अनुसंधान परियोजनायें - 1990-91
RESEARCH PROJECTS - 1990-91

केन्द्रीय समुद्री मात्स्यिकी अनुसंधान संस्थान
CENTRAL MARINE FISHERIES RESEARCH INSTITUTE

कोचिन
COCHIN

भारतीय कृषि अनुसंधान परिषद
INDIAN COUNCIL OF AGRICULTURAL RESEARCH

CENTRAL MARINE FISHERIES RESEARCH INSTITUTE

COCHIN

Research Project Proposals, 1990-91

CONTENTS

Research Projects to be implemented by

.....

RESEARCH PROJECT - 1990-'91

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

3. Name and address of the Research Institute: C.M.F.R.Institute, Cochin-31

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

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

6. Name and Designation of Project Leader. : K.N.Kurup, Scientist S.G.

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

Centre	Name	Designation	Time to be spent (%)	Work to be done
Cochin	K.N.Kurup	Scientist S.G.	40	As per technical programme.

Technical Assistance:

S.S.Dan, G.Balakrishnan, U.K.Satyavan, Varughese Philipose, P.K.Mahadevan Pillai, V.Rajendran, Varughese Jacob, K.C.Yohannan, G.Krishnankutty Nair, P.Sivaraman, V.P.Annam, P.Karunakaran Nair, Abhakant, Joseph Andrews, S.Haja Najeemudeen, C.J.Prasad, P.L.Ammini, M.E.Seynudeen, M.R.Beena, P.P.Pavithran, K.P.George, P.T.Mani, M.Ramachandran, K.Anandan, Lata L.Khambadker, G.Subbaraman and Field Staff.

8. Location of the Research Project: Cochin

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

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

10. Technical Programme: 1) Planning the Sample Survey 2) Execution of field observation. 3) Co-ordination of field work and supervision 4) Processing of survey data 5) Analysis of the results.

a) Work done: Survey following a multistage stratified random sampling design was carried out for estimating marine fish production in the country during 1989.

b) Work envisaged: Sample survey for estimating marine fish production in the country during 1990 will be undertaken.

11. Date of start: 1-4-1990 12. Likely date of completion: 31-3-1991

13. Estimated man-months: 1270 Man months/Year

14. Facilities required : Nil

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

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

(a) Name of the financing organisation.
(b) Title of Project

16. Approximate cost:

(a)	Salary of Scientific staff	Rs.	29,760/-
(b)	Salary of technical staff	Rs.	30,36,000/-
(c)	Salary of supporting staff		
(d)	Casual labourer cost, if any		
(e)	Cost of equipment, facility etc		
(f)	Contingencies, such as chemicals, fertilisers, seeds, animals, feeds, sprayers etc.	Rs.	4,800/-
(g)	T.A.	Rs.	9,60,000/-
	Total cost	Rs.	40,30,560/-

17. Signature of:

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

RESEARCH PROJECT - 1990-'91

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

3. Name and address of Research Institute: : C.M.F.R.Institute, Cochin-31

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

5. Title of Sub-Project: Stock assessment of the exploited marine fishery resources in the multigear - multispecies system incorporating environmental parameters.

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

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

Centre	Name	Designation	Time to be spent (%)	Work to be done
Cochin	K.Alagaraja	Principal Scientist	30	As per technical programme
	M.Srinath	Scientist S.G.	20	

Technical Assistance: Nil

8. Location of the Research Project: Cochin

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

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

10. Technical Programme: 1. Development and application of models for fish stock assessment in the tropical waters with special reference to multigear multispecies system.
2. Development of models incorporating environmental factors for assessing the status of fishery resources.

(a) Work done: Stock Assessment of penaeid prawns and cat fishes completed at important centres.

(b) Work envisaged: Development of models and applying the same to assess the stocks of commercially important groups.

---

11. Date of start: 1-1-1990 12. Likely date of completion: 31-12-1992

---

13. Estimated man-months: 5.4 Man months/Year

---

14. Facilities required :Nil

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

---

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

(a) Name of the financing organisation.

(b) Title of Project

---

16. Approximate cost:

(a)	Salary of Scientific staff	:	Rs. 41,040/-
(b)	Salary of technical staff	:	-
(c)	Salary of supporting staff	:	-
(d)	Casual labourer cost, if any	:	-
(e)	Cost of equipment, Facility etc.	:	-
(f)	Contingencies, such as chemicals, fertilisers, seeds, animals, feeds, sprayers etc.	:	Rs. 8,400/-
(g)	T.A.	:	-
	Total cost	:	Rs. 49,440/-

---

17. Signature of:

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

RESEARCH PROJECT - 1990-'91

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

3. Name and address of the Research Institute: C.M.F.R.Institute, Cochin-31

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

5. Title of Sub-Project: National Marine Living Resources Data Centre.

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

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

Centre	Name	Designation	Time to be spent (%)	Work to be done
Cochin	M.Srinath	Scientist(SG)	60	As per technical programme.
	K.Alagaraja	Principal Scientist	20	
	K.N.Kurup	Scientist(SG)	30	
	K.Balan	Scientist(SG)	40	
	K.S.Scariah	Scientist(SG)	20	
	K.Vijayalakshmi	Scientist	30	

Technical Assistance: Varughese Jacob, G.Krishnankutty Nair, V.P.Annam, P.Sivaraman, P.L.Ammini, K.C.Yohannan, S.Haja Najeemudeen, Joseph Andres, C.J.Prasad, P.Karunakaran Nair, P.P.Pavithran, M.B.Seynudeen, K.P.George, M.Ramachandran, K.Anandan, G.Subbaraman, P.T.Mani, M.R.Beena and Lata L.Khambadkar.

8. Location of the Research Project: Cochin

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

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

10. Technical Programme: 1) To develop suitable software 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.

(a) Work done: Software for storage and retrieval of information and for statistical analysis of data have been developed. Computer facility has been extensively used for data analysis ... retrieval and dissemination of information on marine fishery resources.

(b) Work envisaged: Software development, indepth analysis of data, storage and retrieval of information on marine fishery resources and dissemination to end users. Storage of data collected by other Divisions and computerisation of the same. ... [illegible].

11. Date of start: April 1985 12. Likely date of completion: March 1991

13. Estimated man-months : 57.4 Man months/Year

14. Facilities required : Nil

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

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

(a) Name of the financing organisation.

(b) Title of Project

16. Approximate cost:

(a)	Salary of Scientific staff	:	Rs. 1,44,360/-
(b)	Salary of technical staff	:	Rs. 3,00,000/-
(c)	Salary of supporting staff	:	-
(d)	Casual labourer cost, if any	:	-
(e)	Cost of equipment, facility etc.	:	Rs. 3,00,000/-* up-
(f)	Contingencies, such as chemicals, fertilisers, seeds, animals, feeds, sprayers etc.	:	Rs. 20,000/-grading the pre-
	Maintenance of the computer system:		Rs. 2,00,000/-sent system.
(g)	T.A.		
	Total cost	:	Rs. 9,64,360/-

17. Signature of:

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

RESEARCH PROJECT - 1990-'91

1. Institute Code No.FSS/FRA/1.18 2. I.C.A.R.Code No.

3. Name and address of Research Institute: C.M.F.R.Institute, Cochin-31

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

5. Title of Sub-Project: An appraisal on the present status of marine fishery resources of the maritime states.

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

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

Centre	Name	Designation	Time to be spent (%)	Work to be done
Cochin	K.Balan	Scientist (SG)	60	As per technical programme.
	K.Alagaraja,	Principal Scientist	20	
	K.N.Kurup.	Scientist (SG)	30	
	K.S.Scariah.	Scientist (SG)	20	
	M.Srinath.	Scientist (SG)	20	
	K.Vijayalakshmi.	Scientist	30	

Technical Assistance: V.Rajendran, Varughese Jacob, P.K.Mahadevan Pillai, G.Krishnankutty Nair, P.Sivaraman, V.P.Annam, K.C.Yohannan, P.Karunakaran Nair, Abhakant, Joseph Andrews, S.Haja Najeemudeen, C.J.Prasad and P.L.Ammini.

8. Location of the Research Project: Cochin

9. (a) Objectives: The project aims at indepth study on the marine fishery resources exploited from inshore waters of maritime states so as to understand the current status of the resources and suggest suitable strategies for exploitation.

(b) Practical Utility: Information on the current status of marine fishery resources such as current level of exploitation, effort input and other allied factors are essential tools for formulation of planning developmental programmes and rational management policies.

10. Technical Programme: The data collected through the sample survey on exploited marine fishery resources in the maritime states will be analysed so as to bring out the present status of the resources and variations over time and space.

Work done: The analysis of estimates on marine fish landings in respect of maritime states of the west coast for a period of 1984-1988 completed. Consolidation of data in respect of other states is in progress.

Work envisaged: Completion of analysis of estimates in respect of all maritime states and preparation of reports in respect of each state.

11. Date of start: January 1989. 12. Likely date of completion: March 1991

13. Estimated man-months: 15.2 Man-months/Year

14. Facilities required: Nil

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

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

16. Approximate cost:

(a)	Salary of scientific staff	:	Rs.1,30,440/-
(b)	Salary of technical staff	:	Rs. 90,800/-
(c)	Salary of supporting staff, if any.	:	-
(d)	Casual labour cost, if any	:	-
(e)	Cost of equipment, facility etc:		-
(f)	Contingencies	:	Rs. 25,200/-
(g)	Total cost	:	Rs.2,46,440/-

17. Signatures of:

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

RESEARCH PROJECT - 1990-'91

1. Institute Code No.FSS/FRA/1.19 2. I.C.A.R.Code No.

3. Name and address of Research Institute: C.M.F.R.Institute, Cochin-31

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

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

6. Name and designation of Project Leader: K.S.Scariah, Scientist (SG)

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

Centre	Name	Designation	Time to be spent (%)	Work to be done
Cochin	K.S.Scariah	Scientist (SG)	60	As per Colm 10
	K.Vijayalakshmi,	Scientist	40	

Technical Assistance: Varughese Jacob, G.Krishnankutty Nair, P.Sivaraman, V.P.Annam, K.C.Yohannan, P.Karunakaran Nair, Joseph Andrews, C.J.Prasad, S.Hajā.Najeemudeen and P.L.Ammini.

8. Location of the Research Project: Cochin

9. (a) Objectives:

The project aims at evaluating the changes that have taken place in the catch and composition of marine fishery resources in India vis-a-vis the technological changes that have taken place over the years.

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

10. Technical Programme: The data collected through the sample survey on exploited marine fishery resources in the maritime states during the last two decades will be critically studied.

11. Date of start: January 1989. 12. Likely date of completion: March 1992

13. Estimated man-months: 12 Man-months/Year

14. Facilities required: Nil

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

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

(a) Name of the financing organisation

(b) Title of Project

16. Approximate cost:

(a)	Salary of Scientific staff:	:	Rs.65,760/-
(b)	Salary of technical staff	:	Rs. 6,000/-
(c)	Salary of supporting staff, if any.	:	-
(d)	Casual labourer cost, if any	:	-
(e)	Cost of equipment, facility etc.	:	-
(f)	Contingencies, such as chemicals, fertilisers, seeds, animals, feeds, sprayers etc.	:	Rs.12,000/-
(g)	Total cost	:	Rs.83,760/-

17. Signatures of:

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

RESEARCH PROJECT 1990-91

1. Institute Code No. PF/IP/1 — 2. I.C.A.R. Code No.

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

4. Title of Project : Investigations on gill net fisheries

5. Title of Sub-Project :

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

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

Centre	Name	Designation	Division	Time to be spent (%)	Work to be done
Veraval	R.S. Lal Mohan	P.S.	DFD	50	1, 2 k, 3
	Alexander Kurian	S.G.	PFD	25	1, 2 i, 3, 6
	E. Vivekanandan	S.G.	DFD	~~25~~ 30	1, 2 l, 3
	K.P. Said Koya	S	PFD	50	1, 2 f & g, 3, 4
Bombay	M. Zaffar Khan	S.G.	PFD	30	1, 2 i, 3
	S.G. Raje	S.G.	DFD	25	1, 2 k & l, 3, 4, 6
Mangalore	P.P. Pillai	S.G.	PFD	~~30~~ 25	1, 2 e, f & h, 3, 4, 6
	P.U. Zachariah	S	DFD	25	1, 2 k & l, 3
	G.M. Kulkarni	S	PFD	30	1, 2 i, 3
	K. Sunil Kumar Mohammed	S	MFD	25	1, 2 g, 3
Calicut	M. Sivadas	S	PFD	25	1, 2 e, f & g, 3, 6
	M. Feroz Khan	S	DFD	25	1, 2 k & l, 3
Cochin	A. Noble (APL)	P.S.	PFD	25	1, 2 e, 3
	N.G.K. Pillai	S.G.	PFD	~~40~~ 50	1, 2 f, g & i, 3, 6
	N.G. Menon	S.G.	DFD	25	1, 2 k, 3
	S. Sivakami	S.G.	DFD	25	1, 2 h, 3
	Grace Mathew	S	DFD	25	1, 2 l, 3
Vizhinjam	G. Gopakumar	S.G.	PFD	25	1, 2 e, f, g & h, 3, 4, 6
	S. Lazarus	S.G.	DFD	50	1, 2 k & l, 3

Tuticorin	M. Mohammed Kasim	S.G.	PFD	~~40~~ 50	1, 2 f & g, 3, 4, 6
	V. Rangaswami	S	DFD	~~25~~ 50	1, 2 k, 3
	K.M. Ameer Hamsa	S.G.	DFD	50	1, 2 l, 3
Mandapam	A.A. Jayaprakash	S.G.	PFD	30	1, 2 e, f & g, 3, 4, 6
	P. Livingston	S.G.	DFD	25	1, 2 l, 3
	P. Jayasankar	S	DFD	25	1, 2 k, 3
Madras	R. Thiagarajan	S.G.	PFD	50	1, 2 f & g, 3,4, 6
	R. Devadoss	S.G.	DFD	25	1, 2 l, 3
	G. Mohanraj	S.G.	DFD	25	1, 2 k, 3
Visakha-patanam	G. Luther (PL)	P.S.	PFD	50	1, 2 e, 3, 6
	Y. Appanna Sastri	S.G.	DFD	~~25~~ 50	1, 2 k, 3, 4

Co-opted personnel

a) Tech.Prog. No. 5: V.V. Singh (FEMD, Bombay), M.P. Molly (FEMD, Mangalore) C.V. Mathew (FEMD, Calicut), M.S. Rajagopal (FEMD, Cochin), Rani Mary George (FEMD, Vizhinjam), C.P. Gopinath (FEMD, Turicorin), Rita Jayasankar (FEMD, Mandapam), K. Vijayakumaran (FEMD, Visakhapatnam).

b) Tech.Prog. No. 3 & 7: K.Vijayalakshmi (FRAD, Cochin)

c) Tech.Prog. No. 4: D.B.S. Sehara, K.K.P. Panikkar (FEED, Cochin)

Technical Assistance: H.K. Dhokia, B.P. Thumber (Veraval), J.D. Sarang (Bombay), Vaman Naik, S. Kemparaju (Mangalore), K.K.Balasubramanian, K. Nandakumar (Calicut), M.N.K. Elayathu, V.A. Narayanan Kutty, K. Balachandran, P.K. Sita, K.M. Venugopal (Cochin), P.S. Sharma, T.A. Omana, S.G. Vincent (Vizhinjam), G. Arumugham, R. Rajapaikam (Tuticorin), P. Ramadas, C. Manimaran (Madras), C.V. Sheshagiri Rao, M.S. Sumithrudu, P. Achayya (Visakhapatnam), M. Badrudin (Mandapam)

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

9. a) Objectives: 1. To assess the catch, effort and catch composition and population characteristics of the target species in the gill net fisheries. 2. To study the seasonal abundance and availability of the target species in relation to environmental and meteorological parameters. 3. To study the economics of gill net operation.

b) Practical Utility: Gill net fishing has become widely prevalent during the last two years bringing catches of high unit value fishes like seerfishes, tunas, pomfrets, carangids, catfishes and elasmobrachs. Of late, the use of OBM fitted crafts is on the increase. A study of this fishery will enable to understand the composition and abundance of the target groups along the Indian coasts and to obtain optimum yields.

10. Technical Programme: 1. Monitoring of depthwise catch, effort and species composition of the fish in the gill net (mesh size 45 mm and above). 2. Biological and population characteristics of the dominant species of the major groups: mackerels (e); tunas (f); seerfishes (g); carangids (h); pomfrets (i); catfishes (k); elasmobranchs (l). 3. Stock assessment of the dominant species of the groups under 'work to be done' (Item No. 7). 4. Collection and furnishing of the data on fishery economics. 5. Collection and furnishing of environmental data: (temperature, salinity, dissolved oxygen and plankton biomass) and meteorological data: (wind-force and direction, rainfall, atmospheric pressure and air temperature) of the fishing grounds. 6. Compilation of reports of the centre. 7. Furnishing of catch and effort data of the zone in respect of the total fishery of the gear.

Work done: Dominant species contributing to the gill net fishery have been identified and their seasonal catch rates have been studied. Biological studies on mackerels, tunas, seerfishes, carangids, pomfrets, catfishes and elasmobranchs have been carried out with special reference to their population characteristics. Economics of this fishery has been evaluated at selected centres.

Work envisaged: As per technical programme.

11. Date of start : 1989-90 12. Likely date of completion: 1991-1992

13. Estimated man-months/year : 115 months

14. Facilities required:

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

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

a) Name of financing organisation:

b) Title of Project :

16. Approximate cost:

a)	Salary of scientific staff	:	Rs.6,81,000
b)	Salary of technical staff	:	Rs.1,72,500
c)	Salary of supporting staff	:	-
d)	Casual labourer cost, if any	:	-
e)	Cost of equipment, facility etc.	:	-
f)	Contingencies, such as chemicals, fertilisers, seed, animals, feeds, sprayers etc.	:	Rs. 50,000
g)	T.A.	:	Rs. 50,000
h)	Total cost	:	Rs.9,53,500

17. Signature of:

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

RESEARCH PROJECT 1990-91

1. Institute code No. PF/IP/2 — 2. I.C.A.R code No.

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

4. Title of Project : Investigations on dol net fisheries

5. Title of Sub-project :

6. Name and Designation of Project Leader : Alexander Kurian, Scientist (SG)

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

Centre	Name	Desig-nation	Division	Time to be spent (%)	Work to be done
Veraval	Alexander Kurian (PL)	SG	PFD	50	1,2 i & j, 3,4
	K.K.Philipose	S	CFD	40	1,2 m, 3
	K.P.Said Koya	S	PFD	50	1,2 d & n,3
	S.Shanmugham	SG	CFD	50	1, 2, 3
Bombay	M.Zaffar Khan	SG	PFD	~~40~~ 30	1,2 d & j,3
	S.G.Raje	SG	DFD	25	1,2 k, 3, 4
	V.D.Deshmukh	SG	CFD	40	1,2 m, 3
	M.Aravindakshan	S	CFD	40	1, 2 m, 3
	S.K.Chakraborty	SG	DFD	30	1,2(sciaenids), 6

Co-opted personnel

a) Tech.Prog.No.3 & 6: K.Vijayalakshmi (FRAD, Cochin)
b) Tech.Prog.No.5: V.V.Singh (FEMD, Bombay)

Technical Assistance: H.K.Dhokia, B.P.Thumber (Veraval), J.D.Sarang, A.D.Sawant (Bombay)

8. Location of the Research Project : Veraval, Bombay

9 a) Objectives: 1. To study the dol net fishery with particular reference to catch, catch composition and destruction of young fish, 2. To study the seasonal abundance and availability of the target species in relation to environmental and meterological parameters. 3. To study the economics of dol net operation.

b) Practical Utility: The dol net fishery traditionally accounts for the largest segment of Bombay duck catches along with other constituents like Coilia, pomfrets, catfishes, sciaenids and crustaceans. The continuous monitoring of the Bombay duck fishery and the other resources caught by this gear is of vital importance.

10. Technical Programme: 1) Monitoring of depth-wise catch, effort and species composition of the fish in the gear with special reference to the juvenile component. 2) Biological and population characteristics of the dominant species of major groups: Coilia (d); pomfrets (i); Bombay duck (j); catfishes (k); crustaceans (m); young scombroids (n). 3. Stock assessment of the major species identified under 'work to be done' (Item No. 7) 4) Collection and furnishing of data on fishery economics. 5) Collection and furnishing of environmental data: (temperature, salinity, dissolved oxygen and plankton biomass) and mateorological data: (wind-force and direction, rainfall, atmospheric pressure and air temperature) of the fishing grounds. 6) Furnishing of catch and effort data of the zone.

Work done: Dominant species contributing to the dol net fishery have been identified, the seasonal catch rates of the fish in the gear have been studied. Biological studies on pomfrets, Bombay duck, Coilia, catfishes and crustaceans have been carried out with special reference to their population characteristics. Economics of this fishery has been evaluated.

Work envisaged: As per technical programme.

11. Date of start : 1989-90 12. Likely date of completion: 1991-92

13. Estimated man-months : 34 months

14. Facilities required:

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

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

a) Name of the financing organisation :

b) Title of the Project :

16. Approximate cost:

a)	Salary of scientific staff	: Rs.1,94,300
b)	Salary of technical staff	: Rs. 30,000
c)	Salary of supporting staff	: -
d)	Casual labourer cost, if any	: -
e)	Cost of equipment, facility etc.	: -
f)	Contingencies, such as chemicals, fertilisers, seed, animals, feeds, sprayers etc.	: Rs. 22,500
	TA/DA	: Rs. 30,000
g)	Total cost	: Rs.2,76,800

17. Signature of:

Sd/-
Project Leader

Sd/-
Head of Division

Sd/-
Director

RESEARCH PROJECT 1990-91

1. Institute Code No. PF/IP/3 — 2. I.C.A.R. Code No.

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

4. Title of the Project : Investigations on purse seine fishery and its impact on the resources

5. Title of the Sub-Project :

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

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

Centre	Name	Designation	Division	Time to be spent (%)	Work to be done
Karwar/ Goa	G.G.Annigiri(APL)	P.S.	PFD	50	1, 2.a, b, e & f, 3, 6
	V. Gandhi	S.G.	DFD	25	1, 2 k, 3, 4
Mangalore/ Malpe	P.P. Pillai	S.G.	PFD	~~40~~25	1, 2 e, f & h, 3, 6
	G.M. Kulkarni	S	PFD	10	1, 2 a, b & c, 3, 4
	P.U. Zachariah	S	DFD	25	1, 2 k, 3
Cochin	K.V. Narayana Rao (PL)	P.S.	PFD	50	1, 2 a & b, 3, 6
	A. Noble	P.S.	PFD	25	1,2 e, 3
	N.G.K. Pillai	S.G.	PFD	25	1, 2 f & i, 3
	Puthran Prathibha	S	PFD	25	1, 2 a, b & c, 3
	S. Sivakami	S.G.	DFD	25	1, 2 h, 3

Co-opted Personnel:

a) Tech.Prog. No. 3 & 7: K.N. Kurup (FRAD, Cochin)

b) Tech.Prog. No. 4: K.K.P. Panikkar, D.B.S. Sehara (FEED, Cochin)

c) Tech.Prog. No. 5: K. Krishna Kumar, (FEMD, Karwar), Molly M.P., (FEMD, Mangalore), M.S. Rajagopalan, (FEMD, Cochin)

Technical Assistance: N. Chenappa Gowda, V.M. Dhareshwar (Karwar), Alli C. Gupta, Uma S. Bhat, S. Kemparaju, Vaman Naik, C. Purandara (Mangalore), V.A. Narayanan Kutty, M. Abdul Nizar, M.N.K. Elayathu, P.K. Seetha (Cochin)

8. Location of the Research Project : Karwar, Mangalore, Cochin

9. a) Objectives: 1. To assess the impact of purse seine fishing on the resources of major target species. 2. To study the seasonal abundance and availability of the target species in relation to environmental and meteorological parameters. 3. To evaluate the economic efficiency of purse seining.

b) Practical Utility: The large scale introduction of purse seiners along Goa-Karnataka-Kerala coasts has posed questions as to the effect of fishing pressure on the target resources and also caused social conflicts. The study proposes to collect and analyse all relevant informations on resources, catch, effort and economics of purse-seine and artisanal fisheries for these resources to suggest appropriate management measures.

10. Technical Programme: 1. Monitoring of depth-wise catch, effort and species composition of the fish in the gear. 2. Biological and population characteristics of dominant species of the major groups: oil sardines(a), lesser sardines (b), white baits (c), mackerels (e), tunas (f), carangids (h), pomfrets (i), catfishes (k). 3. Stock assessment of the major species of the groups under 'work to be done' (Item No. 7). 4. Collection and furnishing of the data on fishery economics. 5. Collection and furnishing of environmental data : (temperature, salinity, dissolved oxygen and plankton biomass) and mateorological data: (wind-force and direction, rainfall, atmospheric pressure and air temperature) of the fishing grounds. 6. Compilation of reports of the centre. 7. Furnishing of catch and effort data of the zone.

Work done: Work on the identified species have been carried out as per the technical programme with special reference to population characteristics.

Work envisaged: As per the technical programme.

11. Date of start : 1989-90 12. Likely date of completion: 1991-92

13. Estimated man-months : 40 months

14. Facilities required:

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

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

a) Name of financing organisation :

b) Title of Project :

16. Approximate cost:

a)	Salary of scientific staff	:	Rs.2,81,800
b)	Salary of technical staff	:	Rs. 82,500
c)	Salary of supporting staff	:	-
d)	Casual labourer cost, if any	:	-
e)	Cost of equipment, facility etc.	:	-
f)	Contingencies such as chemicals, fertilisers, seed, animals	:	Rs. 50,000
g)	T.A.	:	Rs. 50,000
h)	Total cost	:	Rs.4,64,300

17. Signature of:

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

RESEARCH PROJECT 1990-91

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

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

4. Title of Project : Investigations on tuna fisheries and related aspects in Lakshadweep

5. Title of Sub-Project :

6. Name and Designation of Project Leader : T.M. Yohannan, Scientist SG

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

Centre	Name	Designation	Division	Time to be spent (%)	Work to be done
Minicoy	T.M. Yohannan(PL)	S.G.	PFD	50	1, 2, 4 & 5
	P. Kaladharan	S	FEMD	25	3

Co-opted Personnel:

Tech.Prog. No. 2: M. Srinath (FRAD, Cochin)

8. Location of the Research Project : Minicoy (Lakshadweep)

9. a) Objectives: 1. To study the resource characteristics especially the population parameters of tunas taken by pole and line, troll line and other gears. 2. To study the seasonal abundance and availability of tunas in relation to environmental and meteorological parameters. 3. To study the resource characteristics of tuna baitfishes, their recruitment pattern, seasonal availability and mortality on capture and during transportation.

b) Practical Utility: As against an estimated potential of about 50,000 tonnes of tunas around Lakshadweep, only about 6000 tonnes are exploited at present. The success of tuna fishery around the islands depends chiefly on factors such as hydrographic and meteorological conditions in the tuna fishing grounds and lagoons, availability of live-bait resources, ecological conditions of coral reefs and the associated fauna and flora.

10. Technical Programme: 1. Collection of data on catch, effort and species composition of tunas and related fishes in the pole and line fishery and troll line fishery. 2. Study of population characteristics and stock assessment of selected species. 3. Collection and analyses of hydro-biological parameters such as temperature, salinity, dissolved oxygen, plankton biomass and meteorological parameters such as wind force, wind direction, rainfall, surface atmospheric pressure and air temperature in relation to tuna catch. 4. Collection of data on the baitfish resources, their fishery and seasonal abundance, and recruitment pattern of different baitfish species in relation to environmental characteristics. 5. Correlation and interlinkage of the above parameters to understand the influence of the above factors on the tuna and baitfish resources and their fisheries.

Work done: Scientific information available on the stock structure of tunas and trend of tuna fishery by pole and line and troll line gears have been updated. Data collected on the economics of tuna fishery and utilisation of tunas at Minicoy and Agatti islands in Lakshadweep during 1986-89 were studied. Results of aimed surveys conducted on the live-bait resources of the Lakshadweep Islands during the pre-monsoon and post-monsoon seasons of 1987-88 were documented. An atlas of species-wise distribution of baitfishes was prepared. Landings of skipjack and yellowfin tunas by pole and line and troll line gears were studied in relation to some meteorological parameters.

Work Envisaged: As per technical programme.

11. Date of start : 1989-90 12. Likely date of completion: 1991-92

13. Estimated man-months : 12 months

14. Facilities required:

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

15. If financed by an organisation other than the Institute : No
   a) Name of the financing organisation :
   b) Title of Project :

16. Approximate cost:

a)	Salary of scientific staff	: Rs.	71,300
b)	Salary of technical staff	:	-
c)	Salary of supporting staff	:	-
d)	Casual labourer cost, if any	: Rs.	7,000
e)	Cost of equipment, facility etc.	:	-
f)	Contingencies, such as chemicals, fertilisers, seed, animals, feed, sprayers etc.	: Rs.	40,000
g)	TA/DA	: Rs.	5,000
	Total cost	: Rs.	1,23,300

17. Signature of:

Sd/-
Project Leader

Sd/-
Head of Division

Sd/-
Director

RESEARCH PROJECT - 1990-91

1. Institute Code No. PF/IP/5 2. I.C.A.R. Code No.

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

4. Title of Project : Tagging of commercial species of fish and shellfish

5. Title of Sub-Project : Population studies by tagging of oil sardine, mackerel, catfish and other fin fishes of importance, prawns and molluscs

6. Name and Designation of Project Leader : S. Reuben, Scientist (SG)

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

Centre	Name	Designation	Division	Time to be spent (%)	Work to be done
Mangalore	K.K. Sukumaran	S.G.	CFD	25	2, 4
Calicut	M. Sivadas	S	PFD	25	2, 4
Cochin	N.G. Menon	S.G.	DFD	25	1, 2, 4
Vizhinjam	G. Gopakumar	S.G.	PFD	25	2, 4
Tuticorin	K. Ramados	S.G.	MFD	25	3, 4
Mandapam	A.P. Lipton	S.G.	MFD	25	3, 4
Madras	P. Devadoss	S.G.	~~MFD~~ PFD	25	2, 4
Visakha-patanam	S. Reuben (PL)	S.G.	PFD	50	2, 4

Note:- Officers-in-charge of the Research Centres will prepare a roster of participants from time to time and all scientists and technical assistants will participate by rotation irrespective of their division. Institute's boat at each research centre may be provided whenever required for tagging programme.

8. Location of the Research Project : Mangalore, Calicut, Cochin, Vizhinjam, Tuticorin, Mandapam, Madras, Visakha-patanam.

9. a) Objectives: Study the growth and migration of the species concerned.

b) Practical Utility: Knowledge on growth, migration and population structure, aids in the management of the resource.

10. Technical Programme: 1. Procurement and supply of tags. 2. Tagging of available commercial fin fishes and prawns. 3. Tagging of molluscs. 4. Procure and distribute propaganda material and carry out recovery programmes.

11. Date of start : 1989-90 12. Likely date of completion: 1990-91

13. Estimated man-months : 21 months

14. Facilities required:

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

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

a) Name of financing organisation:

b) Title of Project :

16. Approximate cost:

a)	Salary of scientific staff	: Rs.1,32,000
b)	Salary of technical staff	: Rs. -
c)	Salary of supporting staff	: " -
d)	Casual labourer cost, if any	: " -
e)	Cost of equipment, facility etc.	: Rs. 10,000
f)	Contingencies, such as chemicals, fertilisers, seed, animals, feeds sprayers, etc.	: Rs.10,00,000
g)	TA/DA	: Rs. 50,000
	Total cost	: Rs.11,92,000

17. Signature of:

Sd/-
Project Leader

Sd/-
Head of Division

Sd/-
Director

RESEARCH PROJECT - 1990-91

1. Institute Code No. PF/IP/6 — 2. I.C.A.R. Code No.

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

4. Title of Project : Atlases of marine resources

5. Title of Sub-Project : Atlases of marine finfishes and shell fishes

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

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

Centre	Name	Designation	Division	Time to be spent (%)	Work to be done
Cochin	A. Noble (PL)	P.S.	PFD	25	a
	N.G. Menon	S.G.	DFD	25	b
	C. Suseelan	S.G.	CFD	25	c
	K. Prabhakaran Nair	S.G.	MFD	25	d

Technical Assistance: M.A. Nizar, K. Balachandran, P.K. Baby, Mathew Joseph

8. Location of the Research Project : Cochin

9. a) Objectives: Information on the distribution, abundance and biological characteristics of the various commercially important finfishes and shellfishes is scattered and mostly inaccessible. This project aims at furnishing synoptic pictures of the foregoing aspects in the form of atlases.

b) Practical Utility: The Atlas will be useful to the fishing industry as a baseline reference to work on the spatial/seasonal distribution and abundance of commercially important finfishes and shellfishes of the seas around India for better exploitation.

10. Technical Programme: . Information on distribution, biology, fishery, exploitation, utilisation, economics of the common species of finfishes and shellfishes will be collected and depicted in the form of synoptic illustrations: a) mackerels, b) catfishes, c) prawns and lobsters, d) cephalopods

11. Date of start : 1989-90 — 12. Likely date of completion: 1990-91

13. Estimated man-months : 12 months

14. Facilities required:

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

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

a) Name of the financing organisation :
b) Title of the Project :

16. Approximate cost:

a)	Salary of scientific staff	: Rs.	76,300
b)	Salary of technical staff	: Rs.	30,000
c)	Salary of supporting staff	:	-
d)	Artists support (for making 400 charts in colour at Rs.150/- per chart)	: Rs.	60,000
e)	Drawing equipments	: Rs.	8,000
f)	Contingencies (Purchase of paper, ink (colour) printing 500 copies each	: Rs.	800,000
g)	T.A.	: Rs.	5,000
	Total	: Rs.	16,66,000

17. Signature of:

Sd/-
Project Leader

Sd/-
Head of Division

Sd/-
Director

RESEARCH PROJECT 1990-91

1. Institute Code No.DF/IP/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 resource exploited by small mechanised trawlers (14 M and below)

5. Title of Sub-project

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

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

Centre	Name	Designation	Time to be spent (%)	Work to be done	
Veraval	R.S.Lal Mohan (DFD)	P.S.	50	1,3,4	Sciaenids Catfish
	Alexander Kurian (PFD)	S.(SG)	25	1,3,4	Pomfret & Ribbonfish
	E.Vivekanandan (DFD)	S.(SG)	70	1,3,4	Elasmo-branch, Lizardfish Threadfin breams
	K.K.Philippose (CFD)	S	60	1,3,4	Prawn, Lobster & Crab
	S.Shanmugham (CFD)	S.(SG)	50	1,3,4,	Prawn, Lobster & Crab
Bombay	M.Zafar Khan (PFD)	S	40	1,3,4	Pomfret, Ribbonfish Coilia
	S.G.Raje (DFD)	S.(SG)	50	1,3,4	Catfish, Elasmo-branch, Lizardfish
	S.K.Chakraborty (DFD)	S.(SG)	70	1,3,4	Perch, Sciaenids threadfin breams
	P.V.Kagwade (CFD)	PS	100	1,3,4	Lobster

Centre	Name	Desig-nation	Time to be spent (%)	Work to be done	
Bombay	M.Aravindakshan(CFD)	S.	60	1,3,4	Prawns
	V.D. Deshmukh(CFD)	S.(SG)	60	1,3,4	Prawns & Crab
	Kuber Vidyasagar(MFD)	S.(SG)	100	1,3,4	Cephalopods
	K.S. Sundaram(MFD)	S.(SG)	100	1,3,4	Cephalopods
Karwar	V. Gandhi (DFD)	S.(SG)	75	1,3,4	Catfish Sciaenids & Pomfrets
	V.S. Kakati(CFD)	S.(SG)	50	1,3,4	Prawns
	P.K. Ashokan(MFD)	S.	25	1,3,4	Cephalopods
Mangalore	P.U. Zacharia(DFD)	S.	50	1,3,4	Catfish, threadfin bream & Lizardfish
	G.M. Kulkarni(PFD)	S.	30	1,3,4	Stolephorus
	P.P.Pillai (PFD)	S.(SG)	30	1,3,4	Carangids
	K.K.Sukumaran(CFD)	S.(SG)	60	1,3,4	Prawns, Crabs
	S.K. Mohamed (MFD)	S.	25	1,3,4	Cephalopods
Calicut	M.Sivadas (PFD)	S.	30	1,3,4	Ribbonfish, Stolephorus & Carangids
	M. Kumaran (PFD)	P.S.	50	1,3,4	Pomfrets
	M. Feroz Khan (DFD)	S.	50	1,3,4	Catfish, Elasmobranchs & Flatfishes
	P.T. Sarada(CFD)	S.	75	1,3,4	Prawns, crabs
	G.P.K. Achary (MFD)	S.(SG)	25	1,3,4	Cephalopods
Cochin	Prathiba Puthran(PFD)	S.	25	1,3,4	Stolephorus
	S. Sivakami (DFD)	S.(SG)	25	1,3,4	Carangids Barracudas
	N.G.Menon (DFD)	S.(SG)	25	1,3,4	Catfish, Priacanthus
	K.V.S. Nair (DFD)	S.(SG)	50	1,3,4	Sciaenids, Threadfin breams, Lizardfish
	Grace Mathew (DFD)	S.	50	1,3,4	Perches, Flatfishes, Elasmobranchs
	C. Suseelan (CFD)	S.(SG)	25	10	Prawns
	G. Nandakumar (CFD)	S.(SG)	50	1,3,4	Prawns
	K.N.Rajan (CFD)	S.	50	1,3,4	Prawns

Centre	Name	Designation	Time to be spent (%)	Work to be done
Cochin	P.E.Sampson Manickam(CFD)	S.(SG)	60	9 prawns
	N.S.Kurup (CFD)	S.(SG)	50	1,3,4 Prawns
	K.R. Manmadan Nair(CFD)	S.(SG)	40	1,3,4 Crabs
	V. Kripa(MFD)	S.	50	1,3,4 Cephalopods
	K. Alagaraja (FRAD)	P.S.	30	1,2,4, 6 & 7
Tuticorin	P. Sam Bennet (PFD)	S.(SG)	50	1,3,4 Ribbon fish, Stolephorus
	K.M. Ameer Hamsa(DFD)	S.(SG)	50	1,3,4 Perches Threadfinbreams
	V.S.Rengaswami(DFD)	S.	50	1,3,4 Sciaenids, Silverbellies, Catfishes
	M. Rajamani(CFD)	S.(SG)	50	1,3,4 Prawns
	D.Sivalingam (MFD)	S.	25	1,3,4 Cephalopods
	Mohamed Kasim (PFD)	S.(SG)	30	1,3,4 Seerfish
Mandapam	A.A.Jayaprakash (PFD)	S.(SG)	30	1,3,4 Carangids
	P. Livingston (DFD)	S.(SG)	70	Silverbellies Elasmobranchs
	P. Jayasankar(DFD)	S.	25	1,3,4 Catfish Flat fish
	G. Maheswarudu (CFD)	S.(SG)	25	1,3,4 Prawns, Crabs, Lobsters
	A.P. Lipton (MFD)	S.(SG)	25	1,3,4 Cephalopods
Madras	R. Thiagarajan(PFD)	S.	50	1,3,4 Ribbonfishes
	N.S. Radhakrishnan (PFD)	S.(SG)	40	1,3,4 Stolephorus, Carangids
	S. Srinivasarangan(DFD)	S.(SG)	70	1,3,4 Silverbellies

Centre	Name	Designation	Time to be spent (%)	Work to be done
Madras	P.Devadoss (DFD)	S.(SG)	50	1,3,4 Sciaenids, Elasmobranchs
	J.C. Gnanamuthu (DFD)	S.(SG)	75	1,3,4 Lizard fish, oil sardine
	G.Mohanraj (DFD)	S.(SG)	50	Catfish, Thread-finbreams
	M.M. Meiyappan (MFD)	S.(SG)	50	1,3,4 Cephalopods
Kakinada	P.N.R. Nair (PFD)	S.(SG)	75	1,3,4 Ribbonfish, Mackerel, Carangids
	V.S.R. Murty (DFD)	S.(SG)	100	1,3,4 Silver bellies, Thread fin breams
	V.Thangaraj Subramanian (CFD)	S.(SG)	70	1,3,4 Prawn
	G. Syda Rao (MFD)	S.(SG)	33	1,3,4 Cephalopods
Visakha-patnam	S.Reuben (PFD)	S.(SG)	25	1,3,4 Ribbonfishes
	Y.Appanna Sastry (DFD)	S.(SG)	50	1,3,4 Silverbellies, Catfish
	T. Appa Rao (DFD)	P.S.	100	1,3,4 Sciaenids, Threadfin breams, Lizard fishes
	G.Sudhakara Rao (CFD)	S.(SG)	35	1,3,4 Prawns
	G.Radhakrishnan (MFD)	S	100	1,3,4 Cephalopods

Co-opted personnel:

V.V.Singh, S4 (FEMD) - Bombay - Technical Programme, 5

Krishnakumar, S (FEMD) - Karwar - Technical programme, 5

M.S.Rajagopalan, P.S.(FEMD) - Cochin - Tech. Programme, 5

D.B. Sehara, P.S. (FEED) - Cochin - Technical programme, 8
K.K.P. Panikkar, S.(SG) (FEED), Cochin - Tech. programme, 8
K.S. Scariah, S.(SG) (FRAD) - Cochin - Technical prog. 1,2,4,6 & 7
C.P.Gopinathan, S.(SG) (FEMD) - Tuticorin - Tech.prog. 5
K.J.Girijavallabhan, S.(SG) (FEMD) - Madras - Tech. prog. 5
K. Vijayakumar, S. (FEMD) - Visakhapatnam - Tech. prog. 5

Technical Assistance: Veraval: M.K. Dokia (DFD), P.B. Thumber (CFD), Bombay: B.B. Chavan (DFD), A.Y. Mestry (CFD), A.D. Sawant (CFD), J.D. Sarang (PFD), Karwar: C.K. Dinesh (CFD), M.M. Bhaskaran (MFD), N. Chennappa Gowda (PFD), Mangalore: Y. Muniappa (DFD), O. Tippaswamy (CFD), Ali C. Gupta (DFD), G. Subramaniya Bhatt (FEMD), D.Nagaraj (MFD), R.A. Naik (PFD), C.Purandara (PFD), Calicut: K. Nandakumar (DFD), K.P. Viswanathan (FEMD), K. Kaumudi Menon (CFD), S. Lakshmi (CFD), V.K. Janaki, V.C. Surandranathan (MFD), K.K. Balasubramanian (PFD), Cochin: R.Reghu (DFD), K. Balachandran (DFD), J. Narayanaswamy (DFD), K.M. Venugopalan (DFD), P.K. Seetha (DFD), C. Nalini (CFD), K. Chellappan (CFD), K.N. Gopalakrishnan (CFD), P.K. Baby (CFD), Khambadkar (FEMD), Mathew Joseph (MFD), A. Kanakam (FEMD), K.P. Salini (FEED), V.A. Narayanan Kutty (PFD), M.N. Kesavan Elayathu (PFD), V.R. Arunachalam (PFD), Tuticorin: R. Rajapackiam (DFD), M. Enose (MFD), J.X. Rodrigo (FEMD), M. Manikaraja (CFD), C. Arumugam (PFD) H. Salvaraj, Mandapam: M. Muniyandi, R. Thillairajan (MFD), M. Baddruddin (DFD), Madras: P. Ramdoss (DFD), S.K. Balakumar (DFD), L. Jayasankar (FEMD), A. Mohan (CFD), P. Thirumilu (CFD), G.Srinivasan (MFD), R. Mohan (PFD), A. Bastein Fernando (FEED), Kakinada: N. Burayya (MFD), P. Ramalingam (DFD), K. Dhanaraju (CFD), Visakhapatnam: K. Narayana Rao (DFD), M. Prasada Rao (MFD), J.S. Verma (CFD), M.V. Somaraju (PFD).

In addition to the above, the staff of the FRA Division will collect data on catch and effort at the respective centres.

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

---

9. a) Objectives: To assess the effect of trawling on the resources and to understand the relationship between environment and fishery resources.

b) Practical Utility: To study helps in regulation of 1) Efforts and mesh size of small commercial trawlers in the presently trawled areas and also to advise the Govt. and the industry on the MSY of important resources. 2) The project helps in prediction of availability of resources in space and time.

---

10. Technical programme: 1) Collection and analysis of catch effort and species composition of groups proposed to be studied by DFD, PFD, CFD, MFD and FRAD 2) Collection of mesh size data (FRAD) 3) Collection and analysis of data on various aspects of biology of dominant groups such as perches, sciaenid, silverbellies, catfish, threadfin breams, Elasmobranchs, Lizardfish, Flat fish, Pomfrets, Ribbon fish, Stolephorus, Carangids, Prawns, Lobsters, Crabs and Cephalopods 4) Analysis of data for stock assessment (DFD), PFD, CFD, MFD, FRAD 5) Collection and analysis of data on environmental parameters including study of benthos (FEMD) 6) To provide estimated effort and catch compositions of the resources and to estimate the length composition of the species for the maritime States. (FRAD) 7) To provide sampling methodology for collection of length frequency data (FRAD) after examining the suitability of such methodology for different centres (PFD, DFD, CFD, MFD) 8) Economics of trawl operations (FEED) 9) Study of the ecology of shrimp trawling grounds off Cochin 10) Study of the abundance and population characteristics of prawn in the trawling grounds by experimental shrimp trawling using 'Cadalmin'.

11. Date of start : 1989 12. Likely date of completion: 1992

13. Estimated man-months: 378 man-months/year

14. Facilities required:

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

NB: Shrimp and fish trawl when they are in significant numbers will be treated separately.

16. Approximate cost;

a) Salary of scientific staff	Rs.	18,40,000
b) Salary of Technical staff	Rs.	8,40,000
c) Salary of Supporting staff	Rs.	
d) Casual Labour cost, if any		
e) Cost of equipment, facility etc.		
f) Contingencies, such as chemicals, fertilizers, seed, animals, feed, sprayers etc.		
g) T.A. and D.A.	Rs.	92,000
h) Total cost	Rs.	29,22,000

17. Signatures of :

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

RESEARCH PROJECT 1990-91

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

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

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

5. Title of Sub-Project : Investigation on the Finfish and shellfish resources

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

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

Centre	Name	Designation	Time to be spent (%)	Work to be done
Cochin	P. Bensam	P.S.	25	Non conventional Resources
	S. Sivakami	S.(S.G)	25	Carangids
	N.G. Menon	S.(S.G)	Co-opted	Priacanthus, catfishes
	K.V.S. Nair	S.(S.G)	25	Nemipterids, Sciaenids
	N.G.K.Pillai	S.(S.G)	25	Pelagic Resources
	Prathiba Puthran	S.	25	Pelagic Resources
	K. Prabhakaran Nair	S.(S.G)	25	Cephalopods
	C.Suseelan	S.(S.G)	25	Crustaceans
	Manmadan Nair	S.(S.G)	25	Crustaceans
	K.N. Rajan	S.(S.G)	25	"
	Grace Mathew	S.	25	Perch,Elasmo.

Technical Assistants: J. Narayanaswamy, K. Chellappan, C. Nalini, R. Reghu, K. Balachandran, K.M. Venugopalan, Mathew Joseph, P.K. Seecha, M.A. Nizar, V.R. Arunachalam.

8. Location of the Research Project : Cochin

9. (a) Objectives: To study the availability, distribution pattern and relative abundance of different resources in Indian EEZ, based on the experimental operations of FORV Sagar Sampada.

(b) Practical Utility: The project will throw light on the existence and characteristics of non-conventional resources to enable their exploitation in future.

---

10. Technical programme: 1) Analysis of the catch and effort data and biological studies of fish, crustaceans and cephalopods. 2) Charting of the distribution and relative abundance of the major resources in space and time and correlating them with environmental parameters. 3) Analysis of the samples brought ashore.

---

11. Date of start : 1989 12. Likely date of completion: 1992

---

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

---

14. Facilities required:

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

---

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

a) Name of financing organisation
b) Title of project

---

16. Approximate cost:

a)	Salary of Scientific staff	Rs.	1,62,000
b)	Salary of Technical staff	Rs.	1,00,000
c)	Salary of Supporting staff	Rs.	
d)	Casual labour cost, if any		
e)	Cost of equipment, facility etc.		
f)	Contingencies, such as chemicals, fertilisers, seed, animals, feeds, sprayers, etc.	Rs.	5,000
g)	T.A.	Rs.	
h)	Total	Rs.	2,67,000

---

17. Signatures of:

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

RESEARCH PROJECT - 1990-91

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

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

4. Title of the Project : Studies on artificial reef

5. Title of Sub-project :

6. Name and designation of Project Leader : Dr. P.S.B.R. James, Director

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

Centre	Name	Designation	Time to be spent (%)	Work to be done
Tuticorin	M. Rajamani	S.(S.G)	25	2-4
Vizhinjam	S. Lazarus	S.(S.G)	50	2-4
Cochin	P.S.B.R. James	Director	25	4
Minicoy	T.M.Yohanan	S.(S.G)	50	2-4
	Pon Siraimeetan	S.(S.G)	25	1

Technical Assistance: M. Manikaraja, A. Dasman Fernando (Tuticorin) & K.K. Kunji Koya (Minicoy) and A.K. Velayudhan (Vizhinjam).

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

9. a) Objectives: 1) To monitor the existing man made reef ecology. 2) To study the fauna associated with these reefs 3) To evaluate the apparent preference for different reef materials by the fishes/crustaceans and molluscs. 4) Study of the resources abundance and seasonal trends and exploitation. 5) To study the use of waste products as reef building materials. 6) Survey of new prospective grounds for artificial reef construction.

b) Practical Utility: It is a new field attracting lot of scientific interest. Experimental attempts were made by many developed countries by dumping countless tonnes of waste materials at selected locations for the construction of artificial reef with fascinating results in fish production and for recreational means.

10. Technical programme: 1) Collection of environmental and benthic information (FEMD). 2) Study of the biology of reef population 3) Experimental use of different waste/discarded materials for preference study for fishes. 4) Study on suitable gears for exploitation.

a) Work done: Artificial reefs have been constructed at few location and general monitoring is taken up.

b) Work envisaged: As in Technical programme 1 - 4.

---

11. Date of start : 1989 12. Likely date of completion : 1992

---

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

---

14. Facilities required:

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

---

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

a) Name of financing organisation
b) Title of project

---

16. Approximate cost :

a)	Salary of Scientific staff	Rs.	80,000
b)	Salary of Technical staff	Rs.	40,000
c)	Salary of Supporting staff		
d)	Casual labour cost, if any		
e)	Cost of equipment, facility etc.	Rs.	20,000
f)	Contingencies, such as chemicals, fertilisers, seed, animals, feeds, sprayers, etc.	Rs.	10,000
g)	T.A		12,000
h)	Total cost	Rs.	1,62,000

---

17. Signatures of :

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

RESEARCH PROJECT - 1990-91

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 :	Fin Fish seed production
5. Title of Sub-project :	Induced breeding and seed production of seabass.
6. Name and Designation of Project Leader :	Dr. P. Nammalwar, Scientist (SG)

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

Centre	Name	Designation	Time to be spent (%)	Work to be done
Mandapam	R. Marichamy	S. (S.G)	75	i - vii
	P. Nammalwar	S. (S.G)	100	i - vii
	A. Raju	S. (S.G)	100	i - vii
	P. Jayasankar	S.	50	i - vii

Technical Assistance: M.R. Arputharaj

8. Location of the Research Project : Mandapam

9. a) Objectives: To produce the seeds of the seabass by induced breeding so as to pave the way for commercial culture.

   b) Practical Utility: Seabass is a prime quality fish successfully bred and cultured in Thailand, Singapore and Philippines. Successful breeding would go a long way for providing the seeds of this fish for commercial culture.

10. Technical Programme: (i) Collection of mature specimens/ spawners and maintenance of brood stock in ponds and net cages; (ii) Establishment of infrastructure facilities for induced breeding, larval rearing and nurseries, including sea water supply, water aeration etc. (iii) Establishment of larval food facilities (rotifers, Cladocera, Artemia) and microalgal food for the larval feed; (iv) Induced breeding experiments; (v) Larval rearing and feeding in indoor tanks;

(vi) Nursery rearing and feeding in indoor and outdoor tanks; (vii) Fingerling rearing and feeding.

---

11. Date of Start : 1990 — 12. Likely date of completion: 1993

---

13. Estimated man-months : 36 man months/year

---

14. Facilities required:

i) Land - water area: 1.5 ha
ii) Labour-6 for 3 years
iii) Special equipment, Battery operated aerators - 30 Nos.
iv) Animal Shed - Wet Laboratory 20 m x 20 m - 3 Nos.
v) Fish ponds - 9 Nos
vi) Foreign exchange:
vii) Other items; Logs, nets, floats, anchors
viii) Total estimated cost: Rs.4,05,000

---

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

a) Name of financing organisation:
b) Title of Project :

---

16. Approximate cost:

a) Salary of Scientific staff	Rs.	1,90,000
b) Salary of Technical staff	Rs.	90,000
c) Salary of Supporting staff	Rs.	50,000
d) Casual Labour cost, if any	Rs.	30,000
e) Cost of equipment, facility etc.		30,000
f) Contingencies, such as chemicals, fertilisers, seed, animals, feeds, sprayers etc.	Rs.	5,000
g) T.A.	Rs.	10,000
h) Total cost	Rs.	4,05,000

---

17. Signatures of :

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

RESEARCH PROJECT - 1990-91

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

3. Name and address of Research Institute : CMFR Institute, Cochin - 31.

4. Title of Project : Soil and water management in fish culture ponds

5. Title of Sub-project :

6. Name and Designation of project Leader : R. Marichamy, Principal Scientist

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

Centre	Name	Designation	Time to be spent (%)	Work to be done
Mandapam	R. Marichamy	P.S	25	1-6
	B.S. Ramachandradu	(T-7)	70	1-6

Technical Assistance: P. Thankappan (Mandapam)

8. Location of the Research Project : Mandapam

9. (a) Objectives: To study the soil and water management problems, such as seepage, sedimentation etc. in culture ponds, and to devise suitable techniques to tackle these problems. 2) To develop suitable models to study soil and water characteristics relationships in culture systems. 3) To develop artificial devices for aerating the culture ponds.

(b) Practical Utility : 1) Development and application of suitable techniques to combact excessive seepage loss and siltation would help farmers to minimise the cost of water supply and desilting respectively in culture ponds. Soil and water characteristics study will help in better soil and water management to increase fish production. 2) Artificial aeration will enable intensive culture leading to enhance production.

10. Technical Programme: 1) Observation on daily loss of water due to seepage in earthen ponds. 2) Periodical monitoring of silt deposition in culture ponds. 3) Application of techniques to reduce seepage loss and comparison between them.

4) Monitoring of soil and water characteristics. 5) Development of mathematical relationships based on the data obtained on soil and water characteristics over time period. 6) Study the soil erosion of farm bunds and suggest measures for arresting the same.

11. Date of start : 1989

12. Likely date of completion : 1992

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

14. Facilities required :

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

15. If financed by an organisation other than the Institute

a) Name of financing organisation

b) Title of Project

16. Approximate cost :

a)	Salary of Scientific staff	Rs. 20,000
b)	Salary of Technical staff	Rs. 90,000
c)	Salary of Supporting staff	Rs. 14,000
d)	Casual labour cost if any	Rs. 5,000
e)	Cost of equipment, facility etc.	50,000
f)	Contingencies, such as chemicals, fertilisers, seed animals, feeds, sprayers, etc.	Rs. 5,000
g)	T.A.	Rs.
h)	Total	Rs. 1,84,000

17. Signatures of :

Sd/-
Project Leader

Sd/-
Head of Division

Sd/-
Director

RESEARCH PROJECT - 1990-91

1. Institute code No.CF/IP/1 — 2. I.C.A.R. Code No.

3. Name and address of Research Institute : C.M.F.R.Institute, Cochin-31.

4. Title of Project : Investigations on the artisanal fisheries

5. Title of Sub-project : Nil

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

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

Centre	Name	Designation	Time to be spent (%)	Work to be done (T.P.)
Karwar	V.S.Kakati (CFD)	SG	~~25~~ 50	ii(prawns),v,vi,vii
	G.G.Annigeri (PFD)	SG	50	ii(mackerel, oil sardine, lesser sardine and tunas), v,vi,viii
	P.K.Ashokan (MFD)	S	25	ii(cephalopods), v, vi,viii.
Mangalore	K.K.Sukumaran (CFD)	SG	~~30~~25	ii(prawn & crabs), iii,v,vi,viii.
Calicut	P.T.Sarada (CFD)	S	25	ii(prawn & crabs), iii,v,vi,viii.
	M.Sivadas (PFD)	S	~~30~~ 25	ii(mackerel),v,vi, viii.
	M.Kumaran (PFD)	PS	~~30~~50	ii(oil sardine, pomfrets),v,vi,viii.
	M.Feroz Khan (DFD)	S	25	ii(catfish,flatfish) v,vi,viii.
Cochin	G.Nandakumar (CFD)	SG	25	iii,v,vi,viii
	K.N.Rajan (CFD)	SG	25	ii(prawn),v,vi,viii
	N.S.Kurup (CFD)	SG	50	ii(prawn),v,vi,viii
	K.V.Narayana Rao(PFD)	PS	50	ii(oil sardine),v, vi,viii
	Prathibha Puthran (PFD)	S	25	ii(oil sardine & Stolephorus),v,vi, viii.

D.B.S.Sehara, SG (FEED) - Cochin	T.P. vii & viii
K.K.P.Panikkar, SG (FEED) - Cochin	-do-
P.A.Thomas, SG (FEMD) - Vizhinjam	T.P.iv & viii
C.P.Gopinathan,SG (FEMD) - Tuticorin	-do-
Rita Jayasankar, S (FEMD) - Mandapam	-do-
K.G.Girijavallabhan, SG (FEMD) - Madras	-do-
S.Krishna Pillay, S (FEMD) - Kakinada	-do-
K.Vijayakumaran, S (FEMD) - Visakhapatnam	-do-

Technical Assistance: V.M.Dhaneswar, C.K.Dinesh, M.M.Bhaskaran (Karwar), Y.Muniyappa, R.Appaya Naik, G.Subramanya Bhat (Mangalore), V.K.Janaki, S.Lakshmi, K.Koumudi Menon, K.Nandakumar, K.P.Viswanathan, Swarnalatha (Calicut), K.N.Gopalakrishnan, C. Nalini, K. Chellappan, P.K.Baby, M.A.Nizar, V.R.Arunachalam, R.Reghu, K. Kanakkan, K.P.Salini, K.Pushkaran (Cochin), S.Sasidharan Pillai, A.R.Velayudhan, T.A.Omana, R.Vasanthakumar (Vizhinjam), G.Arumukham, M.Manickaraja, R.Rajapackiam, J.X.Rodrigo(Tuticorin), M.Badrudin, M.Selvaraj (Mandapam), A.Bastian Fernando, S.Mohan, P.Thirumilu, S,Chandrasekhar, P.Ramadoss, G.Sreenivasan, L.Jayasankar (Madras), P.Ramalingam, K.Dhanaraju,(Kakinada), J.B.Varma, M.S.Sumithrudu, M.V.Somaraju, P.Achayya (Visakhapatnam).

---

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

9(a): Objectives

i. To assess the magnitude of the artisanal fishery of the coastal waters and contiguous estuarine areas and to understand the population characteristics of the constituent species.

ii. To study the changes in the fishery of the coastal zone as a result of the introduction of nonconventional gears and mechanisation of country crafts.

iii. To study the impact of trawling/purse seining on artisanal fisheries.

iv. To find out the possibility of using juvenile abundance in nursery areas as an index for fishery forecasts.

v. To study the effect of environmental factors on the coastal fish stocks.

vi. To study the economics of operations of major indigenous gears.

vii. To estimate the mean sustainable yield of different species, groups.

(b) Practical utility:

Majority of the traditional fishermen continue to be below the poverty line and depend solely on the coastal fish resources exploited by indigenous gears for their livelyhood. Introduction of modern fishing methods like trawling, purse seining and other nonconventional gears is affecting the artisanal fishery causing socio-economic problems. The present project will provide necessary scientific support to solve such problems and manage the fishery in a judicious way.

---

10. Technical programme:

i). Collection of catch and effort data of fish, crustaceans and cephalopods exploited by indigenous gears from the coastal waters of the project centres/zones/states adopting statistically designed proceedures.

ii). Collection of data on catch, effort, species composition, size distribution, sex ratios, spawning intensities, recruitment and other relevant information pertaining to the exploited stock of a) prawns, b) lobsters, c) crabs, d) cephalopods, e) mackerels, f) oil sardine, g) pomfrets, h) lesser sardines, i) tunas, j) Stolephorus k) carangids, l) ribbon fish, m) sciaenids, n) silver-bellies, o) catfish and p) flatfish from different indigenous gears operated by the artisanal fishermen at selected landing centres.

iii). Collection of data on catch, efforts, species composition and size distribution and sex ratios of important species in respect of the juvenile prawn fisheries of estuarine environments.

iv). Collection of data on rainfall, salinity, temperature, dissolved oxygen, plankton, mud banks and other environmental parameters influencing the coastal fish resources.

v). Collection of data on mesh sizes and other gear specifications involved in the fishery.

vi). Variations in the prices of different species/groups landed by indigenous gears will be recorded at the landing centres.

vii). Collection of data on craft-gear characteristics and the capital cost of different types of units from selected centres. Data on operating costs, catch and revenue for these units will be collected on sample days.

viii). Detailed analysis of the data collected on the above aspects and preparation of reports and scientific papers.

Work done: Relevant data on the above aspects have been collected for one year and partly analysed.

Work envisaged in the current year:

All the work as per technical programmes i-viii

11. Data of start : 1989 12. Likely date of completion : 1992

13. Estimated man-months/year : 127 man months/year

14. Facilities required:

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

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

16. Approximate cost:

a)	Salary of scientific staff	Rs 6,85,000
b)	Salary of technical staff	Rs 5,00,000
c)	Salary of supporting staff	
d)	Casual labourer cost, if any	
e)	Cost of equipment, facility etc (T.A.)	Rs 70,500
f)	Contingencies, such as chemicals, fertilizers, seed, animals, feeds, sprayers etc.	Rs 70,500
g)	Total cost	Rs 13,26,000

17. Signatures of:

Sd/-
Project Leader

Sd/-
Head of Division

Sd/-
Director

RESEARCH PROJECT - 1990-91

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

3. Name and address of Research Institute : Central Marine Fisheries Research Institute, Cochin.

4. Title of Project : Sea ranching of marine prawns

5. Title of sub-project :

6. Name and designation of Project Leader : N.Neelakanta Pillai
Scientist-SG

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

Centre	Name	Designation	Time to be spent (%)	Work to be done
Mandapam Camp	N.N.Pillai	SG	75	T.P.1,2,3 & 5
	E.V.Radhakrishnan	SG	100	T.P.1,2,3 & 4
	G.Maheswarudu	S	25	T.P.1,2,3 & 4
Technical Assistance				
	M.R.Arputharaj		50	

8. Location of the Research Project : Mandapam Camp

9. (a) Objectives: To release the hatchery reared seed of marine prawns into the natural environment in order to enhance the population of prawns and thus increase the magnitude of the prawn catch from the marine prawn fishery.

(b) Practical Utility: The marine prawn catch in the country has not increased in the recent years in spite of increased fishing effort. By introducing hatchery reared prawn seed in the advanced postlarval stage, when they have a better chance of survival into the natural environment the recruitment of prawns to the capture fishery could be improved. This is turn would help to augment the prawn catches.

10. Technical programme: 1. Breeding of P.semisulcatus and rearing of larvae to postlarval stage. 2. Nursery rearing of postlarvae to stockable size. 3. Release of seed into the lagoon/sea at selected sites near Mandapam. 4. Regular collection of data on the exploited resource of P.semisulcatus at the Mandapam region. 5. Analysis of data to study the effect of such release on the recruitment and P.semisulcatus catch at the Mandapam region.

Work done: About 2 millions hatchery raised P.semisulcatus seed were released into the Gulf of Mannar/Pillaimadam lagoon at Mandapam. Regular data on biolotical and fishery aspects of P.semisulcatus were collected to study the effect of ranching.

Work envisaged in the current year: As shown in the Technical Programme

1. Date of start : 1984-85 12. Likely data of completion : 1990-1991

3. Estimated man-months : 24 man months/year

4. Facilities required:

i) Land - Nil
ii) Labour - Nil
iii) Special equipment
iv) Animal sheds -
1.Polycraft pools (10 t cap. 5 nos)
2.Out door cement tanks - 100 t cap.5 nos
3.Fibre glass tanks - 10 nos (oval) 2 t cap.
4.Micropulvirasor (50 kg cap)
5.Air blower - one
6. Sampling units
v) Fish ponds - 3 fish ponds for nursery rearing.
vi) Foreign exchange - Nil
vii) Other items - aerator tubes, stones, chemicals
viii) Total estimated cost

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

a. Name of financing organization
b. Title of project

16. Approximate cost (Rs)

a) Salary or scientific staff	1,40,000
b) Salary of technical staff	27,000
c) Salary of supporting staff	12,000
d) Casual labourer cost, if any	
e) Cost of equipment, facility etc	4,35,000
f) Contingencies, such as chemicals, fertilizers, seed, animals, feeds, sprayers etc.	20,000
g) Total cost	6,34,000

17. Signatures of:

Sd/-
Project Leader

Sd/-
Head of Division

Sd/-
Director

RESEARCH PROJECT-1990-91

1. Institute code No. CF/IP/2 2. I.C.A.R.

3. Name and address of Research Institute : CMFR Institute, Cochin-31.

4. Title of Project : Evaluation of the fishery resources exploited by large trawlers

5. Title of Sub-project :

6. Name and designation of Project Leader : G. Sudhakara Rao, Scientist-SG

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

Centre	Name	Designation	Time to be spent(%)	Work to be done
Cochin	G.Nandakumar	SG	25	TP-1, 2a, 3
	K.R.Manmadhan Nair	SG	25	TP-1, 2a, 3
	P.E.Sampson Manickam	SG	40	TP-1, 2a, 3
	K.Prabhakaran Nair	SG	25	TP-1, 2a, 3
Visakhapatnam	G.Sudhakara Rao	SG	40	TP-1, 2a, 3

Technical Assistance: K.N.Gopalakrishnan and Mathew Joseph (Cochin); J.B.Varma (Visakhapatnam).

8. Location of the Research Project : Cochin and Visakhapatnam

9. (a) Objectives:

1. To assess the magnitude of exploited crustacean and cephalopod resources and to study their relative abundance in space and time at the respective centres.

2. To study the population characteristics and biology of important species.

(b) Practical Utility:

The information gathered will be highly useful for suggesting proper management steps for rational exploitation and conservation of the resources.

10. Technical Programme:

1. Data on catch, effort and species composition will be collected from fishing log of all the trawlers.

2. Data on size composition, sex composition and other biological aspects of (a) prawns and lobsters and (b) cephalopods will be collected and analysed.

3. The data so collected will be used for the estimation of growth parameters, mortality rates and finally stock assessment.

11. Date of start : 1990 12. Likely date of completion : 1992

13. Estimated man months :18.6 man months/year

14. Facilities required:

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

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

16. Approximate cost:

a.	Salary of scientific staff	Rs 1,20,000
b.	Salary of technical staff	Rs 33,000
c.	Salary of supporting staff	
d.	Casual labourer cost, if any	
e.	Cost of equipment, facility etc.	
f.	Contingencies, such as chemicals, fertilizers, seed, animals, feeds, sprayers etc.	Rs 6,000
g.	T.A.	Rs 10,000
h.	Total	Rs 1,69,000

17. Signature of:

Sd/-
Project Leader

Sd/-
Head of Division

Sd/-
Director

RESEARCH PROJECT 1990-91

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

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

4. Title of the Project : Investigation on molluscan fishery resources

5. Title of Sub-Project : Studies on clam, mussel and gastropod resources

6. Name and Designation of the Project Leader : G. Syda Rao, Scientist (SG)

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

Centre	Name	Designation	Time to be spent (%)	Work to be done
Vizhinjam	N. Ramachandran	Scientist	75 b, c	1-4
Kakinada	G. Syda Rao	Scientist (SG)	33 a	1-4
Cochin	V. Kripa	Scientist	50 a, b	1-4
Mangalore	Sunil K. Mohammed	Scientist	50 a, b	1-4
Karwar	P.K. Asokan	Scientist	~~25 a~~ 50, b	1-4
Tuticorin	K. Ramados	Scientist (SG)	50 c, d	1-4
Mandapam	A.P. Lipton	Scientist (SG)	25 c, d	1-4
Madras	P.V. Sreenivasan	Scientist (SG)	50 a, b, d	1-4
	P. Natarajan	Scientist	25 a, b, d	1-4

Technical Assistance: N. Burayya (Kakinada), D. Nagaraja (Mangalore), K.T. Thomas (Vizhinjam), C.T. Rajan, A. Dasman Fernando, F. Soosai V.Rayan (Tuticorin), P. Thillairajan (Mandapam) Mathew Joseph (Cochin), M.M. Bhaskaran (Karwar), R. Thangavelu, V. Selvaraj (Madras).

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

9. a) Objectives: The clams, mussels and sacred chanks and some other gastropods constitute fisheries of considerable magnitude. This project aims to monitor the present level of exploitation, their abundance and distribution, and biological characteristics so as to suggest suitable management measures of these resources for rational exploitation.

b) Practical Utility: The clams and mussels are subjected to heavy fishing pressure in some area due to the increase in demand of their meat. The results obtained in this project will enhance our knowledge about the characteristics of clam, mussel and sacred chank and other gastropod resources so that suitable measures can be adopted for the conservation of the resources.

10. Technical Programme: The following groups of molluscs are to be studied: a) clams b) mussels c) chanks d) gastropods other than chanks.
1. To monitor the distribution, population density, standing stock and biological features of clams, mussels and chanks. 2. To study the exploitation, seasonal abundance, size composition of commercial catches and their marketing/utilisation. 3. To study the seed availability. 4. To monitor environmental parameters of the areas of occurrence of these molluscs.

11. Date of start: 1989 12. Likely date of completion: 1992

13. Estimated man-months : 45 man-months/year

14. Facilities required:

i)	Land	: -	v)	Fish ponds	: -
ii)	Labour	: yes	vi)	Foreign exchange	: -
iii)	Special	: nil	vii)	Other items	: yes
iv)	Animal sheds	: nil	viii)	Total estimated	: -

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

a) Name of the financing organisation : No

b) Title of the Project :

16. Approximate cost:

a)	Salary of scientific staff	: Rs.2,42,000
b)	Salary of technical staff	: " .2,00,000
c)	Salary of supporting staff	: " . 25,000
d)	Casual labourer cost, if any	: -
e)	Cost of equipment, facility etc	: " . 10,000
f)	Contingencies, such as chemicals, fertilisers, seed, animals, feed, sprayers etc.	: " . 50,000
	TA & DA	: " . 50,000
g)	Total cost	: Rs.5,77,000

17. Signature of:

Sd/-
Project Leader

Sd/-
Head of Division

Sd/-
Director

RESEARCH PROJECT 1990-91

1. Institute Code No. MOL/CUL/4 (Revised) 2. I.C.A.R. Code No.

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

4. Title of Project : Seed production and sea ranching of molluscs

5. Title of Sub-Project : Development of hatchery technology for experimental/mass production of the seed of gastropods, clams, mussels, edible oysters, pearl oysters and cephalopods and sea ranching of clams and pearl oysters

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

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

Centre	Name	Designation	Time to be spent (%)	Work to be done
Tuticorin	K.A. Narasimham	Prin.Scientist	100	a, b, 1-5, 7, 11, 12
	P. Muthiah	Scientist (SG)	50	a, c, 1-5, 7, 11, 12
	M.E. Rajapandian	Scientist (SG)	50	c 1-7, 11, 12
	Rani Palaniswamy	Scientist	50	c, 1-7, 11, 12
	D. Sivalingam	"	75	b, h, 1-5, 8, 11, 12
	D. Dharmaraj	Scientist (SG)	50	d, e 1-7, 12
	A. Chellam	Scientist (SG)	~~50~~ 25	d, e, 1-5, 7, 12
	T.S. Velayudhan	Scientist (SG)	50	d, e, 1-7, 12
	A.C.C. Victor	Scientist (SG)	50	d, 11
	C.P. Gopinathan	Scientist (SG)	25	10
Calicut	G.P.K. Achari	Scientist (SG)	75	f, 1-5, 7
	P.S. Kuriakose	Scientist (SG)	100	f, 1-5, 7
Port Blair	K. Ramadoss	Scientist (SG)	25	g, 1-5, 9, 12
	One scientist from CARI			g, 1-5, 9,11, 12

Technical Assistance: D. Sundararajan, C.T. Rajan, A.A.P. Mudaliar, S.M. Sathakkathulla, K. Srinivasagam, N. Jesuraj, K. Shanmugasundaram, J.X. Rodrigo, K. Jeyabalan, A. Dasman Fernando, F. Soosai V. Rayan, P. Muthukrishnan (Tuticorin), To be identified (Port Blair), V.G. Surendranathan (Calicut)

8. Location of the Research Project : Tuticorin, Calicut and Port Blair

9. a) Objectives: 1. To develop appropriate technology for the production of seed of commercially important gastropods, clams, mussels, black lip pearl oyster and cephalopods. 2. To standardise the techniques in the various operational phases of the hatchery system for the mass production of the seed of edible oyster and the Indian pearl oyster. 3. Sea ranching of clams and pearl oysters.

b) Practical Utility: While a moderate level of proficiency has been achieved in the controlled breeding and mass production of the seed of Crassostrea madrasensis and Pinctada fucata, the hatchery techniques required for the production of seed of a number of gastropod, clam, mussel and cephalopod species are either wanting or are in an early stage of development. This project aims to standardise the techniques for mass production of seed in the former and to develop appropriate technology for seed production on experimental basis in the latter. The results achieved in this project would help to meet the year round seed requirements for culture operations and also to initiate/intensify sea ranching programmes of different commercial molluscs. By sea ranching the natural population can be replenished and also new beds can be created which in turn results in increased production.

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

a) Paphia malabarica b) Katelysia opima c) Crassostrea madrasensis d) Pinctada fucata e) P. margaritifera, f) Perna viridis g) Trochus niloticus and h) Sepioteuthis lessoniana.

1. Collection, transportation and maintenance of broodstock.
2. Conditioning and induced maturation and spawning
3. Larval rearing and seed production.
4. Study of production and survival of spat factors influencing them and evaluation of production cost of seed.
5. Nursery rearing in the hatchery/field of juveniles to stockable size
6. Selective breeding of pearl oysters and edible oysters.
7. Standardization of the various phases of the hatchery operations such as broodstock management and larval/spat rearing for mass production of seed.
8. Collection of egg clusters of Sepioteuthis lessoniana and investigations on optimum hatching conditions. Development of appropriate culture techniques in the hatchery rearing including the rearing of suitable live food organisms.
9. Studies on the habits and reproductive biology of Trochus niloticus in Andamans. To work out the food requirements during different growth stages of T. niloticus.
10. To isolate different species of microalgae from plankton, maintain stock and mass cultures and study of growth kinetics/nutritional aspects of different microalgal species.
11. Sea ranching of hatchery produced seed of clams, edible oyster, pearl oyster and T. niloticus. Pens to be erected, if necessary. Monitoring of the environmental parameters, growth, survival and the effect of sea ranching on the natural populations if any.
12. Planning, execution, analysis and interpretation of results and preparation of reports.

11. Date of start : 1989 (Revised) 12. Likely date of completion: 1992

13. Estimated man months : 63 man months/year

14. Facilities required:

i)	Land : yes	v)	Fish ponds (Nursery)	:	Rs.90,000
ii)	Labour : yes				
iii)	Special : yes	vi)	Foreign exchange	:	Rs.10,000
iv)	Animal sheds (Hatchery sheds) : Rs.25,000	vii)	Other items	:	-
		viii)	Total estimated cost	:	-

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

a) Name of the financing organisation :

b) Title of the project :

16. Approximate cost:

a)	Salary of scientific staff	:	Rs. 389423
b)	Salary of Technical staff	:	Rs. 232767
c)	Salary of Supporting staff	:	Rs. 25000
d)	Casual labourer cost, if any	:	Rs. 75800
e)	Cost of equipment, facility etc.	:	Rs. 473900
f)	Contingencies, such as chemicals, fertilisers, seed, animals, feed, sprayers etc.		Rs. 366190
	T.A/D.A	:	Rs. 44500
g)	Total cost	:	Rs.18,07,580

17. Signatures of:

Sd/-
Project Leader

Sd/-
Head of Division

Sd/-
Director

RESEARCH PROJECT 1990-91

1. Institute Code No. MOL/CUL/6 2. I.C.A.R. Code No.

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

4. Title of Project : Mariculture of molluscs

5. Title of Sub-Project : Investigations of the factors affecting cultured pearl production

6. Name and Designation of Project Leader : Dr.A.C.C. Victor, Scientist (S.G.)

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

Centre	Name	Designation	Time to be spent (%)	Work to be done
Tuticorin	A.C.C. Victor	S.G.	50	1-5
	A. Chellam	S.G.	50	1-5
	S. Dharmaraj	S.G.	50	1-5
	T.S. Velayudhan	S.G.	50	1-5

Technical Assistance: S. Srinivasagam, K. Shanmugasundaram, A. Dasman Fernando. F. Soosai V. Rayan, N. Jesuraj, P. Muthukrishnan and L. Soosai Antony Silva.

8. Location of the Research Project : Tuticorin

9. a) Objectives: (1) To investigate the factors contributing to the high cost of cultured pearl production; (2) To increase the survival rate of pearl oyster seed in the hatchery, nursery and farm; (3) To achieve higher percentage of success in pearl production in implanted oysters; (4) To make cultured pearl production economically viable; (5) To select alternate sites for pearl culture farms based on already observed optimum environmental factors.

b) Practical Utility: The investigations would lead to the production of pearl at low cost.

10. Technical Programme: (1) Investigation of factors that cause the present high cost of pearl production for taking suitable corrective measures; (2) The factors causing high mortality of larvae and seed oysters are to be studied for taking measures to achieve optimum survival rate at the hatchery nursery and farm levels; (3) Suitability of cheap indigenous nucleii for implantation is to be tested for achieving maximum pearl production, and sources are to be identified for the production/supply of nucleii of required sizes and quality; (4) Based on the above studies and from past experience, standardised techniques are to be evolved for making pearl culture an economically viable proposition; (5) Basing the studies made so far on the optimum environmental conditions, suitable sites in the Gulf of Mannar are to be suggested for establishing pearl culture farms.

11. Date of start: 1990 12. Likely date of completion: 1992

13. Estimated man-months ≠ 24 man months/year

14. Facilities required:

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

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

a) Name of financing organisation:

b) Title of Project :

16. Approximate cost:

a) Salary of scientific staff	:	Rs. 2,99,220
b) Salary of technical staff	:	Rs. 1,79,780
c) Salary of supporting staff	:	Rs. -
d) Casual labourer cost, if any	:	-
e) Cost of equipment, facility etc.	:	
f) Contingencies, such as chemicals, fertilisers, seed, animals, feeds sprayers, etc.		
1) Contract labour cost	:	Rs. 57,000
2) Farm and rearing materials	:	Rs. 2,12,000
3) Chemicals & paints	:	Rs. 5,000
g) Total cost	:	Rs. 7,53,000

17. Signature of:

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

RESEARCH PROJECT - 1990-91

1. Institute Code No. MOL/CUL/7 2. I.C.A.R. Code No.

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

4. Title of Project : Edible oyster culture

5. Title of Sub-Project :

6. Name and Designation of Project Leader : P. Muthiah, Scientist (SG)

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

Centre	Name	Designation	Time to be spent (%)	Work to be done
Tuticorin	P. Muthiah	S.G.	~~50~~ 45	1, 2
	M.E. Rajapandian	S.G.	50	1, 2
	Rani Palaniswamy	S	50	1, 2
Madras	K.Satyanarayana Rao	P.S.	100	3
	P.V.Sreenivasan	S.G.	50	3
	P. Natarajan	S	50	3
Kakinada	G. Syda Rao	S.G.	34	3
Karwar	P.K. Asokan	S	25	3

Technical Assistance: C.T. Rajan, D. Sundararajan, A. Agastheesa Pillai (Tuticorin), M.M. Bhaskaran (Karwar), R. Thangavelu, V. Selvaraj, P. Poovannan (Madras), M. Burayya (Kakinada)

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

9. a) Objectives: (1) To study the survival rate of larvae, seed and adult oysters up to marketable size in the hatchery and farm; (2) To improve oyster culture system to make it economically viable; (3) To test the feasibility of culturing edible oysters at Madras, Kakinada and Karwar.

   b) Practical Utility: The results will help in demonstrating the feasibility of carrying out oyster culture economically.

10. Technical Programme: (1) The causative factors of mortality of larvae and seed will be investigated for taking corrective measures; (2) To improve and refine the farming techniques to get higher yields; (3) To study the feasibility of oyster culture in selected areas at Madras, Kakinada and Karwar.

11. Date of start: 1989 12. Likely date of completion : 1991-92

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

14. Facilities required:

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

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

a) Name of financing organisation :

b) Title of Project :

16. Approximate cost:

a)	Salary of scientific staff	: Rs. 1,99,400
b)	Salary of technical staff	: Rs. 1,42,000
c)	Salary of supporting staff	: Rs. 51,360
d)	Casual labourer cost, if any	: Rs. 50,000
e)	Cost of equipment, facility etc.	:
f)	Contingencies, such as chemicals, fertilisers, seed, animals, feeds, sprayers, etc.	: Rs. 1,85,000
	T.A.	: Rs. 40,000
g)	Total cost	: Rs. 6,77,760

17. Signature of:

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

RESEARCH PROJECT 1990-91

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

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

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

5. Title of Sub-Project:

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

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

Centre	Name	Designation	Time to be spent (%)	Work to be done
Bombay	V.V. Singh	Scientist	100	2-7
Karwar	P.K.Krishnakumar	"	50	"
Mangalore	M.P.Molly	"	50	"
Calicut	V.Narayana Pillai	Pri.Sci.	50	"
	C.V. Mathew	Scientist	50	"
Cochin	M.S. Rajagopalan	Pri.Sci.	30	"
	V. Chandrika	Scientist SG	100	"
	G.S.Daniel Selvaraj	"	50	"
	S.Muthuswamy	"	50	"
	T.S. Naomi	Scientist	50	"
	I. David Raj	"	30	"
Minicoy	Pon Siraimeetan	Scientist SG	50	"
	P. Kaladharan	Scientist	50	"
Vizhinjam	P.A. Thomas	Scientist SG	100	"
	Rani M. George	"	100	"
	S. Jasmine	Scientist	50	"
Tuticorin	C.P.Gopinathan	Scientist SG	30	"
Mandapam	Rita Jayasankar	Scientist	30	"
Madras	K.G.Girijavallabhan	Scientist SG	50	"
	M.Rajagopalan	"	50	"
Visakhapatnam	K. Vijayakumar	Scientist	100	"
Kakinada	S.Krishna Pillai	"	100	"

Technical Assistance: V.K.Balachandran, N.P.Kunhikrishnan, K.N.Pushkaran, L.R.Khambadkar, A.Kanagam, V.K.Suresh, T.N.Ananthalakshmi (Cochin); R.Vasanthakumar (Vizhinjam); J.X.Rodrigo (Tuticorin) M.Selvaraj, J.R.Ramalingam (Mandapam); T.Dandapani, V.Rangacharyalu (Madras), K.P.Viswanathan (Calicut) K. Ramasomayajulu (Visakhapatnam)

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

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

10. Technical Programme: 1) Wherever Cadalmin series of boats are operating the Officers in Charge of the respective Centre will draw up in advance a monthly programme of participation of all scientists and tech.staff in Cadalmin trips on a rotation basis. 2) Basic hydrographs factors such as temperature, salinity, dissolved oxygen content should be collected from the inshore fishing grounds thrice a week. 3) Estimation of phytoplankton production and zooplankton biomass to be made weekly. 4) Collection and analysis on nutrients wherever equipment facilities are there. 5) Estimation of bacterial production and growth rate off Cochin. 6) Collection and analysis of mateorological data. 7) All data to be entered and maintained in a common register at each Centre and at Headquarters.

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

13. Estimated man-months:

14. Facilities required:

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

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

16. Approximate cost:

a)	Salary of Scientific staff	Rs.4.50 lakhs
b)	Salary of Technical staff	Rs.2.00 "
c)	Salary of Supporting staff	-
d)	Casual labourer cost, if any	
e)	Cost of equipment, facility etc.	Rs.4.00 "
f)	Contingencies, such as chemicals, fertilizers, seed, animals, feeds, sprayers etc.	Rs.1.00
	T.A.	Rs.1.00
g)	Total cost:	Rs.12.50 lakhs

17. Signature of:

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

RESEARCH PROJECT 1990-91

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

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

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

5. Title of Sub-Project:

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

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

Centre	Name	Designation	Time to be spent (%)	Work to be done
Cochin	M.S. Rajagopalan	Principal Sci.	30	
	D.S. Rao	"	~~30~~ 100	
	R.N.Misra	Scientist SG	50	
	G.S.Daniel Selvaraj	"	50	
	I.David Raj	Scientist	~~30~~ 50	
Madras	M.Rajagopalan	Scientist SG	50	
Calicut	C.V. Mathew	"	50	
Mangalore	M.P. Molly	Scientist	50	
Mandapam	B.S. Ramachandrudu	T7	30	

Technical Assistance:
K.S.Leela Bai,
A. Kanagam, R. Anilkumar (Cochin)
V. Rengacharyulu (Madras) P.Swarnalatha (Calicut)

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

9. (a) Objectives: 1) To understand the environmental ecology of the coastal zone and its influence on the coastal marine resources. 2) To identify potential sites for mariculture/ seafarming.
(b) Practical Utility: The coastal zone is an important base for artisanal fisheries and also for coastal aquaculture and seafarming. The extent of coastal waterbodies, nursery grounds, coastal vegetation like mangroves and the connected ecological parameters have a profound influence on the local inshore fisheries. The project aims at understanding some of these aspects.

10. Technical Programme: 1. Systematic survey of the coastal zone for mapping coastal waterbodies, lagoons and potential sites for sea farming.

2.Ecological studies on the coastal mangroves, the resident and migratory fauna of the mangroves ecosystem.
3. Diurnal studies on physico-chemical factors and plankton in the coastal waterbodies.
4. Soil sediment characteristics in the coastal water bodies.

---

11. Date of start: 1987 12. Likely date of completion: 1991

---

13. Estimated man-months : 42 man months/year

---

14. Facilities required:

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

---

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

a) Name of financing organisation:
b) Title of Project:

---

16. Approximate cost:

a)	Salary of Scientific staff	1.5 lakhs
b)	Salary of Technical staff	0.5 lakhs
c)	Salary of Supporting staff	-
d)	Casual Labourer cost, if any	-
e)	Cost of equipment, facility etc.	0.1 lakhs
f)	Contingencies, such as chemicals, fertilizers, seed, animals, feeds, sprayers etc.	0.2 lakhs
	T.A.	0.3 lakhs
g)	Total cost:	2.6 lakhs

---

17. Signature of:

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

RESEARCH PROJECT 1990-91

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

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

4. Title of Project: MARINE POLLUTION

5. Title of Sub-Project: Monitoring marine pollution in relation to protection of living resources

6. Name and Designation of Project Leader: V. Kunjukrishna Pillai, Scientist (SG)

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

Centre	Name	Designation	Time to be spent (%)	Work to be done
Cochin	V. Kunjukrishna Pillai	Scientist SG	~~75%~~ 100	1,2
	R.N. Misra	"	50%	1
Karwar	P.K.Krishnakumar	Scientist	50%	3,4
Tuticorin	Peer Mohamed	Pri.Sci.	~~75%~~ 100%	5,6
	C.P. Gopinathan	Scientist SG	~~30%~~ 25	5,6
	D.Kandaswami	"	~~25%~~ 50%	5,6

Technical Assistance: (Cochin) K.K. Valsala, V.K.Balachandran K.S.Leela Bai

(Tuticorin) J.X. Rodrigo, P. Paul Sigaman

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

9. (a) Objectives: (1) To identify major sources of pollutants in the inshore areas and to assess their levels and effects on living resources. (2) Heavy metal levels in the aquatic environment and their build up in the organisms will be monitored and investigated. (3) Bio-assays will be carried out with larval, juvenile and adult organisms to evaluate lethal and sublethal effects of selected pollutants.
(b) Practical utility: In recent years there has been a world wide awareness on the problems of marine pollution and its effects on the living resources. In India, on a national level, priority has been assigned to pollution monitoring and control measures. Information on the causes of fish kills, levels of pollutants like heavy metals in water, animals and sediment and also its short and long-term effects will help to assess the effect of pollution. To understand the effect of deteriorating water quality on cultivable organisms in identified areas of pollution in the coastal waters. Hence studies on marine environmental damage by different sources becomes an obvious necessity to evaluate the present level of pollution in our coastal waters.

10. Technical Programme: Cochin: (1) Water, sediment and biological samples will be collected and analysed for metals (Zn, Cu, Cd, Pb and Hg) (2) Laboratory experiments using selected

animals to evaluate lethal and sub-lethal effects of pollutants.
(Karwar) (3) Monitoring of metal levels in the environment and biota and (4) Laboratory experiments to evaluate physiological responses in mussels due to pollutants.
(Tuticorin)(5) Regular monitoring of environmental parameters from selected stations to understand the level of pollution (with special reference to thermal water discharge, fly ash and other chemicals). (6) Laboratory experiments to evaluate the lethal and sub-lethal effects on different organisms using selected pollutants.

11. Date of start: 1982 12. Likely date of completion: 1992

13. Estimated man-months:

14. Facilities required:

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

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

16. Approximate cost:

a) Salary of scientific staff	2,45,000
b) Salary of Technical staff	1,15,000
c) Salary of Supporting staff	-
d) Casual Labourer cost, if any	40,000
e) Cost of equipment, facility etc.	5,00,000
f) Contingencies, such as chemicals, fertilizers, seed, animals, feeds, sprayers etc.	1,00,000
g) Total cost:	10,00,000

17. Signature of:

Sd/-
Project Leader

Sd/-
Head of Division

Sd/-
Director

RESEARCH PROJECT - 1990-91

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

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

4. Title of Project: Resources assessment of seaweeds and their culture

5. Title of Sub-project :

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

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

Centre	Name	Designation	Time to be spent(%)	Work to be done
Minicoy	V.S.K. Chennubhotla	Pri.Sci.	100	1, 3, & 5
	P. Kaladharan	Scientist	~~100~~ 75	3 & 5
Mandapam	N.Kaliaperumal	Sci. SG	100	1,2,5,6
	Rita Jayasankar	Scientist	100	2 & 4

Technical Assitance: S. Kalimuthu, J.R. Ramalingam, M.Muniyandi, M. Najmuddin (Mandapam)

8. Location of the Research Project: Mandapam and Minicoy

9. a) Objectives: 1) To quantify the deep water seaweeds resources of Tamil Nadu and Andhra Pradesh coasts.
2) To augment the seaweed resources through artificial and field culture practices.

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

10. Technical Programme: 1. To estimate the deep water seaweed resources of Tamil Nadu and Andhra Pradesh coasts.
2. To carry out culture experiments of economically important seaweeds by suitable artificial methods. (3) To attempt field cultivation of commercially important seaweeds in Minicoy lagoon.
4. To undertake spore culture and fragment culture of agar and algin yielding seaweeds in the laboratory. 5) To collect data on the optimal environmental conditions for agarophytes and alginophytes from the natural habitat.

6) To study the effect of harvesting in the regeneration and growth of economically important seaweed from ~~exploited areas.~~

Work done: The seaweed resources survey of shallow waters of Tamil Nadu and Kerala coasts were completed. The deep water survey of seaweed resources from Keelakarai to Manapad in Tamil Nadu coast was completed. Field cultivation of Gracilaria edulis in Gulf of Mannar and Palk Bay was standardized.

Work envisaged: As given in the Technical Programme at 1-7

---

11. Date of start: 1989 12. Likely date of completion: 1992

---

13. Estimated man months: 208 Man-months/year: 104 man months/year

---

14. Facilities required

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

---

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

---

16. Approximate cost

	Rs. in Lakhs
a) Salary of scientific staff	3.50
b) Salary of technical staff	2.00
c) Salary of supporting staff	0.80
d) Casual labourer cost, if any	0.60
e) Cost of equipment, facility etc.	1.75
f) Contingencies, such as chemicals, fertilizers, seed, animals, feeds, sprayers, etc.	1.00
T.A.	0.50
g) Total cost	10.15

---

17. Signature of

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

RESEARCH PROJECT 1990-91

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

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

4. Title of Project: Remote Sensing and Fisheries

5. Title of Sub-project: Application of Remote Sensing technology in marine fisheries

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

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

Centre	Name	Designation	Time to be spent (%)	Work to
Cochin	G. Subbaraju	Principal Sci.	100%	
	M.S.Rajagopalan	"	30%	

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

8. Location of the Research Project: Cochin

9. a) Objectives: To make increased use of remote sensing data to delineate areas of high productivity and potential fishing grounds in the EEZ.

   b) Practical Utility: It is possible to map out potential fishing grounds and resources based on Chlorophyll and SST configuration obtained from Satellite data.

10. Technical Programme: 1. Acquisition of satellite and sea-truth data relating Chlorophyll and SST. 2. To map out fishery resources data for each depth zone area. 3. To correlate satellite data, sea truth data and fishery resources data. 4. To monitor the areas of upwelling and study circulation patterns based satellite data.

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

13. Estimated man-months : 20 Man months/year

14. Facilities required:

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

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

16. Approximate cost:

a) Salary of scientific staff	:	Rs. 0.8 lakhs
b) Salary of technical staff	:	0.4 lakhs
c) Salary of supporting staff	:	-
d) Casual labourer cost, if any	:	-
e) Cost of equipment, facility etc.	:	1.0 lakhs
f) Contingencies, such as chemicals, fertilizers, seed, animals, feeds, sprayers etc.	:	0.2 lakhs
T.A.	:	0.2 lakhs
g) Total cost	:	2.6 lakhs

17. Signature of:

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

RESEARCH PROJECT - 1990-91

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

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

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

5. Title of Sub-project: --

6. Name and Designation of Project Leader : A.V.S. Murty, Principal Scientist

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

Centre	Name	Designation	Time to be spent(%)	Work to be done
Cochin	A.V.S. Murty	Principal Scientist	~~75~~ 100	As per technical programme
Calicut	V.N. Pillai	-do-	50	

Technical Assistance: P.M. Aboobaker (Cochin)

8. Location of the Research Project: Cochin, Calicut

9. a) Objectives: To explain the variations observed in the fishery of offshore and deep sea regions of the Indian EEZ in relation to changes in the oceanographic conditions.

   b) Practical Utility: Prediction of fishery for the benefit of vessel operators/Administrators

10. Technical Programme: Collection, analysis and processing of sea water temperature, salinity and dissolved oxygen at surface and sub-surface levels in areas of fishing activity, onboard FORV Sagar Sampada. Attempting possible correlations with oceanographic conditions in cases of large scale fluctuations noticed in selected fishery. For this purpose, the fish catch data of FORV Sagar Sampada will be made use of.

11. Date of start : Jan. 1989 12. Likely date of completion: December 1992

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

14. Facilities required

i. Land	: Nil	v. Fish ponds	: Nil
ii. Labour	: Nil	vi. Foreign exchange	: Nil
iii. Special requirement	: Nil	vii. Other items: Vessel facility	
iv. Animal shed	: Nil	viii. Total estimated cost	: Institute's budget

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

a) Name of the financing organisation : Department of Ocean Development will meet all expenses connected with data collection.

b) Title of Project : Survey of living resources of the Indian EEZ (DOD scheme)

16. Approximate cost

a) Salary of scientific staff	: 1.5 lakhs
b) Salary of technical staff	: 0.3 lakhs
c) Salary of supporting staff	-
d) Casual labourer cost, if any	-
e) Cost of equipment, facility etc.	-
f) Contingencies, such as chemicals, fertilizers, seed, animals, feeds, sprayers etc.	
T.A.	: 0.2 lakhs
g) Total cost	: 0.2 lakhs
	: 2.2 lakhs

17. Signature of:

Sd/-
Project Leader

Sd/-
Head of Divisions

Sd/-
Director

RESEARCH PROJECT - 1990-91

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

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

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

5. Title of Sub-project: Investigations on zooplankton and components of DSL of the EEZ of India

6. Name and designation of Project Leader : K.J. Mathew, Scientist SG

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

Cochin	Name	Designation	Time to be spent(%)	Work to
Cochin	K.J. Mathew	Sci.S.G	~~60~~ 100	1, 3a, 2
	T.S. Naomi	Scientist	50	1
	N.Gopinatha Menon	Sci.S.G.	Co-opted	2
	K. Rengarajan	-do-	~~50~~ 100	3b
	K.R.Manmadhan Nair	-do-	25	3c
	P. Bensam	Pri.Sci.	50	3f
	K.Prabhakaran Nair	Sci.S.G.	25	3d
Karwar	V.S. Kakati	-do-	50	3c
Mandapam	N.N. Pillai	-do-	50	3c
Madras	M.M. Meiyappan	-do-	25	3d
Calicut	G.P.K. Achari	-do-	Co-opted	3e
Mangalore	P.P. Pillai	-do-	25	3g

Technical Assistance: S.Natarajan, K.N. Gopalakrishnan, K.Chellappan K. Soloman(Cochin, A.Mohan(Madras), J. Narayanaswamy (Cochin)

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

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

b) Practical utility: i) A study of the total zooplankton biomass would help in understanding the productivity at the secondary level which could very well be correlated to the abundance and distribution of fish. (ii) Study of the components of DSL would reveal the magnitude of a hitherto unestimated and unexploited resource. A study of the total biomass of IKMT samples would indicate the richness of forage organisms available to primary and secondary carnivores.

10. Technical programme

1. Estimation of total zooplankton biomass; study of zooplankton groups, zooplankton sorting, documentation of data, distribution of samples and data.
2. Estimation of biomass of IKMT collections, sorting of IKMT samples, documentation of data.
3. Studies on the distribution, abundance and related environmental parameters of selected groups ie. a) Euphausiae, b) Siphonophores, c) decapod crustaceans, d) cephalopods, e) polychaetes, f) fish eggs & larvae, g) copepods etc.
4. Studies on the Deep Sea their larger - detection, biomass, components etc.

11. Date of start: Jan. 1989 12. Likely date of completion: 1993

13. Estimated man-months:

14. Facilities required

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

15. If financed by an organisation other than the Institute:
a) Name of financing organisation: The DOD will meet all expenses
b) Title of project connected with data collection

16. Approximate cost:

a) Salary of scientific staff	Rs 600,000 (50% of the total estimated)
b) Salary of technical staff	Rs 150,000 -do-
c) Salary of supporting staff	Nil
d) Casual Labourer cost, if any	Rs 75,000 (for sorting zoopln)
e) Cost of equipment, facility etc.	
f) Contingencies, such as chemicals, fertilizers, seed, animals, feeds, sprayers etc.	Rs 5,000
g) Total cost	Rs 8,30,000

17. Signature of:

Sd/-
Project Leader

Sd/-
Head of Division

Sd/-
Director

RESEARCH PROJECT 1990 -91

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

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

4. Title of Project : Conservation oriented researches on endangered ecosystem

5. Title of Sub-project: Investigations on coral reef ecosystem

6. Name and Designation of Project Leader : C.S. Gopinadha Pillai Principal Scientist

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

Centre	Name	Designation	Time to be spent(%)	Work to be done
Cochin	C.S.Gopinadha Pillai	Pri.Sci.	100	12- 3
Vizhinjam	G.Gopakumar	Sr.Sci.	25	-do-
	S.Jasmin	Scientist	50	-do-

Technical Assistance

8. Location of the Research Project: Cochin, Vizhinjam

9. a) Objectives: To study the present status of coral reefs in Lakshadweep, Gulf of Kutch and S.E. coast; to identify the causes of damage to reef ecosystem and to suggest remedial measures.

b) Practical Utility:

Coral reef ecosystems harbour a large number of species marine fauna including ornamental fishes, tuna live baits etc. which have linkages to the fishery potential around the region. In recent years the ecosystems have been affected by man made changes and other natural causes. The project aims at analysing these causes and suggesting remedial measures.

10. Technical Programme

1. To monitor the coral reefs in Lakshadweep, Gulf of Kutch and S.E. coast periodically to assess their present status with reference to associated fauna and to chart out areas of good coral growth.
2. To assess the damages caused to the coral reefs due to natural causes as well as human interference.
3. To conduct experimental work on transplantation and rejuvenation corals.

11. Date of start : 1989

12. Likely date of completion: 1992

13. Estimated man-months : 21 man months

14. Facilities required

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

15. If financed by an organisation other than the Institute

a) Name of financing organisation
b) Title of project

16. Approximate cost

a) Salary of scientific staff	: Rs 1.5 lakhs
b) Salary of technical staff	
c) Salary of supporting staff	
d) Casual labourer cost, if any	
e) Cost of equipment, facility etc.	
f) Contingencies, such as chemicals, fertilizers, seed, animals, feeds, sprayers etc.	: Rs 40,000
T.A.	: Rs 10,000
g) Total cost	: Rs 2.0 lakhs

17. Signature of

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

RESEARCH PROJECT 1990-91

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

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

4. Title of Project : Mariculture - Culture of live feed organisms

5. Title of Sub-Project : Mass culture of unicellular algae and other live feed organisms for use as feed in the hatcheries.

6. Name and designation of Project Leader: C.P. Gopinathan, Scientist SG

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

Centre	Name	Desig-nation	Time to be spent (%)	Work to be done
			25	
Tuticorin	C.P. Gopinathan	Scientist SG	~~50%~~	1-4
	P. Muthiah	"	25%	"
	A. Chellam	"	25%	"
Mandapam	Rita Jayasankar	Scientist	25%	"
Technical Assistance:				
Tuticorin	J.X. Rodrigo	T.II.3	25%	"

8. Location of work : Tuticorin, Mandapam

9. a) Objectives: (i) To isolate phytoplankters especially the flagellates and diatoms from the plankton of the coastal waters. (ii) To determine the acceptability of the unicellular algae as feed by the rearing organisms in the hatchery. (iii) Mass culture of the unicellular algae in the indoor and outdoor environments and study of the growth kinetics and nutritional aspects. (iv) To develop and maintain cultures of other marine organisms used as live food (Brachionus, Moina, Artemia).

b) Practical utility: The above investigation will help for the large-scale seed production of economically important cultivable marine organisms such as Oysters, Clams and Sea-cucumbers in the hatchery system.

10. Technical Programme: (1) Isolation of required species of unicellular micro-algae such as phytoflgellates and diatoms from the plankton of the coastal waters and maintain them as stock culture. (2) Mass culture of the required species of unicellular micro-algae and feeding them to the various organisms rearing in the hatcheries. (3) To study the growth kinetics and nutritional aspects of the micro-algae by conducting different experiments. (4) To develop and maintain culture of Moina, Brachionus, Artemia etc.

11. Date of start: 1990 12. Likely date of completion: 1992

13. Estimated man months : 15 man months/year

14. Facilities required:

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

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

a) Name of the financing organisation : No
b) Title of the project:

16. Approximate cost

a) Salary of Scientific staff	:	Rs. 1.2 lakhs
b) Salary of Technical staff	:	0.2 lakhs
c) Salary of Supporting staff	:	0.2 lakhs
d) Casual labourer cost, if any	:	-
e) Cost of equipment, facility etc.	:	0.5 lakhs
f) Contingencies, such as chemicals, fertilizers, seed, animals, feeds, sprayers etc.	:	0.2 lakhs
g) Total cost		2.3 lakhs

17. Signature of:

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

RESEARCH PROJECT 1990-91

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

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

4. Title of the Project: Breeding seed production and sea ranching of sea cucumber Holothuria scabra.

5. Title of Sub-Project:

6. Name and Designation of Project Leader: D.B. James, Scientist (SG)

7. Names and Designations of Project Leader and Project Associates together with time proposed to be spent and work to be done.

Centre	Name	Desig-nation	Time to be spent (%)	Work to be done
Tuticorin	D.B. James	Scientist (SG)	100%	1-3

Technical Assistance: N. Palaniswamy, T.II.3

8. Location of the Research Project: Tuticorin

9. a) Objectives:

Breeding seed production and sea ranching of sea cucumber Holothuria scabra

b) Practical Utility: At present India is exporting Beche-de-mer worth of nearly one crore of rupees. There is very great demand for beche-de-mer in Singapore and Hong Kong markets. The natural populations of H. scabra in the Gulf of Mannar and Palk Bay are fast dwindling due to overfishing. The natural populations can be revived by sea ranching programme.

10. Technical Programme:

1. To standardise the techniques for induced spawning.
2. To develop suitable rearing techniques for various stages of larvae.
3. To sea ranch the juveniles produced in the hatchery in suitable places to augment coastal production.

Work done: For the first time Holothuria scabra was induced to spawn in the laboratory. The various stages of larvae were successfully reared to juvenile stage.

11. Date of start: 1987 — 12. Likely date of completion: 1992

13. Estimated man months: 12

14. Facilities required:

i) Land : Nil
ii) Labour : 4 persons
iii) Special equipment: -
iv) Hatchery shed: Present
v) Fish ponds: Nil
vi) Foreign exchange: Nil
vii) Other items:
viii) Total estimated cost:

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

a) Name of the financing organisation: -

b) Title of the Project: -

16. Approximate cost:

a) Salary of scientific staff	:	Rs. 0.70 lakhs
b) Salary of Technical staff	:	0.30 lakhs
c) Salary of supporting staff:		
d) Casual labourer cost if any:	:	0.14 lakhs
e) Cost of equipment, facility etc.	:	1.00 lakh
f) Contingencies, such as chemicals, fertilizers, seed, animals, feeds, sprayers etc.	:	0.20 lakhs
g) Total cost		2.34 lakhs

17. Signature of:

Sd/-
Project Leader

Sd/-
Head of Division

Sd/-
Director

RESEARCH PROJECT PROPOSAL 1990-91

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

3. Name and address of Research Institute : Central Marine Fisheries Research Institute, Cochin-31.

4. Title of the Project : Fish and shellfish Nutrition

5. Title of Sub-Project : Farm trial of compounded feeds developed for prawns

6. Name and Designation of Project Leader : Dr. R.Paul Raj Scientist (SG)

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

Centre	Name	Designation	Time to be spent(%)	Work to be done
Madras	R.Paul Raj	Scientist(SG)	100	Planning of experiments &Tech Prog.1-4
"	M.Vijayakumaran	Scientist(SG)	100	Tech.Prog. 1-4
Tuticorin	D.Kandasami	Scientist(SG)	50	Tech.Prog. 1-4
Cochin	Manpal Kaur	Scientist	100	Composition analysis of feeds and raw materials

Technical Assistance: Madras: Dr.V.Selvaraj, Shri.Rangacharyulu, Shri. Shahul Hameed, Shri.Ahmed Kamal Basha.

8. Location of the Project : Madras

9. a) Objectives:

- to evaluate the efficacy of compounded feeds for semi-intensive and extensive prawn culture through farm trials.
- to evolve practical feeding strategies for the two types of farming systems.

../-

b) Practical Utility:

One of the major constraints encountered by prawn culturists is the non-availability of nutritionally adequate, water-stable feeds for feeding their culture stock at reasonable prices. The commercial prawn feeds available in the country are reported to be either too costly or of relatively poor quality in terms of water stability and nutrients balance. Nutrition research carried out at the Central Marine Fisheries Research Institute has led to the development of a few compounded pelleted feeds that have proved satisfactory in short-term laboratory trials for Penaeus indicus and Penaeus monodon. However, farm trial of these feeds is pre-requisite for their commercial application. The feed formulations found effective through farm trials and economically viable will be disseminated and end-users. The study would also help in evolving suitable feeding strategies (ration to be offered, feeding schedule, feeding frequency, feed dispensing methods) in the selected prawn culture systems to achieve optimum results.

---

10. Technical Programme:

1. Preparation of feeds for farm trials:
   - Manufacture of feeds: Weighing, grinding, sieving, mixing, pelleting, drying, bagging and storing.
2. Farm trials:
   - Selection and preparation of ponds
   - Procurement, transportation and stocking
   - Monitoring the physico-chemical characteristics of water and soil
   - Monitoring plankton and productivity
   - Gross estimates of benthos
   - Moniotoring microbial load
   - Application of feeds and feeding management
   - Monitoring growth(weekly cast-net samples)
   - Water level management
3. Response parameters:
   - Specific and relative growth rates, food conversion ratios, apparent protein efficiency ratios, Net protein retention, body composition, production and yield.

4. Assessment of economics of feed production and utilization:
   - Feed production economics
   - Prawn production economics

---

11. Date of start: 1990-91

---

12. Likely date of completion: Two years from the date of start. (1991-92)

---

13. Estimated man-months: 30 man-months (Scientific)

---

14. Facilities required:

i) Feed manufacturing plant, ware-house to store raw materials and finished feeds (To be provided by the manufacturer arranged by MPEDA)

ii) Ponds: 6 nos. preferably 0.5 ha size to be arranged MPEDA at Nellore in Andhra Pradesh.

(3 ponds for semi-intensive culture and 3 ponds for semi-extensive culture)

iii) Labour: Casual labourers for the feed manufacturing facility, seed and feed transportation, stocking, feeding, sampling, harvesting, pumping water, pond prepafation etc. (at least 2 persons)

iv) Watch and Ward for the farm: to be provided by the farm owner arranged by MPEDA.

v) Transport facilities for seed and feed.

vi) Nets, pumps, paddle-wheel aerators (to be provided Farm owner arranged by MPEDA)

vii) Raw materials for feed preparation

viii) Feeding trays

---

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

a) Name of financing organisation:

b) Title of the project:

---

16. Approximate cost:

a) Salary of scientific staff : Rs.1,10,000/yr

b) Salary of technical staff : Rs. 80,000/yr

c) Salary of supporting staff :

d) Casual labour cost, if any : (Given alongwith contingencies)

e) Cost of equipment, facility

.../-

f) Contingencies:

Chemicals	- 50,000
Glasswares	- 30,000
Feed	-3,50,000
Miscellaneous	- 20,000
TA/DA	- 40,000 per year
Labour	- 20,000 (for 2 persons approximately for 300 days during the project)

g) Total cost(excluding salaries and fixed costs) approximately Rs. 5,30,000/-

---

Signature of :

Project Leader Head of Division Director

RPF-I

RESEARCH PROJECT

1. Institute Code No. PNP/37 2. ICAR Code No.

3. Name and address of Research Institute : Central Marine Fisheries Research Institute, Cochin-31.

4. Title of Project : FISH AND SHELLFISH DISEASES

5. Title of Sub-Project : Disease investigation and disease control in culture system.

6. Name and Designation of Project Leader : Dr. K.C. George Scientist (SG)

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

Centre	Name	Designation	Time to be spent(%)	Work to be done
Cochin	K.C. George	Scientist(SG)	100%	1-7
Mandapam	A.P. Lipton	-do-	25%	1-4,7

Technical Assistance: A. Udayakumar

8. Location of the Research Project: C.M.F.R.I. Cochin-31

9.a) Objectives:

1. To investigate and identify the disease conditions affecting the culture system, hatcheries and brood stock.
2. To find out suitable control and prophylectic measures against such diseases.

b) Practical Utility: The area of fish pathology is a comparatively virgin area where not much information is available and neither much work has been done in our country. For achieving increased seafood production it is essential to identify the factors which are detrimental to such production and to remove the cause. Diseases are known to be established factors for reduced production in the aquaculture/mariculture. By quick diagnosis of the disease and applying suitable control measures we can increase the food production.

10. Technical Programme:

1. Collection of data regarding the details of culture system, hatcheries and brood stock management centres.
2. Collection of data regarding prevelence of diseases in finfishes, crustacea and molluscs.
3. On-the-spot investigations of diseases in culture ponds and hatcheries.
4. Collection of samples for histopathological and bacteriological examination.
5. Reproduction of the disease in the laboratory and trials for the control and prophylectic measures.
6. Histopathology of the affected specimen.
7. Bacteriological isolation and characterization.

---

11. Date of start: 1.1.1990 12. Likely date : 31.12.92 of completion.

---

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

---

14. Facilities required:

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

---

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

---

16. Approximate Cost:

a)	Salary of Scientific staff	- 90,000
b)	Salary of Technical staff	- 24,000
c)	Salary of Supporting staff	- -
d)	Casual Labourer cost, if any	- 6,000
e)	Cost of equipment, facility etc.	-1,00,000
f)	Contingencies, such as chemicals, fertilizers, seed, animals, feeds, sprayers etc.	- 25,000
g)	Total cost	2,45,000

---

17. Signature of:

Project Leader Head of Division Director

RP-I

RESEARCH PROJECT

1. Institute Code No. PNP/38 2. ICAR Code No.

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

4. Title of Project : Reproductive physiology of finfishes

5. Title of Sub-Project : Studies on cryopreservation and its influence on storage and viability of gametes in mullet.

6. Name and Designation of Project Leader : Dr. A.D. Diwan Scientist S-3

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

Centre	Name	Design-ation	Time to be spent (%)	Work to be done
Cochin	A.D. Diwan	S-3	70/100	

Technical Assistance : A. Nanda Kumar(Cochin)

8. Location of the Research Project : Cochin

9. a) Objectives: The main objective of this study is to evolve suitable techniques for preservation and storage of finfish sperms for shorter and longer duration period and further to assess the virility and viability of cryopreserved sperms by studying their motility, acrosome formation and fertilization of ripe eggs.

b) Practical Utility: The success of the production of animals primarily depends upon the availability of spawners and brooders. In our aquaculture system one of the major constrains is the non-availability of sufficient spawners at desired time. Therefore, to solve this problem it is felt to evolve a suitable method of obtaining sperms through creation of gamete banks so that through artificial fertilization one can be able to produce the seeds at any time of the year. If the method proved to be successful it may help in propagation of animals for the development of aquaculture.

10. Technical Programme:

1. Collection of matured spawners from wild and removal of semen (milt) by stripping and ova from the female.
2. Preservation of ova and semen in small semen chambers containing suitable cryoprotectants/diluents and subjecting semen samples for short and long term preservations through standard procedures.
3. Thawing of the preserved sperms and testing their virility and viability by motility, acrosome formation (histological and EM studies) and actual fertilization.
4. Biochemical studies of fresh and preserved semen (Total lipids, CHO and proteins).
5. Assessing the relative quality of the hatchlings produced with cryopreserved spermatozoa and ova.

11. Date of start :January 1990. 12. Likely date of completion. December 1991

13. Estimated man-months: 10 Man months/Year 5

14. Facilities required:

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

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

16. Approximate cost:

a) Salary of scientific staff	-	Rs. 51,240 (for one year)
b) Salary of Technical staff	-	6,000
c) Salary of Supporting staff	-	
d) Casual Labourer cost, if any	-	2,100@ 35/day for two months
e) Cost of equipment, facility etc.		
f) Contingencies, such as chemicals, fertilizers, seeds, animals, feeds, sprayers etc (including T.A.)		15,000
g) Total cost		17,100(Excluding salary)

17. Signature of:

Project Leader Head of Division Director

RESEARCH PROJECT

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

3. Name and Address of Research Institute : Central Marine Fisheries Research Institute, P.B.No.2704, Cochin-31.

4. Title of Project : Reproductive Physiology of Finfishes and Shellfishes.

5. Title of Sub-Project : Endocrinological factors influencing maturation in selected species of finfishes and prawns.

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

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

Centre	Name	Designation	Time to be spent (%)	work to be done
Cochin	Dr.N.Sridhar	Scientist	100%	Tech.Prog. 1-6
	Mohan K.Zachariah	"	100%	1-6
	A.K. Pandey	"	100%	1-6

Technical assistance:

8. Location of the Research Project:

9. (a) Objectives:

1. Identify the biotic and abiotic factors responsible for gonadal maturation in mullets and Penaeid prawns.
2. To isolate and purify the protein fractions from the hypothalamo-hypophyseal system and to study their role in triggering the maturation of the ovary in mullets.
3. To study the effect of eye-stalk fractions and catecholamines on gonadal development in the Penaeid prawns.

.../-

(b) Practical Utility:

i) Results of the present investigation can identify the neurosecretory material (NSM) as well as the protein fractions from the hypothalamo-hypophyseal system responsible for ovarian maturation. The isolated protein fractions could be tested for developing a viable technology for inducing gonadal development and maturation of these important consumable fishes in captivity.

ii) By isolation of one of these hormones and through bioassay procedures one can achieve gonadal development of prawns in short duration under controlled environment and thereby develop brood stock.

10. Technical programme:

1. Partial purification and accumulation of the protein fractions from the hypothalamo-hypophyseal system of mullets by standard biochemical procedures.
2. Testing of purified protein fractions and standardisation of their dosages.
3. Collection of eye-stalks from possible sources and isolation and purification of eye-stalk fractions through possible biochemical techniques.
4. Bioassay of eye-stalk fractions to observe gonadal development.
5. Histological comparison of gonadal maturation in test animals.
6. To study and simulate the environmental conditions desirable for gametogenesis of captive brood stock.

---

11. Date of start : January, 1989. 12. Likely date : December, of completion. 1991.

---

13. Estimated man-months: 105 months Man months/year.35months/year

.../-

14. Facilities required:

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

---

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

a) Name of financing organisation:
b) Title of Project:

---

16. Approximate cost: For 1990(One year)

	Rs.ps.
a) Salary of Scientific staff	- 87,500
b) Salary of Technical staff	
c) Salary of Supporting staff	
d) Casual Labourer cost if any	- 3,000
e) Cost of equipment,facility etc.	- 25,000
f) Contingencies,such as chemicals, fertilizers, seed, animals, feeds, sprayers etc.	- 50,000
g) Total cost	1,65,500

---

17. Signature of:

Project Leader Head of Division Director

RESEARCH PROJECT

1. Institute Code No. PNP/41 2. I.C.A.R. Code No.

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

4. Title of Project : Finfish and Shellfish Genetics

5. Title of Sub-Project : Identification of Genetic stocks in Indian Mackerel (*Rastrelliger kanagurta*)

6. Name and Designation of Project Leader : Dr. M.K. George Scientist (SG)

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

Centre	Name	Designation	Time to be spent(%)	Work to be done
Cochin				
	M.K.George	Scientist(SG)	~~100~~ 75	Tech.Prog. 1-4
	P.C. Thomas	Scientist(SG)	100	1-4
	I.D. Gupta	Scientist	100	1-4
	N.K. Verma	Scientist	100	1-4

Technical assistance : To be appointed

8. Location of the Research Project : Cochin

9.a) Objectives:

1. To study biochemical genetic polymorphism in populations of different locations.
2. To identify distinct genetic stocks sustaining the fishery, using population genetic analysis.

b) Practical Utility:

The information on genetic constitution of *Rastrelliger kanagurta* is in its infancy. The present study will help in explaining the genetic make up of the species and it would be possible to assess whether, the fishery is constituted by more than one genetic stock. The information on stock composition is essential for effective management and may help in forecasting the fluctuations.

10. Technical programme:

1.a) To standardize electrophoretic techniques to resolve and separate different enzyme systems and general proteins.

b) To standardize serological techniques for identification of blood groups.

2. To screen population samples to discover polymorphic enzyme systems.

3. To work out allelic frequencies of selected polymorphic enzyme systems/in populations samples collected from west and east coast./and blood groups

4. To compare statistically the gene frequencies between populations and between regions to identify the genetic stocks sustaining the fishery.

---

11. Date of start: 1990 12. Likely date of completion : 1991

---

13. Estimated man months : 45 man-months

---

14. Facilities required:

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

---

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

---

16. Approximate cost:

		Per year
a)	Salary of Scientific staff :	Rs.1,20,000
b)	Salary of Technical Staff :	20,000
c)	Salary of Supporting staff :	
d)	Casual labourer cost if any :	
e)	Cost of equipment :	30,000
f)	Contingencies such as, chemicals, fertilisers, seeds, animals, feed, sprayers etc. :	50,000
g)	Total cost :	3,20,000

---

17. Signature of:

Project Leader Head of Division Director

1. Institute code No: FE & E/23. 2. I.C.A.R.Code No:

3. Name and address of Research Institute: C.M.F.R.Institute, Cochin-31.

4. Title of project: Investigations on adoption potentials of fisheries innovations in marine sector.

5. Title of sub-project: Study on the feasibility of transfer of fish/prawn culture technologies in selected coastal villages.

6. Name and designation of project leader : P.S.B.R.James, Director

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

Centre	Name & Designation	Time to be spent (%)	Work to be done.
Cochin	P.S.B.R.James, Director	25	As per activity milestone.
	M.M.Thomas, P.S.	25	
	D.B.S.Sehara, S.G.	25	
	Jancy Gupta, Scientist	70	

Technical Assistance

Martin Thompson	T-7
K.N.R.Kartha	T-6
P.Radhakrishnan	T-5
A.Kanakkan	T-II.3
K.P.Salini	T-1

(Coopted Scientists: V.K.Pillai and Manpalkaur Sanhotra)

8. Location of the Research Project: Cochin

9(a) Objectives:

To study the feasibility of transfer of fish/prawn culture technologies by carrying out suitable extension programmes in selected coastal villages.

(b) Practical utility:

This project will serve as a strong linkage of the Institute with the fishermen and other development agencies and will form a suitable model for fisheries extension.

---

10. Technical programme:

a) Preliminary survey of the villages
b) Selection of target families
c) Benchmark survey of identified families
d) Demonstration of scientific fish and prawn culture
e) Training programmes for target groups
f) Organisation of film shows, seminars, field days, field trips etc.
g) Organisation of programmes for integrated development of villages.
h) Evaluation of the programme.

Work done: Nil

Work envisaged: Preliminary survey of the villages in Cochin area will be carried out to select suitable families. Benchmark survey of the selected families will be conducted and potential farms will be inspected. Culture ponds will be scientifically prepared and seeds of chanos chanos and mullets will be stocked. Seeds of P.indicus will be stocked in the same fields after 3 - 4 months and regular monitoring will be maintained. Training in fish culture, prawn culture, prawn seed collection and fish processing will be imparted. Impact of the programme will be studied.

---

11. Date of start: April 1990. 12. Likely date of completion : March 1992.

---

13. Estimated man-months: 35 man-months/year.

---

14. Facilities required:

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

---

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

a) Name of the financing organisation :

b) Title of the project:

---

16. Approximate cost:

a) Salary of Scientific staff	: Rs.0.71 lakhs per year	
b) Salary of Technical staff	: Rs.0.52 lakhs per year + Rs.0.20 lakhs (TA + DA)	
c) Salary of Supporting staff	: Nil	
d) Casual labourer cost, if any	: Nil	
e) Cost of equipment, facility etc.	: Nil	
f) Contingencies, such as chemicals, fertilizers, seed, animals, feeds, sprayers etc.:	: Rs.1 lakh for culture in about 30 acres (@ about Rs.3,000 per acre approx.) and Mass contact programmes.	
g) Total cost:	Rs.2.40 lakhs.	

17. Signature of:

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