केन्द्रीय समुद्री मात्स्यिकी अनुसंधान संस्थान, कोचीन
Central Marine Fisheries Research Institute, Cochin

अनुसंधान परियोजनायें 1995-'96
Research Projects 1995-'96

भारतीय कृषि अनुसंधान परिषद्
INDIAN COUNCIL OF AGRICULTURAL RESEARCH

CENTRAL MARINE FISHERIES RESEARCH INSTITUTE

RESEARCH PROJECTS FOR 1995-96

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RESEARCH PROJECT 1995-'96

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

6. Name(s) and Designation(s) of Associate(s) and establishment(s) on which borne: a) whole time b) Part time (Indicate proportion of time to be devoted and other area(s))

Name and Designation		Centre	Time to be spent(%)	work to be done
K.Balan	S(SG)	Cochin	35	1-5 & 6 (ii)
M.Srinath	S(SG)	"	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:
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, Sindhu K.Augustine and 106 Field Staff posted at different centres.

7. Location of the research Project : Cochin

8. (a) Objectives: To estimate the marine fish landings and fishing effort expended in of different maritime states of India and to assess the resource-wise/gear-wise details in the total landings.

(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.

9. 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 iv) Goa and West Bengal v) Tamil Nadu, Pondicherry and Andhra Pradesh.

10. Date of start: 1-4-1995 11. Likely date of completion: 31-3-1999

12. Estimated man-months :
    a) Scientific : 16.2 man months/year
    b) Technical : 2832 man months/year

13. 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

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

15. Approximate cost:

(a)	Salary of Scientific staff		Rs. 2,08,000/-
(b)	Salary of Technical staff		Rs. 95,93,000/-
(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. 13,52,000/-
	Total cost		Rs.1,11,78,000/-

16. Signature of :

Sd/-
16. Project Leader

Sd/-
17. Head of Division

Sd/-
18. Director

RESEARCH PROJECT 1995-'96

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 : Stock Assessment Techniques in Marine Fish and Shell Fish Resources and Management.

5. Name and Designation of Project Leader : M.Srinath, Scientist (SG)

6. Name(s) and Designation(s) of Associate (s) and establishment(s) on which borne: a) whole time b) Part time (Indicate proportion of time to be devoted and other area(s))

Name and Designation		Centre	Time to be spent (%)	work to be done
M.Srinath	Scientist (SG)	Cochin	25	i & iii
T.V.Sathianandan	Scientist	"	25	ii & iii

Technical Assistance: Nil

7. Location of the Research Project: : Cochin

8. (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 is essential for their rational exploitation and judicious management.

9. 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 rate with reference to length class interval through simulation technique. iii) Forecasting total marine fish landings in India and also for commercially important groups such as oil sardine, mackerel and penaid prawns.

10. Date of start: 1-4-1995 11. Likely date of completion: 31-3-1999

12. Estimated man-months :
    a) Scientific : 6 man-months/year
    b) Technical : -

13. 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

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

15. Approximate cost:

(a)	Salary of Scientific staff	: Rs. 1,08,000/-
(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.	: Rs. 10,000/-
	Maintanence of the computer system.	:
(g)	T.A.	:
	Total cost	: Rs. 1,18,000/-

Signature of :

Sd/-	Sd/-	Sd/-
16. Project Leader	17. Head of Division	18. Director

RESEARCH PROJECT 1995-'96

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 : Evaluation of change in the pattern of catch and composition of marine fishery resources in India

5. Name and Designation of Project Leader : K.S.Scariah, Sr.Scientist

6. Name(s) and Designation(s) of Associate(s) and establishment(s) on which borne: a) whole time b) Part time (Indicate proportion of time to be devoted and other area(a))

Name and Designation		Centre	Time to be spent (%)	work to be done
K.S.Scariah	Sr.S	Cochin	25	iii
K.Balan	S(SG)	"	25	ii
M.Srinath	S(SG)	"	25	i
K.Vijayalekshmi	S	"	25	iv
T.V.Sathianandan	S	"	25	v

Technical Assistance:
G.Balakrishnan, Varughese Philipose, V.Rajendran, Varughese Jacob, 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, Sindhu K.Augustine

7. Location of the Research Project: Cochin

8. (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 changes 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 respective 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.

9. 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 states of i) Maharashtra and Orissa ii) West Bengal, Gujarat and Orissa iii) Karnataka iv) Tamil Nadu and Pondicherry v) Andhra Pradesh and Goa.

10. Date of start: 1-4-1995 11. Likely date of completion: 31-3-1999

12. Estimated man-months :
    a) Scientific : 15 man months/year
    b) Technical : 1272 man months/year

13. 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

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

15. Approximate cost:

(a)	Salary of Scientific staff	: Rs. 2,08,000/-
(b)	Salary of Technical staff	: Rs. 6,78,000/-
(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.	: 25,000/-
(g)	T.A.	:
	Total cost	: Rs.9,11,000/-

Signature of:

Sd/-	Sd/-	Sd/-
16. Project Leader	17. Head of Division	18. Director

RESEARCH PROJECT 1995-'96

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 : Management Information Systems in Marine Fisheries

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

6. Name (s) and Designation(s) of Associate(s) and establishment(s) on which borne a) whole time b) Part time (Indi of time to be devoted and other area(

Name & Designation		Centre	Time to be spent (%)	work to be done
T.V.Sathianandan	S	Cochin	25	As per technical programme
K.Balan	S(SG)	"	25	
K.S.Scariah	Sr.S	"	25	
M.Srinath	S(SG)	"	25	
K.Vijayalekshmi	S	"	25	

Technical Assistance:
Varughese Jacob, G.Krishnankutty Nair, V.P.Anram, Joseph Andrews, 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, Sindhu K. Augustine

7. Location of the Research Project: Cochin

8. (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

9. 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. 6) To establish communication network with other information systems like NOIS of DOD 7) PFZ information linkage with MARSIS of NRSA

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10. Date of start: 1-4-1995 11. Likely date of completion: 31-3-1999

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12. Estimated man-months :
    a) Scientific : 15 man months/year
    b) Technical : 912 man months/year

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13. 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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14. 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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15. Approximate cost:

(a)	Salary of Scientific staff	: Rs. 2,08,000/-
(b)	Salary of Technical staff	: Rs. 4,49,000/-
(c)	Salary of supporting staff	:
(d)	Casual labour cost, if any	:
(e)	Cost of equipment, facility etc.	: Rs. 1,00,000/- (software)
(f)	Contingencies, such as chemicals, fertilisers, seeds, animals, feeds, sprayers etc.	: Rs. 25,000/-
	Maintanence of the computer system.	: Rs. 2,50,000/-
(g)	T.A.	:
	Total cost	: Rs. 10,32,000/-

Signature of:

16. Sd/- Project Leader 17. Sd/- Head of Division 18. Sd/- Director

RESEARCH PROJECT 1995-96

1. Institute Code No. PF/RE/1.1 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 Sardines (Sardinella spp.)

5. Name and Designation of Principal Investigator : N. Gopalakrishna Pillai, Senior Scientist

6. Name(s) and Designation of Associate(s) and establishment (s) on which borne: (a) Whole time (b) Part time (indicate proportion of time to be devoted and other area(s)

Name & Designation		Centre	Time to be spent (%)	Work to be done (Tech. Programme)
K. Preetha	S	Karwar	40	1-4 & 6
Prathibha Rohit	S	Mangalore	40	1-6
K.P. Said Koya	S	Calicut	25	1-4 & 6
N.G.K. Pillai	Sr.S	Cochin	25	1-4 & 6
R. Thiagarajan	S(S.G)	Madras	30	1-4 & 6
G. Syda Rao	Sr.S	Visakhapatnam	25	1-4 & 6

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

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

8. a) Objectives: Species-wise estimation of Sardinella spp. in the commercial landings and study the important biological parameters of major species aiming at the assessment of the stock and to study the impact of the fishing pressure on the resource. To interpret the fluctuations in abundance with reference to spawning, recruitment and environmental characteristics.

   b) Practical Utility: On an average, 1,83,000 t of oil sardine and 86,000 t of lesser sardines are landed along the Indian coasts. Of late, the oil sardine has established as a fishery along the east coast also. The results of the study would help in understanding the resource characteristics of the species in the fishing grounds.

9. Technical Programme: 1. Collection and analysis of gear-wise data on effort, catch and species composition of Sardinella spp. 2. To collect data on the size distribution, sex ratio, maturity, spawning and recruitment of oil sardine and the dominant species among the lesser sardines. 3. Estimation of growth and mortality parameters and assessment of the stock. 4. To correlate their fluctuations in abundance with environmental parameters. 5. Tag recovery studies on oil sardine at Mangalore. 6. To draw out the results by analysis and interpretation of the data and submit the periodical reports.

10. Date of start: April 1992 11. Likely date of completion: March 1996

12. Estimated man-months

a) Scientific	:	16
b) Technical	:	55
c) Supporting		

13. Facilities required and estimated cost

Land		
Works		
Tagging Equipments	:	Rs. 25,000
Hiring charges for Purse seiner	:	Rs.1,20,000
Publicity	:	Rs.1,00,000
Reward for recovered specimens	:	Rs. 50,000
Salaries and allowances		
Scientific	:	Rs.1,80,840
Technical	:	Rs.2,32,760
Labour	:	
Travel costs	:	Rs. 92,000
Contingencies	:	Rs. 39,600
Chemicals	:	
Glassware	:	
Fertilisers and plant protection chemicals	:	
Other items	:	
Total cost	:	Rs.8,40,200
Supporting		
Field preparation and planting		
Inter cultivation and top dressing		
Plant protection		
Harvesting		
Other items		

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

a) Name of Financing Organisation
b) Title of the Project

15. Approximate cost : Rs. 8,40,200

Signatures of:

Sd/-	Sd/-	Sd/-
16. Principal Investigator	17. Head of Division	18. Director

RESEARCH PROJECT 1995-96

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 : Fishery and Resource characteristics of Anchovies

5. Name and Designation of Principal Investigator : R. Thiagarajan, Scientist (S.G.)

6. Name(s) and Designation of Associate(s) and establishment(s) on which borne: (a) Whole time (b) Part time (indicate proportion of time to be devoted and other area(s)

Name & Designation		Centre	Time to be spent (%)	Work to be done (Tech.Programme)
M. Zaffar Khan	S(S.G.)	Bombay	40	1-5
Prathibha Rohit	S	Mangalore	30	1-5
P.N.R. Nair	Sr.S	Cochin	25	1-5
G. Gopakumar	S(S.G)	Vizhinjam	30	1-5
R. Thiagarajan	S(S.G)	Madras	40	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)

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

8. a) Objectives: The project aims to evaluate the relative abundance of the resource along the Indian coasts, to collect the fishery and the biological characteristics of the commercially important species and to assess the potential of the resource.

b) Practical Utility: The average annual landing of anchovies during 1988-93 was around 73,600 t. As there are indications of the resource being subjected to heavy fishing pressure in the inshore fishing grounds, a detailed study on various biological aspects of the species and the assessment of their stock are necessary for the proper management of the fishery.

9. Technical Programme: 1. Monitoring of the exploited resources based on the data on effort, catch and species composition from different gears. 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 assessment of stock. 5. Critical evaluation of the results and submission of periodical reports.

10. Date of start: April 1992 11. Likely date of completion: March 1996

12. Estimated man-months

a) Scientific : 16
b) Technical : 28

13. Facilities required and estimated cost

Land		
Works		
Equipment		
Existing		
To be purchased		
Salaries & allowances		
Scientific	:	Rs.2,15,600
Technical	:	Rs.1,23,200
Labour	:	
Travel costs	:	Rs. 77,000
Contingencies	:	Rs. 44,000
Chemicals	:	
Glassware	:	
Fertilisers and plant protection chemicals	:	
Other items	:	
Total cost	:	Rs.4,59,800
Supporting		
Field preparation and planting		
Inter cultivation and top dressing		
Plant protection		
Harvesting		
Other items		

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

a) Name of Financing Organisation
b) Title of the Project

15. Approximate cost : Rs.4,59,800

Signatures of:

Sd/-	Sd/-	Sd/-
16. Principal Investigator	17. Head of Division	18. Director

RESEARCH PROJECT 1995-96

1. Institute Code No. PF/RE/2.1 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 Seerfishes

5. Name & Designation of Principal Investigator : C. Muthiah, Scientist (S.G.)

6. Name(s) and Designation of Associate(s) and establishment(s) on which borne: (a) Whole time (b) Part time (indicate proportion of time to be devoted and other area(s)

Name & Designation		Centre	Time to be spent (%)	Work to be done (Tech. Programme)
B. Manojkumar	S	Veraval	30	1-4
Alexander Kurian	Sr.S	Bombay	40	1-4
C. Muthiah	S(S.G)	Mangalore	40	1-4
K.P. Said Koya	S	Calicut	25	1-4
N.G.K. Pillai	Sr.S	Cochin	25	1-4
H. Mohammed Kasim	Sr.S	Tuticorin	30	1-4

Technical Assistance: H.K. Dhokia (Veraval), J.D. Sarang (Bombay), Uma S. Bhat, G. Sampath Kumar (Mangalore), K.K. Balasubramaniam, M.M. Bhaskaran (Calicut), M.N.K. Elayathu (Cochin), T.S. Balsubramaniam (Tuticorin), P.K. Mahadevan Pillai, C. Manimaran (Madras), M.V. Somaraju, M.S.Sumithrudu (Visakhapatnam)

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

8. a) Objectives: To study the species-wise abundance of seerfishes, and their size and age distribution in the commercial fishery to estimate the growth and mortality parameters and to assess the stocks.

   b) Practical Utility: The resource is well exploited from the inshore fishing grounds and the estimated average annual catch for 1988-93 was 38,300 tonnes. With the expansion of the offshore fishing, informations on the characteristics of the resource would be essential for a rational exploitation and for formulating necessary management policy.

9. Technical Programme: 1. Collection of data on gear-wise effort, catch and species composition; 2. Length distribution of different species and their juvenile and young fish components in the commercial catch. 3. Estimation of the age composition of the species and their growth and mortality parameters for the estimation of stocks. 4. Interpretation of the results and submission of periodical reports.

10. Date of start : April 1992 11. Likely date of completion: March 1996

12. Estimated man-months

a) Scientific	:	24
b) Technical	:	43
c) Supporting	:	

13. Facilities required and estimated cost

Land		
Works		
Equipment		
Existing		
To be purchased		
Salaries and allowances		
Scientific	:	Rs.2,94,800
Technical	:	Rs.1,63,350
Labour	:	
Travel costs	:	Rs. 44,000
Contingencies	:	Rs. 44,000
Chemicals	:	
Glassware	:	
Fertilisers and plant protection chemicals	:	
Other items		
Total cost	:	Rs.5,46,150
Supporting		
Field preparation and planting		
Inter cultivation and top dressing		
Plant Protection		
Harvesting		
Other items		

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

a) Name of Financing Organisation
b) Title of the Project

15. Approximate cost : Rs.5,46,150

Signatures of:

16. Sd/- Principal Investigator

17. Sd/- Head of Division

18. Sd/- Director

RESEARCH PROJECT 1995-96

1. Institute Code No. PF/RE/2.2 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 tunas, tuna live-baits and billfishes

5. Name and Designation of Principal Investigator : P.P. Pillai, Principal Scientist

6. Name(s) and Designation of Associate(s) and establishment(s) on which borne: (a) Whole time (b) Part time (indicate proportion of time to be devoted and other area(s)

Name & Designation		Centre	Time to be spent (%)	Work to be done (Tech. Programme)
B. Manojkumar	S	Veraval	40	1,3,4 & 10
M. Zaffar Khan	S(S.G)	Bombay	30	1,3,4 & 10
C. Muthiah	S(S.G)	Managalore	30	1,3,4 & 10
K.P. Said Koya	S	Calicut	40	1,3,4 & 10
P.P. Pillai	PS	Cochin	30	1,3,4 & 10
N.G.K. Pillai	Sr.S	"	25	1,3,4 & 10
G. Gopakumar	S(S.G)	Vizhinjam	30	1,3,4 & 10
H. Mohammed Kasim	Sr.S	Tuticorin	40	1,3,4 & 10
M. Sivadas	S	Minicoy	100	1,2,3,4,5,8, 9 & 10
A.K.V. Nasser	S	"	100	6,7,8 & 10

Technical Assistance: H.K. Dhokia (Veraval), J.D. Sarang (Bombay), S. Kemparaju (Mangalore), K.K. Balasubramaniam, M.M. Bhaskaran (Calicut), M.N.K. Elayathu (Cochin), P.S. Sadasiva Sharma (Vizhinjam), T.S. Balasubramaniam (Tuticorin), K.S. Krishnan, C. Manimaran (Madras), A. Anasukoya, A. Kunhikoya (Minicoy)

7. Location of the Research Project : Veraval, Bombay, Mangalore, Calicut, Cochin, Vizhinjam, Tuticorin, Madras and Minicoy

8. a) Objectives: To assess the magnitude of exploited resources of tunas, baitfishes and billfishes; to estimate their species-wise abundance and to study the age composition of major species landed by different gears and to assess the stock of the resource.

b) Practical Utility: Potential for the development of tuna and billfish fishery is of great significance in view of the recent 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 and the other related species have got extensive domestic and export markets. Estimation of the potential of these species is a pre-requisite for suggesting developmental and managerial programmes in the tuna fishery in India.

9. Technical Programme: 1. Collection and analysis of data on effort, catch and species composition of tunas and billfishes landed by different gears along the coasts of mainland and Minicoy (Lakshadweep). 2. Estimation of catch per bait of tunas (CPUB) at Minicoy. 3. Gear-wise collection of data on size composition of different species for the estimation of age, growth and mortality parameters for assessing their stock. 4. Collection of data on the juvenile and young fish components of tunas taken by different gears. 5. Collection of data on biological characteristics such as sex-ratio, maturity, fecundity, spawning and food preference of skipjack tuna at Minicoy. 6. Collection and analysis of data on the fishery, qualitative and quantitative abundance and biological characteristics of tuna live-baits at Minicoy, Agatti and Kavarathi Islands. 7. Collection of data on the tuna fishery, CPUB and the biology of skipjack tuna landed at Agatti and Kavarathi. 8. Studies on monsoon fishery at Minicoy, 9. Studies on breeding and survival rate of selected species of live-baits in captivity at Minicoy. 10. Analysis and critical evaluation of the results and submission of periodical reports.

10. Date of start: April 1992 11. Likely date of completion: March 1996

12. Estimated man-months

a) Scientific	: 52
b) Technical	: 67
c) Supporting	:

13. Facilities required and estimated cost

Land	
Works	
Equipment	: Rs. 22,000
Existing	
To be purchased	
Salaries and allowances	
Scientific	: Rs.4,52,100
Technical	: Rs.2,69,800
Labour	: Rs. 27,500
Travel costs	: Rs.1,65,000
Contingencies	: Rs. 55,000
Chemicals	
Glassware	
Fertilisers and plant protection chemicals	:
Other items	
Total cost (Sub total)	: Rs.9,91,400

	Supporting Field preparation and plnating Inter cultivation and top dressing Plant protection Harvesting Other items	:	Rs. 17,600
14.	If financed by an organisation other than the Institute, then give the following information a) Name of Financing Organisation b) Title of the Project	:	Financed by the Institute
15.	Approximate cost	:	Rs.10,09,000

Signatures of:

	Sd/-		Sd/-		Sd/-
16.	Principal Investigator	17.	Head of Division	18.	Director

RESEARCH PROJECT 1995-96

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 : Fishery and Resource characteristics of Mackerel

5. Name and Designation of Principal Investigator : G. Gopakumar, Scientist (S.G.)

6. Name(s) and Designation of Associate(s) and establishment(s) on which borne: (a) Whole time (b) Part time (indicate proportion of time to be devoted and other area(s)

Name & Designation		Centre	Time to be spent (%)	Work to be done (Tech. Programme)
K. Preetha	S	Karwar	30	1-5
Prathibha Rohit	S	Mangalore	30	1-5
K.P. Said Koya	S	Calicut	25	1-5
P.P. Pillai	PS	Cochin	25	1-5
P.N.R. Nair	Sr.S	"	25	1-5
G. Gopakumar	S(S.G.)	Vizhinjam	40	1-5
H. Mohamed Kasim	Sr.S	Tuticorin	30	1-5
E.M. Abdussamad	S	Kakinada	25	1-5
G. Syda Rao	Sr.S	Visakhapatnam	25	1-5

Technical Assistance: N. Chennappa Gawda (Karwar), Alli C. Gupta, G. Sampath Kumar (Mangalore), K.K. Balasubramaniam, V.K. Janaki (Calicut), V.R. Arunachalam, K.V. Rema (Cochin), A.K. Velayudhan (Vizhinjam), T.S. Balasubramaniam, G. Arumugam (Tuticorin), N. Ramamoorthy (Mandapam), V. Abbulu (Kakinada), M.S. Sumithrudu (Visakhapatnam)

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

8. a) Objectives: Estimation of the exploited resources of mackerel along the coasts of India by different gears; to study the variation in the biological and population characteristics of the species at different localities and to interpret the fluctuation in abundance with reference to spawning and recruitment, and environmental parameters.

b) Practical Utility: The average catch of mackerel during 1988-93 was estimated around 1,95,700 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.

9. Technical Programme: 1. Collection and analysis of data on the effort and catch of mackerel landed by different gears along both the coasts of India. 2. Collection of data on size distribution, sex ratio, spawning and recruitment of mackerel. 3. Estimation of growth and mortality parameters and assessment of stock. 4. To correlate the fluctuations in abundance to environmental parameters. 5. Analysis and interpretation of data and submission of periodical reports.

10. Date of start : April 1992 11. Likely date of completion: March 1996

12. Estimated man-months

a) Scientific	:	26
b) Technical	:	59
c) Supporting	:	

13. Facilities required and estimated cost

Land		
Works		
Equipments		
Existing		
To be purchased		
Salaries and allowances		
Scientific	:	Rs.3,10,000
Technical	:	Rs.3,40,000
Labour	:	
Travel costs	:	Rs. 50,000
Contingencies	:	Rs. 50,000
Chemicals	:	
Glasswares	:	
Fertilisers and plant protection chemicals	:	
Other items	:	
Total cost	:	Rs.7,50,000
Supporting		
Field preparation and planting		
Inter cultivation and top dressing		
Plant protection		
Harvesting		
Other items		

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

a) Name of Financing Organisation
b) Title of the Project

15. Approximate cost : Rs.7,50,000

Signatures of:

Sd/-	Sd/-	Sd/-
16. Principal Investigator	17. Head of Division	18. Director

RESEARCH PROJECT 1995-96

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

Name and Address of Research Institute : CMFR Institute, Cochin

Title of Project : Fishery and Resource characteristics of Bombay duck

Name and Designation of Principal Investigator : Alexander Kurian, Senior Scientist

Name(s) and Designation of Associate(s) and establishment(s) on which borne: (a) Whole time (b) Part time (indicate proportion of time to be devoted and other area(s)

Name & Designation		Centre	Time to be spent (%)	Work to be done (Tech. Programme)
P. Said Koya	S	Veraval	30	1-4
. Manojkumar	S	"	30	1-4
lexander Kurian	Sr.S	Bombay	60	1-4

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

Location of the Research Project : Veraval, Bombay

) Objectives: To assess the magnitude of the Bombay duck resource and its abundance in space and time along the north west coast of India; to study the biological characteristics of the species and to estimate growth and mortality parameters leading to the assessment of stock and for suggesting management measures.

) Practical Utility: The annual average (1988-93) landing of Bombay duck has been estimated as 1,21,600 tonnes. The proposed study will help in the formulation of management policies for a rational exploitation of this resource which is presently subjected to heavy fishing pressure.

Technical Programme: 1. Collection and analysis of data on effort and catch by different gears. 2. Collection of data on size distribution, sex-ratio, maturity, spawning, recruitment and feeding habits. 3. Assessment of the stock and suggest management measures for optimum exploitation. 4. Critical analysis of the data and submission of periodical reports.

Date of start : April 1992 11. Likely date of completion: March 1996

Estimated man-months

a) Scientific : 14
b) Technical : 6
c) Supporting

Facilities required and estimated cost

Land
Works
Equipment
Existing
To be purchased

Salaries and allowances
Scientific : Rs.1,00,980
Technical : Rs. 27,720
Labour
Travel costs : Rs. 22,000
Contingencies : Rs. 15,400
Chemicals
Glassware
Fertilisers and plant protection chemicals
Other items
Total cost : Rs.1,66,100

Supporting
Field preparation and planting
Inter cultivation and top dressing
Plant protection
Harvesting
Other items

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

a) Name of Financing Organisation
b) Title of the Project

Approximate cost : Rs.1,66,100

Signatures of:

Sd/-
Principal Investigator 17.

Sd/-
Head of Division 18.

Sd/-
Director

RESEARCH PROJECT 1995-96

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. Name and Designation of Principal Investigator : P.N. Radhakrishnan Nair, Senior Scientist

6. Name(s) and Designation of Associate(s) and establishment(s) on which borne: (a) Whole time (b) Part time (indicate proportion of time to be devoted and other area(s)

Name & Designation		Centre	Time to be spent (%)	Work to be done (Tech.Programme)
K.K. Joshi	S	Veraval	30	1-4
M. Zaffar Khan	S(S.G.)	Bombay	30	1-4
K. Preetha	S	Karwar	30	1-4
C. Muthiah	S(S.G.)	Mangalore	30	1-4
P.N. Radhakrishnan Nair	Sr. S	Cochin	25	1-4
R. Thiagarajan	S(S.G.)	Madras	30	1-4
E.M. Abdussamad	S	Kakinada	25	1-4

Technical Assistance: H.K. Dhokia (Veraval), J.D. Sarang (Bombay), N. Chennappa Gawda (Karwar), S. Kemparaju (Mangalore), V.R. Arunachalam, K.V. Rema (Cochin), P.S. Sadasiva Sharma (Vizhinjam), P. Ramados (Madras), V. Abbulu (Kakinada), M.V. Somaraju, M.S. Sumithrudu (Visakhapatnam)

7. Location of the Research Project : Veraval, Bombay, Karwar, Mangalore, Cochin, Vizhinjam, Madras, Kakinada and Visakhapatnam

8. a) Objectives: To study the magnitude of exploitation of ribbonfishes by different gears; their species composition in the exploited stock and the biological characteristics of dominant species aimed to understand the resource potential, stock and the possible reasons for the fluctuations of the fishery.

b) Practical Utility: The average annual exploitation of ribbon fish in India during 1988-93 is estimated at 87,590 tonnes. The fishery has been exhibiting seasonal fluctuations in abundance along the different zones of the Indian coasts. The study may reveal the biological characteristics of the species and the possible reasons for seasonal and spatial variations in their abundance.

9. Technical Programme: 1. Estimation of effort, catch and species composition of ribbonfishes from all types of gears. 2. Collection of data on size distribution, sex ratio, maturity, spawning periodicity, recruitment and food preference of the major species. 3. Estimation of growth parameters and mortality rates and also assessment of stock. 4. Critical evaluation of the findings and submission of periodical reports.

10. Date of start : April 1992 11. Likely date of completion: March 1996

12. Estimated man-months

a) Scientific	:	24
b) Technical	:	38
c) Supporting		

13. Facilities required and estimated cost

Land		
Works		
Equipment		
Existing		
To be purchased		
Salaried and allowances		
Scientific	:	Rs.2,46,840
Technical	:	Rs.1,18,140
Labour	:	
Travel costs	:	Rs. 44,000
Contingencies	:	Rs. 39,600
Chemicals	:	
Glassware	:	
Fertilisers and plant protection chemicals	:	
Other items	:	
Total cost	:	Rs.4,48,580
Supporting		
Field preparation and planting		
Inter cultivation and top dressing		
Plant protection		
Harvesting		
Other items		

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

a) Name of Financing Organisation
b) Title of the Project

15. Approximate cost : Rs.4,48,580

Signatures of:

Sd/-	Sd/-	Sd/-
16. Principal Investigator	17. Head of Division	18. Director

RESEARCH PROJECT 1995-96

1. Institute Code No. CMFRI/IDP/FF/1 2. I.C.A.R. Code No.

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

4. Title of Project : Fishery forecasting based on multi-species resource interaction in space and time in the Malabar upwelling zone

5. Name and Designation of Principal Investigator : P.P. Pillai, Principal Scientist

6. Name(s) and Designation of Associate(s) and establishment(s) on which borne: (a) Whole time (b) Part time (indicate proportion of time to be devoted and other area(s)

Name & Designation		Centre	Time to be spent (%)	Work to be done (Tech.Programme)
M. Devaraj	Director	Cochin	10	6
P.P. Pillai	P.S.	"	25	1-6
P.N.R. Nair	Sr.S	"	25	1-6
V.N. Pillai	P.S	"	25	1-6
K.G.Girijavallabhan	S(SG)	"	25	1-6
K. Balan	S(SG)	"	25	1-6
M. Srinath	S(SG)	"	25	1-6
P. Bensam	P.S.	"	25	1-6
N.G. Menon	Sr.S	"	25	1-6
S. Sivakami	Sr.S	"	25	1-6
N.N. Pillai	Sr.S	"	25	1-6
K.N. Rajan	S(SG)	"	25	1-6
K.A. Narasimham	P.S.	"	25	1-6
Lakshmi Latha	S	"	25	1-6

Technical Assistance: S. Natarajan, A. Nandakumar (FEMD), K.V. Rema, V.R. Arunachalam (PFD), Sindhu Sebastian, T.P. Pavithran (FRAD), K.M. Vemugopal, K. Balachandran (DFD), P.K. Baby, K. Chellappan (CFD) and N.P. Ramachandran, G. Chithra (MFD)

7. Location of the Research Project : Cochin

8. a) Objectives: To develop a multispecies yield prediction model for commercially important fisheries.

   b) Practical Utility: This modelling will help in developing indicators which will serve as proxies for catch forecasting which is essential for effective fisheries management.

9. Technical Programme: 1. Review of all available historical data from Karwar, Mangalore, Calicut, Cochin and Vizhinjam centres on a) catch, b) effort and c) length of mackerel, sardines, anchovies, scads, tunas, seerfishes, pelagic sharks, threadfin breams, lizard fishes, cat fishes, sciaenids and perches, squids, cuttlefishes and shrimps. 2. Review of all available meteorological and oceanographic data in the area under study. 3. Review of all available primary and secondary production data pertaining to the area. 4. Collection and analysis of ichthyoplankton data from the above centres (starting with Cochin). 5. Analysis of the trend in the above parameters. 6. Estimating the interrelationships between the parameters and develop suitable prediction models for individual groups.

10. Date of start: April 1995 11. Likely date of completion: March 1996

12. Estimated man-months

a) Scientific	:	37
b) Technical	:	48
c) Supporting	:	

13. Facilities required and estimated cost

Land		
Works		
Equipment		
Existing		
To be purchased		
Salaries and allowances	:	
Scientific	:	Rs.3,50,000
Technical	:	Rs.1,93,000
Labour	:	
Travel costs	:	
Contingencies	:	
Chemicals	:	
Glassware	:	
Fertilisers and plant protection chemicals	:	
Other items	:	
Total cost	:	Rs.5,43,000
Supporting		
Field preparation and planting		
Inter cultivation and top dressing		
Plant protection		
Harvesting		
Other items		

14. If financed by an organisation other than the Institute, then give the following information
a) Name of Financing Organisation
b) Title of the Project
: Financed by the Institute

15. Approximate cost : Rs.5,43,000

Signatures of:

16. Sd/- Principal Investigator

17. Sd/- Head of Division

18. Sd/- Director

RESEARCH PROJECT 1995-96

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 : Monitoring the resources characteristics of Elasmobranchs.

5. Name and Designation of Principal Investigator : P. Devadoss, Senior Scientist

6. Name (s) and Designation of Associate (s) and Establishment (s) on which borne: (a) whole time (b) part time (indicate proportion of time to be devoted and other area (s).

Name and Designation	Centre	Time to be spent (%)	Work to be done (Tech. prog.)
S. Lazarus, SS	Veraval	30	(1) - (3)
S.G. Raje, S (SG)	Bombay	40	(1) - (3)
	Mangalore	To be posted	
	Calicut	To be posted	
Grace Mathew, S (SG)	Cochin	25	(1) - (3)
R. Marichamy, PS	Tuticorin	25	(1) - (3)
V. Gandhi, S(SG)	Mandapam	25	(1) - (3)
P. Devadoss, PS	Madras	50	(1) - (3)

Technical Assistance: B.B. Chavan (Bombay), K.M. Venugopalan (Cochin), M. Badrudeen (Mandapam), S. Rajapackiam (Tuticorin) and G. Srinivasan (Madras).

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

8. (a) Objectives: To understand the fisheries characteristics of the resource.

(b) Practical Utility : The project aims at understanding the effect of exploitation on the resource as well as the variations in the availability and abundance in space and time.

9. Technical Programme : (1) Estimation of effort, catch and species composition by different gears in various depth zones and calculation of catch per unit effort; (2) Collection of data on length of sharks, skates and rays, (3) Samples to be examined for determining breeding seasons.

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

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12. Estimated man months :

(a) Scientific	:	24
(b) Technical	:	24
(c) Supporting (in man days)	:	240

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13. Facilities required and and estimated cost:

Land	:	
Works	:	
Equipment	:	
Existing	:	
To be purchased (items & cost)	:	
Salaries & allowances (Man months)		
Scientific	:	Rs. 3,00,000
Technical	:	
Travel costs	:	Rs. 25,000
Contingencies	:	Rs. 23,000
Chemicals	:	
Glassware	:	
Fertilizers and plant Protection chemicals	:	
Other items	:	
Total cost		
Supporting (Man days)	:	
Field preparation and planting	:	
Inter cultivation and top dressing	:	
Plant Protection	:	
Harvesting	:	
Other items	:	

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

(a) Name of Financing Organisation :

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

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15. Approximate cost:

Signatures of:

Sd/-	Sd/-	Sd/-
16. Principal Investigator	17. Head of Division	18. Director

RESEARCH PROJECT 1995-96

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 : Monitoring the resource characteristics of groupers, snappers and pigface breams.

5. Name and Designation of Principal Investigator : S. Lazarus, Senior Scientist

5. Name (s) and designation of Associate (s) and Establishment (s) on which borne: (a) Whole time (b) Part time (indicate proportion of time to be devoted and other area (s).

Name and Designation	Centre	Time to be spent (%)	Work to be done (Tech. prog.)
S. Lazarus, SS	Veraval	40	(1) - (2)
S.K.Chakraborty, SS	Bombay	30	(1) - (2)
Grace Mathew, S (SG) API*	Cochin	50	(1) - (2)
K.K. Philippose, S CFD	Vizhinjam	40	(1) - (3)
R. Marichamy, PS	Tuticorin	25	(1) - (2)
P. Nammalwar, SS	Madras	50	(1) - (2)

Technical Assistance: Thakur Das (Bombay), K.M. Venugopalan (Cochin), S.G. Vincent (Vizhinjam), S. Rajapackiam (Tuticorin) and T.A. Omana (Vizhinjam).

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

8. (a) Objectives: To understand the biological and fishery characteristics as well as to estimate the maximum sustainable yield for rational management of the resource.

(b) Practical utility: The project aims at understanding the biological characteristics and nature of stocks so that suitable management measures can be suggested. The study will also help in understanding the variations in availability and abundance.

9. Technical Programme: (1) Collection and analysis of data on effort, catch and specific composition of the important resources, locally available; (2) Collection of data for age, maturity-composition estimates and fecundity; (3) Collection and analysis of resources data from artificial reefs at Vizhinjam.

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

* Associate Principal Investigator.

12.	Estimated man months :	
	(a) Scientific :	28
	(b) Technical :	18
	(c) Supporting (in man days) :	270
13.	Facilities required and estimated cost:	
	Land :	
	Works :	
	Equipment :	
	Existing :	
	To be purchased (items & cost) :	
	Salaries & allowances (Man months) :	
	Scientific	Rs. 2,23,000
	Technical :	Rs. 1,00,000
	Labour :	
	Travel costs :	Rs. 15,000
	Contingencies :	Rs. 23,000
	Chemicals :	
	Glassware :	
	Fertilizers and plant Protection chemicals :	
	Other items :	
	:	
	Total costs :	Rs. 3,61,000
	Supporting (Man days) :	270
	Field preparation and planting :	
	Inter cultivation and top dressing :	
	Plant protection :	
	Harvesting :	
	Other items :	
14.	If financed by an organisation other than the Institute, then give the following information :	
	(a) Name and financing Organisation :	
	(b) Title of the Project (if the project forms a part of a larger project) :	
15.	Approximate cost :	

Signatures of:

Sd/-	Sd/-	Sd/-
16. Principal Investigator	17. Head of Division	18. Director

RESEARCH PROJECT 1995-96

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 : Monitoring the resource characteristics of Catfishes.

5. Name and designation of Principal Investigator : N.G. Menon, Senior Scientist

6. Name (s) and designation of Associate (s) and establishment (s) on which borne: (a) Whole time (b) Part time (indicate proportion of time to be devoted and other area (s).

Name and Designation	Centre	Time to be spent (%)	Work to be done (Tech. prog.)
S.G. Raje, S (SG)	Bombay	25	(1)-(4)
N.G. Menon, SS	Cochin	25	(1)-(4)
P.Nammalwar, SS	Madras	50	(1)-(4)

Technical Assistance: B.B. Chavan (Bombay), K. Balachandran (Cochin), and K. Narayana Rao (Visakhapatnam).

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

8. (a) Objectives: To assess the effect of exploitation on the resource, to improve the fishery through biological information and to monitor species changes and replacements in space and time.

(b) Practical Utility : The production of catfishes showed gradual decline especially along the south-west coast; but has been improving in recent years. Many migrating species are being replaced by resident populations of less migrant species. The Project aims at understanding the effect of exploitation on production, so that suitable regulatory measures can be suggested. The study also helps in understanding the variations in abundance with reference to space and time.

9. Technical Programme: (1) Estimation of gearwise and species wise catfish catch; (2) Collection of biological data such as growth and spawning of dominant species; (3) Estimation of biomass and spawning biomass; (4) Estimation of juvenile, spawners and brooders landed by major gears.

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

12. Estimated man months	:	
(a) Scientists	:	12
(b) Technical	:	12
(c) Supporting (in man days)	:	180
13. Facilities required and estimated cost	:	
Land	:	
Works	:	
Equipment	:	
Existing	:	
To be purchased (items & cost)	:	
Salaries and allowances (Man-months)	:	
Scientific	:	Rs. 1,50,000
Technical	:	83,000
Labour	:	
Travel costs	:	23,000
Contingencies	:	12,000
Chemicals	:	
Glasswares	:	
Fertilizers and plant protection chemicals	:	
Other items	:	
Total cost	:	Rs. 2,68,000
Supporting (man days)	:	
Field preparation and planting	:	
Intercultivation and top dressing	:	
Plant protection	:	
Harvesting	:	
Other items	:	
14. If financed by an organisation other than the Institute, then give the following information.		
(a) Name of the Financing Organisation	:	
(b) Title of the project (if the project forms a part of a larger project)	:	
15. Approximate cost	:	

Signatures of:

Sd/- Sd/- Sd/-

16. Principal Investigator 17. Head of Division 18. Director

RESEARCH PROJECT 1995-96

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 : Stock assessment of threadfin breams and silverbellies.

5. Name and Designation of Principal Investigator : E. Vivekanandan, Senior Scientist.

6. Name (s) and designation of Associate (s) and Establishment (s) on which borne: (a) Whole time (b) Part time (indicate proportion of time to be devoted and other area (s).

Name and designation	Centre	Time to be spent (%)	Work to be done (Tech. prog)
P.P.Manoj Kumar, S	Veraval	30	(1)-(4)
S.K. Chakraborty, SS	Bombay	30	(1)-(4)
P.Livingston, S (SG)	Karwar	30	(1)-(4)
P.J.Zacharia, S	Mangalore	30	(1)-(4)
N.G. Menon, SS	Cochin	30	(1)-(4)
V.S.Rengaswamy, S,S-2	Tuticorin	30	(1)-(4)
V.Gandhi, S (SG)	Mandapam	35	(1)-(4)
E. Vivekanandan, SS	Madras	50	(1)-(4)
A. Raju, S (SG)	Kakinada	40	(1)-(4)
K.M.S.A. Hamsa, S (SG)	Visakhapatnam	40	(1)-(4)

Technical Assistance: H.K. Dhokia (Veraval), B.B. Chavan (Bombay), V.M. Dhareshwar (Karwar), H.S. Mahadevaswamy (Mangalore), K. Balachandran (Cochin), J. Narayanaswamy (Cochin), M. Rajapackiam (Tuticorin), M. Badrudeen (Mandapam), S.K. Balakumar (Madras), P. Ramdoss (Madras), P. Ramalingam (Kakinada) and C.V. Seshagiri Rao (Visakhapatnam).

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

8. (a) Objectives: To study the fishery and biological characteristics of the resources.

(b) Practical utility: (i) An estimated annual average of 90,000 tonnes of threadfin breams and silverbellies are landed. This project aims at understanding the effect of exploitation, so that suitable regulatory measures can be suggested. (ii) The study will also help to understand the variations in availability and abundance in relation to space and time.

9. Technical Programme: (1) Collection of data on effort, catch and species composition; (2) Collection of length data on dominant species; (3) Estimation of biological parameters like growth and spawning and (4) Stock assessment of various species and estimation of MSY.

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

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12. Estimated man months :

(a) Scientific	:	36
(b) Technical	:	36
(c) Supporting (in man days)	:	360

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13. Facilities required and estimated cost :

Land	:		
Works	:		
Equipment	:		
Existing	:		
To be purchased (items & cost)	:		
Salaries & allowances			
Scientific	:	Rs.	3,56,000
Technical	:	Rs.	2,20,000
Labour	:		
Travel costs	:	Rs.	60,000
Contingencies		Rs.	31,000
Chemicals	:		
Glasswares	:		
Fertilizers and plant protection chemicals	:		
Other items	:		
Total cost	:	Rs.	6,67,000
Supporting (Man days)		360	
Field preparation and planting	:		
Inter cultivation and top dressing	:		
Plant protection	:		
Harvesting	:		
Other items	:		

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14. If financed by an organisation other than the Institute, then give the following information. -

(a) Name of Financing Organisation :

(b) Title of the project (if the project forms a part of a larger project) :

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15. Approximate cost : :

Signatures of:

Sd/- Sd/- Sd/-

16. Principal Investigator 17. Head of Division 18. Director

RESEARCH PROJECT 1995-96

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 : Studies on the fishery and biology of Sciaenids

5. Name and Designation of Principal Investigator : S.K. Chakraborty, Senior Scientist

6. Name (s) and designation of Associate (s) and Establishment (s) on which borne: (a) Whole time (b) Part time (indicate proportion of time to be devoted and other area (s).

Name and Designation	Centre	Time to be spent (%)	Work to be done (Tech. prog)
P.P. Manoj Kumar, S	Veraval	40	(1) - (3)
S.K. Chakraborty, SS	Bombay	40	(1) - (3)
P.Livingston, S (SG)	Karwar	40	(1) - (3)
M. Feroz Khan, S	Calicut	40	(1) - (3)
S. Sivakami, SS	Cochin	50	(1) - (3)
V.S. Rengaswamy, S (SG)	Tuticorin	30	(1) - (3)
V. Gandhi, S (SG)	Mandapam	40	(1) - (3)
P. Devadoss, SS	Madras	25	(1) - (3)
A. Raju, S (SG)	Kakinada	35	(1) - (3)
K.M.S.A. Hamsa, S (SG)	Visakhapatnam	35	(1) - (3)

Technical Assistance: H.K. Dhokia (Veraval), B.B. Chavan (Bombay), V.M. Dhareshwar (Karwar), K. Nandakumar (Calicut), P.K. Seetha (Cochin), M. Rajapackiam (Tuticorin), M. Badrudeen (Mandapam), P. Ramadoss (Madras), P. Ramalingam (Kakinada), C.V. Seshagiri Rao (Visakhapatnam), C. Manimaran (Madras).

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

8. (a) Objectives: To study the effect of exploitation of resources as well as the probable causes for the decline in the yield of resources of 'ghol' and 'koth' off Maharashtra and Gujarat.

(b) Practical utility: The project will help in formulating regulatory measures for the exploitation of various species in different centres.

9. Technical Programme: (1) Collection and analyses of data on fishing efforts, catch, mesh size and species composition; (2) Collection of data on the length composition, sex, maturity stages, food and feeding condition of various species; (3) Estimation of growth mortality yield per recruitment spawning stock and total biomass and MSY.

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

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12. Estimated man months :

(a) Scientific	: 45
(b) Technical	: 36
(c) Supporting (in man days)	: 18

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13. Facilities required and estimated cost : -

Land	: -
Works	
Equipment	: -
Existing	: -
To be purchased (items & cost)	: -
Salaries & allowances	:
Scientific	: Rs. 7,02,000
Technical	: Rs. 2,42,000
Labour	: -
Travel costs	: Rs. 74,410
Contingencies	: Rs. 49,200
Chemicals	: Rs. 15,000
Glassware	: Rs. 10,000
Fertilizers and plant protection chemicals	: -
Other items	: -
Total cost	: Rs.10,92,610
Supporting (man days)	: 18
Field preparation and planting	: -
Inter cultivation and top dressing	: -
Plant protection	: -
Harvesting	: -
Other items	: -

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14. If financed by an organisation other than the Institute, then give the following information. NO

(a) Name of Financing Organisation: N.A

(b) Title of the project (if the project forms a part of a larger project):

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15. Approximate cost:

Signatures of:

Sd/- Sd/- Sd/-

16. Principal Investigator 17. Head of Division 18. Director

RESEARCH PROJECT 1995-96

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 : Resource characteristics and biology of Lizard fishes, Threadfins and Flat heads.

5. Name and Designation of Principal Investigator : S. Sivakami, Senior Scientist

6. Name (s) and Designation of Associate (s) and Establishment (s) on which borne: (a) Whole time (b) part time (indicate proportion of time to be devoted and other area (s).

Name and Designation	Centre	Time to be spent (%)	Work to be done (Tech. prog.)
P.P. Manoj Kumar, S	Veraval	30	(1) - (6)
S.G. Raje, S (SG)	Bombay	35	(1) - (6)
M. Feroz Khan, S	Calicut	30	(1) - (6)
S. Sivakami, SS	Cochin	30	(1) - (6)
E. Vivekanandan, SS	Madras	25	(1) - (6)
	Visakhapatnam	To be posted	

Technical Assistance: H.K. Dhokia (Veraval), B.B. Chavan (Bombay), K. Nandakumaran (Calicut), P.K. Seetha (Cochin), S.K. Balakumar (Madras) and K.Narayana Rao (Visakhapatnam).

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

8.a) Objectives: 1) To understand the effect of exploitation on the qualitative and quantitative distribution and abundance of the important minor demersal finfish resources. 2) To study the probable causes for the fluctuations in the catches. 3) To assess the causes for the decline in the production of "Dhara " (*P. indicus, P. heptadactylus*) in the Northwest coast.

b) Practical Utility: (1) An understanding of the availability and abundance of these resources will enable to recommend measures for judicious exploitation. (2) The study will help to assess spawning periodicity and recruitment so that regulatory measures could be suggested to curtail recruitment over fishing.

9. Technical Programme: (1) Collection and analysis of data on effort and catch from all the gears and monitoring mesh sizes. (2) Collection of biological data such as length, sex and maturity. (3) Estimation of growth parameters using length data and growth checks on hard parts. (4) Collection of data on food habits and food preference. (5) Estimation of total stock biomass and spawning stock biomass. (6) Evaluation of the relationship between the adult stocks and recruitment.

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

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12. Estimated man months :

(a) Scientific	: 24
(b) Technical	
(c) Supporting (in man days)	

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13. Facilities required and estimated cost :

Land	:		
Works	:		
Equipment	:		
Existing	:		
To be purchased (items & Cost)			
Fish samples	:	Rs.	5,000/year
Salaries & allowances (Man months)	:		
Scientific	:	Rs.	2,82,000
Technical	:	Rs.	1,65,000
Labour	:		
Travel costs	:		
Contingencies	:		
Chemicals	:		
Glassware	:		
Fertilizers and plant protection chemicals	:		
Other items	:	Rs.	41,000
Total cost	:	Rs.	4,88,000
Supporting (Man days)	:		
Field preparation and planting	:		
Inter cultivation and top dressing	:		
Plant protection			
Harvesting	:		
Other items	:		

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

    (a) Name of Financing Organisation :

    (b) Title of the project (if the project forms a part of a larger project) :

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15. Approximate cost :

Signatures of:

Sd/-	Sd/-	Sd/-
16. Principal Investigator	17. Head of Division	18. Director

RESEARCH PROJECT 1995-96

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 : Biology and fishery of flatfishes, goat fishes and whitefish.

5. Name and Designation of Principal Investigator : P. Bensam, Principal Scientist

6. Name (s) and Designation of Associate (s) and Establishment (s) on which borne: (a) Whole time (b) Part time (indicate proportion of time to be devoted and other area (s).

Name and Designation	Centre	Time to be spent (%)	Work to be done (Tech.prog.)
S. Lazarus, SS	Veraval	30	(1)-(3)
P.J.Zachariah, S	Mangalore	30	(1)-(3)
M. Feroz Khan, S	Calicut	30	(1)-(3)
P. Bensam, PS	Cochin	25	(1)-(3)
Grace Mathew, S (SG)		25	(1)-(3)
S. Krishna Pillai, S (SG)	Vizhinjam	40	(1)-(3)
P. Jayasankar, S (SS)	Mandapam	25	(1)-(3)
P. Devadoss, SS	Madras	25	(1)-(3)
K.M.S.A. Hamsa, S (SG)	Visakhapatnam	25	(1)-(3)

Technical Assistance: H.S. Mahadevaswamy (Mangalore), K. Nandakumaran (Calicut), K. Balachandran (Cochin), J. Narayanaswamy (Cochin), K.M. Venugopalan (Cochin), S.G. Vincent (Vizhinjam) and P. Ramadoss (Madras).

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

8. (a) Objectives : To improve the fishery through information on their population characters for rational management of the resource.

(b) Practical utility: The project aims at understanding the effect of exploitation, for judicious management of the resources.

9. Technical programme: (1) Estimation of catch and effort from all gears. (2) Collection of data on length composition, maturity and spawning. (3) Determination of stock-recruitment relationship

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

13. Estimated man months	:	
(a) Scientific	:	36
(b) Technical	:	32
(c) Supporting (in Man days)	:	480

13. Facilities required and estimated cost :

Land	:	
Works	:	
Equipment	:	
Existing	:	
To be purchased (items & cost)	:	
Salaries and allowances (Man months)		
Scientific	:	Rs. 4,27,000
Technical	:	Rs. 2,87,000
Labour	:	
Travel costs	:	Rs. 31,000
Contingencies	:	Rs. 41,000
Chemicals	:	
Glasswares	:	
Fertilizers and plant protection chemicals	:	
Other items	:	
Total cost	:	Rs. 7,[illegible]6,000
Supporting (Man days)	:	480
Field preparation and planting	:	
Inter cultivation and top dressing	:	
Plant protection	:	
Harvesting	:	
Other items	:	

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

    (a) Name of Financing Organisation

    (b) Title of the project (if the project forms a part of a larger project)

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15. Approximate cost :

Signatures of:

Sd/-	Sd/-	Sd/-
16. Principal Investigator	17. Head of Division	18. Director

RESEARCH PROJECT 1995-96

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 : Investigations on the impact of coastal bottom trawling on demersal fishes and macro-benthos.

5. Name and Designation of Principal Investigator : N.G. Menon, Senior Scientist.

6. Name (s) and designation of Associate (s) and Establishment (s) on which borne: (a) Whole time (b) Part time (indicate proportion of time to be devoted and other area (s).

Name and Designation	Centre	Time to be spent (%)	Work to be done (Tech. prog)
P.Livingston, S (SG)	Karwar	30	(1)-(7)
P.J.Zachariah, S	Mangalore	40	(1)-(7)
P. Bensam, PS	Cochin	25	
N.G. Menon, SS		25	(1)-(7)
P.Jayasankar, S (SG)	Mandapam	25	(1)-(7)
E.Vivekanandan, SS	Madras	25	(1)-(7)
A. Raju, S (SG)	Kakinada	25	(1)-(7)

Technical Assistance: V.M. Dhareshwar (Karwar), H.S. Mahadevaswamy (Mangalore), K. Balachandran (Cochin), J. Narayanaswamy (Cochin), K.M. Venugopalan (Cochin), P.K. Seetha (Cochin), A. Shanmugha Velu, (Mandapam), S.K. Balakumar (Madras) and P. Remalingam (Kakinada).

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

9. (a) Objectives: (1) To study the impact of physical disturbance of bottom trawling on the macro-benthos and its relationship with the fishery resources. (2) Impact of the gear on the sizes of demersal fish stocks. (3) Impact of mesh size reduction on juvenile fish populations. (4) Effect of benthos destruction on coastal fish resources. (5) Rate of recolonisation of benthic biomass in relation to that of exploitation resources.

(b) Practical Utility: (1) 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, compose of a wide spectrum of bottom biotic 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 identify the magnitude c the problem and formulate management strategies.

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9. Technical Programme: (1) Collection of species wise data on the juveniles/subadults of major demersal groups that are harvested, (2) Estimation of their monthly numbers in different size classes, (3) Qualitative and quantitative estimation of the benthic biota discarded/destroyed by trawling, (4) Collection of data by experimental trawling Cadalmin vessels wherever available, (5) Analysis of stomach contents of major constituent species, (6) Analyse of data in the light of the catch and effort particulars trawlers (from FRA Division), (7) Formulation of strategies for imparting management advice.

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10. Date of start : 1994-'95 11. Likely date of completion : 1995-'9

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12. Estimated man-months :

(a) Scientific	:	25 man months
(b) Technical	:	35 man months
(c) Supporting (in man days)	:	180 man days

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13. Facilities required and Estimated cost :

Land	:	
Works	:	
Equipment	:	
Existing	:	
To be purchased (items & Cost)	:	
Salaries and allowances		
Scientific	:	Rs. 3,02,000
Technical	:	Rs. 1,82,000
Labour	:	
Travel costs	:	
Contingencies	:	Rs. 29,000

Chemicals	:	
Glassware	:	
Fertilizers and plant protection chemicals	:	
Other items	:	
Total cost	:	Rs. 5,13,000
Supporting (Man days)	:	
Field preparation and planting	:	
Inter cultivation and top dressing	:	
Plant protection	:	
Harvesting	:	
Other items	:	

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14. If financed by an Organisation other than the Institute, then give the following information :

    (a) Name of financing Organisation :

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

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15. Approximate cost:

Signatures of:

sd/-	Sd/-	sd/-
16. Principal Investigator	17. Head of Division	18. Director

RESEARCH PROJECT 1995-96

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 : Broodstock development of Seabass and selected species of perches.

5. Name and Designation of Principal Investigator : R. Marichamy, Principal Investigator.

6. Name (s) and Designation of Associate (s) and Establishment (s) on which borne: (a) Whole time (b) Part time (indicate proportion of time to be devoted and other area (s).

Name and Designation	Centre	Time to be spent	Work to be done (Tech. prog.)
Dr. P. Jayasankar, S (SS)	Mandapam	50	(1)-(5)
R. Marichamy, PS	Tuticorin	30	(1)-(5)
V.S. Rengaswamy, S, S-2	Tuticorin	40	(1)-(5)

Technical Assistance: N. Ramamurthy, N. Palanichamy, S. Mohan, A. Shanmuga Velu (Mandapam) and S. Rajapackiam (Tuticorin).

7. Location of the Research Project : Mandapam and Tuticorin.

8. (a) Objectives : To develop and maintain a broodstock 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 cultured in Thailand, Singapore and Philippines. Developing and Maintaining the broodstock would enable to undertake breeding experiments and pave way for seed production.

9. Technical Programme : (1) Collec ion of mature specimens and spawners as well as juveniles at Mandapam and Tuticorin. (2) Acclimatisation conditioning and transportation of the specimens. (3) Maintenance and feeding of the specimens in ponds and net cages. (4) Administration of hormones to enhance maturity of the adult specimens as well as raising to reach the stage for conducting induced breeding experiments. (5) Environmental manipulation to attain maturity for natural spawning.

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

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12. Estimated man months :

(a) Scientific	: 15
(b) Technical	: 15
(c) Supporting (in Man days)	: 270

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13. Facilities required and Estimated cost	: 5000 m^2 at Mandapam to be improved.
Land (Sq.m)	: 4000 m^2 2 ponds available Needs renovation at Tuticorin.
Works (item)	: 100 ton capacity tanks 2. 10 ton tanks 6 nos.
Equipments	: Salinometer. Field kits to study, pH, D_2 Temp °C Hot plate. Portable aerators.
Existing	: Cost of the cement tanks etc. Rs. 2,25,000
To be purchased (items & cost)	: Rs. 70,000
Salaries & allowances	
Scientific	: Rs. 5,10,000
Technical	: Rs. 1,40,000
Labout	: Rs. 60,000
Travel costs	: Rs. 50,000
Contingencies	: Rs. 80,000
Chemicals	: Rs. 70,000
Glassware	: Rs. 10,000

Fertilizers and Plant Protection chemicals	:	
Other items : Farm materials, renovations etc.	:	Rs. 7,85000
Total cost	:	Rs.20,00000
Supporting (Man days)	:	
Field preparation and planting	:	
Inter cultivation and top dressing	:	
Plant protection	:	
Harvesting	:	
Other items	:	

14. If financed by an organisation other than the Institute, then give the following information. -

    (a) Name of Financing Organisation :

    (b) Title of the project (if the project forms a part of a larger project) :

15. Approximate cost : -

Signatures of:

Sd/-	Sd/-	Sd/-
16. Principal Investigator	17. Head of Division	18. Director

RESEARCH PROJECT 1995-96

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

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

4. Title of Project : Assessment of fishery and resource characteristics of the penaeid shrimps of the west coast of India.

5. Name & designation of of Principal Investigator : C.Suseelan Senior Scientist

6. Name(s) and designation of Associate(s) and establishment (s) on which borne. (a) Whole time (b) Part time (indicate proportion of time to be devoted and other area(s)

Name & designation		Centre	Time to be spent (%)	Work to be done
A.P.Dinesh Babu	S	Veraval	50	i,ii,vi
V.D.Deshmukh	Sr.Sci.	Bombay	25	i,iii & vi
V.S.Kakati	Sr.Sci.	Karwar	50	i, ii, vi
		Mangalore		i,ii,vi
E.V.Radhakrishnan	Sr.Sci.	Calicut	60	i, ii, vi
C.Suseelan	Sr.Sci.	Cochin	40	i,iii,iv,vi
K.N.Rajan	SG		75	i, ii, vi
K.R.Manmadhan Nair	SG		50	i,ii,iv,v,vi
Mary K.Manisseri	Sr.Sci.		50	i, ii, vi
P.E.Sampson Manickam	SG		25	i, ii, vi
G.Nandakumar	SG		100	i,ii,v,vi
K.K.Philippose	S	Vizhinjam	35	1,ii,vi

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).

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

a) Objectives: i. To study the spatial and temporal distribution, abundance and population characteristics of important species of penaeid shrimps. 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 shrimp resources which form the backbone of the seafood export industry of the country. The data generated would also form a strong scientific base to settle disputes between the mechanised and artisanal sectors involved in the exploitation of penaeid shrimps 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.

9. Technical Programme: i. Collection of gear-wise data on catch, effort and species composition. ii. 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. iii. Collection of depth wise information on abundance by conducting experimental shrimp trawling using cadalmin/FORV Sagar Sampada and study the population characteristics. iv. Analysis of pelagic and midwater shrimp collections made by the past exploratory surveys. v. Estimate the reproductive potential vis a vis recruitment pattern of Metapenaeus dobsoni (at Cochin) and Metapenaeus affinis (at Bombay) stocks. vi. Processing of data and publication of the finding.

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

12. Estimated man months:

a. Scientific : 82.2 man months/year

b. Technical : 99 man months/year

13. Facilities required and estimated cost:

Land		
Works		
Equipment		
Existing		
To be purchased		
Salaries & allowances		
Scientific	:	6,90,810
Technical	:	5,26,200
Labour		
Travel cost	:	62,360
Contingencies	:	60,460
Chemicals	:	17,500
Glassware	:	7,000
Fertilizers and plant protection chemicals		
Other items	:	14,000
Total cost		
Supporting		
Field preparation and planting		
Inter cultivation and top dressing		
Plant protection		
Harvesting		
Other items		

14. If financed by an organization other than the Institute, then give the following information : Nil

a) Name of Financing Organization
b) Title of the Project

15. Approximat cost : 13,78,330

Signatures of:

Sd/-	Sd/-	Sd/-
16.Principal Investigator	17.Head of Division	18. Director

RESEARCH PROJECT 1995-96

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

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

4. Title of Project : Assessment of fishery and resource characteristics of the penaeid shrimps of the east coast of India

5. Name & designation of Principal Investigator : G.Sudhakara Rao, Senior Scientist

6. Name(s) and designation of Associate(s) and establishment (s) on which borne: a) Whole time b) part time (indicate proportion of time to be devoted and other area(s)

Name & designation		Centre	Time to be spent (%)	Work to be done
G.Sudhakara Rao	Sr.Sci.	Visakhapatnam	75	i to v
V.Thangaraj-Subramanian	Sr.Sci.	Madras	75	i to v
K.N.Saleela	S	Kakinada	50	i to v
M.Aravindakshan	S1	Mandapam	100	i to v
Josileen Jose	S		50	i to v
M.Rajamani	Sr.Sci.	Tuticorin	50	i to v

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.Krishnan (Madras), [illegible], A.Ramakrishnan (Mandapam), M.Manickaraja(Tuticorin)

7. Location of the research Project : Puri, Visakhapatnam, Kakinada, Madras, Mandapam and Tuticorin

8. a. Objectives: 1. To study the spatial and temporal distribution, abundance and population characteristics of important species of penaeid shrimp. (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 shrimp 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 shrimps and other management problems arising in different maritime states of east coast of India

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9. Technical Programme: 1. Collection of gear-wise data on catch, effort and species composition. ii. Collection of data on various biological aspects such as size, sex and maturity of major constituent species in the fishery. iii. Collection of depth-wise information on abundance from large trawlers. iv. Study the population characteristics of major species. v. Processing of data and publication of the finding.

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

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12. Estimated man months:

a. Scientific	:	51 man months/year
b. Technical	:	68 man months/year

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13. Facilities required and estimated cost:

Land		
Works		
Equipment		
Existing		
To be purchased		
Salaries & allowances		
Scientific	:	4,29,900
Technical	:	3,75,384
Labour	:	7,800
Travel costs	:	57,600
Contingencies	:	60,600
Chemicals	:	15,000
Glassware	:	6,000
Fertilizers and plant protection chemicals	-	
Other items	:	12,000

Total cost
Supporting
Field preparation and planting
Inter cultivation and top dressing
Plant protection
Harvesting
Other items

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14. If financed by an organizationc other than the Institute, then give the following information : Nil
    a. Name of Financing Organization
    b. Title of the project

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15. Approximate cost : 9,64,384

Signatures of:

Sd/-	Sd/-	Sd/-
16. Principal Investigator	17.Head of Division	18.Director

RESEARCH PROJECT 1995-96

1. Institute Code No. CF/RE/1.13 2. ICAR Code No.

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

4. Title of Project : Investigations on the non penaeid shrimp fishery of north west coast of India

5. Name & designation of Principal Investigator : V.D.Deshmukh, Senior Scientist.

6. Name(s) and designation of Associate(s) and establishment (s) on which borne: (a) Whole time (b) Part time (indicate proportion of time to be devoted and other area(s)

Name and designation		Centre	Time to be spent (%)	Work to be done
A.P.Dinesh Babu	S	Veraval	25	i-iv
V.D.Deshmukh	Sr.Sci.	Bombay	50	i-iv

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

7. Location of the research project: Veraval, Bombay

8. a) Objectives: 1. Assessment of the magnitude of exploited resources and potential/sustainable stocks of various non-penaeid shrimp species along the Gujarat and Maharashtra coasts. 2. Study of the biology 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.

9. Technical programme: i. Collection of gear wise data on catch, effort and species composition of the non-penaeid shrimp landings at Veraval and Bombay. ii. Collection of data on various biological aspects such as length, sex and maturity stages of the constituent species in the fishery. iii. Study the population characteristics of the major species. iv. Processing of data and publication of the findings.

10. Date of start : 1993-93 11. Likely date of Completion: 1997-98

12. Estimated man months:

a. Scientific : 9 man months/year
b. Technical : 9 man months/year

13. Facilities required and estimated cost:

Land
Works
Equipment
Existing
To be purchased

Salaries & allowances

Scientific	:	78,900
Technical	:	40,800
Labour	:	2,000
Travel costs	:	40,400
Contingencies	:	7,200
Chemicals	:	5,000
Glassware	:	1,000
Other items	:	1,000

Total cost
Supporting
Field preparation and planting
Inter cultivation and top dressing
Plant protection
Harvesting
Other items

14. If financed by an organisation other than the Institute, then give the following information. : Nil
a. Name of Financing Organization
b. Title of the project

15. Approximate cost : 1,76,300

Signatures of:

Sd/-	Sd/-	Sd/-
16.Principal Investigator	17. Head of Division	18.Director

RESEARCH PROJECT 1995-96

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

3. Name & Address of Research Institute/Centre : C.M.F.R. Institute, Cochin.

4. Title of Project : Investigations on lobster and crab resources of Indian coast

5. Name & Designation of Principal Investigator : N.Neelakanta Pillai, Senior Scientist.

6. Name(s) and designation of Associate(s) and establishment (s) on which borne: (a) Whole time (b) part time(indicate proportion of time to be devoted and other area(s)

Name & Designation		Centre	Time to be spent(%)	Work to be done
A.P.Dinesh Babu	S.	Veraval	25	i-vi
V.D.Deshmukh	Sr.Sci.	Bombay	25	i-vi
V.S.Kakati	Sr.Sci.	Karwar	25	iii-vii
		Mangalore		iii-vi
E.V.Radhakrishnan	Sr.Sci.	Calicut	40	i-vi
N.Neelakanta Pillai	Sr.Sci.	Kochi	25	i & vi
C.Suseelan	Sr.Sci.		25	i-ii & vi
Mary K.Manisseri	Sr.Sci.		50	iii-vi
K.K.Philippose	S.	Vizhinjam	40	i-ii & vi
M.Rajamani	Sr.Sci.	Tuticorin	50	iii-vi
D.B.James	Sr.Sci		25	i-ii & vi
Josileen Jose	S.	Mandapam Camp	25	i-vi
V.Thangaraj Subramanian	Sr.Sci.	Madras	25	i-vi
K.N.Saleela	S.	Kakinada	25	iii-vi

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), K.Shahul Hameed, M.M.Sultan, K.S. Krishnan (Madras), K.Dhanaraju (Kakinada), A.Ramakrishnan(Mandapam)

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

Veraval, Bombay, Karwar, Mangalore, Calicut Cochin, Tuticorin, Mandapam, Madras and Kakinada for crabs

8. (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.

9. Technical Programme: i. Data on catch and effort (gear-wise) of shallow water lobsters to be collected. ii. 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. iii. Collection of data on catch and effort (gear-wise) of commercially important crabs. iv. Data on mesh size and other particulars of the gear used and the price structure of the commercially important crabs to be recorded regularly. v. Studies on species composition and sex-ratio, size-distribution (sex-wise) and maturity stages of the constituent species to be carried out. vi. Processing of data and publication of the finding. vii. Brachiuran larval studies based on past exploratory survey collections.

10. Date of start : 1992-93

11. Likely date : 1997-98 of completion

12. Estimated man months:

a) Scientific : 48.6 months
b) Technical : 60 months

13. Facilities required and estimated cost:

Land		
Works		
Equipment		
Existing		
To be purchased		
Salaries & allowances:		
Scientific	:	4,48,260
Technical	:	3,16,200
Labour	:	11,000
Travel costs	:	58,560
Contingencies	:	51,000
Chemicals	:	27,500
Glassware	:	11,000
Fertilizers & Plant protection chemicals	:	-
Other items	:	22,000
Total cost		
Supporting		
Field preparation and planting		
Inter cultivation and top dressing		
Plant protection		
Harvesting		
Other items	:	22,000

14. If financed by an organization other than the Institute, then give the following information.: Nil
a) Name of Financing Organization:
b) Title of the Project .

15. Approximate cost : 9,35,960

Signatures of:

Sd/-
16. Principal Investigator

Sd/-
17. Head of Division

Sd/-
18. Director

RESEARCH PROJECT 1995-96

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 and fish seed resources

5. Name & designation of Principal Investigator : G.Subbaraju, Principal Scientist.

6. Name(s) and designation of Associate(s) and establishment (s) on which borne: (a) Whole time (b) Part time (indicate proportion of time to be devoted and other area(s)

Name & designation	Centre	Time to be spent (%)	Work to be done
G.Subbaraju, Pl.Sci.	Kakinada	10	1-6
A.Raju, Sci(SG)		10	1-6
K.N.Saleela, Sci.		25	1-6
G.Sudhakara Rao, Sr.Sci.	Visakhapatnam	25	2

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

7. Location of the research project with complete address : Kakinada, Visakhapatnam.

8. (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 [illegible] 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.

9. Technical programme: (1) Collection of data on the exploitation of prawn seed from Yanam to Tuni in the East Godavari district of Andhra Pradesh. (2) Collection and analysis of representative samples of prawn seed from different centres for species composition. (3) Collection of data on the ecological condition of the places from where prawn seed are collected. (4) Collection of information on the manpower involvement. (5) Collection of information on the implements employed in the collection of prawn seed. (6) Collection of data on the price structure and destination markets.

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

12. Estimated man months:

a. Scientific-Scientist(s) : 16 man months/year
b. Technical : 24 man months/year

13. Facilities required and estimated cost:

Land; Works; Equipment; Existing; To be purchased;

Salaries & Allowances: Scientific: 78,000; Technical: 28,000; Labour; Travel costs; Contingencies; Chemicals; Glassware; Fertilizers and plant protection chemicals : 15,000; Other items; Total cost;

Supporting (man days); Field preparation and planting; Inter cultivation and top dressing; Plant protection; Harvesting; Other items

14. If financed by an organization other than the Institute, then give the following information: Nil
a. Name of financing organization; b. Title of project:

15. Approximate cost : 121,000

16. Signatures of:

Sd/- Sd/- Sd/-

16. Principal Investigator 17. Head of Division 18. Director

RESEARCH PROJECT 1995-96

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

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

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

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

6. Name(s) designation(s) of associate(s) and establishment (s) on which borne: (a) Whole time (b) Part time (indicate proportion of time to be devoted and other area(s)

Name & designation		Centre	Time to be spent (%)	Work to be done
N.Neelakanta Pillai,	Sr.Sci.	Cochin	35	ii-v & vii
K.R.Manmadhan Nair	SG		50	ii-v & vii
P.E.Sampson Manickam	SG		75	ii-v & vii
V.S.Kakati	Sr.Sci.	Karwar	25	viii
Josileen Jose	S.	Mandapam Camp	25	i-iii
P.T.Sarada	S.	Minicoy	50	vi & vii

Technical Assistance: K.N.Gopalakrishnan, K.Chellappan, P.K.Baby (Cochin), C.K.Dinesh (Karwar), M.R.Arputharaj (Mandapam), A.Anasu Koya, Kunhi Koya (Minicoy).

7. Location of the Research Project : Cochin, Karwar, Mandapam Camp, Minicoy

8. a) Objectives: 1. To develop a viable technology for the broodstock management of marine penaeid shrimps. ii. To study the effect transportation on the survival and development of eggs and larvae of penaeid shrimps. iii. To provide consultancy service in shrimp hatchery technology. iv. To carry out tagging experiments with hatchery reared shrimps and monitor their growth and movements. v. To conduct experimental hatchery operations on penaeid shrimps at Minicoy as part of the live bait development for tuna fishery. vi. To carry out experiments on the farming of Penaeus semisulcatus and Penaeus merguiensis. vii. To study the availability of various crustacean larval resources at Minicoy and attempt to rear some of them.

8) Practical utility: 1. As breeders of penaeid shrimps are difficult to obtain at the appropriate time, continuous hatchery operation for penaeid shrimps become difficult. To overcome this, it is essential to have a broodstock of shrimps 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 often 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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9. Technical programme: i. Broodstock development of commercially important shrimps by eyestalk ablation and environmental manipulation. ii. Spawning and rearing of larvae of Penaeus semisulcatus (Mandapam), Metapenaeus dobsoni and Parapenaeopsis stylifera (Cochin & Minicoy) to seed size under controlled conditions. iii. Tagging and releasing of hatchery raised juveniles of P.semisulcatus in Palk Bay and monitoring their recruitment in to commercial fishery. iv. Experimental transportation of spawner and nauplii of penaeid prawns from Cochin to Minicoy 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.

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10. Date of start : 1984-85 11. Likely date of completion : 1997-98

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12. Estimated man months:

a.	Scientific	: 31.2 man month/year
b.	Technical	: 48 man month/year

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13. Facilities required and estimated cost:

Land
Works
Equipment
Existing - Generator, compressor, pools, blowers already present at the MRC of Mandapam Camp. The hatchery facility at Mandapam Camp will be used for this.

To be purchased

1.	Compressor 1 no. for Karwar	.. 15,000
2.	Net	.. 5,000
3.	Plastic items	.. 30,000
4.	Pools	.. 80,000
5.	Tags	.. 25,000
6.	Pipe Hoze etc	.. 15,000
7.	Electrical fittings	.. 10,000
8.	Airstones	.. 6,000
9.	Mixie 3 nos)	.. 15,000
10.	Pressure cooker (3 nos)	.. 4,500
11.	Fridge	.. 20,000

Salaries & allowances

Scientific	.. 2,80,180
Technical	.. 2,34,600
Labour	.. 43,000
Travel costs	.. 40,000
Contingencies (feed & animal)	.. 11,700
Chemicals	.. 6,000
Glasswares	.. 15,000
Fertilizers and plant protection chemicals	.. 20,000
Other items	.. 10,000
Total cost	
Supporting	
Field preparation and planting	.. 1,50,000
Inter cultivation and top dressing	
Harvesting	.. 5,000
Other items	

14. If financed by an organization other than the Institute, then give the following information : Nil
a. Name of Financing Organization
b. Title of the project

15. Approximate cost : 10,36,000

Signatures of:

Sd/- Sd/- Sd/-

16. Principal Investigator 17. Head of Division 18. Director

RESEARCH PROJECT 1995-96

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

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

4. Title of Project : Investigations on the resource characteristics of cephalopods

5. Name & designation of Principal Investigator: M.M. Meiyappan, Scientist (SG)

6. Name(s) and designation of Associate(s) and establishment (s) on which borne. (a) Whole time (b) Part time indicate proportion of time to be devoted and other area(s)

Name & Designation		Centre	Time to be spent (%)	Work to be done Tech.prog.
K.K. Joshi	Sci.	Veraval	50	1-4
Kuber Vidyasagar	Sr.Sci.	Bombay	50	1-4
K.S. Mohamed	Sci.	Mangalore	25	1-4
P. Laxmi Latha	Sci.	Calicut	25	1-4
K.K. Appukuttan	Sci.(SG)	Cochin	25	1-4
K. Prabhakaran Nair	Sci.(SG)	Vizhinjam	100	1-4
A.P. Lipton	Sr.Sci.	Mandapam	25	1-4
M.M. Meiyappan	Sci.(SG)	Madras	75	1-4
E.M. Abdusamad	Sci.	Kakinada	25	1-4
R. Sarvesan	Sci.(SG)	Visakhapatnam	75	1-4

Technical Assistance: Bombay: L.R. Khambadkar, T-I-3, Mangalore: D. Nagaraja, T-I-3; Calicut: V.G. Surendranathan, T-I-3; Cochin: G. Chitra, T-1; Vizhinjam: K.T. Thomas, T-I-3; and T.A. Omana, T-I-3; Mandapam: K. Jayabalan, T-1; Madras: G. Srinivasan, T.1.3; Kakinada: K.R. Somayajulu, T-4 and P. Achayya, T-1; Visakhapatnam: M. Prasada Rao, T-I-3.

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

8. a) Objectives: To assess the potential yield of cephalopods through stock assessment studies in the presently exploited fishing grounds.

RESEARCH PROJECT 1995-96

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

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

4. Title of Project : Investigations on the resource characteristics of cephalopods

5. Name & designation of Principal Investigator: M.M. Meiyappan, Scientist (SG)

6. Name(s) and designation of Associate(s) and establishment (s) on which borne. (a) Whole time (b) Part time indicate proportion of time to be devoted and other area(s)

Name & Designation		Centre	Time to be spent (%)	Work to be done Tech.prog.
K.K. Joshi	Sci.	Veraval	50	1-4
Kuber Vidyasagar	Sr.Sci.	Bombay	50	1-4
K.S. Mohamed	Sci.	Mangalore	25	1-4
P. Laxmi Latha	Sci.	Calicut	25	1-4
K.K. Appukuttan	Sci.(SG)	Cochin	25	1-4
K. Prabhakaran Nair	Sci.(SG)	Vizhinjam	100	1-4
A.P. Lipton	Sr.Sci.	Mandapam	25	1-4
M.M. Meiyappan	Sci.(SG)	Madras	75	1-4
E.M. Abdusamad	Sci.	Kakinada	25	1-4
R. Sarvesan	Sci.(SG)	Visakhapatnam	75	1-4

Technical Assistance: Bombay: L.R. Khambadkar, T-I-3, Mangalore: D. Nagaraja, T-I-3; Calicut: V.G. Surendranathan, T-I-3; Cochin: G. Chitra, T-1; Vizhinjam: K.T. Thomas, T-I-3; and T.A. Omana, T-I-3; Mandapam: K. Jayabalan, T-1; Madras: G. Srinivasan, T.1.3; Kakinada: K.R. Somayajulu, T-4 and P. Achayya, T-1; Visakhapatnam: M. Prasada Rao, T-I-3.

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

8. a) Objectives: To assess the potential yield of cephalopods through stock assessment studies in the presently exploited fishing grounds.

b) Practical utility: The cephalopod landings and the export of cephalopod products have increased several times over the years. The reason for the increased production has to be scientifically investigated. The effects of increasing trawl net effort and reduction in cod end mesh size on the resource have to be assessed. The results of these investigations will indicate the level of exploitation and its pressure on the potential stocks so as to initiate proper management measures. The biological studies will also help to fill up the gaps in our knowledge on semelparous or non-semelparous condition in different species, post spawning mortality if any, spawning and spawning migrations and juvenile recruitment.

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9. Technical programme: 1) Collection of catch, effort and size composition, monitoring of production trend and fishery characteristics at different centres. 2) Collection of biological data on important species with special reference to information on semelparity, post spawning mortality and juvenile recruitment. 3) Assessment of stocks of important species based on data collected under technical programmes 1 & 2. 4) Analysis and interpretation of data for periodic reports and research publications.

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10. Date of start : 1992-93 11. Likely date of completion : 1996-97

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12. Estimated man-months:
a. Scientific - Scientist(s) : 57
b. Technical : 70
c. Supporting (in man days) : 2100

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13. Facilities required and estimated cost :

Land (Sq.m)	: Nil
Works (item)	: Nil
Equipment	: Microscopes & balances
Existing	: Microscopes available, Weighing balances available at all Centres except Visakhapatnam
To be purchased (items & cost)	: Top pan balance at Visakhapatnam Rs.7000/-

Salaries & allowances (Man months)

Scientific	: 5,38,000
Technical	: 1,20,000
Labour	: Nil
Travel costs	: 72,000
Contingencies	: -
Chemicals	: 10,000
Glassware	: 5,000
Fertilizers and plant Protection chemicals	
Other items (cost of specimens)	: 60,000
Total cost	: 8,12,000
Supporting	: 80,000

Field preparation and planting
Inter cultivation and top dressing
Plant protection
Harvesting
Other items

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

a) Name of Financing Organization : N.A.

b) Title of the project : N.A.

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15. Approximate cost : 8,92,000

Signatures of:

Sd/-	Sd/-	Sd/-
16. Principal Investigator	17. Head of Division	18. Director

RESEARCH PROJECT 1995-96

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

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

4. Title of Project : Investigations on the resource characteristics of bivalves and gastropods

5. Name & designation of Principal Investigator : P.S. Kuriakose, Principal Scientist

6. Name(s) and designation of Associate(s) and establishment (s) on which borne. (a) Whole time (b) Part time indicate proportion of time to be devoted and other area(s)

Name & Designation		Centre	Time to be spent (%)	Work to be done Tech.prog.
K.K.Joshi	Sci.	Veraval	25 a-e	1-5
M.E. Rajapandian	Sci.(SG)	Karwar	50 a,b,c	1-6
Sunilkumar Mohamed	Sci.	Mangalore	25 a,c	1-6
P.S. Kuriakose	Pri.Sci.	Calicut	25 b	1-6
P. Laxmi Latha	Sci.	Calicut	25 a,c	1-6
K.K. Appukuttan	Sci.(SG)	Cochin	25 a,e	1-6
T.S. Velayudhan	Sci.(SG)	Cochin	25 a,c	1-6
N. Ramachandran	Sr.Sci.	Vizhinjam	50 a,b	1-6
K. Ramadoss	Sci.(SG)	Tuticorin	25 c,d,e	1-5,7
A.P. Lipton	Sr.Sci.	Mandapam	25 d,e	1-5,7
P.V.Sreenivasan	Sr.Sci.	Madras	25 a,c,e	1-6
P. Natarajan	Sci.(SG)	Madras	50 d,e	1-5
R. Sarvesan	Sci.(SG)	Visakhapatnam	25 a,e	1-6
To be posted		Kakinada	a,d,e	1-6

Technical Assistance: Karwar: Maruti S. Naik, T-1-3; Managalore: D. Nagaraja, T-1-3, Calicut: V.G. Surendranathan, T-1-3; Cochin: G. Chitra, T-1; Vizhinjam: K. Ramakrishnan Nair, T-5, K.T. Thomas, T-1-3; Tuticorin: C.T.Rajan, T-5, A. Dasman Fernando, T-1-3, F. Soosai V. Rayan, T-1-3; Mandapam: K.Jeyabalan, T-1; Madras: P. Poovannan, T-1-3, R. Thangavelu, T-II-3; Kakinada: K.R. Somayajulu, T-4, P. Achayya, T-1; Visakhapatnam: M. Prasada Rao, T-2.
To be provided at Veraval

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

8. 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 information on resource characteristics and annual catch estimates at important production centres. (2) Resources such as chank and mussels are subjected to heavy fishing pressure 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 an important marine gastropod resource.

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9. 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 at important production centres. (2) To study the size frequency, maturity, growth and condition factor. (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.

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10. Date of start : 1989-90 11. Likely date of completion : 1996-97

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12. Estimated Man-months:
    a. Scientific - Scientist(s) : 48
    b. Technical : 45
    c. Supporting (in man days) : 960

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13. Facilities required and estimated cost:

Land (Sq.m)	: Nil
Works (item)	: Nil
Equipment	: Nil
Existing	: Microscopes, balances available
To be purchased (items & cost):	Replacements required Rs.15,000

Salaries & allowances (Man months)		
Scientific	:	5,80,000
Technical	:	2,70,000
Labour	:	22,000
Travel costs	:	80,000
Contingencies	:	20,000
Chemicals	:	10,000
Glassware	:	5,000
Fertilizers and plant protection chemicals		
Other items	:	
Total cost	:	10,02,000
Supporting	:	68,000
Field preparation and planting		
Inter cultivation and top dressing		
Plant protection		
Harvesting		
Other items		

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

a) Name of Financing Organisation : N.A.

b) Title of the project : N.A.

15. Approximate cost : 10,70,000

Signatures of:

Sd/-	Sd/-	Sd/-
16. Principal Investigator	17. Head of Division	18. Director

RESEARCH PROJECT 1995-96

1. Institute Code No. MF/CUL/4 2. I.C.A.R. Code No.

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

4. Title of project : Seed production of molluscs and ranching of clam seed in coastal waters

5. Name & designation of Principal Investigator : Dr.K.A. Narasimham, Principal Scientist

6. Name(s) and designation of Associate(s) and establishment (s) on which borne. (a) Whole time (b) Part time indicate proportion of time to be devoted and other area(s)

Name & Designation		Centre	Time to be spent (%)	Work to be done Tech.prog.
K.A. Narasimham	Pri.Sci.	Cochin	25 c	8,9
*K. Ramadoss	Sci.(SG)	Tuticorin	50 a	1,3,5-7,9
P. Muthiah	Sci.(SG)	Tuticorin	50 a	1,3,5-7,9
*D. Sivalingam	Sci.(SG)	Tuticorin	50 c	1,3,5-7,9
*A.C.C. Victor	Sr.Sci.	Tuticorin	25 b	1,3-7,9
A. Chellam	Sci.(SG)	Tuticorin	25 b	1,3-7,9
S. Dharmaraj	Sci.(SG)	Tuticorin	25 b	1,3-7,9
*G.P.K. Achary	Sci.(SG)	Vizhinjam	100 d	2,9

*Associate Project Leaders

Technical Assistance: Cochin: N.P. Ramachandran, T-1; Tuticorin: A.A.P. Mudaliar, T-5, R. Athipandian, T-2, S.M. Sathakkathullah, T-1, J. Padmanathan, T-1, K. Srinivasagan, T.1.3, N. Jesuraj, T-1-3, K. Shanmugasundaram, T-2, P. Muthukrishnan, T-2, S. Sekhar V. Rayer, T-2, C.T. Rajan, T-5, U. Jeyaraman, T-1, J.X. Rodrigo, T-II.3, Vizhinjam: K.T. Thomas, T-1-3.

7. Location of the Research Project : Cochin, Tuticorin and Vizhinjam

8. a) Objectives: 1) To standardise the techniques in various phases of hatchery system for mass production of seed of edible oyster, pearl oyster and clams. 2) To develop field technology for mass seed production of mussels by ecosystem management. 3) Ranching of clam seed in coastal waters to enhance the recruitment.

b) Practical utility: Moderate level of proficiency has been achieved in the controlled breeding and mass production of seed of Crassostrea madrasensis, Pinctada fucata, Paphia malabarica, Anadara granosa and Meretrix sp. The result achieved in this project

would help to set up viable hatcheries to meet the seed requirements of culture operations. Also enhancement of natural stocks by ranching the hatchery raised seed is envisaged.

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9. Technical programme: The following species/bivalve groups are identified.
(a) Crassostrea madrasensis (b) Pinctada fucata
(c) Clams and (d) mussels.
(1) Collection, transportation and maintenance of brood stock, conditioning, induced maturation and spawning, larval rearing and spat production. (2) To develop field technology for mass seed production of mussels by ecosystem management. (3) Maintain stock cultures of different species of micro-algae and to produce them on mass scale. (4) Assess the growth of pearl oyster spat by feeding them with different species of micro-algae either singley or in combination. (5) Study the factors influencing spat settlement. (6) Study survival of spat, factors influencing it and evaluation of production cost of seed. (7) Nursery rearing of seed to stockable size. (8) Ranching of hatchery produced seed of clams in suitable sites in coastal waters and monitoring of growth and survival and also the environmental factors. Effects if any, of ranching on natural populations to be studied. (9) Planning and execution of project work. Analysis and interpretation of data and preparation of reports.

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10. Date of start : 1989-90 11. Likely date of completion : 1996-97

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12. Estimated Man-months:
a. Scientific - Scientist(s) : 42
b. Technical : 51
c. Supporting (in man days) : 1080 days

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13. Facilities required and estimated cost:

Land (Sq.m)	:	Nil
Works (item)	:	Improvements to Tuticorin hatchery Rs.5,00,000
Equipment	:	Air conditioners 4 nos. Rs.1,20,000
Existing	:	Hatchery shed, seawater supply system, larval/spat rearing tanks, Micro-algal Laboratory available at Tuticorin
To be purchased (items & cost)	:	Rafts & field equipment at Vizhinjam Rs.26,000
Salaries & allowances (Man months)		
Scientific	:	4,26,000
Technical	:	2,88,000
Labour	:	60,000
Travel costs	:	50,000
Contingencies	:	2,00,000

Chemicals	:	20,000
Glassware	:	10,000
Fertilizers and plant protection chemicals		
Other items	:	
Total cost	:	17,00,000
Supporting	:	75,000
Field preparation and planting		
Inter cultivation and top dressing		
Plant protection		
Harvesting		
Other items		

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

a) Name of Financing Organisation : N.A.

b) Title of the project : N.A.

15. Approximate cost : Rs.17,75,000

Signatures of:

Sd/-	Sd/-	Sd/-
16. Principal Investigator	17. Head of Division	18. Director

RESEARCH PROJECT 1995-96

1. Institute Code No. MF/CUL/8 2. I.C.A.R. Code No.

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

4. Title of Project : Selection of suitable sites for bivalve culture

5. Name & designation of Principal Investigator : K. Satyanarayana Rao, Principal Scientist

6. Name(s) and designation of Associate(s) and establishment (s) on which borne. (a) Whole time (b) Part time indicate proportion of time to be devoted and other area(s)

Name & Designation		Centre	Time to be spent (%)	Work to be done Tech.prog.
M.E.Rajapandian	Sci.(SG)	Karwar	50 a,c	1-4
Sunilkumar Mohamed	Sci.	Mangalore	50 a,c	1-4
P.S. Kuriakose	Pri.Sci.	Calicut	25 a,b,c	1-4
T.S. Velayudhan	Sci.(SG)	Cochin	25 a,b,c	1-4
A.C.C. Victor	Sr.Sci.	Tuticorin	25 b	1-6
A. Chellam	Sci.(SG)	Tuticorin	25 b	1-6
S. Dharmaraj	Sci.(SG)	Tuticorin	25 b	1-6
K.Satyanarayana Rao	Pri.Sci.	Madras	50 a	1-4
P.V. Sreenivasan	Sr.Sci.	Madras	50 a	1-4
P. Natarajan	Sci.(SG)	Madras	50 a	1-4
G. Syda Rao	Sr.Sci.	Visakhapatnam	50 a,b,c	1-4
E.M. Abdussamad	Sci.	Kakinada	25 b	1-4

Technical Assistance: Karwar: Maruti S. Naik, T-I-3; Mangalore: D. Nagaraja, T-I-3; Calicut: V.G. Surendranathan, T-I-3; Cochin: N.P. Ramachandran, T-1, G. Chitra, T-1; Tuticorin: K. Srinivasagam, T-I-3, N. Jesuraj, T-2, P. Muthukrishnan, T-2, K. Shanmugasundaram, T-2, Madras: R. Thangavelu, T-4; P. Poovannan, T-I-3; Kakinada: K.R. Somayajulu, T-4, P. Achayya, T-1; Visakhapatnam: M. Prasada Rao, T-2.

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

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 identify areas suitable for culture of edible oyster, pearl oyster and clams leading to the development of aquaculture of these molluscs.

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9. Technical programme: (1) Collection of seed of (a) edible oyster (b) pearl oyster and (c) clams (Paphia/Villorita/Meretrix/Mactra) 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. (5) Monitoring of the growth, survival and pearl production in sea water feeder, discharge canals and ponds in prawn farm. (6) Laboratory observations on tolerance of pearl oysters to exposure and different salinities.

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

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12. Estimated man-months:
    a) Scientific - Scientist(s) : 60
    b) Technical : 54
    c) Supporting (in man days) : 336 days

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13. Facilities required and estimated cost:

Land (Sq.m)	:	Nil
Works (item)	:	Nil
Equipment	:	Nil
Existing	:	Microscopes, balances
To be purchased (items & cost)	:	Nil
Salaries & allowances (Man months)		
Scientific	:	4,80,000
Technical	:	2,20,000
Labour	:	20,000
Travel costs	:	35,000
Contingencies	:	50,000
Chemicals	:	15,000
Glassware	:	5,000
Fertilizers and plant protection chemicals		
Other items	:	
Total cost	:	8,25,000
Supporting	:	25,000
Field preparation and planting		
Inter cultivation and top dressing		
Plant protection		
Harvesting		
Other items		

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14. If financed by an organisation other than the Institute, then give the following information:
    a) Name of Financing Organisation : N.A.
    b) Title of the project : N.A.

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15. Approximate cost : Rs.8,50,000

Signatures of

Sd/-
16. Principal Investigator

Sd/-
17. Head of Division

Sd/-
18. Director

RESEARCH PROJECT 1995-96

1. Institute Code No. MF/CUL/10 2. I.C.A.R. Code No.

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

4. Title of project : Upgradation and transfer of technology of pearl culture

5. Name & designation of Principal Investigator : A.C.C. Victor, Senior Scientist

6. Name(s) and designation of Associate(s) and establishment (s) on which borne. (a) Whole time (b) Part time indicate proportion of time to be devoted and other area(s)

Name & Designation		Centre	Time to be spent (%)	Work to be done Tech.prog.
A.C.C. Victor	Sr.Sci.	Tuticorin	25	1-6
A. Chellam	Sci.(SG)	Tuticorin	50	1-6
S. Dharmaraj	Sci.(SG)	Tuticorin	25	1-6
M.C. Arunmozhi Devi	Sci.	Tuticorin	25	4-6

Technical Assistance:

Tuticorin: 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-I-3, P. Muthukrishnan, T-2, Sekar V. Rayer, T-2.

7. Location of the Research Projects : Tuticorin

8. 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.

9. Technical programme: (1) Maintenance of farm, production of cultured pearls and economics of pearl culture.
(2) To experiment with different farm materials and assess their durability and cost effectiveness.
(3) To conduct experiments with mantle of different pearl oyster species and assess pearl production.
(4) To study pearl production in relation to the size of the nucleus implanted, season of implantation, age

and maturity condition of the oyster. (4) To establish pearl culture farm near Nellatanni island involving fishermen. (5) Transfer of technology to fishermen, farmers and entrepreneurs. (6) Analysis of data and interpretation of results.

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10. Date of start : 1991-92 11. Likely date of completion : 1996-97

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12. Estimated Man-months:
    a. Scientific - Scientist(s) : 15
    b. Technical : 24
    c. Supporting (in man days) : 96

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13. Facilities required and estimated cost:

Land (Sq.m)	:	Nil
Works (item)	:	Nil
Equipment	:	Nil
Existing	:	Microscopes, balances, Surgical tools.
To be purchased	:	Farm materials Rs.75,000
Salaries & allowances (Man months)		
Scientific	:	1,72,000
Technical	:	1,05,000
Labour	:	25,000
Travel costs	:	20,000
Contingencies	:	20,000
Chemicals	:	5,000
Glassware	:	-
Fertilizers and plant protection chemicals		
Other items	:	
Total cost	:	4,22,000
Supporting	:	8,000
Field preparation and planting:		
Inter cultivation and top dressing		
Plant protection		
Harvesting		
Other items		

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

    a) Name of Financing Organisation: N.A.

    b) Title of the project : N.A.

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15. Approximate cost : Rs.4,30,000

Signatures of:

Sd/-	Sd/-	Sd/-
16.Principal Investigator	17.Head of Division	18.Director

RESEARCH PROJECT 1995-96

1. Institute Code No. MF/CUL/11 2. I.C.A.R. Code No.

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

4. Title of Project : Popularisation and transfer of oyster culture technology at selected centres along Kerala coast

5. Name and designation of Principal Investigator : K.K. Appukuttan, Scientist (SG)

6. Name(s) and designation of Associate(s) and establishment (s) on which borne. (a) Whole time (b) Part time indicate proportion of time to be devoted and other area(s)

Name & Designation		Centre	Time to be spent (%)	Work to be done Tech.prog.
K.K. Appukuttan	Sci.(SG)	Cochin	50	1-6
T.S. Velayudhan	Sci.(SG)	Cochin	25	1-6
P.S. Kuriakose	Pri.Sci.	Calicut	25	1-6
P. Laxmi Latha	Sci.	Calicut	25	1-6
N. Ramachandran	Sci.(SG)	Vizhinjam	25	1-6

Technical Assistance: Cochin: N.P. Ramachandran, T-1; Calicut : V.G. Surendranathan, T-1-3, Vizhinjam : K.T. Thomas, T-1-3.

7. Location of the Research project : Cochin, Calicut and Vizhinjam

8. a) Objectives: This project envisages to create awareness and transfer oyster culture technology developed by the Institute to small-scale farmers at selected centres along the Kerala coast.

   b) Practical utility: The Institute has developed the oyster culture technology at Tuticorin. The location testing programmes have shown that Kerala coast is suitable for oyster farming. As the oysters are conventionally taken as food and there is ready market along the Kerala coast, the chances of adoption of oyster culture technology are bright. Successful transfer of oyster culture technology helps to augment oyster production and generates employment and income in rural areas.

9. Technical programme: The work is to be carried out in the first instance at the Ashtamudi lake and Dharmadham estuary. (1) To set up oyster farms. (2) Monitor growth, survival and production of oysters. (3) Monitor the

environmental conditions at the culture site. (4) Upgrade the culture technology to suit the local conditions. (5) Train the fishermen, involve them in farming activities and transfer the technology. (6) Analysis, interpretation of data and preparation of reports.

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10. Date of start : 1995-96 11. Likely date of completion : 1998-99

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12. Estimated Man-months:
    a. Scientific - Scientist(s) : 18
    b. Technical : 9
    c. Supporting (in man days) : 96 days

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13. Facilities required and estimated cost:

Land (Sq.m)	:	Nil
Works (item)	:	Nil
Equipment	:	Nil
Existing	:	Microscopes, balances
To be purchased (items & cost)	:	Farm materials Rs.60,000
Salaries & allowances (Man months)		
Scientific	:	1,80,000
Technical	:	60,000
Labour	:	20,000
Travel costs	:	20,000
Contingencies	:	10,000
Chemicals	:	8,000
Glassware	:	2,000
Fertilizers and plant protection chemicals		
Other items	:	
Total cost	:	3,60,000
Supporting	:	7,000
Field preparation and planting		
Inter cultivation and top dressing		
Plant protection		
Harvesting		
Other items		

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14. If financed by an organisation other than the Institute, then give the following information:
    a) Name of Financing Organisation : N.A.
    b) Title of the project : N.A.

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15. Approximate cost : 3,67,000

Signatures of:

Sd/- Sd/- Sd/-

16. Principal Investigator 17. Head of Division 18. Director

RESEARCH PROJECT 1995-9

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

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

le of project : Development of Feeds for culturable marine animals

Name & Designation of Principal Investigator : R. Paul Raj Senior Scientist

Name(s) and designation of Associate(s) and establishment(s) together with time proposed to be spent and work to be done

ıe & Designation		Centre	Time to be spent(%)	Work to be done (T.P.)
Paul Raj	Sr. S.	Madras	60	1 - 10
Vijayakumaran	Sr. S.	Madras	40	3, 5 & 6
Kandaswami	S (SG)	Mandapam	40	1,2,3,5&9
;.V. Easterson	S (SG)	Tuticorin	40	2 & 4
ıan K. Zachariah	S	Mandapam	40	1,2,3,5&9
ıpal Sridhar	S (SS)	Cochin	40	7 & 10
Vijayagopal	S	Cochin	40	7 & 10

:hnical Assistance:

ıras	Ahamed Kamal Basha, Poovannan & Shahul Hameed
ıdapam	Vairamani (one more to be posted)
ticorin	N. Retnaswamy (one more to be posted)
:hin	One to be posted

Location of the research project : Madras, Cochin, Mandapam and Tuticorin Centres

a. Objectives: (i) To study the protein, lipid, carbohydrate and vitamin requirements of Penaeus semisulcatus. (ii) To formulate feeds for post-larvae, juveniles, grow-out stages and broodstock of Penaeus semisulcatus and evaluate their performance. (iii) To evaluate the efficacy of bio-additives (enzyme supplements, immunostimulants, attractants, binders, anabolic agents and pigments) in shrimp feeds. (iv) To determine the digestibility of ingredients and optimal level of incorporation of ingredients in shrimp feeds. (v) To develop processes for preparation of protein concentrates and lipids from trash fish, mantis shrimp etc., (vi) To determine the factors affecting feed and ingredients spoilage and develop methods to improve

. Objectives : (Contd)

shelf-life. (vii) To develop feeds for marine ornamental fish and a holothurian and evaluate their acceptability. (viii) To reduce feed based pollution in shrimp farms.

. Practical utility: Nutritionally balanced feeds are essential for sustainable development of aquaculture. The proposed project would provide information on the nutritional requirements of selected marine species; help to develop practical feeds for selected species of marine prawns, fish and a holothurian to develop processes for improvements in ingredients and feeds and develop methods for improving shelf-life. The study would also help in determining factors inducing spoilage and develop optimum conditions for storage of ingredients and feeds. The study would also help identity additives to improve stability, intake, digestibility and conversion of feed and to produce normal colour in fish/shrimp and develop optimum rations, feeding frequency and feeding schedules. The study on holothurian and ornamental fish species would explore the possibility of utilising exogenous feeds.

Technical Programme: (1). Determine the nutritional requirements of Penaeus semisulcatus. (2) Development of compounded feeds and their evaluation in P. semisulcatus a marine ornamental fish and a holothurian. (3) Evaluation of selected additives incorporated in feeds. (4) Development of process for production of trash fish protein and mantis shrimp protein concentrate, lipids and carotenoids of marine origin. (5) Use of probiotics in feeds and evaluation of such feed. (6) Evaluation of silage-based feeds (7) Development and evaluation of methods to improve shelf-life. (8) Assessment of economics and environmental benefits of each process developed. (9) Determination of optimum rations, feeding schedules, feeding frequency. (10) Determination of digestibility of ingredients in feeds.

Plan of procedure: Standard and approved procedures will be adopted for experimental design, conduct and evaluation, chemical and biochemical analyses and statistical analyses of data. Development of processes for marine protein sources, lipids and carotenoids and formulated feeds will be carried out using standard and modified procedures and processing equipment. Nutritional requirement studies will be carried out using semi-purified ingredients and formulated feeds using natural and processed ingredients by-products. Marine prawns, finfish, a holothurian are the candidate species identified for the project.

. Date of start: April 1995 11. Likely date of completion: March 1998

. Estimated manmonths:
   a. Scientific - 108 for 3 years
   b. Technical - 63
   c. Supporting - 1800 mandays

Facilities required and estimated cost:

Land		-
Works		-
Equipment:		
Existing	(1) Conventional Feed Analysis equipments	
	(2) Conventional water analysis equipments	
To be purchased (items and cost)		
1. Experimental feed mill (grinder, mixer, pellet, pellet mill, dryer, cooler, crumbler) (2) Freeze Dryer, (3) Deep Freezer, (4) Generator, (5) UV/VIS Spectrophotometer and (6) BOD Incubator. - Rs 6,00,000 $ 5,000		
Salaries and allowances:	Scientific	Rs 7,65,000
	Technical	Rs 3,60,000
	Labour	Rs 65,000
	Travel costs	Rs 60,000
Contingencies:	Chemicals	Rs 1,50,000
	Glassware	Rs 60,000
Fertilizers and plant protection chemicals		-
Other items		Rs 1,65,000
Total cost		Rs 23,60,000
Supporting(mandays)		Rs 1,65,000
Field preparation and planting		Rs 6,000
Inter cultivation and top dressing		-
Plant protection		-
Harvesting		-
Other items		-

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

   a. Name of financing organisation - N.A.

   b. Title of the project - N.A.

. Approximate cost : Rs 25,31,000/-

gnatures of

Sd/-	Sd/-	Sd/-
. Principal Investigator	17. Head of Division	18. Director

RESEARCH PROJECT - 1995-96

1. Institute Code No. : PNP/39 2. I.C.A.R. Code No.

3. Name and address of Research Institute : CMFRI, Cochin - 14

4. Title of project : Endocrinological factors influencing maturation in penaeid prawn *P. indicus*

5. Name and designation of Principal Investigator: N. Sridhar, Scientist (Sr. Scale)

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

Name and designation		Centre	time to be spent(%)	work to be done (T.P.)
M. Peer Mohamed	P.S.	Cochin	25	3
N. Sridhar	S(Sr. S)	Cochin	75	1-3

Technical Assistance: A. Udayakumar (Cochin)

7. Location of the Research Project : Cochin

8. a. Objectives: To induce maturation of gonads in commercially important prawns through injection of combination of extracts of eyestalk, brain and thoracic ganglion and certain amines, as well as implantation of pellets prepared out of these extracts.

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

9. Technical Programme:

   1. Preparation of protein extracts from the neurosecretory centres and their concentration.
   2. Preparation of pellets with extracts and catecholamines in different combination.
   3. Injection of extracts, catecholamines and implantation of pellets in prawns and monitoring the effect produced in terms of gonadal maturation.

   Techniques: All standard Biochemical techniques.

1. Date of start: April 1995	11. Likely date of completion: March '96

2. Estimated man-months :

a.Scientific	- 12
b.Technical	- 6
c.Supporting	- 120 mandays

3. Facilities required and estimated cost

Land	-		
works	-		
Equipment:			
Existing :	Spectrophotometer, Ultrafilteration cell, Micro centrifuges.		
To be purchased (items & costs)			
	UF membranes	- Rs	20,000
Salaries & Allowances:	Scientific	Rs	3,12,000
	Technical	Rs	18,000
	Labour	Rs	3,000
	Travel cost	Rs	12,000
Contingencies:	Chemicals	Rs	80,000
	Glasswares	Rs	5,000
Fertilizers and plant protection chemicals			-
Other items			-
Total cost		Rs	4,50,000
Supporting mandays:			
Field preparation and planting :			-
Inter cultivation and top dressing :			-
Plant protection :			-
Harvesting :			-
Other items :			-

4. If financed by an organisation other than the Institute. Then give the following information		Financed by the Institute
(a) Name of Financing Organisation	:	N.A.
(b) Title of the project	:	N.A.
5. Approximate cost	Rs	4,50,000

Signatures of

Sd/-	Sd/-	Sd/-
6. Principal Investigator	17. Head of Division	18. Director

RESEARCH PROJECT 1995-96

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

3. Name and address of Research Institute: CMFRI, Cochin - 14

4. Title of the Project : Identification of genetically different stocks in the Indian mackerel, Rastrelliger kanagurta

5. Name and designation of: Principal Investigator — M.K. George, 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

Name and designation		Centre	time to be spent (%)	work to be done(T.P.)
M.K. George	Sr. S.	Cochin	25	1 - 5
P.C. Thomas	Sr. S.	Cochin	80	1 - 5
N.K. Verma	Sci	Cochin	55	1 - 5
Technical Assistance:		To be posted		

7. Location of the Research Project : Cochin

8. a. Objectives:

1. Study the genetic variability of the species expressed by enzymatic/non-enzymatic proteins, restriction fragement length polymorphisms (RFLPS) of mitochondrial DNA and body diamensions variations.

2. Statistically analyse these three independent but complementary data obtained to identify genetically different stocks, if any, within the species.

b. Practical Utility: Indian mackerel is a commercially important major pelagic resources of India. Accurate identification of natural units sustaining the present Indian mackerel fishery is essential for its scientific exploitation/conservation of its genetic resources and for planning successful short/long term forecast on its abundance. The required data on the genetic stock structure of the species are not available now. If the mackerel fishery presently managed as a single stock fishery emerges as either genetically heterogenous or homogenous group of populations, the new informations will be of great significanoo in planning a better strategy for the exploitation and conservation of the economically very important mackerel fish resources. Further, it will advance the knowledge on the genetics of the species.

Technical Programme: (1) Collect suitable tissues like liver/muscle/ovary in most fresh condition from specimens and deep-freez/preserve in ethanol for analysis of mitochondrial DNA patterns. (2) Study genotype patterns of known polymorphic enzyme/protein systems present in sample specimens representing each population by gel electrophoresis method. (3) Record body dimensions of sample specimens representing each population using truss net work method. (4) Mitochondrial DNA will be isolated from sample tissues representing each population and its genotype patterns will be characterised using standard protocol. (5) Data obtained from each of these three independent source will be used to determine the level of heterogeneity between populations.

Date of start : April 1990 11. Likely date of completion : March '96

Estimated manmonths:
a) Scientific : 20
b) Technical : To be posted
c) Supporting : 30 mandays

Facilities required and estimated cost:
Land - Works -
Equipments: Esisting: 1. Gel Electrophoresis system
2. DNA Electrophoresis Unit and
3. UV-Transilluminator
To be purchased : Nil

Salaries and allowances :	Scientific	Rs 2,40,000
*if appointed	Technical	Rs 36,000*
	Labour	Rs 2,000
	Travel cost	Rs 25,000
	Contingencies	Rs 10,000
Chemicals:	Chemicals	Rs 2,00,000
	Glasswares	Rs 5,000
Fertilizers and plant protencion chemicals		-
Other items		Rs 5,000
Total cost		Rs 5,23,000

Supporting mandays - 30
Field preparating and planting : - Harvesting: -
Inter cultivation and top dressing: - Other items: -
Plant protection : -

If financed by an organisation other than the Institute. Give the following information : NO

(a) Name of the Financing Organisation : N.A.
(b) Title of the project : N.A.

Approximate cost Rs 6,00,000

natures of

Sd/-
Principal Investigator

17. Sd/-
Head of Division

18. Sd/-
Director

RESEARCH PROJECT 1995-96

1. Institute Code No. PNP/44 2. I.C.A.R. Code No.

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

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

5. Name and designation of Principal Investigator : Dr. M. Peer Mohamed Principal 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.

Name & designation		Centre	Time to be spent(%)	Work to be done (TP)
M. Peer Mohamed	P.S.	Cochin	50	1-3
D.C.V. Easterson	S(SG)	Tuticorin	50	1-3
N. Sridhar	S(Sr. S)	Cochin	25	4

Technical Assistance A. Udayakumar (Cochin)
N. Retnaswamy (Tuticorin)

7. Location of the Research Project : Cochin & Tuticorin

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

b. Practical utility: The results of the study will elucidate (1) the behaviour of the test animals to different levels of temperature, salinity and ambient oxygen and (2) the optimum levels of these environmental factors to achieve better growth and survival.

9. 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 temperature and high ambient oxygen. (3) Low lethal oxygen level in the test species at different temperature and salinities. (4) Changes induced in the tissue enzyme profile by various stress factors.
Plan of procedure: Standard and approved procedure will be adopted.

Date of start : April 1992 11. Likely date of completion :March '96

Estimated man-months

a) Scientific 15
b) Technical 24
c) Supporting 100 man-days

Facilities required and estimated cost:

Land -
works -
equipments :-
Existing : All available equipments will be used
To be purchased (items and cost)

Salaries & allowances:	Scientific	Rs 2,64,000
	Technical	Rs 60,000
	Labour	Rs 10,000
	Travel costs	Rs 10,000
Contingencies, chemicals & glasswares		Rs 1,00,000 + Rs 5,000
Fertilizers and plant protection chemicals		=
Other items		
Total cost		Rs 4,49,000
Supporting (mandays)		
Field preparation and planting		
Inter cultivation and top dressing		Nil
Plant protection		
Harvesting		
Other items		

4. If financed by an organisation other than the Institute. Then give the following information : Financed by the Institute

a) Name of financing organisation : N.A.

b) Title of the project : N.A.

5. Approximate cost Rs 4,49,000

Signature of

Sd/- Sd/- Sd/-

6. Principal Investigator 17. Head of Division 18. Director

RESEARCH PROJECT - 1995-96

Institute code No.: PNP/45 2. I.C.A.R. Code No.

Name and address of the Research Institute: CMFRI, Cochin - 14

Title of the project : Studies on cryopreservation of gametes and embryos of penaeid prawns.

Name and Designation of Principal Investigator : A.D. Diwan Principal Scientist

Name(s) and designation of Associate(s) and establishments(s) together with time proposed to be spent and work to be done

ne & Designation		Centre	Time to be spent (%)	Work to be doen (T.P.)
). Diwan	P.S.	Mandapam	25	1 - 6
Kandaswamy	S (SG)	Mandapam	50	1 - 6
han K. Zachariah	S	Mandapam	25	1 - 6

Technical Assistance: M.R. Arputharaj T-II-3. Mandapam Camp

Location of the Research Project : Mandapam RC of CMFRI

a. Objectives: (i) The first objective of the study is to evolve suitable technique for cryopreservation and storage of gametes (spermatophores) of marine prawns *P. indicus* and *P. semisulcatus* for shorter and longer duration and to assess the virility and viability of the sperms.
(ii) 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.

b. Practical Utility: In mariculture systems one of the major constraints is the non-availability of sufficient number of spawners at desired time and in case they are available broodstock maintenance and management is difficult and an 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 in-vitro fertilisation. If the method proved to be successful it may help in propagation of animals for the development of aquaculture.

b. Practical utility : (Contd.)

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 this 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.

9. Technical Programme:

1. Collection of mature prawns from the wild and maintain them in the laboratory.
2. Removal of spermatophores from mature 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 study normal embryonic development in the laboratory condition. Then evolve a suitable medium/media for cryo-preservation 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 spermato-phores for shorter and longer duration and assess the viability.
5. Study the biochemical changes (protein, amino acids, lipids and carbohydrates etc.) of spermatophores in normal and cryopreserved condition.
6. Histology and E.M. studies of spermatophores.

Plan of procedure: Standard and approved procedures will be adopted.

10. Date of start: April 1994 11. Likely date of completion : March '96

12. Estimated manmonths:
    a. Scientific - 30
    b. Technical - 15
    c. Supporting (mandays) - -

13. Facilities required and estimated cost:

Land	- Nil	
Works	- Nil	
Equipment:		
Existing	- Nil	
To be purchased (items and cost)		
1. Cryocan		Rs 15,000
2. Ultra temperature cabinet		Rs 2,00,000
3. Phase contrast microscope with photography attachment		Rs 1,00,000
		Rs 3,15,000

3. (Contd)			
Salaries and allowances:	Scientific	Rs	1,02,000
	Technical	Rs	15,000
	Labour	Rs	4,000
	Travel cost	Rs	33,000
	Chemicals &Glassware	Rs	40,000
Contingencies:			-
Fertilizers and plant protection chemicals			-
Other items		Rs	5,09,000
Total cost			-
Supporting (mandays)			-
Field preparation and planting			-
Inter cultivation and top dressing			-
Plant protection			-
Harvesting			-
Other items			

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

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

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

5. Approximate cost: Rs 5,09,000

Signatures of

Sd/-	Sd/-	Sd/-
16. Principal Investigator	17. Head of Division	18. Director

RESEARCH PROJECT - 1995-96

1. Institute Code No. :PNP/46 2. IC.A.R. Code No.

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

4. Title of the Project : Disease investigations in marine shell fishes

5. Name and Designation of: M. Vijayakumaran, Senior Scientist
Principal Investigator

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

Name and Designation	Centre	time to be spent (%)	Work to be done (T.P.)
M. Vijayakumaran	Sr. S. Madras	40	1 - 7
M. Paul Raj	Sr. S. Madras	25	1 - 7
M.P. Lipton	Sr. S. Mandapam Camp	25	1,3,5 & 7
M.K. Sanil	Sci. Cochin	50	1,3 and 7
Technical Assistance:	K. Sahul Hameed, T.I.3		Madras
	Ahmed Kawal Basha T-2		"
	J.B. Varma		Visakhapatnam
	Mohamed Habeeb		Tuticorin
	A. Dhanraju		Kakinada
	S. Mohan		Mandapam Camp
	A. Udayakumar		Cochin

7. Location of the Research Project : Madras, Cochin, Mandapam, Tuticorin, Kakinada, Visakhapatnam.

8. a. Objectives: (1) To record disease problems in extensive and semi-intensive prawn grow out systems, hatcheries and lobster holding systems. (2) To investigate the causative factors - such as environmental stress, nutritional deficiency, endotoxins, exotoxins, parasites and microbial pathogens responsible for the disease outbrake. (3) To suggest preventive measures and treatment for specific disease situations.

Many disease problems caused by environmental stress, inadequate feeds, microbial pathogens and possible toxin in feed have been recorded in prawn farms and lobster holding systems during the first year of study. Adequate preventive measures also have been initiated in certain cases. Tissues have been processed for histopathology.

Practical utility: Diseases have appeared in a massive scale in the sphere of prawn culture in India and several agencies are coming out with conflicting claims regarding the causes. There is no scientific documentation on the stressors that predisposed the prawns to diseases in grow out systems in India and on specific diseases. The project envisages to fill this lacuna.

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

Technical Programme:

1. Monitoring of selected prawn grow out systems and hatcheries.
2. Monitoring of selected lobster holding facilities.
3. Collection of data on growth and environmental conditions.
4. Collection of samples for histopathological and microbiological (after establishing facilities for microbial culture) investigations.
5. Histopathological examinations of collected tissues.
6. Recording and identification of parasites and epibionts in prawn grow out systems.
7. Elucidation of measures to prevent disease and appropriate treatment in specific disease situations.

Date of start : April 1994 Likely date of completion : March '96

Estimated man-months :

a. Scientific - 15
b. Technical - 20
c. Supporting - 720 mandays

Facilities required and estimated cost:

Land - Nil
Works - Nil
Equipment:
Existing - Sterio microscope, Microtome
To be purchased (items and cost)
(1) Microscope with photomicrograph and video attachment, (2) Laminar flow cabinet, (3) BOD incubators, (4) High speed centrifuge, (5) Histokinnettes, (6) Autoclaves, (7) Platinum loops, (8) Automatic dispensers, (9) Refrigerators and portable pH meters (cost - Rs 7,00,000 + $ 10,000)

Salaries and allowances:	Scientific	Rs 1,00,000
	Technical	Rs 90,000
	Labour	Rs 15,000
	Travel cost	Rs 40,000
	Contingencies	Rs 1,00,000
	Chemicals	Rs 50,000
	Glasswares	Rs 25,000
Fertilizers and plant protection chemicals		-
Other items		-
Total cost		Rs 11,20,000 + $ 10,000
Supporting (mandays)		Rs 21,600
Field preparation and planting		-
Inter cultivation and top dressing		-
Plant Protection		-
Harvesting		-
Other items		Rs 10,000

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

    (a) Name of financing organisation : Institute Project

    (b) Title of the project (if financed by other organisation) : N.A.

15. Approximate cost Rs 11,51,600 + $ 10,000

Signatures of

Sd/- Sd/- Sd/-

16. Principal Investigator 17. Head of Division 18. Director

RESEARCH PROJECT - 1995-96

1. Institute Code No. PNP/47 2. I.C.A.R Code No.

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

4. Title of the project: Formulation of nutritional strategies for the management of aquaculture wastes (NSMAW) through low pollution diets for shrimp

5. Name and Designation of Principal Investigator : Manpal Sridhar, Scientist (S.S.)

6. Name(s) and designation of Associate(s) and establishment(s) together with time proposed to be spent and work to be done

ame and Designation		Centre	Time to be spent (%)	Work to be done (T.P.)
anpal Sridhar	S.(S.S.)	Cochin	50	1 - 9
. Peer Mohamed	P.S.	Cochin	25	6
. Vijayagopal	S	Cochin	50	1 - 9

Technical Assistance: S. Nandakumar Rao
V. Suresh

7. Location of the Research Project : Cochin

8. a. Objectives: To control the pollution impact of feeds on environment by reducing feeding wastage in farming operations of shrimp through development and formulation of low pollution diets. Screening/evaluation of these high nutrient dense (HND) diets for maximum nutritional efficiency and verification of the accuracy of NSMAW through feed input, nutritional retention and waste output.

b. Practical utility: The principal source of pollution in shrimp culture operation is feeds and feeding because fish and shrimp do not pollute. Control and reduction of fish culture wastes can best be achieved through a biological (nutritional) approach focussing on feeds and feeding (Cho et al., 1991). This approach recognises that feed is the sole source of waste outputs in a culture system and is based on measurements of apparent digestibility coefficients (ADC), nutrient retention efficiencies (NRE) and estimated feed wastage (FW). Low P/N ratio is a characteristic desirable for low pollution diet formulation. Effluent quality can be improved through the use of HND diets, refined feeding strategies and flexible production targets which in turn are applied to predict waste output accurately and at a reasonable cost.

b. Practical Utility: (Contd.)
This study will greatly help in minimising the impact of aquaculture effluents on the environment by replacing ordinary compounded feeds with low-pollution feeds.

Technical Programme:

1. Screening and selection of feed ingredients of plant and animal origin for shrimp based upon their phosphorous and nitrogen ratios.
2. Formulation of high nutrient dense (HND) diets and determination of their physicochemical characteristics, water stability and digestibility for shrimp under laboratory conditions.
3. Determination of non-faecal losses (Dissolved wastes in growth trials and comparative carcass analysis under laboratory conditions.
4. Measurement of apparent digestibility coefficient, nutrient retention efficiencies (NRE) and estimated feed wastage (FW) under field conditions in feed, faeces and carcass.
5. Calculation of total solids and dissolved wastes on dry mater basis.
6. Development of feeding standards based on nutritional bio-energetics.
7. Assessment of the cost effectiveness of these feeds in relation to production.
8. Comparison of data obtained from both biological and chemical methods in field and laboratory studies.
9. Analysis of the combined effects of feed quality, feed quantity and shrimp produced as prediction models for assessing aquaculture waste output with data from actual effluent analysis under practical production conditions.

Techniques - All standard nutritional and biochemical techniques will be utilized.

10. Date of Start : April 1995 11. Likely date of: March '97 completion

12. Estimated manmonths:
    a. Scientific - 32.4
    b. Technical - 36
    c. Supporting - 90 mandays

13. Facilities required and estimated cost:
    Land - Nil
    Works - Nil
    Equipment:
    Existing Viz - Conventional nutritional composition analysis equipment viz. Kjeldahl and Soxtect systems, Water quality testing equipment, Spectrophotometer etc.

13. Facilities (Contd.)

Equipments to be purchased (items and cost)		
Kjeltec Auto analyser		Rs 9,00,000
Computer software		Rs 47,000
Bomb Calorimeter		Rs 50,000
Refractometer		Rs 3,000
Salaries and allowances :	Scientific	Rs 2,40,000
	Technical	Rs 1,80,000
	Labour	Rs 8,000
	Travel cost	-
Contingencies :	Chemicals	Rs 1,00,000
	Glasswares	Rs 6,000
Fertilizers and plant protection chemicals		-
Other items		-
Total cost		Rs 15,34,000
Supporting		-
Field preparation and planting		-
Inter cultivation and top dressing		-
Plant protection		-
Harvesting		-
Other items		-

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

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

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

15. Approximate cost : Rs 15,34,000

Signatures of

Sd/-	Sd/-	Sd/-
16. Principal Investigator	17. Head of Division	18. Director

RESEARCH PROJECT 1995-96

Institute Code No. FEM/ES/1 2. I.C.A.R. Code No.

Name & Address of Research Institute/Centre : CMFR Institute, Cochin

Title of project: Investigation on environmental parameters of inshore waters in relation to fisheries

Name & Designation of Principal Investigator : C.P. Gopinathan, Senior Scientist

Name(s) and designation of Associate(s) and establishment(s) on which borne: a) Whole time b) Part time (indicate proportion of time to be devoted and other area(s)

and designation	Centre	Time to be spent(%)	Work to be done(Tech. programme)
Gopinathan, Sr. Sci.	Cochin	50	1-3
Girijavallabhan, Sci.SG	Cochin	25	1-3
andrika Sr. Sci.	"	25	4a, 4b
thusamy, Sci. SG	"	75	1-3, 5
Naomi Scientist	"	50	1-3
Siraimeetan, Sr.Scientist	Tuticorin	25	1-3
Singh, Scientist	Bombay	100	1-3, 5
Krishnakumar, Scientist	Mangalore	50	
Mathew, Sci. SG	Calicut	50	-do-
aladharan, Scientist	Cochin	70	-do-
Mary George, Sci.SG	Vizhinjam	25	-do-
	Mandapam		
ajagopalan, Sr. Sci.	Madras	50	-do-
jayakumaran, Scientist	Visakhapatnam	50	-do-
Sarada, Scientist	Minicoy	50	-do-
Ramachandrudu, T7	Kakinada	50	1, 2, 5

nical Assistance: V.K. Balachandran, N.Palaniswamy, M.P.Sivadasan, R. Khambadkar, K.N.Pushkaran, V.K.Suresh, T.N.Anathalakshmy ochin), R. Vasanthakumar (Vizhinjam), J.X.Rodrigo, D.Sundararajan, Selvaraj(Tuticorin), L.Jayasankaran(Madras), K.P.Viswanathan, M.Bhaskaran (Calicut), K.Diwakar, K.Chittibabu, M.S.Sumithrudu isakhapatnam), K.Muniyandi (Mandapam), G.S.Bhat (Mangalore), rayana G.Vaidya (Karwar).

/ N.P.Kunhikrishnan

ocation of the project: Cochin, Vizhinjam, Tuticorin, Madras, Calicut, Visakhapatnam, Mandapam, Mangalore, Kakinada, Karwar, Minicoy

) Objectives: 1) To assess the role of physical, chemical and biochemical characteristics of inshore waters in relation to fluctuation and abundance of fish catches, 2) to correlate

RESEARCH PROJECT 1995-96

1. Institute Code No. FEM/ES/1 2. I.C.A.R. Code No.

3. Name & Address of Research Institute/Centre : CMFR Institute, Cochin

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

5. Name & Designation of Principal Investigator : C.P. Gopinathan, Senior Scientist

6. Name(s) and designation of Associate(s) and establishment(s) on which borne: a) Whole time b) Part time (indicate proportion of time to be devoted and other area(s)

Name and designation	Centre	Time to be spent(%)	Work to be done(Tech. programme)
C.P.Gopinathan, Sr. Sci.	Cochin	50	1-3
K.G.Girijavallabhan, Sci.SG	Cochin	25	1-3
M.Chandrika Sr. Sci.	"	25	4a, 4b
P.Muthusamy, Sci. SG	"	75	1-3,5
K.S. Naomi Scientist	"	50	1-3
Mon Siraimeetan, Sr.Scientist	Tuticorin	25	1-3
V.V. Singh, Scientist	Bombay	100	1-3, 5
M.K.Krishnakumar, Scientist	Mangalore	50	
K.V. Mathew, Sci. SG	Calicut	50	-do-
P. Kaladharan, Scientist	Cochin	70	-do-
Rani Mary George, Sci.SG	Vizhinjam	25	-do-
K. Rajagopalan, Sr. Sci.	Mandapam Madras	50	-do-
M.Vijayakumaran, Scientist	Visakhapatnam	50	-do-
C.T. Sarada, Scientist	Minicoy	50	-do-
K.S. Ramachandrudu, T7	Kakinada	50	1,2,5

Technical Assistance: V.K. Balachandran, N.Palaniswamy, M.P.Sivadasan, L.R. Khambadkar, K.N.Pushkaran, V.K.Suresh, T.N.Anathalakshmy (Cochin), R. Vasanthakumar (Vizhinjam), J.X.Rodrigo, D.Sundararajan, M.Selvaraj(Tuticorin), L.Jayasankaran(Madras), K.P.Viswanathan, / M.M.Bhaskaran (Calicut), K.Diwakar, K.Chittibabu, M.S.Sumithrudu (Visakhapatnam), K.Muniyandi (Mandapam), G.S.Bhat (Mangalore), Narayana G.Vaidya (Karwar).

/ N.P.Kunhikrishnan

7. Location of the project: Cochin, Vizhinjam, Tuticorin, Madras, Calicut, Visakhapatnam, Mandapam, Mangalore, Kakinada, Karwar, Minicoy

8. a) Objectives: 1) To assess the role of physical, chemical and biochemical characteristics of inshore waters in relation to fluctuation and abundance of fish catches, 2) to correlate

climatic factors such as atmospheric 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.

Technical programme: 1. Collection of hydrographic data such as temperature, salinity, dissolved oxygen. 2) Estimation of primary and secondary production. 3) Analysis of nutrients. 4.a) Estimation of microflora and microfauna in the sediments in backwater and inshore waters. b) Estimation of bacterial production and growth rate off Cochin. 5) Collection and analysis of meteriological data. All data to be entered and maintained in a common register at each centre and at Headquarters.

). Date of start : 1989 11. Likely date of completion:Continuing

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2. Estimated man months
Scientific - Scientist(s) : 108
b. Technical : 108
c. Supporting (in man days) : 520

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3. Facilities required and estimated cost:
Land (Sq.m) : Nil
Works (Item) : Nil
Equipment : Spectrophotometer at all centres
To be purchased (items & cost) Spectrophotometer 4 Nos. Rs 8 lakhs
Salaries & allowances (Man months)
Scientific : Rs 8.80 lakhs
Technical : Rs 4.2 lakhs
Labour : Rs 0.8 lakhs
Travel costs : Rs 2 lakhs
Contingencies : Rs 2 lakhs
Chemicals : Rs 1 lakh
Glassware : Rs 1 lakh
Fertilizers & plant protection chemicals : -
Other items : Rs 0.2 lakhs
Total cost : Rs 20 lakhs
Supporting (Man days)
Field preparation and planting
Inter cultivation and top dressing
Plant protection
Harvesting
Others items

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

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5. Approximate cost : Rs 20 lakhs

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6. Signatures of:

Sd/- Sd/- Sd/-

rincipal Investigator 17. Head of Division 18. Director

RESEARCH PROJECT 1995-96

1. Institute Code No. FEM/SS/1 2. I.C.A.R. Code No.

3. Name & address of Research Institute/Centre : CMFR Institute, Cochin

4. Title of Project : Biological productivity of the Indian EEZ in relation to oceanographic parameters

5. Name & Designation of Principal Investigator : V. Narayana Pillai, Principal Scientist

6. Name(s) and designation of Associate(s) and establishment(s) on which borne: a) Whole time b) Part time (Indicate proportion of time to be devoted and other area(s)

Name & Designation		Centre	Time to be spent(%)	Work to be done (Tech.Progr.)
V. Narayana Pillai,	Pri. Sci.	Cochin	50	1,2,3,7
V.K. Pillai	Sr. Sci.	"	25	2,3, 7
K.G.Girijavallabhan	Sci.SG	"	50	4,5,6
S. Natarajan	T7	"	50	5

Technical Assistance: A. Nandakumar, V.K. Balachandran, K.S.Leela Bhai, K.K. Valsala, L.R. Khambadkar, K. Solomon, R. Anilkumar (Cochin)

7. Location of the research project : Cochin

8. 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 ofthe fishery resources

9. Technical programme: 1) Analysis and interpretation of physical oceanographic data collected in the cruises of the vessel. 2) Collection, analysis and interpretation of chemical oceanographic data. 3) Collection, analysis and interpretation of primary productivity data. 4) Collection, analysis and interpretation of zooplankton biomass data;5) 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.

/ Collection,

10. Date of start : Jan. 1989 11. Likely date of completion: Continuing

3. Estimated Man months
   a) Scientific - Scientist(s) : 24
   b) Technical : 22
   c) Supporting (in man days)

3. Facilities required and estimated cost :
   Land (Sq.m)
   Works (item)
   Equipment
   Existing
   To be purchased (items & cost)
   Salaries & allowances (Man months)
   Scientific : Rs 1.5 lakhs
   Technical : Rs 0.8 lakhs
   Labour --
   Travel costs : Rs 0.5 lakhs
   Contingencies : Rs 0.5 lakhs
   Chemicals : Rs 0.5 lakhs
   Glassware : Rs 0.6 lakhs
   Fertilizers & plant protection, chemicals : --
   Other items : --
   Total cost : Rs 4.4 lakhs
   Supporting (Man days) : 52
   Field preparation & planting
   Inter cultivation & top dressing
   Plant protection
   Harvesting
   Other items

4. If financed by an organization other than the Institute, then give the following information.
   a) Name of Financing Organization
   b) Title of the project (If the project forms a part of a larger project)

5. Approximate cost : Rs 4.5 lakhs

6. Signatures of :

Sd/-
Principal Investigator

Sd/-
17. Head of Division

Sd/-
18. Director

RESEARCH PROJECT 1995-96

1. Institute Code No.: FORV/SS/3 2. I.C.A.R. Code No.

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

4. Title of project: Investigations on zooplankton components of the EEZ of India

5. Name & Designation of Principal Investigator : K.J. Mathew, Senior Scientist

6. Name(s) and designation of Associate(s) and establishment(s) on which borne: a) Whole time b) Part time (Indicate proportion of time to be devoted and other area(s)

Name & Designation	Centre	Time to be spent(%)	Work to be done(Tech.Progr.)
P.V. Rao, Pri. Sci.	Cochin	50	b
K.J. Mathew, Sr. Sci.	"	60	a, g
K. Rengarajan, Sr. Sci.	"	50	c
T.S. Naomi, Scientist	"	50	e
Molly Varghese, Scientist	"	50	d
R. Sarvesan	Visakhapatnam	50	c
S. Jasmine, Scientist	Vizhinjam	50	i
V.S.Kakati, Sr. Sci.	Karwar	25	b
M.M. Meiyappan, Sci.SG	Madras	50	c

Technical Assistance: K.N. Gopalakrishnan, Geetha Antony, M. Ayyappan Pillai (Cochin)

Outside Institute Associates

Material was also sent to the following external experts:

M. Srinivasan, Zoologist	Madras(ZSI)	-	j
P.N. Aravindakshan, Sci.C	Cochin(NIO RC)	-	k
C.B.Lalithambika Devi,	" "	-	l
V. Santhakumari	" "	-	m
Rosamma Stephen	" "	-	n
S.U. Panampunnayil	" "	-	o

7. Location of the Research Project: Cochin, Karwar, Visakhapatnam, Vizhinjam and Madras

8. 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 of the food availability and food 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.

. Technical programme: To carry out studies on spatial and seasonal distribution of zooplankton and mesopelagic components such as (a) Euphausiids, b) decapod larvae, c) cephalopods, d) Amphipods, e) Cladocerans, f) Gonostomatidae, Nomeidae and Pregmacerotidae, g) Lucifer, h) Salps & doliolids, i) Appendicularians, j) Chaetognaths, k) Pteropods & heteropods, k) Fish eggs & larvae, m) medusae & Ctenophores, n) Ostracods and o) Mysids in relation to environmental parameters.

10. Date of start : Jan. 1989 11. Likely date of completion: Continuing

12. Estimated man months
Scientific - Scientist(s) 54
b. Technical 21
c. Supporting(in man days) Nil

13. Facilities required and estimated cost: Nil

1 Land(Sq.m)
Works (item)
Equipment
Existing : Glasswares and microscopes
To be purchased
(items & cost) : Formalin
Salaries & allowances(Man months)
Scientific : Rs 4,85 lakhs
Technical : Rs 1,75 lakhs
Labour
Travel costs
Contingencies
Chemicals : Rs 0.02 lakhs
Glasswares : Nil
Fertilizers and plant
Protection chemicals: -
Other items : Polythene jars : Rs 5000

Total cost : Rs 6.67 lakhs

Supporting (Man days) : -
Field preparation and planting : -
Inter cultivation and top dressing : -
Plant protection : -
Harvesting : -
Other items : -

14. If financed by an organization other than the Institute, then give the following information : Nil
a) Name of Financing Organization
b) Title of the project (If the project forms a part of a larger project)

15. Approximate cost : -

16. Signatures of :
Sd/-
Principal Investigator

Sd/-
17. Head of Division

Sd/-
18. Director

RESEARCH PROJECT 1995-96

1. Institute Code No. FEM/ES/6 2. I.C.A.R. Code No.

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

4. Title of project : Ecological investigations on the intertidal and surf zones of the Kerala and Kanyakumari coasts in relation to fin and shell fish seed resources.

5. Name and designation of Principal Investigator : G.S.Daniel Selvaraj, Scientist SG

6. Name(s) and designation of Project Associate(s) and establishment on which borne: a) Whole time b)Part time (indicate proportion of time to be devoted and other area(s)

Name and designations	Centre	Time to be spent(%)	Work to be done(Tech. programme)
G.S. Daniel Selvaraj, Sci.SG	Cochin	75	a,b,c,f
Molly Varghese, Scientist	"	50	d, e, f
C.V. Mathew, Scientist	Calicut	70	a-f
S.Krishna Pillai, Sci.SG	Vizhinjam	50	a,b,c,f
S. Jasmine, Scientist	"	50	d-f

Technical Assistance: R. Anilkumar, K.N.Pushkaran, K. Solomon (Cochin), K.P.Viswanathan, M.M.Bhaskaran (Calicut), R.Vasanthakumar, D.Soundararajan (Vizhinjam), P.Swarnalatha (Calicut)

7. Location of the Research Project: Cochin, Calicut, Vizhinjam

8. a) Objectives: To understand the ecological characteristics of the inter-tidal & surf waters along the sea coast and their diurnal and seasonal fluctuations. To determine the fertility of the surf waters with reference to primary productivity in relation to monsoon cycles; To study the qualitative and quantitiative aspects of the fin and shell fish seed resources and their seasonal fluctuations in relation to environmental features, giving coverage to "Nonnau" fishery.

b) Practical utility: The knowledge gained on the distribution of water temperature, salinity and dissolved oxygen of the surf region through diurnal and seasonal studies would help to understand the influence of tides, monsoons and coastal upwelling processes on the biological productivity of this intertidal zone in the primary and secondary production levels and their influence on the distribution and abundance of fin and shell fish seeds of this region. The study would help to assess the important and sea farming potential seed resources, their seasons and areas of abundance along the coast; and also to correlate their abundance with the spawning behaviour and periodicity of the respective groups.

9. Technical programme: a) Survey of the inter-tidal and surf zones; collection of hydrographic data on temperature, salinity, and dissolved oxygen; and seed samples from selected centres: b) diurnal observations on hydrography and seed resources (from plankton) at fixed station at 2 hourly intervals on or close to Full moon day at every alternate months; c) In situ experiments on primary productivity (by L & D oxygen method) at fixed stations; d) Maintenance of data on atmospheric temperature and rainfall (fortnightly) from the daily weather chart; and on tidal height and time from the 'Tide Table' for the field observation dates; e) Analysis and estimation of fish and shell fish seed resources from the samples; f) processing of hydrographic and biological data for season-wise treatment and interpretation.

10. Date of start : 1995 11. Likely date of completion: 1998

12. Estimated Man months
    Scientific-Scientist(s) : 34
    b. Technical : 26
    c. Supporting (in man days) : 150

13. Facilities required and estimated cost:
    Land (Sq.m)
    Works (item)
    Equipment
    Existing : Existing laboratory facilities of the Institute
    To be purchased (items & cost): Specimen bottles, plankton nets, Scoop nets etc. Rs 5000/-
    Salaries & allowances (Man months) per year

Scientific	: Rs	2,75,000
Technical	: Rs	60,000
Labour (Supp. staff)	: Rs	10,000
Travel costs	: Rs	70,000
Contingencies	: Rs	10,000
Chemicals	: Rs	10,000
Glassware	: Rs	5,000

    Fertilizers & plant protection

Chemicals	:	Nil
Other items	:	Nil
Total cost	: Rs	4.45 lakhs
Supporting (Man days)	:	150 days

    Field preparation & planting
    Inter cultivation and top dressing
    Plant protection
    Harvesting
    Other items

14. If financed by an organization other than the Institute, then give the following information : Nil
    a) Name of Financing Organization
    b) Title of the project

15. Approximate cost

16. Signatures of:

Sd/-	Sd/-	Sd/-
Principal Investigator	17. Head of Division	18. Director

RESEARCH PROJECT 1995-96

Institute Code No.: FEM/SW/1 2. I.C.A.R. Code No.

Name and address of Research Institute/Centre: CMFR Institute, Cochin

Title of Project : Seaweed Investigations - Resources assessment of seaweeds and their culture

Name & Designation of Principal Investigator : V.S.K. Chennubhotla, Principal Scientist

Name(s) and Designation of Associate(s) and establishment(s) on which borne: a) Whole time b) Part time (Indicate proportion of time to be devoted and other area(s)

me & Designation		Centre	Time to be (spent %)	Work to be done (Tech. programme)
S.K. Chennubhotla,	Pri. Sci.	Visakhapatnam	50	1,2,3,7
Kaliaperumal,	Sr.Sci.	Mandapam Camp	75	1,2,3,4,5,6

chnical Assistance: S. Kalimuthu, K. Muniyandi (M.Camp), K.Diwakar (Visakhapatnam)

Location of the research project with complete address: Visakhapatnam, Mandapam and A & N Islands and Chilka lake (from Visakhapatnam)

a) Objectives: 1) To assess the natural seaweed resources of east coast. 2) To augment the seaweed resources through 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.

Technical programme: 1. To estimate the natural seaweed resources of east coast. 2. To suggest harvest and cropping pattern in selected islands of A&N & Chilka lake. 3. To conduct outdoor cultivation of agar yielding seaweeds under running seawater by different culture techniques at Mandapam. 4. Field cultivation in A & N Islands, Chilka lake, Pulicat lake and Ashtamudi lake. 5. To undertake studies on the seasonal variation in growth and carrageenan content in some red seaweeds of Mandapam coast. 6.To study the growth and biochemical constituents in some edible seaweeds of Mandapam area. 7. To collect data on the commercial seaweed exploitation from Tamil Nadu coast by enquiry. 8.To study the salinity tolerance limit of economically important agar yielding seaweeds by conducting suitable experiments at Mandapam.

Date of start : 1992 11.Likely date of completion : 1996

Estimated Man months
Scientific - Scientists : 15
b. Technical : 15
c. Supporting (in man days) : 104

Facilities required and estimate cost:
Land (Sq.m)
Works (item) : Green House/laboratory at Mandapam
Equipment
Existing
To be purchased (item & cost): Rs 5.00 lakhs
Salaries & allowances (Man months)
Scientific : Rs 1.25 lakhs
Technical : Rs 1.75 "
Labour -
Travel costs : Rs 0.25 "
Contingencies : Rs 0.25 "
Chemicals : Rs 0.25 "
Glasswares : Rs 0.25 "
Fertilizers & plant Protection chemicals -
Other items -
Total cost : Rs 9.00 "
Supporting (Man days)
Field preparation & planting
Inter cultivation & top dressing
Plant Protection
Harvesting
Other items

If financed by an organization other than the Institute, then given the following information:
a) Name of Financing Organization
b) Title of the project (If the project forms a part of a larger project)

Approximate cost : Rs 9.00 lakhs

Signatures of :

Sd/-
ncipal Investigator

Sd/-
17.Head of Division

Sd/-
18. Director

RESEARCH PROJECT 1995-96

1. Institute Code No. FEM/MP/1 2. I.C.A.R. Code No.

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

4. Title of Project : Marine Pollution

5. Name and designation of Principal Investigator : V.Kunjukrishna Pillai, Senior Scientist

6. Name(s) and Designation of Project Associate(s) and establishment on which borne: a) Whole time b) Part time (indicate proportion of time to be devoted and other area(s)

Name and Designation	Centre	Time to be Spent(%)	Work to be done(Tech. programme)
V.K. Pillai, Sr. Scientist	Cochin	50	1, 2
C.P. Gopinathan, Sr. Scientist	"	30	2
P.K. Krishnakumar, Scientist	Mangalore	50	3
DCV Easterson, Sr. Scientist	Tuticorin	30	4
P. Kaladharan, Scientist	Cochin	30	5
M. Rajagopalan, Sr.Scientist	Madras	50	1

Technical Assistance: K.S.Leela Bhai, A. Nandakumar, K.K.Valsala, V.K.Suresh (Cochin), Paul Sigamani(Tuticorin), Subrahmanya Bhat (Mangalore)

7. Location of the Research Project: Cochin, Mangalore & Tuticorin

8. a) Objectives: The objectives are to identify major sources of pollutants in the inshore areas and to assess their levels and effects on living resources. Studies on marine environmental damage by various sources of pollution as well as human interference becomes an obvious necessity to evaluate the present level of pollution in the coastal environment.

b) Practical utility: 1) Long-term monitoring programmes are essential to understand the subtle and long-term effects of pollutants on the resources and to assess the impact as well as to suggest suitable preventive/management measures. 2) Data collected by a comprehensive long-term pollution monitoring programme will be of immense help to understand the effect of deteriorating water quality on living resources in identified areas of pollution in the coastal waters.

9. Technical programme: 1) Regular monitoring of selected environmental parameters at identified locations to study the impact of pollution on the living resources. 2) At Cochin - regular monitoring of environmental parameters (hydrography, metal levels in the biological samples and sediment) will be carried out in a transect from the estuary to the inshore waters. Detailed work of monitoring and pollutant uptake study will be done on selected sentinal organisms (eg. Sunetta scripta).

3) At Mangalore: Thermal, trace metal and organic pollution monitoring in the vicinity of industries such as fertilizers complex & thermal station to assess the impact of pollution on the environment.
4) At Tuticorin: Monitoring of coastal waters in the vicinity of thermal station, Karapad Bay and the coastal waters near DCW will be carried out regularly. Studies with emphasis on the distribution of thermal effluent and fly ash deposits will be carried out in the impact area near the research station.
5) Data will be collected on the baseline radioactivity in the Chavara-Neendakara belt on the fauna and flora, especially phytoplankton.

. Date of start : 1982 11. Likely date of completion: 1997

. Estimated man-months
Scientific - Scientist(s) : 22
b. Technical : 32
c. Supporting (in man days) : 15

. Facilities required and estimated cost:

Land (Sq.m)
Works(item)
Equipment
Existing
To be purchased (items & cost): Rs 8,00,000 (AAS Furnace)
Salaries & allowances (Man months)
Scientific : Rs 2,55,000
Technical : Rs 1,50,000
Labour -
Travel costs : Rs 50,000
Contingencies : Rs 75,000
Chemicals : Rs 50,000
Glassware : Rs 20,000
Fertilizers & Plant Protection, Chemicals: -
Other items : Rs 10,000
Total cost : Rs 14,10,000
Supporting (Man days) 150
Field preparation and planting
Inter cultivation and top dressing
Plant protection
Harvesting
Other items

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

a) Name of Financing Organization
b) Title of the project

.Approximate cost

.Signatures of

Sd/- Sd/- Sd/-
ncipal Investigator 17. Head of Division 18. Director

RESEARCH PROJECT 1995-96

1. Institute Code No.FEM/EE/1 2. I.C.A.R. Code No.

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

4. Title of project : Conservation and management of coral reef ecosystem

5. Name and designation of Principal Investigator : C.S.Gopinadha Pillai, Principal Scientist

6. Name(s) and Designation of Project Associate(s) and establishment on which borne: a) Whole time b) Part time (indicate proportion of time to be devoted and other area(s)

ame & Designations	Centre	Time to be spent(%)	Work to be done(Tech. programme)
S.Gopinadha Pillai, Pri. Sci.	Cochin	75	1, 2, 3

echnical Assistance: N. Kasinathan and N. Ramamurthy (Mandapam Camp)

7. Location of the Research Project: Cochin, Mandapam Camp

8. a) Objectives: To study and understand the specific ecological stresses on marine environment necessary for implementation of conservation measures and eco-development programmes on coral reef of S.E. coast and Lakshadweep.

b) Practical utility: The information gathered will help in identifying problems related to reef conservation and island development

9. 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 transplant various species to fresh habitats to monitor mortality and growth rate. 3. Preparation of completion report of the project.

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

12. Estimated man months
a. Scientific - Scientist(s) : 9
b. Technical : 8
c. Supporting (in man days)

. Facilities required and estimated cost :

Land (Sq.m)
Works (item)
Equipment
Existing
To be purchased (items & cost)

Salaries & allowances (Man months)

Scientific	:	Rs 1.08 lakhs
Technical	:	Rs 0.36 lakhs
Labour	:	-
Travel costs	:	Rs 0.10 lakhs
Contingencies	:	Rs 0.12 lakhs
Chemicals	:	
Glassware	:	
Fertilizers and plant Protection Chemicals		
Other items		
Total cost	:	Rs 1.66 lakhs

Supporting (Man days)
Field preparation and planting
Inter cultivation and top dressing
Plant Protection
Harvesting
Other items

If financed by an organization other than the Institute, then give the following information:

a) Name of Financing Organization
b) Title of the project (if the project forms a part of a larger project)

Approximate cost

Signature of:

Sd/-
Principal Investigator

Sd/-
17. Head of Division

Sd/-
18. Director

RESEARCH PROJECT 1995-96

1. Institute Code No. FEM/AR/1 2. I.C.A.R. Code No.

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

4. Title of project : Biodiversity studies on auxiliary marine resources

5. Name and designation of Principal Investigator : P.A. Thomas, Senior Scientist

6. Name(s) and designation of Project Associate(s) and establishment on which borne: a) Whole time b) Part time (indicate proportion of time to be devoted and other area(s)

ame and designation	Centre	Time to be spent(%)	Work to be done(Tech. programme)
.A. Thomas, Sr. Scientist	Vizhinjam	75	1-5
ani Mary George, Scientist	Vizhinjam	50	1-3

echnical Assistance:

7. Location of the Research project: Vizhinjam

8. a) Objectives: To monitor the exploitation and export of non-conventional ancillary marine resources such as gorgonids, etc. 2. To suggest measures forthe optimum use of these resources and their conservation. 3. To update the biodiversity enumeration of a few groups of marine organisms under the frame-work of GATT agreement.

b) Practical utility: The data and information collected on some lower invertebrates yielding 'wonder drugs' will help in conserving these resources and also in evaluating their availability in space and time, drug potential,, export and related informations needed for scientific planning.

9. Technical programme: 1. Collection of data and other information on the exploitation of non-conventional marine animals from which rare chemicals and 'wonder drugs' are being extracted by other countries. 2. Evaluate the export trend of these resources. This will be made both at primary (collection cite) and secondary (export) levels. 3. Evaluation of their drug potential from published data. 4. Help various national institutions/universities to identify the 'source material' which now forms the basis of their study. 5. Pass on any data of national importance to the institutions in India for follow-up action.

10. Date of start : 1995-96 11. Likely date of completion: 1999

12. Estimated man months
  a. Scientific - Scientist(s) : 15
  b. Technical : Nil
  c. Supporting (in man days) : Nil

13. Facilities required and estimated cost:

Land (Sq.m)		
Works		
Equipment	:	Rs 2,000
Existing		
To be purchased (Items & cost)		
Salaries & allowances (Man-months)		
Scientific	:	Rs 1.75 lakhs
Technical	:	-
Supp. Staff (Labour)	:	Rs 1,000
Travel costs	:	Rs 5,000
Contingencies	:	Rs 2,000
Chemicals, Glasswares	:	Rs 1,000
Fertilizers & plant protection		
Chemicals		
Other items	:	Rs 3,000
Total cost	:	Rs 1.89 lakhs
Supporting (Man days)		
Field preparation & planting		
Inter cultivation and top dressing		
Plant protection		
Harvesting		
Other items		

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

  a) Name of Financing Organization
  b) Title of the project

15. Approximate cost

16. Signatures of:

Sd/-	Sd/-	Sd/-
Principal Investigator	17. Head of Division	18. Director

RESEARCH PROJECT 1995-96

. Institute Code No. FEM/MB/1 2. I.C.A.R. Code No.

. Name & address of Research Institute/Centre : CMFR Institute, Cochin

. Title of Project : Susceptibility of heterotrophic bacteria to antibiotics and their characterisation

. Name & Designation of Principal Investigator : V. Chandrika, Senior Scientist

. Name(s) and Designation of Associate(s) and establishment(s) on which borne: a) Whole time b) Part time (indicate proportion of time to be devoted and other area(s)

lame & Designation	Centre	Time to be spent (%)	Work to be done (Tech. programme)
/. Chandrika, Senior Scientist	Cochin	75	1- 6

Technical Assistance: K.N. Pushkaran, T.N. Ananthalakshmy (Cochin)

/. Location of the research project: Cochin

3. a) Objectives: Micro-organisms have a variety of mechanism for adaptation to the presence of antagonistic compounds. The genes controlling the resistance are carried on plasmids which provide the bacteria with competitive advantage over other organisms when antagonistic compounds are present. Antibiotic resistance pattern of aquatic bacteria will be measured from perennial and seasonal ponds as preliminary studies of antibiotic resistance pattern and levels of minimum inhibitory concentration (MIC) were considered to be of help in further working for the presence of R factors and their transfer to other microbes in the ponds.

b) Practical utility: Application of antibiotics in aquaculture ponds will produce antibiotic resistant aquatic bacteria. Transfer of antibiotic resistance from environmental bacteria to fishes and human strains to fresh resident strains is a major public health problem as resistance can be transferred to other gram-negative pathogens of different genera. Knowledge gained from our culture systems in this regard will help us in management.

9. Technical programme: 1. Samples will be collected from perennial and seasonal culture system. 2. Selected strains will be tested for antibiotic resistance against common antibiotics. 3. Minimum inhibitory concentration (MIC) levels for each antibiotic will be determined by tube and plate agar dilution methods. 4. Plasmids will be isolated from selected cultures showing resistance. 5. Strains will be observed for morphology motility, flagellation & Gram-Staining. 6. Selected metal resistance capability will also be tested with Antibiotic resistant strains to

know their bio-technological potential of aquatic bacteria.

10.Date of start : 1995 11. Likely date of completion: 1997

12.Estimated man-months
Scientific - Scientist(s) : 9
b. Technical :
c. Supporting (in man days) :

13.Facilities required and estimated cost:
Land (Sq.m) : -
Works (item) : -
Equipment : -
Existing : -
To be purchased (Items & cost) :
Salaries & allowances (Man months)

Scientific :
Technical :
Labour :
Travel costs :
Contingencies :
Chemicals
Glassware
Fertilizers and plant protection chemicals
Other items
Total cost
Supporting (Man days)
Field preparation and planting
Inter cultivation and top dressing
Plant Protection
Harvesting
Other items

14.If financed by an organization other than the Institute, then give the following information:
a) Name of Financing Organization
b) Title of the project (If the project forms a part of a larger project)

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15. Approximate cost :

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16. Signature of :

Sd/-
Principal Investigator

Sd/-
17.Head of Division

Sd/-
18. Director

RESEARCH PROJECT 1995-96

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 the bio-economic performance of trawlerss

5. Name & Designation of Principal Investigator : R. Narayana Kumar, Scientist

6. Name(s) and Designation of Associate(s) and establishment(s) on which borne: (a) Whole time (b) Part time (indicate proportion of time to be devoted and other area(s)

Name & Designation		Centre	Time to be spent (%)	Work to be done (Tech. programme)
R. Narayana Kumar	S	Cochin	50	1-3
R. Sathiadhas	Sr.S	Cochin	25	3

Technical Assistance: K.P.Salini (Cochin)

7. Location of the Research project : Cochin

8. (a) Objectives: To evaluate the economic efficiency of different sizes of trawlers; to find out the functional relationship between cost and earnings and factor productivity in trawl operation; to study the distribution and utilisation pattern of different varieties caught by the trawlers.

(b) Practical utility: The search for prawns in the coastal waters is intensifying due to its ever increasing export demand. Trawl fishery generates maximum income in the marine fisheries sector. Diversified trawl operations are resorted to maximise the revenue. The present study will generate information on input-output relationship of trawl units. It will provide vital information on returns to capital, labour and management for trawl units which will help the industry in making suitable entrepreneurial decisions and credit agencies in formulating lending policies.

9. Technical Programme: 1) Sample units from different sizes of trawlers operating in selected centres along Karnataka coast will be drawn. 2) Data regarding the details of catch, price, cost, distribution pattern and employment will be collected

on random observation days selected systematically. 3) Data will be analysed by adopting suitable econometric methods and report will be prepared.

Work done: Data collection on cost and earnings of trawl units from three selected centres in Karnataka, namely, Mangalore, Malpe and Karwar has been continuing.

Work envisaged: Data collection will continue upto December 1995 at the selected centres. Suitable econometric models will be used for analysis and interpretation of the data.

10. Date of start: April 1992 11. Likely date of completion: March'96.

12. Estimated man-months

a) Scientific : 10
b) Technical : 4
c) Supporting :

13. Facilities required and estimated cost:

Land
Works
Equipment
Existing
To be purchased
Salaries & allowances (man months)
Scientific :Rs.66,000
Technical Rs.14,000
Labour : Nil
Travel cost : 10,000
Contingencies: 10,000 (for help in data collection)
Chemicals :
Glassware :
Fertilizers and plant protection chemicals:
Other items :
Total cost :1,10,000

Supporting (man days)
Field preparation & planting
Inter cultivation & top dressing NIL
Plant protection:
Harvesting:
other items:

14. If financed by an organisation other than the Institute, then give the following information : Nil
a) Name of the financing organisation:
b) Title of the project (if the project forms a part of a larger project):

15. Approximate cost: Rs.1,10,000

16. Signatures of:

Sd/-	Sd/-	Sd/-
Principal Investigator	Head of Division	Director.

RESEARCH PROJECT 1995-96

1. Institute code No.: FE & E/31 2. I.C.A.R. Code No:

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

4. Title of project: Modelling and Evaluation of Extension strategies for the development of fishing community.

5. Name & designation of Principal investigator: Krishna Srinath, Sr. Scientist

6. Name(s) and Designation of Associate(s) and establishment(s) on which borne: (a) Whole time (b) Part time (indicate proportion of time to be devoted and other area(s)

Name & Designation		Centre	Time to be spent (%)	Work to be done (Tech. programme)
Krishna Srinath	Sr.S	Cochin	60	1-6
R. Sathiadhas	Sr.S		25	5&6
R. Narayana Kumar	S		25	1 & 5

Technical Assistance: K.P. Salini and N.K. Harshan (Cochin)

7. Location of the Research Project : Cochin

8. (a) Objectives: 1) The study aims at critically examining the effectiveness of fisheries development programmes under governmental and non-governmental agencies through the assessment of awareness, acceptance and utilisation by the fishing community; identifying the behavioural characteristics of the target group, developing and testing models such as women's empowerment, group farming, link worker concept and participatory approach in transfer of technologies and 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 effectiveness of development efforts in fisheries, identify the gaps in their planning and implementation and suggest strategies for socio economic improvement of the fishing community.

9. Technical Programme: 1) Resource mapping and review of present status of R & D programmes; 2) Demonstration of group approach in prawn farming and extending the programme in North Chellanam padasekharam; 3) Location testing for oyster culture; 4) Demonstration of backyard hatchery for prawn; 5) Extension programmes for marine fishermen and comparative economic analysis of development strategies and 6) Evaluation of the models through measurement of socio-psychological changes.

10.Date of start: April 1994 11.Likely date of completion:March'97

12.Estimated man-months
a)Scientific : 15
b)Technical : 6
c)Supporting

13.Facilities required and estimated cost:

Land		
Works		
Equipment		
Existing		
To be purchased		
Salaries and allowances (man-months)		
Scientific	:	Rs.1,45,000
Technical	:	25,000
Labour		
Travel cost	:	5,000
Contingencies	:	15,000
Chemicals	:	
Glassware		
Fertilizers and plant protection chemicals	:	
Other items	:	
Total cost		Rs.1,90,000
Supporting (man-days)		
Field preparation and planting:		
Intercultivation and top dressing:		
Plant protection	:	
Harvesting	:	
Other items	:	

14.If financed by an organisation other than the Institute, then give the following information: Nil
a)Name of the financing organisation:
b)Title of the project (if the project forms a part of a larger project):

15.Approximate cost: Rs.1,90,000

16.Signatures of:

Sd/-	Sd/-	Sd/-
Principal Investigator	Head of Division	Director.

RESEARCH PROJECT 1995-96

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 the project: Integration of small scale mariculture with small scale fisheries along the Peninsular India.

5. Name and designation of Principal Investigator : M.Devaraj, Director, Project Leader.
A.Regunathan, Sr.Scientist, Associate Project Leader.

6. Name(s) and Designation of Associate(s) and establishment(s) on which borne: 9a) Whole time (b) Part time (indicate proportion of time to be devoted and other area(s)

Name & Designation	Centre	Time to be spent (%)	Work to be done (Tech.programme)
A.Regunathan, Sr.S	M.Camp	50	1 - 3
N.Kaliaperumal, Sr.S	"	25	2 & 3
A.P.Lipton, Sr.S	"	25	2 & 3
P.Jayasankar, S	"	25	2 & 3
Sheela Immanuel, S	"	70	1 - 3
A.C.C.Victor, Sr.S	Tuticorin	25	2 & 3
D.Sivalingam, S(SG)	"	25	2 & 3
M.C.Arunmozhi Devi, S	"	70	1 - 3
P.V.Srinivasan, Sr.S	Madras	25	2 & 3
Vijayakumaran, Sr.S	"	25	2 & 3
G.Syda Rao, Sr.S	Kakinada	25	2 & 3
G.Mohanraj, S(SG)	Visakhapatnam	25	2 & 3
K.Vijayakumar, S	"	25	2 & 3
N.Ramachandran, Sr.S	Vizhinjam	25	2 & 3
Krishna Pillai, S(SG)	"	25	2 & 3
R.Sathiadhas, Sr.S	Cochin	25	1 & 3
Krishna Srinath, Sr.S	"	25	1 - 3
P.Kaladharan, S	"	25	2 & 3
P.S.Kuriakose, PS	Calicut	25	2 & 3
K.K.Appukuttan, S(SG)	"	25	2 & 3
C.Muthiah, S(SG)	Mangalore	25	2 & 3
Prathibha Rohit, S	"	25	2 & 3
M.E.Rajapandian, S(SG)	Karwar	25	2 & 3
Preetha, S	"	25	2 & 3

Technical Assistance: R.Reghu and A.Kanakkan(Cochin), A.Bastian Fernando(Tuticorin), Technical Assistants located at various research centres at Visakhapatnam, Kakinada, Madras Tuticorin Mandapam, Vizhinjam, Calicut, Mangalore and Karwar will be provided by the respective OICs.

7. Location of the research project: Visakhapatnam, Kakinada, Madras, Mandapam Camp, Tuticorin, Vizhinjam, Cochin, Calicut, Mangalore, Karwar.

8. (a) Objectives: 1) To study the potential of different mariculture practices for technology transfer among fishermen at selected centres. 2) Demonstration of need oriented location specific mariculture technologies as an income generating acticity for the coastal fiehermen. 3) To study the resource characteristics of target population and 4) To study the factors contributing to and/or inhibiting adoption of different mariculture technologies.

(b) Practical utility: The Institute has developed various mariculture technologies for the culture of edible oyster, mussels, pearls, seaweeds, clams, lobster, sea cucumber, prawns, various fin fishes and crab. The transfer of these technologies to fishermen would not only help to supplement natural marine production but also provide additional source of income and alternate employment to fishermen. The ever increasing external demand for some of these commodities compete with increased demand in the domestic market and enhance the scope of adopting different mariculture practices.

9. Technical programme: 1) Orgnaisation of training programme on selected enterprises 2) Introduction of need oriented location specific culture technologies with people participation at selected centres. 3) Periodical dessemination of resulls through reports and scientific papers.

10. Date of start: April'94 11. Likely date of completion: March'96

12. Estimated man-months
a) Scientific : 86
b) Technical :
c) Supporting :

13. Facilities required and estimated cost:
Land
Works
Equipment
Existing
To be purchased
Salaries and allowances (man-months)
Scientific : Rs. 8,84,000
Technical :
Labour :

Traval costs : 20,000
Contingencies :1,90,000
Chemicals :
Glassware :

Fertilizers and plant protection chemicals :
Other cost :
Total cost : Rs.10,94,000

Supporting (man days)
Field preparation and planting :
Intercultivation and top dressing :
Plant protection :
Harvesting :
Other items :

14. If financed by an organization other than the Institute, then given the following information. :Nil

a) Name of the Financing Organisation:

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

15. Approximate cost : Rs. 10,94,000

16. Signatures of :

Sd/-	Sd/-	Sd/-
Principal Investigator	Head of Division	Director.

RESEARCH PROJECT 1995-96

1. Institute code No. : FE & E/33 2. I.C.A.R. Code No:

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

4. Title of the project: Resource management and socio-economic survey of small scale fisheries in Lakshadweep islands.

5. Name and designation of Principal Investigator : R.Sathiadhas, Senior Scientist

6. Name(s) and Designation of Associate(s) and establishment(s) on which borne: (a) Whole time (b) Part time (indicate proportion of time to be devoted and other area(s)

Name & Designation	Centre	Time to be spent (%)	Work to be done (Tech. programme)
R.Sathiadhas, Sr.S	Cochin	25	1-4
Krishna Srinath, Sr.S	Cochin	25	2 & 4
R.Narayana Kumar, S	Cochin	25	1-4

Technical Assistance: R.Reghu, A.Kanakkan (Cochin)

7. Location of the research project: Cochin

8. (a) Objectives: Different types of fishing techniques with varying capital intensity are on operation. The factor-product combinations and profitability are the determinant factors of resource management. Information on the over-exploitation of certain resource in some regions and the details of socio-economic aspects of fishermen involved are also essential for optimum resource utilisation. The present study aims to carry out a comprehensive evaluation of socio-economic condition of the tribal fishermen at Lakshadweep islands with special emphasis on the study of economics of different fishing techniques; level of employment in fishery sector in various post-harvest operations and impact of introduction of new technologies and practices on traditional fishery sector.

(b) Practical utility: Economic evaluation of fishing methods would provide a basis for formulation of appropriate credit and investment policies. The study would also help to identity the socio-economic dimensions of fishing community and the various constraints which inhibit the growth of small scale fishery sector. The information generated will be helpful in drafting location-specific, environment friendly, coastal fishing zone management plans for the integrated development of Lakshadweep islands.

9. Technical programme: 1) Resource inventory-Data pertaining to infrastructural facilities will be collected from secondary source and institutional or development agencies operating in the area. 2) A household survey will be conducted in selected fishing villages. 3) Data pertaining to cost and earning factors of major fishing techniques and marketing patterns will be collected for a period of one year following a suitable sampling design. 4) Analysis and interpretation of the data using appropriate economic tools and preparation of the report.

Work envisaged: Data collection will be organised through trained local enumerators.

10. Date of start: April 1995 11. Likely date of completion: March'97

12. Estimated man-months

a) Scientific : 10
b) Technical : 10
c) Supporting :

13. Facilities required and estimated cost:

Land :
Works
Equipment
Existing
To be purchased
Salaries & allowances (man-months)
Scientific : Rs. 95,000
Technical : 99,000
Labour : Nil
Travel costs : 35,000
Contingencies: 75,000 (for help in data collection)
Chemicals
Glassware :
Fertilizers and
plant protection chemicals : Nil
Other items :
Total cost: Rs. 3,04,000

Supporting (man-days)
Field preparation and planting: Nil
Intercultivation and top dressing : Nil
Plant protection :
Harvesting :
Other items :

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

a) Name of the financing organisation:
b) Title of the project (if the project forms a part of a larger project)

15. Approximate cost : Rs.3,04,000

16. Signatures of:

Sd/-	Sd/-	Sd/-
Principal Investigator	Head of Division	Director.

RESEARCH PROJECT 1995-96

1. Institute Code No. CMFRI/Spd./1 2. ICAR Code No.

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

4. Title of Project : Survey and assessment of marine ornamental fish resources of Lakshadweep

5. Name & Designation of Principal Investigator : M. Devaraj Director

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

Name & designation		Centre	Time to be spent (%)	Work to be done
M. Devaraj	Director	Cochin		
V. Sriramachandra Murty	(APL) Sr. Sci.	"	100%	As per Technical programme

(Senior Research Fellows, Technical assistants and Field Assistants appointed for the project will assist in implementation of the project)

7. Location of the research project : Cochin and Lakshadweep Islands

8. a) Objectives: a) To study the distribution and abundance in time and space of ornamental fishes in the lagoons and reef flats of different islands; b) to study the various aspects of biology of ornamental fishes; c) to estimate the potential and exploitable resources of different species; d) to identify and assess the possible affects of exploitation of ornamental fishes on the resources and the ecosystem; e) to experiment and decide the best mode of transport of live ornamental fishes to mainland; f) to prepare a comprehensive atlas, with colour photographs, of ornamental fishes of Lakshadweep.

b) Practical utility: The investigation is expected to provide scientific data on the resource and its ecosystem which would form the basis for developing a policy and programme of exploitation without affecting the heritage for future.

9. Technical Programme: 1. Each island will be considered under different zones and fishing using gill nets, encircling nets, traps will be conducted to collect the required data and material. 2. Biological data on all important species will be collected. 3. Experiments on transportation of live fish to the main land will be conducted. 4. Colour photographs will be taken for all ornamental fishes.

10. Date of start: April 1993 11. Likely date of completion: April 1996

12. Estimated man months:

a. Scientific	:	15 man months/year
b. Technical	:	192 man months/year
c. Supporting	:	12 man months/year

13. Facilities required and estimated cost:

Land		
Works		
Equipment		
Existing		
To be purchased		
Salaries & allowances		
Scientific	:	1.5 lakhs
Technical		
Labour		
Travel costs		
Contingencies		Sponsored Project
Chemicals		
Glassware		

14. If financed by an organization other than the Institute:

a) Name of Financing Organization : Ministry of Agriculture, Govt. of India

b) Title of the Project

15. Approximate cost : Rs. 24.78 lakhs (Total cost)

16. Signatures of

Sd/-
Principal Investigator

Sd/-
Director

RESEARCH PROJECT 1995-96

1. Institute Code No. CMFRI/Spo./2 2. I.C.A.R. Code No.

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

4. Title of project : Hatchery production of the seed of the clam, Paphia malabarica and ranching in coastal waters

5. Name & designation of Principal Investigator : K.A. Narasimham, Principal Scientist

6. Name(s) and designation of Associate(s) and establishment (s) on which borne. (a) Whole time (b) Part time indicate proportion of time to be devoted and other area(s)

Name & Designation		Centre	Time to be spent (%)	Work to be done Tech.prog.
K.A. Narasimham	Pri.Sci.	Cochin	25	4,5
T.S. Velayudhan	Sci.(SG)	Cochin	25	4,5
D. Sivalingam	Sci.(SG)	Tuticorin	25	1-5

Technical Assistance: Cochin : N.P. Ramachandran, T-1; Tuticorin : U. Jeyaram, T-1.

Senior Research Fellows: 2

7. Location of the Research Project : Cochin, Tuticorin

8. a) Objectives: 1) To standardise the hatchery techniques for the mass production of the seed of the clam Paphia malabarica. 2) Ranching of the hatchery raised seed in coastal waters to enhance production.

   b) Practical utility: Development of hatchery technology for mass production of the seed of Paphia malabarica helps to meet the seed requirements for culture. Ranching of the hatchery produced seed in suitable coastal waters enhances the recruitment of the stock.

9. Technical programme: 1) P. malabarica brood stock collection, transportation, maintenance, conditioning, induced maturation and spawning, larval and spat rearing. 2) Nursery rearing of seed to stockable size. 3) Maintenance of stock cultures of different species of micro-algae and their mass production. 4) Ranching of the hatchery produced P. malabarica seed in suitable sites and monitoring of growth and survival and also the environmental parameters. 5) Effects, if any, of ranching on natural stocks to be studied.

10. Date of start : December 1992 11. Likely date of completion: 1995-96

12. Estimated Man-months:

a) Scientific - Scientist(s)	: 9
b) Technical	: 3
c) Supporting (in man days)	: 90

13. Facilities required and estimated cost:

Land (Sq.m)	: Nil
Works (item)	: Nil
Equipment	: Nil
Existing	: Hatchery, larval/spat rearing tanks, Micro-algae culture facility
To be purchased	: Farm materials Rs.21,560
Salaries & allowances (Man-months)	
Scientific	: 24,000
Technical	: 6,000
Labour	: 25,475
Travel costs	: 20,455
Contingencies	: 47,700
Chemicals	: 11,550
Glassware	: -
Fertilizers and plant protection chemicals	
Other items	: Remuneration to 2 SRFs Rs.48,000
Total cost	: 2,04,740
Supporting	: 6,260
Field preparation and planting	
Inter cultivation and top dressing	
Plant protection	
Harvesting	
Other items	

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

a) Name of Financing Organisation	: Marine Products Export Development Authority, Cochin (except salaries) Current year contribution Rs.1,74,750
b) Title of the project	: Hatchery production of clam seed and ranching in coastal waters

15. Approximate cost : Rs.2,11,000

Signatures of:

Sd/-
16. Principal Investigator

Sd/-
17. Head of Division

Sd/-
18. Director

RESEARCH PROJECT 1995-96

1. Institute Code No. CMFRI/Spo./3 2. I.C.A.R. Code No.

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

4. Title of project : Hatchery production of clam, *Meretrix* sp. seed

5. Name & designation of Principal Investigator : P.V. Sreenivasan, Senior Scientist

6. Name(s) and designation of Associate(s) and establishment (s) on which borne. (a) Whole time (b) Part time indicate proportion of time to be devoted and other areas(s)

Name & designation		Centre	Time to be spent (%)	Work to be done Tech.prog.
P.V. Sreenivasan	Sr.Sci.	Madras	25	1-6
D. Sivalingam	Sci.(SG)	Tuticorin	25	1-6

Technical Assistance: Tuticorin : U. Jeyaram, T-1.

7. Location of the Research Project : Tuticorin

8. a) Objectives: To develop economically viable hatchery seed production technology for *Meretrix* sp.

   b) Practical utility: Clams are a cheap source of animal protein to coastal people and in recent times clam meat exports from the Country are picking up. The technology of clam culture has already been developed by the Institute. Development of hatchery technology for large scale seed production of *Meretrix* sp. helps to ensure steady seed supply, both for culture and ranching operations.

9. Technical programme: 1) Collection, transportation, conditioning and induced spawning of *Meretrix* sp. and larval/spat rearing. 2) Maintenance of stock cultures of micro-algae and their mass production. 3) Nursery rearing of seed and to work out the economics of seed production. 4) Ranching of the hatchery raised seed in suitable areas and monitoring growth and survival. 5) Monitoring of the environmental parameters. 6) Analysis interpretation of data and preparation of reports.

10. Date of start : 1995-96 11. Likely date of completion : 1997-98

12. Estimated Man-months:

a. Scientific - Scientist(s)	:	6
b. Technical	:	3
c. Supporting (in man days)	:	90

13. Facilities required and estimated cost:

Land (Sq.m)	:	Nil
Works (item)	:	Nil
Equipment	:	Requirements given below.
Existing	:	Hatchery shed, seawater supply system and some rearing tanks
To be purchased	:	Diesel pump set, refractometer, Electric pump, rearing tanks, water bath, U.V. water steriliser, perspex tanks & Air blower Rs.3,02,850
Salaries & allowances (Man months)		
Scientific - Scientist(s)	:	60,000
Technical	:	9,000
Labour	:	30,000
Travel costs	:	10,000
Contingencies	:	15,000
Chemicals	:	5,000
Glassware	:	-
Fertilizers and plant protection chemicals		
Other items	:	
Total cost	:	4,31,850
Supporting	:	6,150
Field preparation and planting		
Inter cultivation and top dressing		
Plant protection		
Harvesting		
Other items	:	

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

a) Name of Financing Organisation	:	Dept. of Biotechnology, Govt. of India (except salaries, TA etc.) First year contribution Rs.3,72,850
b) Title of the project	:	Hatchery production of seed of (A) Mussel and (B) Clam.

15. Approximate cost : Rs.4,38,000

Signatures of:

Sd/-	Sd/-	Sd/-
16.Principal Investigator	17.Head of Division	18.Director

RESEARCH PROJECT 1995-96

1. Institute Code No. CMFRI/Spo./4 2. I.C.A.R. Code No.

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

4. Title of project : Hatchery production of the green mussel, Perna viridis seed

5. Name & designation of Principal Investigator : P.S. Kuriakose, Principal Scientist

6. Name(s) and designation of Associate(s) and establishment (s) on which borne. (a) Whole time (b) Part time indicate proportion of time to be devoted and other area(s)

Name & designation		Centre	Time to be spent (%)	Work to be done Tech.prog.
P.S. Kuriakose	Pri.Sci.	Calicut	25	1-7
P. Lakshmi Latha	Sci.	Calicut	25	1-7

Technical Assistance: Calicut : V.G. Surendranathan, T.1.3
M.P. Sivadasan, T.1.3

Senior Research Fellows: 2

7. Location of the Research Project : Calicut

8. a) Objectives: 1) Upgradation of the technology for mass production of green mussel, Perna viridis seed and to work out the economics of seed production. 2) Demonstration of the technology and training to end users. 3) To ranch the hatchery raised seed and monitor growth and survival.

   b) Practical utility: The technology of mussel culture has been developed by the Institute and a production rate of 4-12 kg/1 m rope/5 months has been obtained by the raft method. Uninterrupted supply of mussel seed is necessary for undertaking mussel culture on commercial lines. The basic hatchery technology has been developed by the Institute and the same has to be upgraded for large scale mussel seed production.

9. Technical programme: 1) Development of hatchery facilities at Calicut. 2) Collection, conditioning and induced spawning of the green mussel Perna viridis. 3) Rearing of larvae, spat and seed in the hatchery/ nursery and work out the economics of seed production. 4) Maintenance of stock cultures of micro-algae and their mass production. 5) Monitoring of the environmental factors. 6) Organisation of demonstration and training to end users in large scale production of mussel

seed. 7) Analysis, interpretation of data and preparation of reports.

10. Date of start : 1995-96 11. Likely date of completion : 1996-97

12. Estimated Man-months:
a. Scientific - Scientist(s) : 6
b. Technical : 3
c. Supporting (in man days) : 90 days

13. Facilities required and estimated cost:

Land (Sq.m)	:	Nil
Works (item)	:	Hatchery Rs.7,00,000
Equipment	:	Given below
Existing	:	Larval rearing tanks
To be purchased	:	Air compressor, autoclave, distilled water still, Hot air oven, refrigerator, microscope, electric pumps, seawater pumping system, rearing tanks Rs.5,47,500
Salaries & allowances (Man months)		
Scientific	:	60,000
Technical	:	9,000
Labour	:	18,000
Travel costs	:	10,000
Contingencies	:	5,000
Chemicals	:	5,000
Glassware	:	3,000
Fertilizers and plant protection chemicals	:	SRFs Salary Rs.10,800
Other items	:	13,68,300
Total cost	:	6,200
Supporting		
Field preparation and planting		
Inter cultivation and top dressing		
Plant protection		
Harvesting		
Other items		

14. If financed by an organisation other than the Institute, then give the following information:
a) Name of Financing Organisation : Dept. of Biotechnology, Govt. of India (except salaries, hatchery etc.). First year contribution Rs.6,16,300
b) Title of the project : Hatchery production of seed of (A) Mussel and (B) Clam.

15. Approximate cost : Rs.13,74,500

Signatures of:

Sd/- Sd/- Sd/-
16. Principal Investigator 17. Head of Division 18. Director

RESEARCH PROJECT 1995-96

1. Institute Code No. CMFRI/Spo./5 2. I.C.A.R. Code No.

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

4. Title of project : Studies on the biology and sea ranching of the sacred chank, Xancus pyrum with special reference to the protection of species in the marine national park of Gulf of Mannar

5. Name & Designation of Principal Investigator : A.P. Lipton, Senior Scientist

6. Name(s) and designation of Associate(s) and establishment (s) on which borne. (a) Whole time (b) Part time indicate proportion of time to be devoted and other area(s)

Name & Designation		Centre	Time to be spent (%)	Work to be done Tech.prog.
A.P. Lipton	Sr.Sci.	Mandapam	50	1-6

Technical Assistance: Mandapam : K. Jeyabalan, T-1.

Senior Research Fellows: 2

Field Assistant : 1

7. Location of the Research Project : Mandapam

8. a) Objectives: To conduct studies on induced breeding of the chank, rear the baby chanks to suitable size and ranch them in selected areas in the Gulf of Mannar.

   b) Practical utility: In recent times the chanks are heavily exploited and also their egg cases are destroyed by commercial trawlers. Development of appropriate technology for controlled breeding, rearing of baby chanks and their release in suitable areas helps in stock enhancement.

9. Technical programme: 1) Development of facilities for maintaining chank brood stock and rearing the baby chanks. 2) Collection and maintenance of brood stock, induced breeding and rearing of the baby chanks. 3) Energy utilisation studies during egg capsule release and baby chank rearing. 4) Racial studies on Xancus pyrum. 5) Monitoring of the environmental conditions. 6) Tagging and release of juvenile chanks. Growth and migration studies to be undertaken based on recoveries of tagged chanks.

10. Date of start : July 1994 11. Likely date of completion : 1996-97

12. Estimated Man-months:
    a. Scientific - Scientist(s) : 6
    b. Technical : 3
    c. Supporting (in man days) : 120 days

13. Facilities required and estimated cost:

Land (Sq.m)	:	Nil
Works (item)	:	Nil
Equipment	:	Nil
Existing	:	Seawater supply system, Sea going vessel
To be purchased	:	Microscope, Electrophoresis unit, top balance, TLC, tissue homogeniser, pH meter, DO analyser, Salinity meter, colorimeter, hot plate, Auto temperature control system : Rs.95,000
Salaries & allowances (Man months)		
Scientific	:	60,000
Technical	:	16,000
JRF	:	45,600
Labour	:	Included under contingencies
Travel costs	:	5,000
Contingencies	:	52,000
Chemicals	:	25,000
Glassware		
Fertilizers and plant protection chemicals		
Other items (Rearing tanks)	:	30,000
Total costs	:	3,28,600
Supporting	:	8,400
Field preparation and planting		
Inter cultivation and top dressing		
Plant protection		
Harvesting		
Other items		

14. If financed by an organisation other than the Institute, then give the following information:
    a) Name of Financing Organisation : Department of Environment and Forests, Govt. of India (except salaries) First year contribution Rs.2,64,600
    b) Title of the project : Studies on the biology and sea ranching of the sacred chank, Xancus pyrum with special reference to the protection of species in the marine national park of Gulf of Mannar

15. Approximate cost : Rs.3,37,000

Signatures of:

Sd/- Sd/- Sd/-

16. Principal Investigator 17. Head of Division 18. Director

RESEARCH PROJECT 1995-96

1. Institute Code No.CMFRI/Spo./6 2. I.C.A.R. Code No.

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

4. Title of project : Tissue culture in pearl oyster

5. Name & designation of Principal Investigator : S. Dharmaraj, Scientist (SG)

6. Name(s) and designation of Associate(s) and establishment (s) on which borne. (a) Whole time (b) Part time indicate proportion of time to be devoted and other area(s)

Name & Designation		Centre	Time to be spent (%)	Work to be done Tech.prog.
S. Dharmaraj	Sci.(SG)	Tuticorin	25	1-6
A.C.C. Victor	Sr.Sci.	Tuticorin	25	1-6

Technical Assistance: Tuticorin: K. Srinivasagan, T-I-3, K. Shanmugasundaram, T-2, P. Muthukrishnan, T-2.

7. Location of the Research project : Tuticorin

8. a) Objectives:1) Initiation of pearl oyster mantle tissue culture (explant culture), cell culture and study of the nature of secretion of these cells and their nutritional requirements. 2) Modification of culture media to alter the quality of secretion. 3) To identify the chemicals responsible for secretion of good quality nacre. 4) Collection of epithelial cells responsible for the production of different colour pearls and establishment of Cell Bank. 5) Production of coloured pearls on large scale.

b) Practical utility: The technology for the production of cultured pearls in the pearl oyster, Pinctada fucata by the introduction of mantle tissue together with a nucleus has been developed by the Institute. By this conventional method the colour of the pearl cannot be manipulated. By utilising the tissue culture technology, pearls of different colours can be produced.

9. Technical programme:1) Setting up of tissue culture laboratory, procurement and installation of equipments. 2) Preparation of stock solutions, culture media, sterilisation and storage. 3) Develop explant culture, cell culture and preservation of cells. 4) Injections of free cells and study of the resultant colour of the pearls. 5) A cell line of mantle cells with particular genetic character is to be developed to obtain pearls of desired colour. 6) Production of pearls of desired colour in large numbers.

10. Date of start: 1995-96 11. Likely date of completion : 1997-98

12. Estimated Man-months:
    a. Scientific - Scientist(s) : 6
    b. Technical : 9
    c. Supporting (in man days) : 90 days

13. Facilities required and estimated cost:
    Land (Sq.m) : Nil
    Works (item) : Laboratory renovation Rs.2,00,000
    Equipment : Given below
    Existing : Autoclave, Magnetic stirrer, Hot air oven, Distillation unit
    To be purchased : CO_2 Incubator, high precision pH meter, refrigerator Centrifuge, tissue culture centrifuge, refrigerator, single pan balance, CO_2 sensor, Sartorius filter unit with filter papers, Inverted microscope and phase contrast attachment, heat gun, O_2 Co_2 and N_2 cylinders, pressure vaccum pump, U.V. lamp, Autostill, pipette washing unit, So-low refrigerator. Rs.21,47,700

    Salaries & allowances (Man months)
    Scientific : 60,000
    Technical : 40,000
    Labour : 10,000
    Travel costs : 5,000
    Contingencies : 10,000
    Chemicals : 20,000
    Glassware : 10,000
    Fertilizers and plant protection chemicals
    Other items :
    Total cost : 25,02,700
    Supporting : 6,300
    Field preparation and planting
    Inter cultivation and top dressing
    Plant protection
    Harvesting
    Other items

14. If financed by an organisation other than the Institute, then give the following information:
    a) Name of Financing Organisation : Dept. of Biotechnology, Govt. of India (excluding salaries, laboratory renovation etc.). First year contribution Rs.21,47,700
    b) Title of the project : Tissue culture in pearl oyster

15. Approximate cost : Rs.25,09,000

Signatures of:

Sd/-	Sd/-	Sd/-
16. Principal Investigator	17. Head of Division	18. Director

RESEARCH PROJECT 1995-96

1. Institute Code No. CMFRI/Spo./7 2. I.C.A.R. Code No.

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

4. Title of Project : Pilot project on oyster culture

5. Name & designation of Principal Investigator : P. Muthiah, Scientist (SG)

6. Name(s) and designation of Associate(s) and establishment (s) on which borne. (a) Whole time (b) Part time indicate proportion of time to be devoted and other area(s)

Name & Designation		Centre	Time to be spent (%)	Work to be done Tech. prog.
P. Muthiah	Sci.(SG)	Tuticorin	50	1-7,9
K. Ramadoss	Sci.(SG)	Tuticorin	25	1-7,9
M.C. Arunmozhi Devi	Sci.	Tuticorin	25	8,9

Technical Assistance: Tuticorin : C.T. Rajan, T-4, A.A.P. Mudaliar, T-4, S.M. Sathakathulla, T-1, E. Athipandian, T-2, J. Padmanathan, T-1.

7. Location of the Research Project : Tuticorin

8. a) Objectives: To study the techno-economic feasibility of oyster culture through upgradation of the present experimental-scale technology for 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 and farmers interested in taking up oyster farming on commercial lines.

9. 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 survival and condition factor of oysters. (3) Laying shell cultch for seed collection from wild. (4) To experiment with various cementing substances for sticking free oyster spat on cultch material and study the growth, survival and production. (5) Monitoring of environmental parameters. (6) Harvesting of oysters when they grow to marketable size and assessing the production and production cost. (7) Depuration of harvested oysters. (8) To study the attributes of fishermen in selected villages towards adoption of oyster culture.

(9) Analysis and interpretation of data and preparation of report.

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

12. Estimated Man-months:

a. Scientific - Scientist(s)	:	12
b. Technical	:	24
c. Supporting (in man days)	:	360 days

13. Facilities required and estimated cost:

Land (Sq.m)	:	Farm area 1 ha available
Works (item)	:	Nil
Equipment	:	Nil
Existing	:	Microscopes, balances, Dhingy, outboard motor and Depuration facility
To be purchased	:	Racks for nursery & farm and cages Rs.50,000
Salaries & allowances (Man months)		
Scientific	:	1,15,000
Technical	:	60,000
Labour	:	1,00,000
Travel costs	:	2,000
Contingencies	:	10,000
Chemicals	:	5,000
Glassware	:	-
Fertilizers and plant protection chemicals		
Other items	:	
Total cost	:	3,42,000
Supporting	:	25,000
Field preparation and planting		
Inter cultivation and top dressing		
Plant protection		
Harvesting		
Other items		

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

a) Name of Financing Organisation : 75% of cost excluding salaries to be financed by the National Bank for Agricultural and Rural Development (NABARD)

b) Title of the project: Pilot project on oyster culture

15. Approximate cost : Rs.3,67,000

Signatures of:

Sd/-	Sd/-	Sd/-
16.Principal Investigator	17.Head of Division	18.Director

RESEARCH PROJECT 1995-96

1. Institute Code No. CMFRI/Spo./8 2. I.C.A.R. Code No.

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

4. Title of Project : Intensive seed production and sea ranching of sea cucumber

5. Name & Designation of Principal Investigator : D.B. James, Senior Scientist

6. Name(s) and designation of Associate(s) and establishment (s) on which borne. (a) Whole time (b) Part time (indicate proportion of time to be devoted and other area(s)

Name & Designation		Centre	Time to be spent (%)	Work to be done
D.B. James	Sr. Sci.	Tuticorin	50	As per Tech. programme

Technical Assistance: A.D. Gandhi (Tuticorin)

7. Location of the Research Project : Tuticorin

8. (a) Objectives: Breeding and production and sea ranching of sea cucumber Holothuria scabra.

   (b) Practical utility: The seed produced can be sea ranched to enhance the natural populations

9. Technical programme: To improve and standardise the techniques for induced spawning of holothurians. To develop suitable rearing techniques for various stages of larvae.

10. Date of start: 1993 11. Likely date of completion: 1995

12. Estimated Man months:

    a. Scientific : 24 man months

    b. Technical : 24 man months

    c. Supporting : 48 man months

13. Facilities required and estimated cost:

Land (Sq.m)	: Nil
Works (item)	: Improvement to existing hatchery shed Rs. 1,00,000.00
Equipment	: Purchase of tanks, motors etc. Rs. 30,000.00
Existing	:
To be purchased	: Chemicals Rs. 10,000, stationery items Rs. 2,500, Slides, photographs etc. Rs. 10,000, Glassware and plastic items Rs. 5,000, cost of specimens Rs. 10,000, printing of manual Rs. 20,000
Salaries & allowances (Man months)	
Scientific	: Met from CMFRI budget
Technical	: Met from CMFRI budget
Labour	: Rs. 43,200.00
Travel costs	: Rs. 39,514.00
Contingencies	: Rs. 7,000.00
Chemicals	: Rs. 10,000.00
Glassware & plastic items	: Rs. 5,000.00
Fertilizers and plant protection chemicals	:

Other items: Maintenance of hatchery Rs. 5,000; Remuneration for SRF Rs. 96,000; Transportation of brood stock Rs.5,000; Pens Rs. 12,000; Expenditure for Training programme Rs. 5,000; For farm work 10,000.

Total cost : Rs. 2,05,814.00

Supporting

Field preparation and planting

Inter cultivation and top dressing

Plant Protection

Harvesting

Other items

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

a) Name of Financing Organisation : Marine Products Export Development Authority

b) Title of the project : Intensive seed production and sea ranching of sea cucumbers

15. Approximate cost : Rs. 6,00,000.00

Signatures of:

Sd/-
16. Principal Investigator

Sd/-
17. Head of Division

Sd/-
18. Director

RESEARCH PROJECT 1995-96

1. Institute Code No. CMFRI/Spo./9 2. I.C.A.R. Code No.

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

4. Title of Project : Cultivation of agar yielding seaweeds under green house condition

5. Name & Designation of Principal Investigator : N. Kaliaperumal Sr. Scientist

6. Name(s) and designation of Associate(s) and establishment(s) on which borne: (a) Whole time (b) Part time (indicate proportion of time to be devoted and other area(s)

Name & Designation	Centre	Time to be spent (%)	Work to be done
N. Kaliaperumal, Sr. Sci.	Mandapam	25	1-8

Technical Assistance: S. Kalimuthu, K. Muniyandi, A. Palanichamy (Mandapam)

7. Location of the Research Project : Mandapam

8. (a) Objectives: 1) To culture agar yielding seaweeds by vegetative and reproductive propagation methods in the green house manipulating the environmental conditions such as light, temperature etc. 2) To increase the rate of growth and production of cultured seaweed by applying different fertilizers and growth promoting hormones.

(b) Practical utility: The present project will help to find out the ways and means of augmenting production of agarophyte Gracilaria edulis by different culture techniques under green house condition and to develop suitable technology for commercial scale cultivation. The technology developed in this project will be transferred to the seaweed farmers and private entrepreneurs through training and demonstration programmes for production of agar yielding seaweed Gracilaria edulis on large scale to meet the raw material requirement of Indian agar industries in addition to that exploited from natural seaweed beds.

9. Technical programme: 1. To undertake culture of agar yielding red alga Gracilaria edulis by vegetative propagation method in continuous running seawater system in green house condition. 2. To attempt spray cultivation method for culture of Gracilaria edulis using vegetative fragments in green house condition. 3. To culture G. edulis by spore culture method

in green house. 4. To study the effect of fertilizers on the growth of cultured seaweed G. edulis. 5. To study the effect of growth promoting hormones in the culture of G. edulis under green house condition. 6. To find out the optimal conditions required for successful cultivation of G. edulis in the green house. 7. To estimate the pigments in G. edulis during the culture period. 8. To estimate the quality and quantity of agar and also other biochemical constitutents from the cultured G. edulis in green house condition.

10. Date of start : 1995 11. Likely date of completion: 1998

12. Estimated Man months : 12 man months/year

13. Facilities required and estimated cost (To be provided by the Institute)

i. Field shed (green house)
ii. Other items : Fibre glass tanks, Humidifier etc.
iii. Total estimated cost: 1 lakh

Non-Recurring

Equipments (Funded by Dept. of Biotechnology)

Lux meter	: 1.40 lakhs
Spectrophotometer	: 2.44 lakhs
Top pan balance	: 0.06 "

Recurring

Consumables	: 0.10
Staff salaries (JRF 1 post)	: 0.22
	4.22 lakhs

Salaries & allowances (Man months)

Scientific	: Met from CMFRI budget
Technical	: Met from CMFRI budget

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

a) Name of Financing Organisation : Dept. of Biotechnology

b) Title of the project : Cultivation of agar yielding seaweeds under green house condition

15. Approximate cost : 4.89 lakhs (Total cost)

Signatures of:

Sd/-	Sd/-	Sd/-
16. Principal Investigator	17. Head of Division	18. Director

RESEARCH PROJECT 1995-96

1. Institute Code No. CMFRI/Spo./10 2. I.C.A.R. Code No.

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

4. Title of Project : Studies on mangrove ecosystem of Gulf of Mannar islands and their impact on larval recruitment of economically useful fishes and prawns

5. Name & Designation of Principal Investigator : Dr. P. Nammalwar, Sr. Scientist

6. Name(s) and designation of Associate(s) and establishment(s) on which borne. (a) Whole time (b) Part time (indicate proportion of time to be devoted and other area(s)

Name & Designation		Centre	Time to be spent (%)	Work to be done
V. Gandhi	S(SG)	Mandapam	30	(a) - (g)
P. Nammalwar	Sr.Sci.	Madras	25	"

Technical Assistance: M. Muniyandi, M.R. Arputharaj (Mandapam) Field Assistants (2)-to be recruited (Mandapam)

7. Location of the Research Project : Mandapam

8. (a) Objectives: (i) To gain precise information on the distribution of mangroves in the island ecosystems of Gulf of Mannar and their impact on the larval recruitment of economically useful fishes and prawns and the influence of environmental characters on their abundance. (ii) To assess the distribution, seasonal and specieswise abundance of economically useful fishes and prawns in the mangrove areas of Gulf of Mannar islands. (iii) To identify the mangrove areas which are under severe environmental and social stress and of critical areas in greater need of protection and conservation.

(b) Practical utility: (i) The project aims at understanding the impact of mangroves on economically useful fish and prawn seed resources. (ii) The study will help in understanding the seasonal variation in abundance of fish and prawn seed in relation to environmental characters so that suitable management strategies for mangroves can be formulated.

9. Technical programme: (a) Survey of mangrove ecosystem in the islands of Gulf of Mannar (b) Survey of fish and prawn seed resources and for locating potential grounds of seed availability (c) Studies on distribution pattern of various species of mangroves and their impact on the larval recruitment of fish and prawns (d) Studies on the ecology of mangroves and identification of suitable sites for aquaculture (e) Environmental monitoring of the mangrove ecosystems in the islands of Gulf of Mannar (f) Investigations on the nature of biodegradation of vegetation in mangrove ecosystems (g) Evaluation of suitable management strategies for the conservation of mangroves.

10. Date of start: 1995-96 11. Likely date of completion: 1997-98

12. Estimated Man months : 12 man months

13. Facilities required and estimated cost

Land (Sq.m)	:	-	
Works (item)	:	-	
Equipment	:	Vessel/Boat, various types of Nylon Nets and cages	
Existing	:	Stereoscopic Microscope Spectrophotometer	
To be purchased (items of cost)	:	Spectrophotometer Salinometer Dissolved oxygen meter pH meter Electronic Balance Hot Plate	Rs. 1,00,000.00

Salaries and allowance (Man months)

Scientific	:	Rs. 48,000.00
Technical	:	46,000.00
Labour	:	-
Travel cost	:	15,000.00
Contingencies	:	20,000.00
Chemicals	:	-
Glassware	:	-
Fertilizers and Plant Protection chemicals	:	-
Other items	:	-
Total cost	:	Rs. 2,49,000.00
Supporting (Mandays)		
Field preparation and planting	:	-
Inter cultivation and top dressing	:	-
Plant protection	:	-
Harvesting	:	-
Other items	:	-

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

(a) Name of financing organisation	:	Government of India, Ministry of Environment & Forests, New Delhi.
(b) Title of the project	:	Gulf of Mannar Biosphere Reserve and Management

15. Approximate cost : Rs. 2,49,000

Signatures of:

Sd/-	Sd/-	Sd/-
16. Principal Investigator	17. Head of Division	18. Director

RESEARCH PROJECT - 1995-96

1. Institute Code No.: CMFRI/Spol/11 2. I.C.A.R. code No.

3. Name & address of Research Institute/Centre : CMFR Institute, Cochin

4. Title of project : Application of remote sensing technology in marine fisheries

5. Name & Designation of Principal Investigator : M.S. Rajagopalan Principal Scientist

6. Name(s) and designation of Associate(s) and establishment(s) on which borne: a) Whole time b) Part time(indicate proportion of time to be devoted and other areas)

Name & Designation	Centre	Time to be spent(%)	Work to be done (Tech. programme)
M.S.Rajagopalan, Pri. Sci.	Cochin	25	1,2,3,5,6
V.N. Pillai, Pri. Sci.	"	25	1,2,3, ,6
C.P.Gopinathan Sr. Sci.	"	25	3
V.K. Pillai Sr. Sci.	"	25	3
K.G.Girijavallabhan, Sci.SG	"	25	2
G.S. Daniel Selvaraj, Sci.SG	"	25	5
G. Subbaraju, Pri. Sci.	Kakinada	50	2, 4

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

7. Location of Research Project : Cochin, Kakinada

8. 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.

9. 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. fom different research centres ad 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.

10. Date of start : 1991 11. Likely date of completion: Continuing

12. Estimated man months
Scientific - Scientist(s) : 24
Technical : 24
Supporting (in man days) : -

13. Facilities required and estimated cost:
Land (Sq.m) : -
Works (item) : -
Equipment : -
Existing : -
To be purchased (items & cost)

Salaries & allowances (Man months)

Scientific	:	Rs 2.00 lakhs
Technical	:	Rs 1.50 "
Labour		-
Travel costs	:	Rs 0.50 "
Contingencies	:	Rs 0.50 "
Chemicals	:	Rs 0.50 "
Glasswares	:	Rs 0.50 "
Fertilizers & plant protection chemicals		-
Other items		-
Total cost	:	Rs 5.00 "
Supporting (Man days)		-
Field preparation & planting		-
Inter cultivation & top dressing		-
Plant protection		-
Harvesting		-
Other items		-

14. If financed by an organisation other than the Institute, then give the following information:
a) Name of Financing Organization : Dept. of Ocean Development, New Delhi & NRSA, Hyderabad
b) Title of project (if the project forms a part of a larger project:

15. Approximate cost : Rs 6.00 lakhs

16. Signatures of :

Sd/-
Principal Investigator

Sd/-
17. Head of Division

Sd/-
18. Director

RESEARCH PROJECT 1995-96

1. Institute Code No. CMFRI/Spo./12 2. I.C.A.R. Code No.

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

4. Title of Project : Genetic studies on marine penaeid prawns

5. Name & Designation of Principal Investigator : M.K. George Sr. Scientist

6. Name(s) and designation of Associate(s) and establishment (s) on which borne. (a) Whole time (b) Part time (indicate proportion of time to be devoted and other area(s)

Name & Designation		Centre	Time to be spent (%)	Work to be done
M.K. George	Sr.Sci	Cochin	55	As per Tech.prog.
N.N. Pillai	Sr.Sci.	Cochin	25	"
N.K. Verma	S	Cochin	25	"

Technical Assistance: M.P. Paulton
Bindu Paul, Sr. Research Fellow

7. Location of the Research Project : Cochin

8. a) Objectives: (1) To study genetic variation in marine penaeid prawns Penaeus indicus, P. monodon and P. semisulcatus. (2) To identify qualitative genetic traits by gel electrophoresis. (3) To identify quantitative genetic traits by morpho-meristic measurements. (4) To identify distinct genetic stocks/strains, if any, within the species. (5) To estimate genetic distance and divergence between populations of each species. (6) To study correlation, if any, between genotype/genetic stock differences and growth/weight differences.

b) Practical Utility: The species Penaeus indicus, P. monodon and P. semisulcatus are commercially most important marine prawns of India. Each of these species is exploited and managed as a unit stock fishery throughout its range of distribution. Accurate identification of natural units sustaining the present fishery of each of these species is essential for its scientific exploitation/conservation of its resources and for planning successful short/long term forecast on its abundance. Any information on the genetic

variability, genotype/genetic stock/strain differences can be correlated to growth/weight differences and such correlations can be utilized to augment production through future aquaculture and breeding programmes of these species.

9. Technical Programme:

First year : 1. Standardization of Multiphore electrophoretic techniques to detect and resolve polymorphic enzyme systems in each species.

2. Analysis of morphometrics following the method of Goswami et al (1986)

Second year : 3. Study selected morpho-meristic characters and determine tail weight of sample specimens.

4. Analyse selected polymorphic enzyme loci to estimate allelic frequencies in the sample populations.

5. Correlate genetic stock differences, if any, with detected growth differences, if any.

Third year : 1. Items 2 to 5 continued

2. Estimate gene frequencies of polymorphic loci detected.

3. Final analysis of data to estimate:

a. Correlation between tail weight and selected morpho-meristic characters or enzyme loci.

b. Genetic distance and divergence between populations.

c. Genetic stock/strain differences within the species.

d. Correlation between genetic stock differences and growth performance differences.

10. Date of start: 1993 January 11. Likely date of completion: 1995 December

12. Estimated man-months : 36

13. Facilities required:

Land : Nil
Labour : Nil
Special requirement: Nil
Animal shed : Nil
Fish ponds : Nil
Foreign exchange : Yes
Other items : Chemicals/prawn samples/TA/DA

Total estimated cost : Rs. 1 lakh

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

a) Name of Financing Organisation : U.S. Department of Agriculture (USDA)

b) Title of the project : Genetic studies on Marine Penaeid prawns

15. Approximate cost : Rs. 24,81,120 (For three years)

Signatures of:

16.	17.	18.
Sd/-	Sd/-	Sd/-
Principal Investigator	Head of Division	Director