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14. Facilities required:

i) Land : No
ii) Labour : Yes
iii) Special equipment for mussel hatchery: Yes
iv) Animal shed: Yes for mussel hatchery shed
v) Fish ponds nursery : Yes
vi) Foreign exchange : No
vii) Other items: No
viii) Total estimated cost :

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

a) Name of financing organisation : MPEDA for clam seed production and Dept. of Environment for Chank seed programme.

b) Title of project :
i) Hatchery production of clam seed and ranching in coastal waters.
ii) Studies in the biology and searanching of the sacred chank, Xancus pyrum with special reference to the protection of the species in the Marine National Park of the Gulf of Mannar.

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16. Approximate cost:

	CMFRI Rs.	MPEDA Rs.	Dept. of Env. Rs.
a) Salary of Scientific staff	6,00,000	-	-
b) Salary of Technical staff	2,66,000	48,000 (SRF)	45,600
c) Salary of Supporting staff	35,000	-	12,000

	CMFRI	MPEDA	Dept.of Envi.
	Rs.	Rs.	Rs.
d) Casual labour cost	85,000	12,000	-
e) Cost of equipment, facility etc.	5,50,000	1,57,000	95,000
f) Contingencies, such as chemicals, fertilizers, seed, animals, feeds, sprayers, etc. and T.A.	2,75,000	34,000	1,12,000
g) Total cost	18,11,000	2,51,000	2,64,600

Grand Total: 23,26,600

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17. Signature of:

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

RESEARCH PROJECT 1994-95

1. Institute Code No. MF/CUL/8 2. ICAR Code No.

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

4. Title of Project : Mariculture of molluscs

5. Title of Sub-project : Selection of suitable sites for bivalve culture

6. Name and Designation of Project Leader : K. Satyanarayana Rao, Principal Scientist.

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	P.K. Asokan	Sci.	50 a,c	1-4
Mangalore	Sunilkumar Mohamed	"	50 a,c	1-4
Calicut	P.S. Kuriakose	Sci.(S-3)	25 a,b,c	1-4
	K.K. Appukuttan	Sci.(SG)	25 a,b,c	1-4
Cochin	T.S. Velayudhan	Sci.(SG)	50 a,b,c	1-4
	V. Kripa	Sci.	25 a,b,c	1-4
Tuticorin	A.C.C. Victor	Sr.Sci.	25 b	1-4
	A. Chellam	Sci.(SG)	25 b	1-4
	S. Dharmaraj	Sci.(SG)	25 b	1-4
Madras	K. Satyanarayana Rao	Pri.Sci.	50 a	1-4
	P.V. Sreenivasan	Sr.Sci.	50 a	1-4
	P. Natarajan	Sci.(SG)	50 a	1-4
Kakinada	G. Syda Rao	Sr.Sci.	50 a,b	1-4

Technical Assistance: Mangalore: D. Nagaraja, T-I-3; Calicut: V.G. Surendranathan, T-I-3, Cochin: N.P. Ramachandran, T-1, A. Palanichamy, T-1; Tuticorin: K. Srinivasagan, T-I-3, N. Jesuraj, T-2, P. Muthukrishnan, T-2, K. Shanmugasundaram, T-2; Madras: V. Selvaraj, T-II-3, R. Thangavelu, T-II-3, P. Poovannan, T-I-3, L. Jayasankar* T-I-3; Kakinada: K.R. Somayajulu, T-4, P. Achayya, T-1. *(FEMD)

8. Location of the Research Project : Karwar, Mangalore, Calicut, Cochin, Tuticorin, Madras, Kakinada

9. (a) Objectives: The technologies of oyster culture, pearl culture and clam culture have been developed by CMFRI but most of the work has been concentrated at Tuticorin (edible and pearl oyster), Vizhinjam (pearl oyster and brown mussel) Calicut (green mussel) and Kakinada (blood clam). As mariculture is area-specific, it is necessary to identify suitable localities where bivalve farming could be carried out and the aim of the project is to fill this Lacuna.

(b) Practical Utility: The results will help to identity areas suitable for culture of edible oyster, pearl oyster and clams leading to the development of aquaculture of these molluscs.

10. Technical programme: (1) Collection of seed of (a) edible oyster (b) pearl oyster and (c) clams (Paphia/ Villorita/Meretrix) either from the natural grounds or from the Tuticorin hatchery of the Institute. (2) Rearing the seed in the field and monitoring the growth, survival, production and other relevant aspects. (3) Monitoring of environmental parameters. (4) Analysis of data and preparation of reports.

Work done: Karwar and Kakinada bays and Pulicat lake were found to be suitable for developing edible oyster culture.

Work envisaged: Several areas in Kerala and Karnataka are to be tested for oyster culture. Similarly the suitability of some areas in Tamil Nadu, Kerala and Andhra Pradesh for pearl culture are to be studied.

11. Date of start : 1991-92 12. Likely date of completion : 1995-96

13. Estimated man-months : 60

14. Facilities required:

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

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

a) Name of financing organisation : -

b) Title of Project : -

16. Approximate cost:

		Rs.
a) Salary of Scientific staff	:	5,00,000
b) Salary of Technical staff	:	2,15,000
c) Salary of Supporting staff	:	-
d) Casual Labourer cost, if any	:	1,80,000
e) Cost of equipment, facility etc.	:	2,00,000
f) Contingencies, such as chemicals, fertilizers, seed, animals, feeds, sprayers, etc. and T.A.	:	75,000
e) Total cost	:	9,70,000

17. Signature of:

Sd/-
Project Leader

Sd/-
Head of Division

Sd/-
Director

RESEARCH PROJECT 1994-95

1. Institute Code No. MF/CUL/9 2. ICAR Code No.

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

4. Title of Project : Pilot project on oyster culture

5. Title of Sub-Project : Semi-commercial production of edible oyster

6. Name and Designation of Project Leader : M.E. Rajapandian, Scientist (SG)

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	M.E. Rajapandian	Sci.(SG)	50	1,5,7
	K. Ramadoss	"	25	1,5,7
	Rani Palaniswamy	Scientist	50	1,5,7
	M.C. Arunmozhi Devi	Scientist	25	6,7

Technical Assistance:
A.A.P. Mudaliar, T-4, S.M. Sathakathulla, T-1, R. Athipandian, T-2, J. Padmanathan, T-1.

8. Location of the Research Project : Tuticorin

9. (a) Objectives: To study the techno-economic feasibility of oyster culture through upgradation of the present experimental-scale technology for semi-commercial production of oysters.

(b) Practical Utility: The project will demonstrate the commercial feasibility of oyster farming. The results obtained in the project will be beneficial to entrepreneurs interested in taking up oyster farming on commercial lines.

10. Technical Programme: (1) Nursery rearing of oyster seed supplied from CMFRI hatchery; transfer of seed from nursery and stocking them in farm; maintenance of farm, including control of foulers and predators. (2) Monitoring of growth and condition factor of oysters.

(3) Monitoring of environmental parametres. (4) Harvesting of oysters when they grow to marketable size. (5) Depuration of harvested oysters. (6) Transfer of technology to farmers and entrepreneurs. (7) Analysis and interpretation of data and preparation of report.

Work done: The oyster farm covers 0.70 ha and over 26 t of oysters were harvested.

Work envisaged: To intensify the work and initiate tranfer of technology programme.

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11. Date of start : 1991-92 12. Likely date of completion : 1994-95

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13. Estimated man-months : 18

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14. Facilities required:

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

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

a) Name of financing organisation : 75% of contingencies financed by National Bank for Agricultural and Rural Development (NABARD)

b) Title of Project : Pilot Project on oyster culture

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16. Approximate cost:

		Rs.
a) Salary of Scientific Staff	:	1,33,000
b) Salary of Technical Staff	:	65,000
c) Salary of Supporting Staff	:	25,000
d) Casual Labourer cost, if any	:	1,55,000
e) Cost of equipment, facility etc.	:	-
f) Contingencies, such as chemicals, fertilizers, seed, animals, feeds, sprayers etc. and T.A.	:	1,40,000
g) Total cost	:	5,18,000

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17. Signature of:

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

RESEARCH PROJECT 1994-95

1. Institute Code No. MF/CUL/10 2. ICAR Code No.

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

4. Title of Project : Mariculture of molluscs

5. Title of Sub-project : Upgradation, location testing and transfer of technology of pearl culture.

6. Name and Designation of Project Leader : A.C.C. Victor, Senior Scientist

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	A.C.C. Victor	Sr.Sci.	50	1-4,6
	A. Chellam	Sci.(SG)	50	1-4,6
	S. Dharmaraj	Sci.(SG)	25	1-4,6
	M.C.Arunmozhi Devi	Sci.	25	5,6

Technical Assistance: K. Srinivasagan, T-I-3, K. Shanmugasundaram, T-2, A. Dasman Fernando, T-I-3, F. Soosai V. Rayan, T-I-3, N. Jesuraj, T-2, Muthukrishnan, T-2.

8. Location of the Research Project : Tuticorin

9. (a) Objectives: To upgrade the pearl culture technology to suit different areas. To transfer pearl culture technology to the farmers and entrepreneurs involving them in the operation of the project.

(b) Practical Utility: Technology upgradation based on different field conditions is necessary to sustain the pearl yield. Transfer of pearl culture technology to farmers and entrepreneurs helps to establish pearl culture ventures on commercial lines leading to income and employment generation.

10. Technical programme: (1) Maintenance of farm and production of cultured pearls involving fishermen at two or three selected areas including Valinokkam so that they are trained in pearl culture. (2) To experiment with different farm materials and assess their durability and cost effectiveness. (3) To work out pearl production in relation to the size of the nucleus implanted, season of implantation, and age and maturity condition of the oyster. (4) To work out the economics of pearl culture. (5) Transfer of technology to farmers and entrepreneurs. (6) Analysis of data and preparation of reports.

Work done: Valinokkam bay in Tamil Nadu proved to be highly suitable for pearl culture. Rack culture method was successfully experimented and it was found to be cost effective when compared to the raft method.

Work envisaged: The technology is to be suitably modified as required at different localities. Various types of farm materials and the production of pearls in relation to the biology of the oyster are to be studied. Transfer of technology to be intensified.

11. Date of start : 1991-92 12. Likely date of completion : 1994-95

13. Estimated man-months : 18

14. Facilities required:

i. Land :
ii. Labour :
iii. Special equipment: Yes (farm)
iv. Animal shed: Pearl processing machinery.
v. Fish ponds:
vi. Foreign exchange:
vii. Other items:
viii. Total estimated cost:

15. If financed by an organisation other than the Institute:
a) Name of financing organisation :
b) Title of Project :

16. Approximate cost:

		Rs.
a) Salary of Scientific staff	:	1,50,000
b) Salary of Technical staff	:	67,000
c) Salary of Supporting staff	:	-
d) Casual Labourer cost, if any	:	25,000
e) Cost of equipment, facility etc.	:	30,000
f) Contingencies, such as chemicals, fertilizers, seed, animals, feeds, sprayers, etc. and T.A.	:	25,000
g) Total cost	:	2,97,000

17. Signature of:

Sd/-
Project Leader

Sd/-
Head of Division

Sd/-
Director

RESEARCH PROJECT 1994-95

1. Institute Code No. PNP/35 2. ICAR Code No.

3. Name and address of Research Institute : C.M.F.R.I., Cochin - 14

4. Title of Project : Fish and shellfish nutrition

5. Title of Sub-project : Development, Evaluation and farm performance of compounded feeds for prawns

6. Name and designation of Project Leader : R. Paul Raj
Senior Scientist

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

Centre	Name	Designation	Time to be spent (%)	Work to be done
Madras	R. Paul Raj	Sr. Scientist	40	Coordination and planning of experiments and T.P. 1- 8
-do-	M. Vijayakumaran	Sr. Scientist	40	2-6
Tuticorin	D.C.V. Easterson	Scientist (SG)	25	2-6
-do-	D. Kandasami	Scientist (SG)	25	2-6
Cochin	Manpal Kaur	Scientist	40	1-7
-do-	P. Vijayagopal	Scientist	40	1-7

Technical Assistance:

Madras V. Selvaraj, N. Shahul Hameed and Ahamed Kamal Basha

Tuticorin : P. Sigamony

Cochin : V. Suresh and S. Nandakumar Rao

8. Location of the Research Project: Madras, Tuticorin ,Cochin

a) Objectives: i) To evaluate the efficacy of different compounded feeds for semi-intensive and extensive prawn culture systems. ii) To evolve practical feeding strategies for prawn culture systems. iii) To study the physico-chemical characteristics, hydrostability, digestibility and shelf-life of feeds. iv) To asses the impact of feed on water quality, plankton production and diseases. v) To develop new feed formulations and test their efficacy. vi) To offer technical advice to small farmers and weaker sections. vii) To offer training and consultancy service on feed production technology, feeding and farm management techniques, and in setting up of mini laboratories.

b) Practical utility: Feed is the major operational input in prawn culture systems. Depending upon the intensity of culture system feed costs very from 40 to 60% of the operational costs. Besides, adaptive research carried out by the CMFRI in Nellore District of Andhra Pradesh have shown that apart from affecting growth and production of prawns, the water and soil characteristics are significantly affected by the quality and quantity of feed supplied. The proposed study would help in developing improved least-cost and water-stable feed formulations for prawn culture. The study sould also help in evolving appropriate feeding strategies to maximise prawn growth, production, feed efficiency and profits and to minimise feed wastage and feed-based water pollution in prawn culture systems. The study would also help in understanding the constraints faced by prawn farmers in the aspects relating to the project. Transfer of the techniques developed through the project through technical advice and consultancies would help in improved economic activity relating to quality prawn feed production and in sustainable prawn culture.

Technical Programme: 1) Determination of the physicochemical characteristics, water-stability and digestibility of feeds. 2) Evaluation of farm performance of farm-made feeds for captive use, indigenous and imported commercial feeds in selected farms in Nellore (Andhra Pradesh), Chidambaranar (Tamil Nadu) and Ernakulam (Kerala) districts. 3) Assessment of growth, production, feed efficiency and economics. 4) Assessment of nutrient requirements and nutrient interactions. 5) Assessment of the impact of feeds and feeding on water quality. 6) Development of new feed formulations and improvement of existing formulations. 7) Studies on shelf-life of prawn feeds. 8) Consultancy in prawn feed production technology, (including setting up of tiny and small scale feed production units) feeding and farm management techniques and setting up of mini-labs will be taken up as and when request is received and approved by the Institute.

Work done: 1) A survey was made covering several prawn farms in Nellore District of Andhra Pradesh to understand the existing prawn culture practices with reference to feeds, feeding management and water quality. 2) Factors affecting prawn growth, production and FCR of the feed were studied in selected farms in Nellore District. 3) Diel variations in water quality parameters (pH, ammonia, dissolved oxygen, salinity and temperature) were studied in 6 ponds for one complete crop period (about 5 months). 4) A feed evaluation experiment was conducted to improve the FCR of feeds. 5) Preliminary study has been made to compare the efficacy of indigenous and imported feeds. 6) Technical advice was given to prawn farmers on feeds, feeding, disease problems and water management.

Work envisaged: As per Technical programme

11. Date of start : 1990-91 12. Likely date of completion :1994-95

13. Estimated man-months : 33.6 man-months

14. Facilities required:

i) Feed preparation equipment: Micropulveriser, Micropulveriser, Seiver with shaker, mini-extruder, Feed mixer, Steam boiler, Drier.
ii) Bomb Calorimeter
iii) Transport facilities
iv) Ponds - farmer's ponds will be utilised

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

16. Approximate cost:

a) Salary of scientific staff	:	Rs 2,20,000/-
b) Salary of technical staff	:	Rs 85,000/-
c) Salary of supporting staff	:	Rs 18,000/-
d) Casual labour, if any	:	Rs 15,000/-
e) Cost of equipment	:	Rs 3,50,000/-
f) Contingencies: Chemicals, glasswares, feed materials etc.		Rs 80,000/-
g) TA/DA		Rs 20,000/-
h) Total cost		Rs 7,88,000/-

17. Signatures of

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

RESEARCH PROJECT - 1994-95

1. Institute Code No. PNP/39 2. ICAR Code No.

3. Name and address of Research Institute : C.M.F.R. Institute, Cochin - 14

4. Title of Project : Reproductive physiology of prawns

5. Title of sub-project : Endocrinological factors influencing maturation in penaeid prawn, Penaeus indicus

6. Name and Designation of Project Leader : N. Sridhar, Scientist

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	N. Sridhar	Scientist	50	1 - 3
Cochin	Mohan K. Zachariah	Scientist	100	1 - 3

Technical Assistance : to be posted

8. Location of the Project : Cochin

9. a) Objectives: To implant the pellets prepared out of the extracts of eyestalk and thoracic ganglion of mature female prawns in commercially important prawns and see them effect on gonadal maturation.

   b) Practical Utility: Results of the present investigation may identify the combination of proteins involved in inducing gonadal maturation and brood stock development.

10. Technical Programme:

1. Preparation of protein extracts from the neuro-secretary centres and their concentration.
2. Preparation of pellets with those extracts and cholesterol in different combinations.
3. Implantation of pellets in prawns and monitoring the effect produced in the prawn in terms of gonadal maturation.

Work done

Standardisation of procedures for the preparation of protein extracts, their corresponding concentration have been carried out. The procedure for preparation of pellets incorporated with extracts in different combination were standardised.

Work envisaged: As per technical programme

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11. Date of start : April 1989 12. Likely date of completion: 1995

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13. Estimated man-months : 18 man-months/year

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14. Facilities required:

i. Land	:	v. Fish ponds	:
ii. Labour	:	vi. Foreign Exchange	:
iii. Special eqpt.	:	vii. Other items	
iv. Animal shed	:	viii. Total estimated cost	:

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

(a) Name of the financing organisation : N.A.
(b) Title of the project : N.A.

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16. Approximate cost :

a) Salary of scientific staff	:	Rs	1,20,000/-
b) Salary of Technical staff	:		
c) Salary of supporting staff	:		
d) Casual labour if any	:		
e) Cost of equipment, facilities etc.	:	Rs	20,000/-
f) Contingencies such as chemicals, fertilizers, seed, animals, feeds, sprayers etc.		Rs	40,000/-
g) TA/DA	:		
h) Total cost	:	Rs	1,80,000/-

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17. Signatures of

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

RESEARCH PROJECT : 1994-95

1. Institute code No. PNP/41 2. ICAR Code No.

3. Name and address of Research Institute : C.M.F.R. Institute, Cochin - 14

4. Title of Project : Finfish and Shellfish Genetics

5. Title of sub-project : Identification of genetic stocks in Indian Mackerel (Rastrelliger Kanagurta)

6. Name and Designation of Project Leader : M.K. George Senior Scientist

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.K. George	Sr. Scientist	25	1 - 3
"	P.C. Thomas	Sr. Scientist	100	1 - 3
"	N.K. Verma	Scientist		

Technical Assistance: To be posted

8. Location of the Research Project : Cochin

9. a) Objectives: To study the genetic stock structure of Rastrelliger kanagurta

b) Practical utility: The informations on the genetic stock composition in R. kanagurta are essential for scientific exploitation and conservation of its resources. The information may also help in understanding the causes of short-term and long term fluctuations in the mackerel fishery.

10. Technical Programme:

1. To estimate allelic frequencies of polymorphic enzyme/protein systems in population samples collected from west and east coast.
2. To compare the gene frequencies between populations and between regions to identify the genetic stocks sustaining the fishery.
3. To study the electrophoretic patterns of DNA in Indian Mackerel populations and its implications in the genetic stock structure.

Work done:

Experimental conditions were standardised to separate and resolve electrophoretic patterns of LDH, XDH, Est. G-6 PD, ADH, SDH, XDH, PO enzyme systems and general proteins. Sample populations from different regions were tested to detect polymorphic enzyme systems like Est. G-6 PD, ADH, XDH, SDH and PO. Preliminary estimate of gene frequency values for Est, G-6 PD, ADH, SDH, XDH and PO was also done for Cochin, Wedge Bank, Mangalore and Thottapally populations.

Work envisaged:

Final screening of different population samples to estimate allelic frequencies and to draw a conclusion on the population genetic structure of the species. Try to correlate DNA patterns and biochemical genetic stock structure.

11. Date of start : 1990 12. Likely date of completion : 1995

13. Estimated man-months : 21 man-months

14. Facilities required:

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

15.	If financed by an organisation other than the Institute	: Nil
	(a) Name of the financing organisation	: N.A.
	(b) Title of the Project	: N.A.

16. Approximate cost

a)	Salary of Scientific staff	: Rs	3,20,000.00
b)	Salary of Technical staff	:	
c)	Salary of supporting staff	:	
d)	Casual labour cost if any	:	
e)	Cost of equipment, facility etc.	Rs	10,000.00
f)	Contingencies such as chemicals, feeds, sprayers etc.	Rs	75,000.00
g)	TA/DA	Rs	10,000.00
h)	Total cost	Rs	4,15,000.00

17. Signatures of

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

RESEARCH PROJECT : 1994 - 95

1. Institute Code No. PNP/44 2. ICAR Code No.

3. Name and address of Research Institute : C.M.F.R. Institute, Cochin - 14

4. Title of Project : Physiology of marine organisms

5. Title of Sub-project : Tolerance limits of certain environmental factors affecting physiological behaviour of some cultivable organisms

6. Name and designation of Project Leader : M. Peer Mohamed Principal Scientist

7. Name(s) and Designation(s) of Project Leader and Project Associate(s) 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. Peer Mohamed	Principal Scientist	50	1-4
Tuticorin	D.C.V. Easterson	Scientist(SG)	50	1&2
Tuticorin	D. Kandasami	Scientist(SG)	50	2&3
Cochin	N. Sridhar	Scientist	25	5

Technical Assistance : P. Sigamani (Tuticorin)
A. Udayakumar (Cochin)

8. Location of the research project: Cochin and Tuticorin

9. a) Objectives: To find out the tolerance limits of temperature, salinity and ambient oxygen in selected cultivable marine organisms such as pearl oysters, clam and sea cucumber - with reference to ecophysiological behaviour.

b) Practical Utility: The results of the study will elucidate, (i) the behaviour of the test animals to different levels of temperature, salinity and ambient oxygen, and (ii) the optimum levels of these environmental factors to achieve better growth and survival.

Work done : The salinity and temperature tolerance limits were studied in edible oyster and clams. In the edible oyster the optimum growth rate was observed in 30‰ salinity and survival rate at 25 - 27°C. In the clams Mesodesma and Donax also the growth and survival was highest at 30‰ salinity whereas in the young Paphia malabarica the maximum survival rate and growth was obtained at 20 - 25‰ salinity.

Work envisaged: The low lethal oxygen level in the experimental animals will be tested at different temperature and salinities. The ecophysiological behaviour and the changes induced in the tissue enzymes under various experimental conditions will also be studied.

10. Technical Programme:

1. Temperature tolerance in the test species at different salinities and high ambient oxygen.
2. Salinity tolerance of the test species at different temperatures and high ambient oxygen.
3. Low lethal oxygen level in the test species at different temperatures and salinities.
4. Behaviour of the test animals under various experimental conditions (1,2&3 of the T.P.)
5. Changes induced in the tissue enzyme profile by various stress factors (1,2 & 3)

11. Date of start : April 1992

12. Likely date of completion: March 1996

13. Estimated man-months : 42 man-months

14. Facilities required:

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

15. If financed by an organisation other than the Institute : Not applicable

(a) Name of the financind organisation : N.A.

(b) Title of the Project : N.A.

16. Approximate cost:

a)	Salary of scientific staff	: Rs	2,88,000.00
b)	Salary of technical staff	: Rs	60,000.00
c)	Salary of supporting staff	: Rs	30,000.00
d)	Casual labour cost if any	: Rs	10,000.00
e)	Cost of equipment, facility etc.		
f)	Contingencies, such as chemicals, fertilizers, seed, animals, feeds, sprayers etc.	: Rs	40,000.00
g)	TA/DA	: Rs	10,000.00
h)	Total cost		4,38,000.00

17. Signatures of

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

RESEARCH PROJECT 1994-95

1. Institute code No. PNP/45 2. ICAR Code No.

3. Name and address of Research Institute : C.M.F.R. Institute, Cochin - 14

4. Title of Project : Marine Biotechnology

5. Title of sub-project : Studies on cryopreservation of gametes and embryos of penaeid prawn P. indicus

6. Name and designation of Project Leader : A.D. Diwan 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
Cochin	A.D. Diwan	S-3	70	1 - 6
Cochin	N. Sridhar	Scientist	25	1, 5

Technical Assistance : V. Suresh

8. Location of Research Project : Cochin

9. Objectives:

a) The first objective of this study is to evolve suitable technique for cryopreservation and storage of gametes (spermatophores) of a marine prawn P. indicus for shorter and longer duration and further to assess the virility and viability of the sperms by acrosome formation and fertilising riped eggs.

b) The second objective is to evolve suitable technique of cryopreservation of embryos for shorter and longer duration and test the viability by studying embryonic development.

Practical utility: The success of the production of animals primarily depends upon the availability of spawners and brooders. In mariculture system one of the major constraints is the non-availability of sufficient number of spawners at desired time and in case they are available brood stock maintenance and management is difficult and expensive affair. Therefore to ease this problem it is felt to evolve suitable methods of cryopreservation and storage of spermatophores and create a gamete bank so that stored spermatophores can be used for production of seed at any time of the year by artificial insemination or invitro fertilization. If the method proved to be successful it may help in propagation of animals for the development of aquaculture.

Another constraint that is encountered in the culture system is large scale mortality of the prawn seed during transportation from hatchery site to the remote rural areas where the prawn farming is being done. Hence there is a urgent need to innovate suitable techniques of preservation of embryos and larvae under low freezing temperature to ensure their safe transformation without much damage.

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10. Technical Programme:

1. Collection of matured spawners and berried females from the wild and maintain them in the laboratory.
2. Removal of spermatophores from matured males by application of electric shock and study the viability of sperms by standard methods.
3. Collection of developing embryos from the females of prawns and [illegible] study normal embryonic development in the laboratory condition. Then evolve suitable medium/media for cryopreservation of embryos and assess the effect of medium and low temperature on the development in relation to preservation time.
4. Evolve suitable methods of cryopreservation of spermatophores for shorter and longer duration and assess the viability.
5. Study the biochemical changes (protein, aminoacids, lipids and carbohydrates etc.) of spermatophores in normal and cryopreserved condition.
6. Histology and EM studies of spermatophores.

Work done

Concerted efforts have been made in devising the techniques to activate non-motile spermatozoa in the freshly extruded spermatophores of marine prawns, viz P. indicus and P. monodon. Good success was achieved in activating the spermatozoa of both the prawns using egg water and two other synthetic

chemicals viz bromocalcium ionophore and Velinomycin. Spermatozoa of both the species could be cryopreserved successfully at 35°C and -196°C for a period of 15 days to begin with. Attempts were also made to investigate detailed morphological and ultrastructural features of sperms using TEM and SEM techniques.

Eye stage embryos of the mud crab Scylla serrata cryopreserved at - 196°C for a period of one hour hatched out successfully, but the larvae could not survive for long time. The media for cryopreservation used was DMSO. Efforts are being made on cryopreservation of embryos of prawn P. indicus.

Work envisaged : As given in the technical programme

11. Date of start : 1993 12. Likely date of completion : 1996

13. Estimated mon-months : 22 man-months

14. Facilities required:

i. Land	: No	v. Fish ponds	: No
ii. Animal shed	: No	vi. Foreign Exchange	: No
iii. Labour	: No	vii. Other items	: No
iv. Special eqpt.	: No	viii. Total Estimated cost:	

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

a) Name of the financing organisations : N.A.

b) Title of the project : N.A.

16. Approximate cost

a) Salary of Scientific staff	:	Rs 86,500.00
b) Salary of Technical staff	:	" 10,000.00
c) Salary of supporting staff	:	-
d) Casual labour cost if any	:	4,000.00
e) Cost of equipment, facility etc.	:	-
f) Contingencies such as chemicals, fertilizers, seeds, animals, feeds, sprayers etc.		30,000.00
g) TA/DA		20,000.00
h) Total cost		1,50,500.00

17. Signatures of

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

RESEARCH PROJECT: 1994-95

1. Institute code No. PNP/46 2. ICAR Code No.

2. Name and address of the Research Institute : C.M.F.R. Institute, Cochin - 14

3. Title of project : Fish and shellfish pathology

4. Title of sub-project : Disease investigations in marine fishes and shell fishes

5. Name and Designation of Project Leader : M. Vijayakumaran
Senior Scientist

6. 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. Vijayakumaran	Sr. Scientist	40	1 - 7
Madras	R. Paul Raj	Sr. Scientist	25	1 - 7

Technical Assistance: V. Selvaraj T-4
K. Shahul Hameed T-I-3
Ahmed Kamal Basha T-2

8. Location of the Research Project : Madras

9. a) objectives.

1. To record disease problems in marine prawn hatcheries, grow-out systems, bivalve hatcheries and lobster holding systems.
2. To investigate the causative factors such as environmental stress, nutritional deficiency, endotoxins, exotoxins, parasites and microbial pathogens.
3. To suggest preventive measures and treatment in specific disease situations

b) Practical Utility: Hatcheries that produce seeds in large numbers are potentially susceptible to various disease situations. Environmental stress and/or nutritional imbalance weaken the larvae and expose them to invasion by obligatory or facultative pathogens leading to mass mortality or production of weak seedlings. A study of the conditions prevailing in Departmental/commercial hatcheries around Madras would give valuable information on hatchery hygiene and identification of disease problems in them.

Holding facilities for keeping spiny lobsters alive, till they are exported live, have been established in many places in Madras, Monitoring such holding systems, where lobsters are stocked at high density under stressful conditions, will help in identifying impending problems and for suggesting effective measures to prevent mass mortality.

There is no scientific documentation of the stressors that reduce growth or result in mortalities in prawn grow-out systems in India. The project envisages to investigate and record diseases occurring in such systems.

). Technical Programme:

1. Regular monitoring of selected prawn hatcheries, grow-out systems and lobster holding facilities for diseases investigation (Initially the study will be restricted to identification of disease situations in relation to stress, parasites and microbial pathogens).
2. Collection of data on growth and environmental conditions inducing reduction in growth and survival.
3. Collection of samples for microbiological and histo-pathological investigations.
4. Isolation, characterisation and antibiotic sensitivity of microbial pathogens.
5. Histopathological examination of tissues of collected specimens.
6. Survey, identification and control of parasites and epibionts.
7. Elucidation of measures to prevent disease and appro-priate treatment in specific disease situations.

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11. Date of start : 1994-95 12. Likely date of completion : 1995-96

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13. Estimated man-months/year : 7.8 man-months

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14. Facilities required:

i. Special equipment:
Microscope with photomicrograph attachment, laminar flow cabinet, incubators, high speed centrifuge, histokinnettes, autoclave, platinum loops, Automatic dispensors etc.

ii. Foreign exchange $ 10,000

iii. Other items : chemicals and glasswares

iv. Total estimated cost: Rs 5,00,000 +$10,000

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

a) Name of the financing organisation : N.A.

b) Title of the Project : N.A.

16. Approximate cost:

a)	Salary of scientific staff	: Rs	1,46,000.00
b)	Salary of technical staff	: Rs	70,000.00
c)	Salary of supporting staff	: Rs	30,000.00
d)	Labour cost if any	: Rs	8,000.00
e)	Cost of equipment, facility, etc. + $ 10,000	Rs	5,00,000.00 +
f)	Contingencies, such as chemicals, fertilizers, seed, animals, feeds, sprayers etc.	Rs	70,000.00
g)	TA/DA	:	
h)	Total cost	: Rs	8,24,000.00 + 10,000.00 $

17. Signatures of:

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

RESEARCH PROJECT - 1994-95

1. Institute Code No. FEM/ES/1 2. ICAR Code No.

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

4. Title of the Project: Investigation on environmental parameters in inshore waters in relation to fisheries

5. Title of Sub-project:

6. Name and Designation of Project Leader : M.S. Rajagopalan, Principal Scientist

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.V. Singh	Scientist	100	1-4,6,7
Karwar	P.K. Krishnakumar	"	50	1-4,6,7
Calicut	V.Narayana Pillai	Pri. Sci.	25	1-4,6,7
	C.V. Mathew	Scientist	50	1-4,6,7
Cochin	M.S. Rajagopalan	Pri. Sci.	25	1-4,6,7
	G.P. Gopinathan	Sr. Sci.	50	1-4
	K. Rengarajan	"	50	1,3
	G.S. Daniel Selvaraj	Sci.SG	50	1-3
	K.G.Girijavallabhan	"	25	1-3
	V. Chandrika	Sr. Sci.	75	1,5a,5b
	S. Muthusamy	Sci. SG	75	1-4
	T.S. Naomi	Scientist	50	1-4
	Molly Varghese	"	40	1-4,6,7
Vizhinjam	P. Kaladharan	"	75	1-4, 6,7
	P.A. Thomas	Sr. Sci.	50	1-4,6,7
	S. Jasmin	Scientist	50	1-4
Mandapam	S.Krishna Pillai	Sci. SG	100	1-4,6,7
Madras	M. Rajagopalan	"	50	1-4,6,7
Visakhapatnam	K. Vijayakumaran	Scientist	50	1-4,6,7
Minicoy	Pon Siraimeetan	Sci. SG	25	1-4,6,7
	P.T. Sarada	Scientist	50	1-4,6,7
Kakinada	B.S. Ramachandrudu	T7	50	1,2,6,7

Technical Assistance: V.K. Balachandran, N.P. Kunhikrishnan, M.P. Sivadasan, A. Kanagam, N. Palaniswamy, L.R. Khambadkar, K.N.Pushkaran V.K. Suresh, T.N. Ananthalakshmi (Cochin), R. Vasanthakumar (Vizhinjam), J.X. Rodrigo, M.Selvaraj (Tuticorin), L.Jayasankaran, (Madras), K.P. Viswanathan(Calicut), K.Diwakar, K.Chittibabu (Visakhapatnam), K.Muniyandi (Mandapam) G.S.Bhat (Mangalore), Abbulu (Kakinada), Narayana G. Vaidya (Karwar)

Work done: Basic hydrographic data were collected from different Centres. Primary and secondary productivity in inshore waters were estimated at selected centres. Bacterial production was monitored from Cochin.

ork envisaged: Work will continue as per technical programme.

. Location of the Research Project: Bombay, Karwar, Calicut, Cochin, Minicoy, Vizhinjam, Tuticorin, Mandapam, Madras, Visakhapatnam, Mangalore.

, a) Objectives: 1) To assess the role of physical, chemical and biological characteristics of inshore waters in relation to fluctuation and abundance of fish catches, (2) to correlate climatic factors such as atmosphere temperature, pressure, rainfall etc. with seawater characteristics and fish abundance.

b) Practical utility: Continuous monitoring of sea water characteristics and biological productivity in relation to climatic and other factors will help in understanding the causes of fluctuation in major groups constituting the inshore fisheries.

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0. Technical programme: 1) All scientists and technical staff to participate in the cruises of FORV Sagar Sampada, Cadalmin or any other vessel as and when required by the Institute, for collection of environmental data. 2) Collection of hydrographic data such as temperature, salinity, dissolved oxygen. 3) Estimation of primary and secondary production. 4) Analysis on nutrients wherever equipment facilities are provided. 5.a) Estimation of bacterial production and growth rate off Cochin. 5.b) Estimation of microflora and microfauna in the sediments in backwater and inshore waters. 6) Collection and analysis of meteorological data. 7) All data to be entered and maintained in a common register at each centre and at Headquarters.

.1. Date of start: 1989 12.Likely date of completion: Continuing

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.3. Estimated man-months : 132 man months/year

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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

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15. If financed by an organisation other than the Institute: Nil
a) Name of financing organisation
v) Title of project

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16. Approximate cost

	Rs. lakhs
a) Salary of scientific staff b) Salary of technical staff c) Salary of supporting staff d) Casual labourer cost, if any	14.18
e) Cost of equipment, facility etc. f) Contingencies, such as chemicals, fertilizers, seed, animals, feeds, sprayers etc.	4.32
T.A.	2.00
g) Total cost	20.50

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17. Signature of

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

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

4. Title of Project : Fishery oceanography of the offshore regions of the Indian EEZ

5. Title of Sub-Project : Seasonal changes in the biological productivity in the Indian EEZ in relation to oceanographic parameters

6. Name of Project Leader : M.S.Rajagopalan, Principal Scientist

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	Pri. Sci.	25	1,7
Kakinada	G.Subbaraju	-do-	25	2
Calicut	V.N.Pillai	-do-	25	2
Cochin	V.K.Pillai	Sr. Sci.	25	3
	C.P.Gopinathan	-do-	25	4
	K.G. Girijavallabhan	Sci.SG	50	5,6
	S.Natarajan	T7	50	5

Technical Assistance: A.Nandakumar, L.P. Khambadkar, V.K.Balachandran, K.S. Leela Bai, Geetha Antony, K. Solaman (Cochin)

8. Location of the Research Project: Cochin, Kakinada, Calicut

9. a) Objectives: To study the seasonal variability of biological productivity in the EEZ and to correlate the productivity pattern with environmental factors.

   b) Practical utility: The information gathered will be helpful in understanding the variations in the environmental parameters and its effect on the distribution and abundance of the fishery resources.

Note:- All Scientists and Technical Staff of the Division to participate in the cruises of the vessel as and when required. Preliminary analysis of samples to be carried out on board the vessel and report submitted to the Project Leader.

Work done: 7 cruises on the west and east coasts have been completed in the EEZ from which data on hydrography including nutrients, chlorophyll and primary productivity and zooplankton were collected. The cruises were planned to cover pre-monsoon, monsoon and post-monsoon seasons. Scientific results from the cruises of west coast have been presented in the second workshop of Sagar Sampada held in Feb. '94.

Work envisaged: To conduct similar planned cruises in the EEZ of the east coast of India to gather detailed information on the biological productivity.

10. Technical Programme: 1) Planning, implementation and coordination of the Division's cruises of FORV Sagar Sampada. 2) Analysis and interpretation of physical oceanographic data collected in the cruises of the vessel. 3) Analysis and interpretation of chemical oceanographic data. 4) Analysis and interpretation of primary productivity data. 5) Analysis and interpretation of zooplankton biomass data; studies on DSL-detection and biomass estimation. 6) Sorting of zooplankton groups for further studies. 7) Interpretation of seasonal changes in biological productivity in relation to hydrographic and fisheries data.

11. Date of start: Jan. 1989 12. Likely date of completion: continuing

13. Estimated man months: 36 man months/year

14. Facilities required:

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

15. If financed by an organisation other than the Institute: Yes (partly)

a) Name of financing organisation: DOD will meet all expenses connected with running of the vessel.

b) Title of project :

16. Approximate cost

a) Salary of scientists	:	)
b) Salary of technical staff	:	) Rs. 4.00 Lakhs
c) Salary of supporting staff	:	)
d) Casual labour, if any	:	)
e) Cost of equipment, facility etc.	:	) Rs. 1.00 "
f) Contingencies, such as chemicals, fertilizers, seed, animals, feeds, sprayers etc.	:	)
T.A.	:	) Rs. 1.00 "
g) Total cost	:	) Rs. 6.00 lakhs

17. Signatures of

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

RESEARCH PROJECT - 1994-95

1. Institute Code No. FORV/SS/3 2. ICAR Code No.

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

4. Title of project : Results of the exploratory survey of the Indian EEZ by FORV Sagar Sampada

5. Title of Sub-projects : Investigations on zooplankton components of the EEZ of India

6. Name and Designation of Project Leader : K.J.Mathew, Senior Scientist

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.Rao	Pri. Sci.	50	1b
	K.J.Mathew	Sr. Sci.	60	1a, 1g
	T.S.Naomi	Scientist	50	1e
	N.Gopinatha Menon	Sr. Sci.	25	1f
	K.Prabhakaran Nair	Sci.SG	50	1c
	M.P.Molly	Scientist	30	1d
Karwar	V.S.Kakati	Sr. Sci.	25	1b
Madras	M.M.Meiyappan	Sci. SG	50	1c

Technical Assistance: K.N.Gopalakrishnan, Geetha Antony, K.Balachandran (Cochin)

8. Location of the Research Project : Cochin, Karwar and Madras

9. a) Objectives: To study the various zooplankton groups and the mesopelagic resources in relation to environmental parameters and fishery resources of EEZ.

b) Practical utility: Studies on various components of zooplankton would lead to better understanding/the food /of web in the marine environment as also their seasonal and spatial distribution. Study of the components of DSL would lead to a better understanding of un-exploited resources.

10. Technical Programme: 1) To carry out studies on zooplankton and mesopelagic components such as a) Euphausiids, b) decapod larvae, c) Cephalopods, d) Amphipods, e) Cladocerans, and f) Gonostomatidae, Nomeidae and Bregmacerotidae/in relation to environmental parameters.

/ and g) Lucifer

Work done: Work on different groups was continued. Based on the results obtained so far, detailed accounts were presented in the workshop of Sagar Sampada.

Work envisaged: Work to continue as per technical programme.

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11. Date of start: 1989 12. Likely date of completion: 1996

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13. Estimated man months : 48 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:	

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

a) Name of financing organisation:

b) Title of project :

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16. Approximate cost:

a) Salary of scientific staff	:	)
b) Salary of technical staff	:	)
c) Salary of supporting staff	:	) Rs 4.7 Lakhs
d) Casual labour cost, if any	:	)
e) Cost of equipment, facility etc.	:	
f) Contingencies, such as chemicals, fertilizers, seed, animals, feeds, sprayers etc.	:	) Rs 0.8 "
g) Total cost	:	) Rs 5.5 "

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17. Signature of

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

RESEARCH PROJECT - 1994-95

1. Institute Code No. FEM/RS/1.1 2. ICAR Code No.

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

4. Title of project : Remote Sensing and fisheries

5. Title of Sub-project: Application of remote sensing technology in marine fisheries

6. Name and designation of Project Leader : M.S. Rajagopalan, Principal Scientist

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	Pri. Sci.	25	1,2,3,5,6
Kakinada	G.Subbaraju	-do-	50	2,3,4
Cochin	K.G.Girijavallabhan	Sci.SG	25	2
	T.V.Sathianantha n	Scientist	25	1,4
	N.G.K. Pillai	Sr.Sci.	25	4
	Grace Mathew	Sci.SG.	25	4
Calicut	V.N. Pillai	Pri.Sci.	25	3
Visakha-patnam	K.Vijayakumaran	Scientist	25	2

Technical Assistance: V.K.Balachandran, A.Kanagam, A.Nandakumar, L.R.Khambadkar (Cochin).

8. Location of Research Project: Cochin, Calicut, Kakinada, Visakhapatnam

9. a) Objectives: To utilize remote sensing data and information for correlating the data on productivity, SST etc. and potential areas of fishing in the EEZ. To utilize remote sensing data on coastal zone for studying ecological parameters of coastal water bodies.

b) Practical utility: Satellite imageries provide continuous data on parameters such as SST, Chlorophyll, sedimentation, coastal changes etc. on a large scale covering most of the EEZ. These data have several applications in marine living resources investigations including mapping of potential areas of fishing, fisheries forecast, etc.

10. Technical Programme

1. To analyse all available environmental data collected by different research centres and relate it to commercial fish catch in the region.

2. Processing analysis and verification of satellite data on fisheries potential obtained regularly from SAC & NRSA with fish catch data.
3. Collection/acquisition of sea truth data such as SST, Chlorophyll concentration etc. from different research centres and from the cruises of FORV Sagar Sampada.
4. To identify parameters other than SST & Chlorophyll which may be useful for remote sensing applications in fisheries.
5. Collection/acquisition of ground truth data on coastal zone ecological parameters for correlation with remote sensing data.
6. To build up a strong ocean information system based on remote sensing and undertake user promotion activities.

Work done: Verification of remote sensing data on potential fishing zones was carried out at selected centres. Sea truth data such as SST were collected during the cruises. Data sets on SST and other oceanographic parameters were taken up for computer analysis. Infrastructure for MARSIS centre developed.

Work envisaged: Work will be continued as per technical programme

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11. Date of start : 1991 12. Likely date of completion: continuing

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13. Estimated man-months : 20 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 shed : No	viii.	Total estimated cost: Institute's Budget

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

a) Name of financing organisation : D.O.D.
b) Title of project :

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16. Approximate cost

a) Salary of scientific staff b) Salary of technical staff c) Salary of supporting staff	Rs. 3.52 lakhs
d) Casual labourer cost, if any	
e) Cost of equipment, facility etc. f) Contingencies, such as chemicals, fertilizers, seed, animals, feeds, sprayers etc.	Rs. 1.68 "
T.A.	Rs. 0.20 "
g) Total cost	Rs. 5.40 "

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17. Signature of

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

RESEARCH PROJECT 1994-95

1. Institute Code No.FEM/ES/5   2. ICAR Code No.

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

4. Title of Project: Environmental ecology of coastal zone and mapping of potential sites for seafarming.

5. Title of Sub-Project:

6. Name and Designation of Project Leader: M.S. Rajagopalan, Principal Scientist

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	Pri. Sci.	25	1, 2, 3,5
	G.S. Daniel Selvaraj	-do-	50	1, 3, 5
	M.P.Molly	Scientist	30	1, 3
Madras	M. Rajagopalan	Sci. SG	50	1, 3
Calicut	C.V.Mathew	-do-	50	1, 3
Kakinada	B.S.Ramachandrudu	T7	50	1, 4

Technical Assistance: K.S. Leela Bai, A Kanagam, M.P.Sivadasan, R. Anilkumar, V.K. Suresh (Cochin), A.A. Kamal Basha, ~~AxxVaixamanx~~ (Madras) P. Swarnalatha (Calicut).

8. Location of the Research Project: Cochin, Madras, Calicut and Kakinada

9. a) Objectives: 1) To understand the environmental ecology of the coastal zone and its influence on the coastal marine resources. 2) To identify potential sites for mariculture/ sea farming.

   b) Practical utility: The coastal zone is an important base for artisanal fisheries and also for coastal aquaculture and sea farming. The extent of coastal waterbodies, nursery grounds, coastal vegetation like mangroves and the connected ecological para meters have profound influence on the local inshore fisheries. The project aims at understanding some of these aspects.

10. Technical programme: 1. Systematic survey of the coastal zone for mapping coastal waterbodies, lagoons and potential sites for sea farming including use of Remote sensing data.

2. Ecological studies on the coastal mangroves, the resident and migratory fauna of the mangrove ecosystems.

3. Diurnal studies on physico-chemical factors and plankton in the coastal waterbodies.

4. Soil sediment characteristics in the coastal waterbodies and in the vicinity of hatcheries, studies on beach profile, tidal rhytms and other coastal feature.

5. Consolidation of information collected so far and publication of results.

Work done: The coastal water bodies along Kerala coast and the estuarine area of Killai was surveyed and reports are being prepared.

Work envisaged: Work to be continued as per above programme.

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11. Date of start: 1987 12. Likely date of completion: 1994-95

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13. Estimated man-months : 42 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:	

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

a) Name of the financing organisation

b) Title of project

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16. Approximate cost

a) Salary of scientific staff	: Rs. 3.0 lakhs)	5.0
b) Salary of technical staff	: Rs. 2.0 lakhs)	
c) Salary of supporting staff	:	
d) Casual labourer cost, if any	: Rs. 0.5 "	
e) Cost of equipment, facility etc.	: Rs. 1.7 lakh)	3.2
f) Contingencies, such as chemicals, fertilizers, seed, animals, feeds, sprayers etc.	: Rs. 1.0 lakhs)	
T.A.	: Rs. 0.3 lakhs	0.3
g) Total cost	: Rs.8.50 lakhs	

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17. Signatures of

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

RESEARCH PROJECT - 1994-95

1. Institute Code No. FEM/SW/1 2. ICAR Code No.

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

4. Title of Project : Seaweed Investigations

5. Title of Sub-project : Resources assessment of seaweeds and their culture

6. Name and designation of Project Leader : V.S.K.Chennubhotla, Principal Scientist

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
Minicoy	V.S.K.Chennubhotla	Pri.Sci.	50	1,2,3,7
Mandapam	N.Kaliaperumal	Sr.Sci.	75	1,2,3,4,5,6

Technical Assistance: S.Kalimuthu, J.R.Ramalingam, K.Muniyandi (Mandapam) P.Anasukoya (Minicoy)

8. Location of the Research Project: Mandapam and Minicoy

9. a) Objectives: 1) To assess the natural seaweed resources of Lakshadweep and Andaman & Nicobar Islands. 2) To augment the seaweed resources through outdoor and field culture practices.

b) Practical utility: The seaweed resources have a great role to play in the phycocolloid industry in the country. The survey of the shallow and deep water resources of seaweeds have been completed. Information is wanting with regard to seaweed resources of other regions of Indian coast. The present project will meet this requirement as also ways and means of augmenting production through outdoor and field culture technologies.

10. Technical programme: 1. To estimate the natural seaweed resources of Lakshadweep and Andaman-Nicobar Islands. 2. To suggest harvest and cropping pattern in selected islands. 3. To conduct outdoor cultivation of agar yielding seaweeds under running seawater by different culture techniques at Mandapam. 4. To undertake studies on the seasonal variation in growth and carrageenan content in some red seaweeds of Mandapam Coast. 5. To study the growth and biochemical constituents in some edible seaweeds of Mandapam area. 6. To collect data on the commercial

seaweed exploitation from Tamil Nadu coast by enquiry. 7. To give training to islanders in the Lakshadweep group of Islands on the techniques of seaweed culture in collaboration with KVK and TTC.

Work done: The seaweed resources survey of shallow waters of Tamil Nadu, Kerala and Lakshadweep were completed. The deep water survey of seaweed resources from Dhanuskhodi to Kanyakumari in Tamil Nadu coast was also completed. Field cultivation of Gracilaria edulis in Gulf of Mannar, Palk Bay and Lakshadweep was standardised. Outdoor culture of G.edulis was carried out successfully with gravitational flow of seawater at Mandapam.

Work envisaged: Work will be continued as per Technical programme.

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11. Date of start : 1992 12. Likely date of completion: 1995

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13. Estimated man months: 36 man months/year

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14. Facilities required:

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

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

a) Name of the financing organisation:
b) Title of project:

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16. Approximate cost:

a) Salary of scientific staff	:)	4.42 Lakhs
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 as chemicals, fertilizers, seed, animals, feeds, sprayers etc.	:) :) :)	1.18 "
g) Total cost	:)	5.60 Lakhs

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17. Signature of

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

RESEARCH PROJECT 1994-95

1. Institute Code No. EEM/MP/1 2. ICAR Code No.

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

4. Title of Project : Marine Pollution

5. Title of Sub-Project : Monitoring marine pollution in relation to protection of living resources

6. Name and designation of Project Leader : V. Kunjukrishna Pillai, Senior Scientist

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	Sr.Sci.	50	1, 2, 4
	C.P. Gopinathan	Sr. Sci.	25	1 & 2
Karwar	P.K.Krishnakumar	Scientist	50	1 & 2
Tuticorin	D. Kandaswami	Sci. SG	25	1 & 3
Vizhinjam	P. Kaladharan	Scientist	25	1
Visakhapatnam	K.Vijayakumaran	"	25	1

Technical Assistance: V.K.Balachandran, K.S.Leela Bai, K.K.Valsala V.K. Suresh (Cochin) P. Paul Sigamani (Tuticorin), K.Diwakar, K. Chittibabu (Visakhapatnam) N.G.Vaidiya (Karwar).

8. Location of the Research Project: Cochin, Karwar, Tuticorin, Vizhinjam and Visakhapatnam.

9. a) Objectives: 1) To identify major source of pollutants in the inshore areas and to assess their levels and effects on living resources. (2) Heavy metal levels in the aquatic environment and their build up in the organisms will be monitored and investigated. (3) Effect of thermal plant discharges into the marine environment will be investigated.

b) Practical utility: In recent years there has been a world wide awareness on the problems of marine pollution and its effects on the living resources. In India, on a national level, priority has been assigned to pollution monitoring and control measures. Information on the causes of fish kills, levels of pollutants like heavy metals in water, animals and sediment and also its short and long-term effects will help to assess the effects of pollution. To understand the effect of deteriorating water quality on cultivable organisms in identified areas of pollution in

the coastal waters. Hence studies on marine environmental damage by different sources becomes an obvious necessity to evaluate the present level of pollution in our coastal waters.

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10. Technical programme: 1. Regular monitoring of environmental parameters at identified stations to study the level of pollution in respective areas due to sewage, industrial effluents etc. 2. Laboratory experiments to evaluate lethal and sublethal effects of pollution on marine organisms/ cultivable species. 3. Directed studies to evaluate level of pollution due to discharge of thermal water, fly ash and other chemicals at Tuticorin. (4) Fish kills due to pollution will be investigated as and when such phenomena happens.

Work done: Metal levels monitored in biological samples and sediments at respective centres. Experimental work on sublethal effects of pollutants were carried out on mussels. Fish kills were also monitored as and when reported.

Work envisaged: Work as per the above programme will continue.

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11. Date of start: 1982 12. Likely date of completion: 1996

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13. Estimated man-months : 48 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 shed	: Nil	viii. Total estimated cost:	

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15. If financed by an organisation other than the Institute: Nil
a) Name of financing organisation
b) Title of project

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16. Approximate cost:

a) Salary of scientific staff	:	Rs. 3,00,000	)
b) Salary of technical staff	:	Rs. 1,50,000	) 4.9 lakhs
c) Salary of supporting staff	:	Rs. 40,000	)
d) Casual labour cost, if any	:	Rs. 35,000	)
e) Cost of equipment, facility etc.	:	Rs. 3,75,000	)
e) Contingencies, such as chemicals fertilizers, seed, animals, feeds, sprayers, etc.	:	Rs. 75,000	) 5.5 lakhs
T.A.	:	Rs. 70,000	)
g) Total cost	:	Rs.10,40,000	:10.4 lakhs

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17. Signature of:

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

RESEARCH PROJECT - 1994-95

1. Institute Code No. FEM/CUL/2 2. ICAR Code No.

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

4. Title of project: Breeding, seed production and sea ranching of sea cucumber Holothuria scabra

5. Title of Sub-project:

6. Name and designation of Project Leader: D.B. James, Senior Scientist

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 (3)	Work to be done
Tuticorin	D.B.James	Sr. Sci.	50	1-3

Technical Assistance: A.D.Gandhi

8. Location of the Research Project : Tuticorin

9. a) Objectives: Breeding and production and sea ranching of sea cucumber Holothuria scabra.

b) Practical utility: At present India is exporting Beche-de-mer worth ~~of~~ nearly one crore of rupees. There is great demand for beche-de-mer in Singapore and Hong Kong markets. The natural populations of H.Scabra in the Gulf of Mannar and Palk Bay are fast dwindling due to overfishing. The natural populations can be revived by sea ranching programme.

10. Technical programme

1. To improve and standardise the techniques for induced spawning of Holothuria spp.
2. To develop suitable rearing techniques for various stages of larvae.
3. To sea ranch the juveniles produced in the hatchery in suitable places to augment coastal production.

Work done: Holothuria spp. were induced to spawn in the laboratory. The various stages of larvae were successfully reared to juvenile stage.

Work envisaged: Breeding, rearing and grow out experiments to continue. Sea ranching will be undertaken at suitable sites.

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11. Date of start : 1987 12. Likely date of completion: 1995

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13. Estimated man months : 12 man months/year

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14. Facilities required

i. Land	: Nil	v. Fish ponds	: Nil
ii. Labour	: 4 persons	vi. Foreign exchange	: Nil
iii. Special equipment	: Nil	vii. Other items	: Nil
iv. Hatchery shed	: Present	viii. Total estimated cost:	

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

a) Name of the financing organisation : MPEDA

b) Title of the Project

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16. Approximate cost

A) Salary of scientific staff	:	Rs. 0.70 lakhs
B) Salary of technical staff	:	Rs. 0.60 lakhs
C) Salary of supporting staff	:	
D) Casual labourer cost, if any	:	Rs. 0.14 lakhs
E) Cost of equipment, facility etc.	:	Rs. 1.00 lakhs
F) Contingencies, such as chemicals, fertilizers, seed, animals, feeds, sprayers etc.	:	Rs. 0.20 lakhs
G) Total cost	:	Rs. 2.64 lakhs

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17. Signatures of

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

RESEARCH PROJECT - 1994-95

1. Institute Code No.FEM/EE/1 2. ICAR Code No.

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

4. Title of Project : Conservation and management of coral reef ecosystem

5. Title of Sub-project : Investigations on coral reef ecosystem in Gulf of Mannar and Lakshadweep

6. Name and Designation of Project Leader : C.S. Gopinadha Pillai Principal Scientist

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	C.S.Gopinadha Pillai	Pri. Sci.	75	1, 2, 3

Technical Assistance : N. Kasinathan and N. Ramamurthi (Mandapam Camp)
K.N. Pushkaran (Cochin)

8. Location of the Research Project: Cochin, Mandapam.

9. a) Objectives: To study and understand the specific ecological stresses on terrestrial and marine environment necessary for implementation of conservation measures and eco-development programmes, in some of the islands.

b) Practical utility:

The information gathered will help in identifying problems related to reef conservation and island development.

10. Technical programme:

1. To undertake short term surveys of identified islands in Gulf of Mannar and Lakshadweep for assessing environmental impact/stresses in the island ecosystems.
2. To study the zonation of corals with reference to conservation.
3. To suggest suitable remedial measures and ecodevelopment programmes for the conservation of the ecosystem. (The

above items of work will be undertaken by participation of scientists and technical staff drawn from different disciplines at different research Centres as per requirement).

Work done: Ecological studies of coral reefs was conducted at Kavaratti (Lakshadweep).

Work envisaged: Work to be done as per technical programme 1 to 3.

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11. Date of start: 1989 12. Likely date of completion: 1995

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13. Estimated man-months : 12 months

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14. Facilities required

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

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15. If financed by an organisation other than the Institute

a) Name of financing organisation

b) Title of project

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16. Approximate cost

a) Salary of scientific staff	: Rs. 0.80	Lakhs
b) Salary of technical staff	: Rs. 0.12	"
c) Salary of supporting staff		
d) Casual labourer cost, if any		
e) Cost of equipment, facility etc.		
f) Contingencies, such as chemicals, fertilizers, seed, animals, feeds, sprayers etc.	: Rs. 0.12	"
T.A.	: Rs. 0.10	"
g) Total cost	: Rs. 1.14 lakhs	

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17. Signatures of

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

RESEARCH PROJECT - 1994-95

1. Institute Code No. FEM/AR/1 2. ICAR Code No.

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

4. Title of the Project : Studies on exploitation of auxiliary marine living resources

5. Title of Sub-project:

6. Name and designation of Project Leader: P.A. Thomas, Senior Scientist

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

Centre	Name	Designation	Time to be spent (%)	Work to be done
Vizhinjam	P.A.Thomas	Sr. Sci.	50	1-5
	S. Jasmin	Scientist	50	"

Technical Assistance

8. Location of the Research Project: Vizhinjam

9. a) Objectives

1. To monitor the exploitation of non-conventional ancillary marine resources which are being exported to various countries for extraction of rare chemicals and 'wonder' drugs from the point of view of conservation of these resources.
2. To render expertise in identifying these plants and animals which are collected by various agencies and to prevent wasteful and indiscriminate collection of these material.
3. To suggest measures for the optimum use of these resources and their conservation.

b) Practical utility : The data and information collected on resources yielding wonder drugs will help in conserving these resources and also help in evaluating the drug potential, their export and related information needed for scientific studies.

10. Technical programme:

1. Collection of data and information on the exploitation of non conventional marine plants and animals from which rare chemical and wonder drugs are being extracted.
2. Ascertain the export trend of these ancillary resources through collection of information at collection site as well as through export data.

3. Collection of information on the drug potential of these resources from published data.
4. Help the various Institutions in India to identify the source material.
5. To suggest measures for management of conservation of these resources.

Work done: Information on exploitation of Gorgonids and sponges collected. Helped various Institutes in identifying the species from which bio active chemicals are extracted.

Work envisaged: To continue the work as per the above programme.

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11. Date of start: 1992-93 12. Likely date of completion: 1994-95

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13. Estimated man-months : 4.5 months/year

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14. Facilities required

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

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15. If financed by an organisation other than the Institute:
    a) Name of the financing organisation
    b) Title of the project

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16. Approximate cost

a)	Salary of scientific staff	Rs. 0.40 Lakhs
b)	Salary of technical staff	
c)	Salary of supporting staff	
d)	Casual labour cost, if any	
e)	Cost of equipment, facility etc.	Rs. 0.60 "
f)	Contingencies, such as chemicals, fertilisers, seed, animals, feed, sprayers etc.	
	T.A.	Rs. 0.20 "
g)	Total cost	Rs. 1.20 Lakhs

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17. Signatures of

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

RESEARCH PROJECT 1994-95

1. Institute code No: FE & E/24.1 2.I.C.A.R.Code No.

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

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

5. Title of Sub-Project: Study on economic performance of trawlers.

6. Name and Designation of Project Leader: D.B.S.Sehara, Scientist (SG)

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.B.S.Sehara, S (SG)	75	As per the technical programme.
	K.K.P.Panikkar S(SG)	100	
	R.Narayana Kumar S	40	

Technical Assistance: K.P.Salini , N.K.Harshan.

8. Location of the Research Project: Cochin

9. a) Objectives: To evaluate the economic efficiency of different sizes trawlers. To analyse the cost structure and factor productivity in trawl operation.

b) Practical utility: The study will generate information on input output demand function of trawl units. It will provide vital information on returns to capital, labour and management for trawl units which would help the industry in making suitable entrepreneurial decisions and credit agencies in formulating lending policies.

10. Technical Programme: Sample units from different sizes of trawlers operating at selected centres along Karnataka coast will be drawn. Data regarding the details of catch, price, cost and employment will be collected on systematically selected random observation days. Data will be analysed by adopting suitable econometric methods and report will be prepared.

Work done: The economic data collection from sample trawl units at 4 centres has been completed. The data analysis work is in progress.

Work envisaged: Data collection on various economic parameters of trawl fishing will be initiated at three selected centres along Karnataka coast. The data will be collected on sample days in each month for a period of one year.

11.Date of start: April '92 12.Likely date of completion: March '96.

13.Estimated man-months : 35 man months

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14. Facilities required: Nil

i) Land	:	v) Fish ponds	:
ii) Labour	:	vi) Foreign exchange	:
iii) Special requirement	:	vii) Other items	:
iv) Animal shed	:	viii) Total estimated cost	:

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15. If financed by an organisation other than the Institute : No
   a) Name of the financing organisation :
   b) Title of the Project:

16.Approximate cost:

		Rs.	
a) Salary of scientific staff	:	2,27,000	
b) Salary of Technical staff	:	30,000	
c) Salary of Supporting staff	: Nil		
d) Casual labourer cost, if any	: Nil		
e) Cost of equipment, facility etc.	:	Nil	
f) Contingencies such as chemicals, fertilisers, seed, animals, feeds, sprayers etc:		15,000	(For rendering help in data collection)
g) TA/DA	:	20,000	
h) Total cost	: Rs.	2,92,000	

17.Signatures of:

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

RESEARCH PROJECT 1994-95

1. Institute code No. FE & E/28. 2. I.C.A.R. Code No.

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

4. Title of Project: Marine fish marketing system and price structure

5. Title of Sub-Project: A study on marine fish marketing in Tamil Nadu.

6. Name and Designation of Project Leader : R. Sathiadhas, Scientist (SG)

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 (SG)	50	As per technical programme.
	R. Narayana Kumar, S	35	

Technical Assistance: A. Bastian Fernando (Tuticorin), A. Kanakkan (Cochin).

8. Location of the Research project: Cochin

9. a) Objectives 1) To analyse the fish marketing structure and role of intermediaries in the distribution channel.
2) To estimate the employment generated in the fishery sector by the postharvest operations of marine fish.
3) To assess the marketing margins and fishermens' share in consumer's rupee for all commercially important varieties of fish and to suggest policy measures to improve marketing efficiency.

b) Practical Utility: The study will be useful for the formulation of appropriate marketing management policies pertaining to marine fisheries.

10. Technical Programme: The data on prices of various varieties of fish at selected primary (Producers market), wholesale and retail markets in Tamil Nadu will be collected for a period of one year covering all seasons. The information on marketing costs and intermediaries margins at different stages of transactions along the marketing channel will also be collected from the selected centres.

Work done: The collection of data on fresh fish prices at primary, wholesale and retail levels at Kanyakumari, Tuticorin, Palayamkottai, Madurai, Nagapattinam and Trichi regions of Tamilnadu has been initiated.

Work envisaged: Fresh fish price data collection for all the varieties at the identified internal marketing channels will be continued for one year. Information on the seasonal availability, marketing pattern and margins of traditional and emerging exportable varieties like prawns, cuttle fishes, Lethrinus, seer fishes, live crabs and lobsters etc. and pharmaceutically important varieties like sea horses, sea fans and sharks will be collected at different stages of the marketing channel at selected centres in Tamilnadu.

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11. Date of start: April 1993 12. Likely date of completion: 31 March 1996.

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13. Estimated man-months : 15 man-months/year

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14. Facilities required: Nil

i) Land	:	v) Fish ponds	:
ii) Labour	:	vi) Foreign exchange	:
iii) Special requirement	:	vii) Other items	:
iv) Animal shed	:	viii) Total estimated cost	:

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15. If financed by an organisation other than the Institute : No
a) Name of the financing organisation:
b) Title of the Project:

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16. Approximate cost:

		Rs.	
a) Salary of scientific staff	:	Rs. 80,000/-	
b) Salary of Technical staff	:	40,000/-	
c) Salary of Supporting staff	:	Nil	
d) Casual labourer cost, if any	:	Nil	
e) Cost of equipment, facility etc.	:	Nil	
f) Contingencies such as chemicals, fertilisers, seed, animals, feeds, sprayers etc.	:	57,600/-	(for enumerators rendering help in data collection)
g) TA/DA	:	8,000/-	
h) Total cost	:	2,05,600/-	

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17. Signatures of:

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

RESEARCH PROJECT 1994-95

1. Institute code No. FE & E/29. 2. I.C.A.R.Code No.

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

4. Title of Project: Investigations on transfer of technology in marine fisheries.

5. Title of Sub-project: Extension of Seaweed culture practices to fishermen.

6. Name and Designation of Project Leader : Sheela James, Scientist.

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 Camp.	Sheela James, S.	60	As per technical programme.

Technical Assistance: S.Kalimuthu.

8. Location of the Research Project: Mandapam

9. a) Objectives: To study the socio-economic characteristics of the target group. 2) To analyse the resources available with them for taking up seaweed culture. 3) To organise training and demonstrations of seaweed culture as well as post harvest practices. 4) To evaluate the effectiveness of the programme in bringing about change in the target group.

b) Practical Utility: Seaweed is a commercially important resource for agar and algin. The demand for seaweed products is partly met from the limited natural production and partly from import. The technology for seaweed culture developed at the Institute if extended to the fishermen community can help in producing cultured seaweed at commercial level. The women and children in the fishermen community can also be gainfully involved in culture operations.

10. Technical Programme: 1) Selection of the locale for the study 2) Formulation of instruments for data collection. 3) Selection of sample. 4) Collection and processing of data, 5) Planning extension programmes. 6) Execution of programmes. 7) Evaluation of the programme.

Work done: The study area was identified and samples were selected. Interview schedule was prepared and data collection was completed.

Work envisaged: Work shown in S.No. 5, 6 & 7 of technical programme will be executed.

11. Date of start: April 1993. 12. Likely date of completion: March 1995.

13. Estimated man-months : 10

14. Facilities required: Nil.

i) Land	:	v) Fish ponds	:
ii) Labour	:	vi) Foreign exchange	:
iii) Special requirement	:	vii) Other items	: Dept. vehicle.
iv) Animal shed	:	viii) Total estimated cost	:

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

a) Name of the financing organisation :
b) Title of the Project:

16. Approximate cost:

	Rs.
a) Salary of scientific staff :	36,000/-
b) Salary of Technical staff :	15,000/-
c) Salary of supporting staff :	Nil
d) Casual labourer cost, if any :	Nil
e) Cost of equipment, facility etc. :	Nil
f) Contingencies such as chemicals, fertilisers, seed, animals, feeds, sprayers etc. :	48,000/-
g) TA/DA :	2,000/-
h) Total cost :	1,01,000

17. Signatures of:

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

RESEARCH PROJECT 1994-95.

1. Institute code No.FE & E/30. 2. I.C.A.R.Code No.

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

4. Title of Project: Investigations on adoption of fishery innovations in marine sector.

5. Title of Sub-project: Study on the adoption of shrimp farming technology by farmers in & around Tuticorin.

6. Name and Designation of Project Leader : M.C.Arunmozhi Devi, Scientist.

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	M.C.Arunmozhi Devi, S.	50	As per technical programme 1 to 4.

Technical Assistance: A.Bastian Fernando.

8. Location of the Research Project: Tuticorin

9. a) Objectives: 1) To conduct a detailed study on various prawn farming practices adopted in selected prawn farms in and around Tuticorin and to identify the constraints in adopting scientific prawn farming. 2) To study the resource characteristics of selected farmers. 3) To disseminate scientific prawn farming in the study area through training and extension education.

b) Practical Utility: The practices recommended under scientific prawn farming are not fully adopted by all those engaged in prawn farming in the area. The study will enable to understand the practices adopted by the farmers in the area and help in disseminating scientific prawn farming to improve the economic well being of the target group.

10. Technical Programme: 1) Identification of practices adopted in selected prawn farms in the study area. 2) Identification of constraints if any in the adoption of recommended prawn farming practices for the area. 3) Organisation of training programmes in shrimp farming. 4) Organisation of extension education programmes for the adoption of scientific prawn farming among the selected prawn farmers.

Work done: Interview schedules were developed for data collection. Information on farms practising different types of prawn farming was collected from MPEDA and farms were selected for data collection. Data collection is under progress.

Work envisaged: Prawn farming practices adopted by different farmers will be studied to identify the gaps in knowledge and constraints if any in adoption. Scientific prawn farming practices will be disseminated through training and extension education.

11. Date of start: July '93 12. Likely date of completion: March '95.

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

14. Facilities required: Nil

i) Land	:	v) Fish ponds	:
ii) Labour	:	vi) Foreign exchange	:
iii) Special requirement	:	vii) Other items	:
iv) Animal shed	:	viii) Total estimated cost:	

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

a) Name of the financing organisation:
b) Title of the Project:

16. Approximate cost:

		Rs.
a) Salary of scientific staff	:	30,500/-
b) Salary of Technical staff	:	15,000/-
c) Salary of Supporting staff	:	-
d) Casual labourer cost, if any:		-
e) Cost of equipment, facility etc.	:	-
f) Contingencies such as chemicals, fertilisers, seed, animals, feeds, sprayers etc.	:	5,000/-
g) TA/DA	:	5,000/-
h) Total cost		55,500/-

17. Signatures of:

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

RESEARCH PROJECT 1994-95

1. Institute code No. FE & E/31. 2. I.C.A.R. code No.

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

4. Title of project: Investigations on the effectiveness of Extension Methods in Technology Transfer in Marine Fisheries.

5. Title of Sub-project: Modelling and evaluation of Extension Strategies for development of fishing communities.

6. Name and Designation of Project Leader: Krishna Srinath, Sr.Scientist

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, Sr.S	80	As per technical programme.
	R. Narayana Kumar, S	25	

The subject matter specialists from other Divisions will be associated in the extension of identified technologies.

Technical assistance: K.P.Salini, N.K.Harshan.

8. Location of the Research Project: Cochin

9. a) Objectives: 1) To critically examine the effectiveness of fisheries development programmes under governmental & non-governmental agencies through the assessment of awareness, acceptance and utilization by the fishing community. 2) To identify the behavioural characteristics of the target group. 3) To develop and test models such as group farming, link worker concept and participatory approach in transfer of technologies. 4) To study the effectiveness of the models in producing socio-economic changes in the community.

b) Practical utility: The study will help in assessing the present status of R & D efforts in fisheries, identify the gaps in their planning and implementation and suggest socio-economic strategies for the improvement of the fishing communities.

10. Technical Programme: 1) Selection and adoption of a fishing village, 2) Resource mapping of the village and to review the present status of development programmes operating in the locality. 3) Organising the interest groups, identification of innovations including edible oyster, pearl oyster, prawn farming and back yard prawn hatchery and planning and execution of extension programmes. 4) Development of linkages with R & D agencies. 5) Comparative economic analysis of the development strategies. 6) Evaluation of the models through measurement of socio-psychological changes.

Work done: Nil

Work envisaged: 1) Selection and adoption of a village 2) Resource mapping and review of present status of R & D programmes 3) Organising interest groups and identification of innovation 4) Training in identified technologies and 5) Implementation of group farming approach in prawn culture.

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11. Date of start: April 1994 12. Likely date of completion: March 1997

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13. Estimated man-months : 12.6 man months/year

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14. Facilities required: Nil

i)	Land :	v)	Fish ponds :
ii)	Labour :	vi)	Foreign exchange :
iii)	Special requirement:	vii)	Other items :
iv)	Animal shed :	viii)	Total estimated cost:

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15. If financed by an organisation other than the Institute : Nil
   a) Name of the financing organisation:
   b) Title of the Project:

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16. Approximate cost:

		Rs.
a)	Salary of Scientific staff:	93,000/-
b)	Salary of Technical staff :	30,000/-
c)	Salary of Supporting staff:	-
d)	Casual labourer cost, if any:	-
e)	Cost of equipment, facility etc. :	-
f)	Contingencies such as chemicals, fertilizers, seed, animals, feeds, sprayers etc. :	35,000/-
g)	TA/DA :	5,000/-
h)	Total cost :	1,63,000/-

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17. Signatures of:

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

RESEARCH PROJECT 1994-95

1. Institute code No. FE & E/32. 2. I.C.A.R. Code No.

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

4. Title of Project : Investigations on Transfer of Technology in Marine Fisheries.

5. Title of Sub-project: Transfer of Edible oyster & Pearl culture technologies among Tamilnadu coast.

6. Name and Designation of Project Leader : A. Regunathan, Sr. Scientist.

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, Sr.S.	50	(1 - 6)
	R. Sathiadhas, S (SG)	25	(2 & 6)
Mandapam Camp.	Sheela James, S	40	(1 - 6)

Technical Assistance: A. Bastian Fernando (Tuticorin), A. Kanakkan (Cochin)

8. Location of the Research Project: Cochin

9. a) Objectives: To study the potentials of pearl culture and edible oyster culture for technology transfer among ~~fisher~~ fishermen at selected centres along Tamilnadu coast. 2) To study the resource characteristics of target population. 3) To study the factors contributing to and/or inhibiting adoption of different mariculture technologies.

b) Practical utility: The Institute has developed mariculture technologies for edible oyster culture and pearl culture. Transfer of edible oyster technology would help to increase marine production. The pearl culture technology with vast potentials would help to meet the local demands and promote export of this valuable gem. These technologies have not been adopted by the target population though they were developed in the early seventies. It has become necessary to examine the potentials of these technologies involving the target population in order to assess the merits and demerits if any of these technologies for the economic development of the coastal rural poor.

10. Technical Programme: 1) Identification of project area for edible oyster culture along Muthupet coast and Pearl culture along Gulf of Mannar. 2) Development of instruments for data collection and organisation of Bench-mark survey in the identified areas. 3) Organisation of interactional situations, film shows, exhibitions etc. on selected technologies and identification of beneficiaries 4) Organisation of training programmes on selected enterprises. 5) Introduction of selected culture technology by involving resources scientists from Molluscan Division. 6) Evaluation of selected enterprises through regular monitoring..

Work done: Nil

Work envisaged: To establish the techno-economic feasibility of edible oyster culture and pearl culture in actual field situations involving the potential adopters at selected centres.

11. Date of start: April '94. 12. Likely date of completion: March 1996.

13. Estimated man-months : 16 man months

14. Facilities required: Rack/Raft.

i) Land	:	v) Fish ponds	:
ii) Labour	:	vi) Foreign exchange	:
iii) Special requirement	:	vii) Other items	:
iv) Animal shed	:	viii) Total estimated cost	:

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

a) Name of the financing organisation:
b) Title of the Project:

16. Approximate cost:

		Rs.
a) Salary of scientific staff	:	1,07,000/-
b) Salary of Technical staff	:	-
c) Salary of supporting staff	:	-
d) Casual labourer cost, if any	:	5,000/-
e) Cost of equipment, facility etc.	:	60,000/-
f) Contingencies such as chemicals, fertilisers, seed, animals, feeds, sprayers etc.	:	10,000/-
g) TA/DA	:	12,000/-
h) Total cost	:	1,94,000/-

17. Signatures of:

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