

# **RESEARCH PROJECTS 1976**



**CENTRAL MARINE FISHERIES RESEARCH INSTITUTE**

**COCHIN-18**

**INDIAN COUNCIL OF AGRICULTURAL RESEARCH**

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COCHIN-18

RESEARCH PROJECTS - 1976

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RESEARCH PROJECT - 1976

1. Institute Code No:	FSS/FRA/FS 1.1
2. I.C.A.R. Code No:	
3. Name and address of Research Institute/Centre:	Central Marine Fisheries Research Institute, Cochin.
4. Title of Project: FSS/FRA/FS.1	Assessment of Marine Fishery Resources.
Title of Problem: FSS/FRA/FS 1.1	Sample Survey for estimating the marine fish production and effort expended to get the production from A-non-mechanised boats and B-mechanised boats.
5. Name and designation of Principal Investigator:	M.S. Prabhu, FS
6. Name(s) and designation of Associate(s) and Establishments on which borne:	
(a) <u>Whole time:</u>	(b) <u>Part time</u>
G.Krishnankutty Nair, Computer	M.G.Dayanandan, AFS.
P.Sivaraman, -do- 0	C.R.Shanmugha Velu, AFS.
V.P. Annam, -do- 0	S.K.Dharma Raja, AFS.
P.R. Krishna Kumari, -do- 0	P.Karunakaran Nair, RA.
V. Rajendran, -do- 0	Varughese Philipose, RA.
A. Kanakkan, -do- 0	K.Narayana Kurup, RA.
S.Haja Najeemudeen, -do- 0	B.Prasanna Kumari, RA.
	K.Balan, RA.
	U.K.Satyavan, RA.
	K.Vijayalakshmi, RA.
	Varughese Jacob, Computer
	K.Nandakumaran, JSA.
	G.Balakrishnan, RA. Madras
	Field Staff J.S.As and L.F.As.
7. Location of the Research Project:	Cochin
8. (a) Objectives:	
Estimation of marine fish production and effort in terms of number of operations of unit gear of different types of (a) non-mechanised boats and (b) mechanised boats along with the detailed breakup of the yield according to variety, region and type of gear and variation in the price structure at the landing centres.	



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### 8. (b) Practical Utility:

The data on catch and effort form the basic requirements for the assessment of exploited stocks. The estimates arrived at as well as the price statistics are made use of by the Governmental agencies and the fishing industry for the fishery developmental programmes in the country.

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### 9. Technical Programme:

The design of sample survey involves space-time stratification. A number of geographically contiguous landing centres form the stratum in space. A ten day period of a month is the time stratum. The primary sampling unit is a centre-day/centre-group of two days. Sampling is also adopted over hours of the selected day and the enumerating units consisting of non-mechanised and mechanised boats, are selected on a systematic basis. The data on night catches and also the landed cost of the different varieties of fishes are obtained by enquiry.

On the basis of estimates made for the primary sampling units, stratum estimates and their percentage error are arrived at. The period of estimation is a month.

Size composition of some of the commercially important species of fishes will be studied under sample survey.

The work programmes of the field staff are prepared at the Headquarters at Cochin and posted to the field staff well in advance for compliance. The field work of the staff is periodically inspected by the Inspecting Officers.

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10. Date of start:

1976

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11. Likely date of completion:

Continuing Project.

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12. Estimated man months:

515 man months/year.

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13. Facilities required:

i) land	--	iv) foreign exchange	--
ii) labour	--	v) Estimated cost:	Institute's Project.
iii) special equipment	--		

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14. If financed by an organisation other than the Institute

a) Name of the financing organisation	--
b) Title of the project (if the project forms a part of a larger project)	--

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15. Approximate cost:

Institute's Project

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16. Signatures of:

Sd.  
Principal Investigator

Head of Division

Sd.  
Director

RESEARCH PROJECT - 1976

1. Institute Code No:	FSS/FRA/FS-1.2
2. I.C.A.R. Code No:	
3. Name and address of Research Institute/Centre:	Central Marine Fisheries Research Institute, Cochin.
4. Title of Project: FSS/FRA/FS/1	Assessment of marine fishery resources.
Title of Problem: FSS/FRA/FS/1.2	Frame Survey.
5. Name and designation of Principal Investigator:	M.S. Prabhu, FS
6. Name(s) and designations of Associate(s) and Establishments on which borne:	
(a) <u>Whole time</u> : Nil	(b) <u>Part time</u>
	S.K.Dharma Raja, AFS.
	Varughese Philipose, RA.
	K.Narayana Kurup, RA.
	K.Balan, RA.
	Varughese Jacob, Computer.
	K.C. Yohannan, JSA.
	Field Staff J.S.As and L.F.As
7. Location of the research Project:	Cochin.
8. (a) Objectives:	
Village-wise data on fishermen population, fishing units of different types and information on fish landing centres constitute the frame of surveys conducted by this Institute. These will also bring out the nature of changing pattern of fishing industry and its consequent impact on fishermen.	
(b) Practical Utility:	
For computing the total marine fish production based on the sample survey and for studying the socic-economic conditions of the fishermen population as well as the changing pattern of fishing industry, the information collected on the village-wise data on fishermen population, fishing units and other information concerning the infrastructure is of vital importance.	

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9. Technical Programme:

Investigators will collect data by visiting different houses and fishing establishments in all the marine fishing villages in India. The data will include number of marine fishing villages, fishing establishments, marine fishermen population, number of active marine fishermen and number of fishing crafts etc. It is proposed to collect such data on a complete census basis every 5 years. The implementation of the Frame Survey will depend upon the availability of T.A. funds and Field personnel.

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10. Date of start: 1976 - 5th Survey

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11. Likely date of completion: End of 1976

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12. Estimated man months: 390 man months/year.

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13. Facilities required:

i) land	--	iv) foreign exchange	--
ii) labour	--	v) Estimated cost :	Institute's
iii) special equipment	--		Project.

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14. If financed by an organisation other than the Institute

a) Name of the financing organisation	--
b) Title of the Project (if the Project forms a part of a larger Project)	--

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15. Approximate cost: Institute's Project

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16. Signatures of:

Sd.  
Principal Investigator

Head of Division

Sd.  
Director

RESEARCH PROJECT - 1976

5

1. Institute Code No:	FSS/FRA/FS 1.3
2. I.C.A.R. Code No:	
3. Name and address of Research Institute/Centre:	Central Marine Fisheries Research Institute, Cochin.
4. Title of Project: FSS/FRA/FS 1	Assessment of Marine Fishery Resources.
Title of Problem: FSS/FRA/FS 1.3	Stock assessment and estimation of potential yield of commercially important fishes.
5. Name and designation of Principal Investigator:	Dr. M.S. Prabhu, FS
6. Name(s) and designations of Associate(s) and Establishments on which borne:	
(a) <u>Whole time:</u> Nil	(b) <u>Part time:</u>
	S.K.Dharma Raja, AFS
	K.Narayana Kurup, RA
	K.Balan, RA
	B.Prasanna Kumari, RA
	K.Vijayalakshmi, RA
	} Cochin
7. Location of the research project:	Cochin
8. (a) Objectives:	
Annual assessment of the stocks of commercially important fishes is essential for a rational exploitation of these stocks. The Fifth Meeting of the ICAR Panel has indicated the importance of such stock assessments. The aim of this project is to find out the effect of fishing on the stocks of commercially important fishes and thus determine the level of exploitation which will give the optimum sustained yields from the exploited stocks.	
(b) Practical Utility:	
Data are essential for the rational exploitation of the commercially important fish stocks as well as for the proper implementation of fishery management policies.	

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9. Technical Programme:

1. Analysis of monthly data on fish size. Estimation of age and growth. Expression of growth by suitable mathematical equation.
2. Collection of the data of sample size composition mentioned above. Conversion of available catch data (by weight) to size/age composition in number for every fishing season.
3. Estimation of relative abundance of various age groups for every fishing season.
4. Estimation of fishing and natural mortality rates.
5. Developing suitable mathematical models for estimating the yield by making use of other parameters (recruitment, growth and mortality rates) and estimating the maximum potential yield from each fishery along with the associated levels of exploitation.
6. Utilization of suitable biological informations for stock measurement and estimating the potential yield.

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10. Date of start: 1976

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11. Likely date of completion: continuing

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12. Estimated man months: 25 man months/year

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13. Facilities required:

i) land	--	iv) foreign exchange	--
ii) labour	--	v) Estimated cost:	Institute's
iii) special equipment	--		Project.

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14. If financed by an organisation other than the Institute

a) Name of the financing organisation	--
b) Title of the project (if the Project forms a part of a larger project)	--

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15. Approximate cost: Institute's Project

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16. Signatures of:

Sd.  
Principal Investigator

Head of Division

Sd.  
Director

Cochin

Madras

9. Technical Programme:

1. Preparation and distribution of standard forms for the collection of relevant data such as
2. Codifying and storing the data
3. Processing the data using the A.D.P. System.
4. Preparation of Charts showing the abundance of fish of different types.
5. Rapid dissemination of processed data to National and International agencies and Fishing industries.

10. Date of start: 1976

11. Likely date of completion: Continuing

12. Estimated man months: 49 man months/year

13. Facilities required:

- |                                |    |                                      |    |
|--------------------------------|----|--------------------------------------|----|
| i) land                        | -- | iv) foreign exchange                 | -- |
| ii) labour                     | -- | v) estimated cost:- Rs.1.5 lakhs for |    |
| iii) special equipment:- Basic |    | special equipments.                  |    |
| data processing electronic     |    |                                      |    |
| equipments.                    |    |                                      |    |

14. If financed by an organisation other than the Institute,

- a) Name of the financing organisation --
- b) title of the project (if the project forms a part of a larger project: --

15. Approximate cost: Forms part of the Institute's Projects and no separate estimates are available.

16. Signatures of:

Sd.		Sd.
Principal Investigator	Head of Division	Director

RESEARCH PROJECT - 1976

1. Institute Code No:	FSS/FRA/ST4																						
2. I.C.A.R. Code No.																							
3. Name and address of Research Institute/Centre	Central Marine Fisheries Research Institute, Cochin																						
4. Title of Project: FSS/FRA/ST1	National Fishery Data Centre,																						
Title of Problem:																							
5. Name and designation of Principal Investigator:	Dr. M.S. Prabhu, FS																						
6. Name(s) and designations of Associate(s) and Establishments on which borne:																							
(a) <u>Whole time</u> :	nil																						
(b) <u>Part time</u> :																							
	<table border="0"> <tr> <td>M.G. Dayanandan, A.F.S.</td> <td rowspan="6">}</td> <td></td> </tr> <tr> <td>C.R. Shanmughavelu, A.F.S.</td> <td></td> </tr> <tr> <td>S.K. Dharma Raja, A.F.S.</td> <td></td> </tr> <tr> <td>Varughese Philipose, R.A.</td> <td>Cochin</td> </tr> <tr> <td>K. Narayana Kurup, R.A.</td> <td></td> </tr> <tr> <td>U.K. Satyavan, R.A.</td> <td></td> </tr> <tr> <td>P. Karunakaran Nair, R.A.</td> <td></td> <td></td> </tr> <tr> <td>K. Nandakumaran, J.S.A.</td> <td></td> <td></td> </tr> <tr> <td>G. Balakrishnan, R.A.</td> <td></td> <td>Madras</td> </tr> </table>	M.G. Dayanandan, A.F.S.	}		C.R. Shanmughavelu, A.F.S.		S.K. Dharma Raja, A.F.S.		Varughese Philipose, R.A.	Cochin	K. Narayana Kurup, R.A.		U.K. Satyavan, R.A.		P. Karunakaran Nair, R.A.			K. Nandakumaran, J.S.A.			G. Balakrishnan, R.A.		Madras
M.G. Dayanandan, A.F.S.	}																						
C.R. Shanmughavelu, A.F.S.																							
S.K. Dharma Raja, A.F.S.																							
Varughese Philipose, R.A.		Cochin																					
K. Narayana Kurup, R.A.																							
U.K. Satyavan, R.A.																							
P. Karunakaran Nair, R.A.																							
K. Nandakumaran, J.S.A.																							
G. Balakrishnan, R.A.		Madras																					
7. Location of the research project:	Cochin																						
8. (a) Objectives:	The National Fishery Data Centre will be the store-house of all the data on exploratory and commercial fishing operations along with the environmental data. The relevant data from all exploratory vessels will be collected and their analysis will enable to draw up contour maps of various fisheries in relation to their abundance which will ultimately be of great value in the exploitation of untapped fishery resources.																						
(b) Practical Utility:	The monthly marine fish production reports in respect of maritime States and India as a whole and also the processed data of off-shore vessels compiled at the National Fishery Data Centre are utilised by the various Governmental and International agencies and fishing industries.																						



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9. Technical Programme:

1. Preparation and distribution of standard forms for the collection of relevant data such as
2. Codifying and storing the data
3. Processing the data using the A.D.P. System.
4. Preparation of Charts showing the abundance of fish of different types.
5. Rapid dissemination of processed data to National and International agencies and Fishing industries.

---

10. Date of start: 1976

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11. Likely date of completion: Continuing

---

12. Estimated man months: 49 man months/year

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13. Facilities required:

- |                                |    |                                      |    |
|--------------------------------|----|--------------------------------------|----|
| i) land                        | -- | iv) foreign exchange                 | -- |
| ii) labour                     | -- | v) estimated cost:- Rs.1.5 lakhs for |    |
| iii) special equipment:- Basic |    | special equipments.                  |    |
| data processing electronic     |    |                                      |    |
| equipments.                    |    |                                      |    |

---

14. If financed by an organisation other than the Institute,

- |   |    |
|---|----|
| a) Name of the financing organisation                                     | -- |
| b) title of the project (if the project forms a part of a larger project: | -- |

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15. Approximate cost: Forms part of the Institute's Projects and no separate estimates are available.

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16. Signatures of:

Sd.  
Principal Investigator

Head of Division

Sd.  
Director

RESEARCH PROJECT - 1976

1. Institute Code No:	FB/MF/1-1	
2. I.C.A.R. Code No:		
3. Name and address of Research Institute/Centre:	Central Marine Fisheries Research Institute, Cochin.	
4. Title of Project:	FB/MF/1	Investigations on the Clupeoid Fishery Resources.
Title of Problem:	FB/MF/1-1	The Fishery and resource characteristics of the oil sardine
5. Name and designation of Principal Investigator:	K.V. Sekharan, SFS	
6. Name(s) and designations of Associate(s) and Establishments on which borne:		
(a) <u>Whole time:</u>	(b) <u>Part time:</u>	
V. Balan, JFS	Calicut	P.Vijayaraghavan, JFS Cochin
		M.H.Dhulkhed, AFS Mangalore
		G.G.Annigeri, AFS Karwar
		V.S.Rengaswamy, RA Calicut
		R.Reghu, JSA Cochin
7. Location of the research project:	Cochin, Calicut, Mangalore and Karwar.	
8. (a) Objectives:		
	1. To prepare annual space/time fishery maps on the distribution pattern of the oil sardine. 2. To monitor the characteristics of the resource such as size and age composition, sex ratio, recruitment and mortality. 3. To assess the size of the exploitable resources. 4. To develop a prediction system.	
(b) Practical Utility:		
	The oil sardine, <u>Sardinella longiceps</u> , is the most abundant fish resource of India and contributed 15% of the marine landings of 1970-74. The fishery is composed mainly of the size group 10-15 cm. The characteristics of this resource in space and time have to be determined continuously and the catch trends watched. The areas from which production could be increased in different seasons have to be determined. In other words, continuous monitoring of the resource is of great importance to the fishing industry. It is also very important to undertake continuing studies to see that fishing does not affect adversely the production potential of this valuable natural resource.	

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9. Technical Programme:

1. A regular record of catch and effort data of different gears will be maintained at the centres selected for biological sampling from which the resource characteristics would be studied.
2. The relationship between the catch and the important environmental parameters will be examined, based on which prediction attempts will be made.
3. The distribution patterns of the exploited stock will be analysed for preparing fishery maps.

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10. Date of start: 1976

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11. Likely date of completion: Continuing

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12. Estimated man months: 40 man months/year

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13. Facilities required:

i) land	--	iv) foreign exchange	--
ii) labour	--	v) Estimated cost:	Institute
iii) special equipment	--		Project

---

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

- |   |  |
|---|--|
| a) Name of the financing organisation                                     | --   |
| b) Title of the Project (if the Project forms a part of a larger Project) | Investigations on the Clupeoid Fishery Resource. |

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15. Approximate cost: Institute Project

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16. Signatures of:

Sd.  
Principal Investigator

Sd.  
Head of Division

Sd.  
Director

- 
1. Institute Code No: FB/MF/1-2
- 
2. I.C.A.R. Code No:
- 
3. Name and address of Research Institute/Centre: Central Marine Fisheries Research Institute, Cochin.
- 
4. Title of Project: FB/MF/1 Investigations on the Clupeoid Fishery Resources.
- Title of Problem: FB/MF/1-2 Unit stocks of oil sardine.
- 
5. Name and designation of Principal Investigator: M.H. Dhulkhed, AFS
- 
6. Name(s) and designations of Associate(s) and Establishments on which borne:
- (a) Whole time: Nil
- (b) Part time:
- G.G. Annigeri, AFS Karwar  
V.S. Rengaswamy, RA Calicut  
R. Reghu, JSA Cochin
- 
7. Location of the Research Project: Cochin, Calicut, Mangalore and Karwar.
- 
8. (a) Objectives:
1. To identify the natural units, if any, in the population.
  2. To see whether these units mix during the season in any of the fishing zones.
- 
- (b) Practical Utility:
- It is necessary to see if there are different unit stocks in the fishery and if so, whether these are confined to particular regions during the season. This information is essential to understand the fluctuations in catches and to recommend measures for proper exploitation of the resource..
- 
9. Technical Programme:
1. Vertebral samples will be collected from different centres and statistical analyses of the samples made in order to test the significance of the differences in the vertebral counts.
  2. Electrophoretic studies will be undertaken of blood serum and muscle and eye lens proteins
  3. Other serological and immunological studies will be undertaken.
-

- 
10. Date of start: 1976
- 
11. Likely date of completion: 5 years
- 
12. Estimated man months: 16 man months/year
- 
13. Facilities required:
- |                        |    |                      |           |
|------------------------|----|----------------------|-----------|
| i) land                | -- | iv) Foreign exchange | --        |
| ii) labour             |    | v) Estimated cost:   | Institute |
| iii) special equipment | -- |                      | Project.  |
- 
14. If financed by an organisation other than the Institute:
- a) Name of the financing organisation --
- b) Title of the Project (if the Project forms a part of larger Project) : Investigations on the clupeoid fishery resources.
- 
15. Approximate cost: Institute Project
- 
16. Signatures of:

Sd.  
Principal Investigator

Sd.  
Head of Division

Sd.  
Director

RESEARCH PROJECT - 1976

1. Institute Code No:	FB/MF/1-3
2. I.C.A.R. Code No:	
3. Name and address of Research Institute/Centre:	Central Marine Fisheries Research Institute, Cochin.
4. Title of Project: FB/MF/1	Investigations on Clupeoid Fishery Resources.
Title of Problem: FB/MF/1-3	Evaluation of the resources of lesser sardines, anchovies and other clupeoids
5. Name and designation of Principal Investigator:	V. Balan, JFS
6. Name(s) and designations of Associate(s) and Establishments on which borne:	
(a) <u>Whole time</u> : Nil	(b) <u>Part time</u> :
	<u>Lesser sardine investigations</u>
	P. Sam Bennet, AFS, Tuticorin
	S. Lazarus, RA Vizhinjam
	P. Radhakrishnan Nair, RA Mandapam Camp.
	<u>Clupeoids of Bombay Regions</u>
	C. Muthiah, RA Bombay
	<u>Anchovies Investigation</u>
	G. Luther, AFS Vizhinjam
	R. Thiagarajan, RA Mandapam Camp
7. Location of the research project:	Mandapam Camp, Tuticorin, Vishinjam and Bombay.
8. (a) Objectives:	
	1. To evaluate the region-wise and species-wise abundance of lesser sardines, anchovies and other important clupeoids.
	2. To elucidate the important biological features of the different species.
	3. To study the homogeneity or otherwise of the exploited stocks.

---

8. (b) Practical Utility:

Lesser sardines, anchovies and other clupeoids form about 14% of the total marine fish landings and the fishery is important along the coasts of Andhra Pradesh, Tamil Nadu and Kerala. There are good prospects for developing their fisheries into highly productive ones along the south east and south west coast of India if more information on the distribution and abundance could be obtained. Fluctuations in the annual production do not appear wholly to indicate any large scale changes in recruitment. Informations along these along the north west coast is scanty.

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## 9. Technical programme:

1. Collection of resources data relating to catch and effort.
  2. Study of biological aspects such as age and size composition, sex ratio, maturity and spawning.
  3. Analysis of distribution pattern of the resources along both the coasts.
  4. Examination of meristic and morphometric characteristics to identify the stocks.
- 

10. Date of start: 1976

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11. Likely date of completion: 1980

---

12. Estimated man months: 40 man months/year

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## 13. Facilities required:

i) land	--	iv) Foreign exchange	--
ii) labour		v) Estimated cost:	Institute
iii) special equipment	--		Project

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## 14. If financed by an organisation other than the Institute:

- a) Name of the financing organisation --
  - b) Title of the project (if the Project forms a part of larger Project) Investigations on the clupeoid fishery resources.
- 

15. Approximate cost: Institute Project

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## 16. Signatures of:

Sd.  
Principal Investigator

Sd.  
Head of Division

Sd.  
Director

RESEARCH PROJECT - 1976

1. Institute Code No:	FB/MF/1-4
2. I.C.A.R. Code No:	
3. Name and address of Research Institute/Centre:	Central Marine Fisheries Research Institute, Cochin.
4. Title of Project: FB/MF/1	Investigation on Glupeoid Fishery Resources.
Title of Problem: FB/MF/1-4	Oil sardine fishery atlas.
5. Name and designation of Principal Investigator:	K.V. Sekharan, SFS.
6. Name(s) and designations of Associate(s) and Establishment(s) on which borne:	
(a) <u>Whole time:</u> Nil	(b) <u>Part time:</u>
	P. Vijayaraghavan, JFS ) Varughese Philipose, RA ) Cochin R. Reghu, JSA )
7. Location of the research project:	Cochin
8. (a) Objectives:	
1. To indicate the average monthly catch of oil sardine, in different zones during 1970-74.	
2. To prepare charts showing the commercial abundance of oil sardine in different grounds in relation to environmental factors.	
3. To demarcate the grounds commercially exploited at present.	
4. To indicate the potential grounds for expansion of the fishery.	
(b) Practical Utility:	
Fishery Atlas would be of great help to the industry. The fifth meeting of the CAC for exploratory survey of marine fisheries strongly recommended the preparation of the Atlas.	
9. Technical programme:	
1. The catch data of 1970-74 will be analysed and the average monthly catch in different zones will be computed.	
2. The available information on the relative abundance of oil sardine in different grounds will be analysed.	
3. The present information on the biological characteristics of the resource will be evaluated and summarised.	



- 
10. Date of start: 1976
- 
11. Likely date of completion: 1977
- 
12. Estimated man months 16 man months
- 
13. Facilities required:
- |                        |    |                      |           |
|------------------------|----|----------------------|-----------|
| i) land                | -- | iv) Foreign exchange | --        |
| ii) labour             |    | v) Estimated cost:   | Institute |
| iii) special equipment | -- |                      | Project   |
- 
14. If financed by an organisation other than the Institute:
- a) Name of the financing organisation --
- b) Title of the Project (if the Project forms a part of larger Project) Investigations on the clupeoid fishery resources.
- 
15. Approximate cost: Institute Project
- 
16. Signatures of:

Sd.  
Principal Investigator

Sd.  
Head of Division

Sd.  
Director

RESEARCH PROJECT - 1976

1. Institute Code No.	FB/MF/1-5
2. I.C.A.R. Code No.	
3. Name and address of Research Institute/Centre.	Central Marine Fisheries Research Institute, Cochin.
4. Title of Project: FB/MF/1	Investigations on <u>Glupeoid</u> Fishery Resources.
Title of Problem: FB/MF/1.5	The present status of the oil sardine fishery.
5. Name and designation of Principal Investigator	K.V.Sekharan, SFS
6. Name(s) and designations of Associate(s) and Establishment(s) on which borne:	
(a) <u>Whole time</u> : nil	(b) <u>Part time</u> : P.Vijayaraghavan, JFS } Cochin Varghese Philipose, RA } R.Reghu, JSA } V.Balan, JFS } Calicut V.S.Rengaswamy, RA } M.H.Dhulkhed, AFS } Mangalore G.G.Annigeri, AFS } Karwar
7. Location of the research project:	Cochin, Calicut, Mangalore and Karwar.
8. (a) Objectives:	
1. To review the trends of landings of oil sardine along different sections of the coast	
2. To collate and analyse the present knowledge regarding the relative abundance and distribution of oil sardine in different grounds.	
3. To evaluate the present information on the population parameters	
4. To evaluate the possibility of increasing the catches.	
(b) Practical utility:	
For increasing the landings of oil sardine it is first of all essential to review critically the present catch trends, the biological parameters of the stocks and other related aspects. The preparation of the status report has also been recommended by the V meeting of the CAC on exploratory survey. The report is expected to throw light on the possibility of further expansion of the fishery.	

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9. Technical Programme:

1. The catch data of 1970-74 will be analysed to estimate the monthly average landings along different sections of the coast.
2. The available information on the relative abundance and distribution of the fish will be collated and analysed.
3. The size and age-composition of the landings in different regions will be reviewed.
4. The mortality estimates will be critically evaluated.

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10. Date of start: 1976

-----  
11. Likely date of completion: 1977

-----  
12. Estimated man months: 16 annually

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13. Facilities required:

- |                        |    |                      |           |
|------------------------|----|----------------------|-----------|
| i) land                | -- | iv) Foreign exchange | --        |
| ii) labour             | -- | v) estimated cost:   | Institute |
| iii) special equipment | -- |                      | project   |

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

- a) Name of the financing organisation:
- b) title of the project (if the : Investigation on clupeoid  
project forms a part of larger fishery resources.  
project):

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15. Approximate cost: 'Institute Project'

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16. Signatures of:

Sd.  
Principal Investigator

Sd.  
Head of Division

Sd.  
Director

RESEARCH PROJECT - 1976

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1. Institute Code No. FB/MF/1.6
- 
2. I.O.A.R. Code No.
- 
3. Name and address of Research Institute/Centre Central Marine Fisheries Research Institute, Cochin
- 
4. Title of Project: FB/MF/1 Investigations on clupeoid fishery resources
- Title of problem: FB/MF/1.6 The present status of the fishery of anchovies.
- 
5. Name and designation of Principal Investigator K.V.Sekharan, SFS
- 
6. Name(s) and designations of Associate(s) and Establishment(s) on which borne:
- (a) Whole time: nil
- (b) Part time
- |                       |   |         |
|-----------------------|---|---------|
| P.Vijayaraghavan, JFS | } | Cochin  |
| M.M.Meiyappan, RA     |   |         |
| R.Reghu, JSA          |   |         |
| V.Ramamohana Rao, AFS | } | Waltair |
| G.Luther, AFS         |   |         |
- Vizhinjam
- 
7. Location of the research project: Cochin, Waltair and Vizhinjam
- 
8. (a) Objectives:
1. To review the trends of landings of the anchovies along different sections of the coast.
  2. To collate and analyse the present knowledge regarding the relative abundance and distribution of anchovies in different grounds.
  3. To evaluate the present information on the population parameters
  4. To evaluate the possibility of increasing the catches.
- 
- (b) Practical utility:
- Recent investigations show that there are good unexploited resources of anchovies especially along the south west and south east coasts. However for increasing their landings it is first of all essential to review critically the present catch trends, the biological parameters of the stocks and other related aspects.
- The preparation of the status report has also been recommended by the V meeting of the CAC on exploratory survey of marine fisheries. The report is expected to throw light on the possibility of further expansion of the fishery.
-

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9. Technical programme:

1. The catch data of 1970-74 will be analysed to estimate the monthly landings along different sections of the coast.
2. The available information on the relative abundance and distribution of the fishes will be collated and analysed.
3. The size-and age-composition of the landings in different regions will be reviewed.

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10. Date of start: 1976

---

11. Likely date of completion 1977

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12. Estimated man months: 16 man months/year

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13. Facilities required:

i) land	--	iv) Foreign exchange	--
ii) labour	--	v) Estimated cost :	Institute
iii) special equipment	--		project

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

- a) Name of the financing organisation:
- b) title of the project (if the project forms a part of larger project): Investigation on clupeoid fishery resources

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15. Approximate cost: Institute Project

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16. Signatures of:

Sd.  
Principal Investigator

Sd.  
Head of Division

Sd.  
Director

RESEARCH PROJECT -1976

1. Institute Code No.	FB/MF/2.1
2. I.C.A.R. Code No.	
3. Name and address of Research Institute/Centre	Central Marine Fisheries Research Institute, Cochin.
4. Title of Project: FB/MF/2	Investigations on Mackerel Fishery Resources.
Title of Problem: FB/MF/2.1	The fishery and resource characteristics of the mackerel
5. Name and designation of Principal Investigator:	K.V.Sekharan, SFS
6. Name(s) and designations of Associate(s) and Establishment(s) on which borne:	
(a) <u>Whole time:</u>	(b) <u>Part time</u>
K.Rajasekharan Nair, RA Vizhinjam.	M.Vasudev Pai, JFS G.M.Kulkarni, RA V.Balakrishnan, JFS A.Noble, AFS M.M.Meiyappan, RA G.Seshappa, FS R.S.Lalmohan, AFS T.M.Yohannan, RA P.Nammalwar, RA D.B.James, SRA
	} Karwar } Cochin } Calicut } Mandapam } Port Blair
7. Location of the research project:	Cochin, Karwar, Calicut, Vizhinjam Mandapam Camp and Port Blair.
8. (a) Objectives:	
1. To study the relative abundance of mackerel ( <u>Rastrelliger</u> spp.) in space and time.	
2. To analyse and maintain, on continuing basis, data on resources characteristics, such as distribution, size and age composition, sex ratio, recruitment and mortality.	
3. To assess the exploitable resource.	
(b) Practical utility:	
The mackerel, <u>Rastrelliger kanagurta</u> (Cuvier) is one of the three most important marine fishes in this country and forms 2-18% of the annual marine catch. The characteristics of this natural resource in space and time have to be constantly determined, and the catch trends watched. The seasons when the catches can be increased and the areas from where such increase in production could be obtained have to be assessed. In other words continuous monitoring of the resource is of great importance to the fishing industry. It is also very important to undertake continuing studies to see that fishing does not adversely affect the production potential of this valuable natural resource.	

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9. Technical Programme:

1. Data on catch and effort for the mackerel fishery will be collected at centres mentioned above, based on random sampling.
2. Studies will be made of the extent of correlation between the relative abundance of mackerel and environmental parameters, to see whether a short-term prediction system for the fishery could be developed.
3. Study the size, age-composition recruitment and mortality will be made by sampling the catch at selected by representative centres which will serve as the monitoring stations.
4. Growth rate variation and movement of mackerel will be studied by regular tagging programme.
5. Racial studies on the species R. kanagurta will be undertaken.

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10. Date of start:

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11. Likely date of completion: Continuing

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12. Estimated man months: 56 man months/year

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13. Facilities required:

- |                        |    |                      |           |
|------------------------|----|----------------------|-----------|
| i) land                | -- | iv) Foreign exchange | --        |
| ii) labour             | -- | v) Estimated cost:   | Institute |
| iii) special equipment | -- |                      | Project   |

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14. If financed by an organisation other than the Institute,

- a) Name of the financing organisation: --
- b) title of the project (if the project forms a part of larger project) : Investigations on the mackerel resources.

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15. Approximate cost:

Institute Project.

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16. Signatures of:

Sd.  
Principal Investigator

Sd.  
Head of Division

Sd.  
Director

RESEARCH PROJECT - 1976

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1. Institute Code No. FB/MF/2.2
- 
2. I.C.A.R. Code No.
- 
3. Name and address of Research Institute/Centre Central Marine Fisheries Research Institute, Cochin
- 
4. Title of Project: FB/MF/2 Investigations on Mackerel Fishery Resources.  
 Title of Problem: FB/MF/2.2 Unit stocks of mackerel.
- 
5. Name and designation of Principal Investigator: V. Balakrishnan, JFS
- 
6. Name(s) and designations of Associate(s) and Establishment(s) on which borne:  
 (a) Whole time: nil (b) part time:  
 M.V. Pai, JFS } Karwar  
 G.M. Kulkarni, RA }  
 M.H. Dhulkhed, AFS } Mangalore  
 T.M. Ychannan, RA } Calicut  
 M.M. Meiyappan, RA } Cochin
- 
7. Location of the research project: Cochin, Calicut, Karwar and Mangalore.
- 
8. (a) Objectives:  
 1. To identify the natural units, if any, of the population  
 2. To see whether these units mix during the season in any of the fishing zones.
- 
- (b) Practical utility:  
 It is necessary to see if there are different unit stocks in the fishery and if so whether these are confined to particular regions during the season. This information is essential to understand the nature of fluctuations in catches, and to recommend measures for proper exploitation of the resources.
- 
9. Technical programme:  
 1. Vertebral samples will be collected from different centres and statistical analysis of the samples made in order to test the significance of the differences among the samples.  
 2. A statistical analysis will be made of the important meristic and morphometric characters of the samples from different centres.  
 3. Electrophoretic studies will be undertaken of the blood serum and the muscle and eye lens proteins.
-



- 
10. Date of start: 1976
- 
11. Likely date of completion 5 years
- 
12. Estimated man months: 24 man months/year
- 
13. Facilities required:
- |                        |    |                      |           |
|------------------------|----|----------------------|-----------|
| i) land                | -- | iv) Foreign exchange | --        |
| ii) labour             |    | v) Estimated cost:   | Institute |
| iii) special equipment | -- |                      | project   |
- 
14. If financed by an organisation other than the Institute,
- |   |  |
|---|--|
| a ) Name of the financing organisation:                                   | --                                       |
| b ) title of the project (if the project forms a part of larger project): | Investigations on the mackerel resources |
- 
15. Approximate cost: ~~Institute Project~~ ~~Project~~ ~~the~~  
~~Center~~ ~~of~~ ~~Marine~~ ~~Resources~~ ~~and~~  
~~Institute~~ ~~etc.~~
- 
16. Signatures of:
- |                        |                  |          |
|------------------------|------------------|----------|
| Sd.                    | Sd,              | Sd.      |
| Principal Investigator | Head of Division | Director |

RESEARCH PROJECT - 1976

1. Institute Code No.	FB/MF/2.3		
2. I.C.A.R. Code No.			
3. Name and address of Research Institute/Centre	Central Marine Fisheries Research Institute, Cochin		
4. Title of the project: FB/MF/1	Investigation on Mackerel Fishery Resources.		
Title of problem: FB/MF/2.3	Mackerel fishery atlas		
5. Name and designation of Principal Investigator	K.V.Sekharan, SFS		
6. Name(s) and designations of Associate(s) and Establishment(s) on which borne:			
(a) <u>Whole time</u> : nil	(b) <u>Part time</u>		
	V.Balakrishnan, JFS	}	Cochin
	A.Noble, AFS		
	K.Balan, RA		
7. Location of the research project:	Cochin.		
8. (a) Objectives:			
1. To indicate the average monthly catch of mackerel in different zones during 1970-74.			
2. To prepare charts showing the commercial abundance of the fish in different grounds in relation to environmental factors.			
3. To demarcate the grounds commercially exploited at present			
4. To indicate the potential grounds for expansion of the fishery.			
(b) <u>Practical utility</u>			
1. Fishery Atlas would be of great help to the industry. The fifth meeting of the CAC for exploratory survey of marine fisheries has strongly recommended the preparation of the Atlas.			
9. Technical programme:			
1. The catch data of 1970-74 will be analysed and the average monthly catch in different zones will be computed.			
2. The available information on the relative abundance of mackerel in different grounds will be analysed.			
3. The present information on the biological characteristics of the resource will be evaluated and summarised.			
10. Date of start:	1976		

11. Likely date of completion: 1977

12. Estimated man months: 16 man months

13. Facilities required:

- i) land
- ii) labour
- iii) special equipment

- iv) Foreign exchange --
- v) Estimated cost: Institute project

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

- a) Name of the financing organisation:
- b) title of the project (if the project: Investigations on mackerel forms a part of larger project): fishery resources.

15. Approximate cost: Institute Project

16. Signatures of:

Sd.  
Principal Investigator

Sd.  
Head of Division

Sd,  
Director

RESEARCH PROJECT - 1976

- 
1. Institute Code No. FB/MF/2.4
- 
2. I.C.A.R. Code No.
- 
3. Name and address of Research Institute/Centre Central Marine Fisheries Research Institute, Cochin
- 
4. Title of Project: FB/MF/2 Investigations on ~~Mackerel Fishery Resources~~.  
 Title of Problem: FB/MF/2.4 The present status of the mackerel fishery.
- 
5. Name and designation of Principal Investigator K.V.Sekharan, SFS
- 
6. Name(s) and designations of Associate(s) and Establishment(s) on which borne:  
 (a) Whole time: nil  
 (b) Part time  
     G.Seshappa, FS ) Calicut  
     T.M.Yohannan, RA )  
     G.Venkataraman, JFS ) M.Camp  
     M.V.Pai, JFS ) Karwar  
     V.Balakrishnan, JFS ) Cochin  
     A.Noble, AFS )  
     K.Rajasekharan Nair, RA ) Vizhinjam
- 
7. Location of the research project: Cochin, Calicut, Karwar, Mandapam Camp and Vizhinjam.
- 
8. (a) Objectives:
1. To review the trends of landings of mackerel along different sections of the coast.
  2. To collate and analyse the present knowledge regarding the relative abundance and distribution of mackerel in different grounds
  3. To evaluate the present information on the population parameters.
  4. To evaluate the possibility of increasing the catches.
- 
- (b) Practical utility:
1. For increasing the landings of mackerel it is first of all essential to review critically the present catch trends, the biological parameters of the stocks and other related aspects. The preparation of the status report has also been recommended by the V meeting of the CAC on exploratory survey. The report, is expected to throw light on the possibility of further expansion of the fishery.
-

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9. Technical programme:

1. The catch data of 1970-74 will be analysed to estimate the monthly landings along different sections of the coast.
  2. The available information on the relative abundance and distribution of the fish will be collated and analysed.
  3. The size and age-composition of the landings in different regions will be reviewed.
  4. The mortality estimates will be critically evaluated.
- 

10. Date of start: 1976

---

11. Likely date of completion: 1977

---

12. Estimated man months: 16 man months/year

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13. Facilities required:

- |                        |    |                      |           |
|------------------------|----|----------------------|-----------|
| i) land                | -- | iv) Foreign exchange | --        |
| ii) labour             | -- | v) Estimated cost:   | Institute |
| iii) Special equipment | -- |                      | project   |
- 

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

- a) Name of the financing organisation:
  - b) title of the project (if the project forms a part of larger project): Investigation on mackerel resources
- 

15. Approximate cost: Institute Project

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16. Signatures of:

Sd.  
Principal Investigator

Sd.  
Head of Division

Sd.  
Director

RESEARCH PROJECT - 1976

- 
1. Institute Code No: FB/MF/3.1
- 
2. I.C.A.R. Code No:
- 
3. Name and address of Research Institute/Centre: Central Marine Fisheries Research Institute, Cochin.
- 
4. Title of Project: FB/MF/3 Investigations on the Resources of Tunas and Related Fishes.
- Title of Problem: FB/MF/3.1 Resources of tunas and bill fishes.
- 
5. Name and designation of Principal Investigator: E.G. Silas, Director.
- 
6. Name(s) and designations of Associate(s) and Establishment(s) on which borne:
- |                        |         |                        |           |
|------------------------|---------|------------------------|-----------|
| (a) <u>Whole time:</u> |         | (b) <u>Part time:</u>  |           |
| P.Livingston, RA       | Minicoy | M.D.K.Kuthalingam, JFS | Vizhinjam |
|                        |         | V. Balan, JFS          | Calicut   |
|                        |         | M.S.Rajagopalan, AFS   | Cochin    |
|                        |         | K.J.Mathew, SRA        |           |
|                        |         | Pon Siraimetan, RA     | Tuticorin |
- 
7. Location of the Research Project: Cochin, Vizhinjam, Tuticorin Calicut and Minicoy.
- 
8. (a) Objectives:
- The world catch of tunas and related species has been steadily increasing since 1945 and in the Indian Ocean the growth of the tuna fishery has been spectacular since 1952 and it is estimated that about 1,75,000 tonnes of these fishes (including related species) are caught in the Indian Ocean. Some of the areas of abundance of the species are close to India and there is an immediate need for utilising this rich resource to the best advantage to the country. There are several coastal species such as Euthynnus affinis, Sarda orientalis, Kishionella tonggol and frigate mackerel (Auxis thazard and A.rochei) which are under-fished. The project is aimed at estimating the resources and biology of tunas and related fishes and also investigate the bait fish resources in the Bay Islands.
- 
- (b) Practical Utility:
- Although tunas form less than 0.5% of the annual marine catch of the country, the potential for the development of their fishery is great. The Indian Ocean stocks of tunas are now exploited by many foreign nations. More information on the biology and stock characteristics of these fishes as well as of bill fishes will be of great help in expanding their fisheries.
-

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### 9. Technical Programme:

1. Stock assessment of various species of tunas
2. Sub-population studies - based on blood group characteristics
3. Migratory habit of different species based on tagging programmes
4. Productivity and food chain studies relating to tunas and related species
5. Investigation on tuna associated species in long lining such as pelagic sharks, Alepisaurus and dolphin (Coryphaena)
6. Investigations on the bait fish resources in the Lakshadweep
7. Environmental studies in relation to tuna fisheries
8. Modern methods of detecting tuna resources, using sonar etc.
9. Fishery and biology of tunas and other related fishes such as bill fishes.
10. Investigate sea birds associated with surface shoals of tunas which help in scouting for tunas.

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10. Date of start: 1976

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11. Likely date of completion: 1980

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12. Estimated man months: 28 man months/year

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### 13. Facilities required:

i) land	--	iv) Foreign exchange	--
ii) labour		v) Estimated cost:	Institute
iii) special equipment	--		Project

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### 14. If financed by an organisation other than the Institute:

- a) Name of the financing organisation --
- b) Title of the Project (if the Project Investigations on tunas and forms a part of larger Project): related fishes.

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15. Approximate cost: Institute Project

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### 16. Signatures of:

Sd.  
Principal Investigator

Sd.  
Head of Division

Sd.  
Director

RESEARCH PROJECT - 1976

1. Institute Code No:	FB/MF/3.2
2. I.C.A.R. Code No:	
3. Name and address of Research Institute/Centre:	Central Marine Fisheries Research Institute, Cochin.
4. Title of Project: FB/MF/3	Investigations on the resources of tunas and related fishes.
Title of Problem: FB/MF/3.2	Status report on the fisheries for tunas and related species of the Indian Ocean.
5. Name and designation of Principal Investigator:	E.G. Silas, Director.
6. Name(s) and designations of Associate(s) and Establishments on which borne:	
(a) <u>Whole time</u> : Nil	(b) <u>Part time</u> : M.S. Rajagopalan, AFS Cochin
7. Location of the research project:	Cochin.
8. (a) Objectives:	
To indicate the trend in tuna catches along the coasts of India and in the Indian Ocean; to evaluate the relative abundance of various species in different areas; to critically examine the existing data on population parameters and to indicate the possibilities for future expansion in the fisheries for various species.	
(b) Practical Utility:	
The fishing industry and the marine product export trade is looking forward to diversification of the Country . exportable products and tunas could be one of the most important groups which could be profitably exploited in the high seas and along the coasts of India. For this purpose the Vth meeting of the Central Advisory Committee on Exploratory Survey of Marine Fisheries has called for a Status Report on tuna fisheries. This project will critically evaluate the present catch trends, biological aspects, distribution and migratory aspects etc for each important species. It is proposed to examine also the fishing methods, crafts & gears and other aspects connected with tuna fisheries.	



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9. Technical Programme:

1. Analysis of catch trends for various species along different zones and areas based on catch statistics for the years 1970-74.
2. Analysis of relative abundance and distribution of various species.
3. Estimation of size and age composition and also other population parameters.
4. To evaluate the fishing methods, crafts, gears and other aspects.

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10. Date of start: 1976

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11. Likely date of completion: 1977

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12. Estimated man months: 6 man months/year

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13. Facilities required:

i) land	--	iv) Foreign exchange	--
ii) labour	--	v) Estimated cost:	Institute
iii) special equipment	--		Project.

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

- a) Name of the financing organisation --
- b) Title of the Project (if the Project forms a part of a larger Project): --

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15. Approximate cost: Institute Project

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16. Signatures of:

Sd.  
Principal Investigator

Head of Division

Sd.  
Director

RESEARCH PROJECT - 1976

1. Institute Code No:	FB/MF/3.3
2. I.C.A.R. Code No:	
3. Name and address of Research Institute/Centre:	Central Marine Fisheries Research Institute, Cochin.
4. Title of Project: FB/MF/3	Investigations on the resources of tunas and related fishes.
Title of Problem: FB/MF/3-3	Resources of seer fishes.
5. Name and designation of Principal Investigator:	M.V. Pai, JFS
6. Name(s) and designations of Associate(s) and Establishment(s) on which borne:	
(a) <u>Whole time</u> : Nil	(b) <u>Part time</u> :
	M. Devaraj, SRA Mandapam Camp T.M. Yohannan, RA Calicut
7. Location of the research project:	Karwar, Mandapam Camp, Calicut.
8. (a) Objectives:	
1. To study the relative abundance of seer fishes in space and time.	
2. To evaluate the fishery and resource characteristics of seer fishes, such as size and age composition, sex-ratio, recruitment and mortality.	
(b) <u>Practical Utility</u> :	
The importance of seer fishes in the internal and external trade is increasing. At present they form about 1.5% of the annual marine landings of the country. If more information on their distribution and relative abundance could be supplied that would be of help in increasing their catches and their share in the fish trade.	

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9. Technical Programme:

1. A regular record of catch and effort at selected centres will be maintained for estimating the relative abundance of the group in different grounds.
2. Studies will be made of the biology of the important species.
3. Detailed study will be made of the size and age composition of the catches and recruitment and mortality of these fishes at selected centres.

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10. Date of start: 1976

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11. Likely date of completion: 1980

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12. Estimated man months: 12 man months/year

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13. Facilities required:

- |                        |    |                      |           |
|------------------------|----|----------------------|-----------|
| i) land                | -- | iv) Foreign exchange | --        |
| ii) labour             |    | v) Estimated cost:   | Institute |
| iii) special equipment | -- |                      | Project.  |

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

- a) Name of financing organisation --
- b) Title of the Project (if the Project forms a part of larger Project): Investigations on the resources of tunas and related fishes.

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15. Approximate cost: Institute Project

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16. Signatures of:

Principal Investigator

Sd.  
Head of Division

Sd.  
Director

- 
1. Institute Code No: FB/MF/4.1
- 
2. I.C.A.R. Code No:
- 
3. Name and address of Research Institute/Centre: Central Marine Fisheries Research Institute, Cochin.
- 
4. Title of Project: FB/MF/4 Investigations on Bombay Duck and Lizard Fish resources.
- Title of Problem: FB/MF/4.1 Studies on the fishery and resource characteristics of Bombay duck and lizard fish.
- 
5. Name and designation of Principal Investigator: S.V. Bapat, JFS
- 
6. Name(s) and designations of Associate(s) and Establishments on which borne:
- (a) Whole time:
- (b) Part time:
- Bombay duck investigations
- |                   |   |         |
|-------------------|---|---------|
| A.S. Kaikini, AFS | } | Bombay  |
| A. Kurien, RA     |   |         |
| M.Z. Khan, RA     |   | Veraval |
- Lizard fish investigations
- |                      |        |
|----------------------|--------|
| S. Basheeruddin, AFS | Madras |
|----------------------|--------|
- 
7. Location of the research project: Bombay, Madras and Veraval.
- 
8. (a) Objectives:
1. To assess the relative abundance of the Bombay duck and lizard fish in space and time.
  2. To monitor the characteristics of the resources such as size and age composition, sex ratio, recruitment and mortality.
  3. To study the effect of fishing on the Bombay duck population with special reference to the changes in mean size and mean age of the landed fish.
-

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### 8. (b) Practical Utility:

Bombay duck forms an important fishery in India yielding a catch of 60,000-70,000 tonnes per annum. As there are indications of the resource . being subjected to heavy fishing pressure a /watch careful/on the catch trends and stock characteristics should be maintained. The study on the stock has to be intensified considerably. The lizard fishes are the important constituents of the trawl catches especially in the region where the Bombay duck is scarce. Information on their biology and relative abundance would help in increasing the demersal fishery production.

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### 9. Technical Programme:

Accurate resources data especially on catch and effort will be collected from landing centres and also by personal participation in the surveys conducted by the fishing vessels.

Biological aspects such as, age and growth, food and feeding habits, maturity, sex ratio, spawning and migration will be studied along with stock assessment.

---

10. Date of start: 1976

---

11. Likely date of completion: continuing

---

12. Estimated man months: 40 man months/year

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### 13. Facilities required:

i) land	--	iv) Foreign exchange	--
ii) labour	--	v) Estimated cost:	Institute
iii) special equipment	--		Project.

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### 14. If financed by an organisation other than the Institute:

a) Name of the financing organisation --

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

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### 15. Approximate cost:

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### 16. Signatures of:

Principal Investigator

Head of Division

Sd.  
Director

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1. Institute Code No:	FB/MF/4.2
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2. I.C.A.R. Code No:	
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3. Name and address of Research Institute/Centre:	Central Marine Fisheries Research Institute, Cochin.
-----	
4. Title of Project: FB/MF/4	Investigations on the Resources of Bombay Duck and Ligard Fishes.
Title of Problem: FB/MF/4.2	Unit stocks of Bombay duck.
-----	
5. Name and designation of Principal Investigator:	S.V. Bapat, JFS
-----	
6. Name(s) and designations of Associate(s) and Establishments on which borne:	
(a) <u>Whole time</u> : Nil	(b) <u>Part time</u> :
	M.V. Deshmukh, AFS } M.K. George, SRA } Bombay A. Kurian, RA }
-----	
7. Location of the research project:	Bombay.
-----	
8. (a) Objectives:	
1. To identify the natural units if, any, of the population	
2. To see whether these units mix during the season in any of the fishing zones.	
-----	
(b) Practical Utility:	
<u>/is</u>	The Bombay duck fishery is confined to the Gujarat and Maharashtra coasts. The resource at present/subjected to heavy fishing pressure. It is necessary to know whether there are different
<u>/are</u>	natural stocks in the fishery and if all these/being exploited intensively. This information is essential for recommending measures for proper exploitation of the resource.
-----	
9. Technical Programme:	
1. A statistical study of important morphometric characters of the fish samples collected from representative fishing centres will be made in order to find out the probability of occurrence of different unit stocks.	
2. Electrophoretic studies of the blood serum, muscle and other tissue proteins will be undertaken.	
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10. Date of start: 1976
- 
11. Likely date of completion 5 years
- 
12. Estimated man months: 80 man months/year
- 
13. Facilities required:
- |                        |    |                      |           |
|------------------------|----|----------------------|-----------|
| i) land                | -- | iv) Foreign exchange | --        |
| ii) labour             |    | v) Estimated cost    | Institute |
| iii) special equipment | -- |                      | Project.  |
- 
14. If financed by an organisation other than the Institute:
- a) Name of the financing organisation --
- b) Title of the Project (if the Project Evaluation of the resource of  
forms a part of larger Project): Bombay duck and lizard fishes.
- 
15. Approximate cost: Institute Project
- 
16. Signatures of:

Sd. .  
Principal Investigator

Sd.  
Head of Division

Sd.  
Director

RESEARCH PROJECT - 1976

- 
1. Institute Code No: FB/DR/1.1
- 
2. I.C.A.R. Code No:
- 
3. Name and address of Research Institute/Centre: Central Marine Fisheries Research Institute, Cochin.
- 
4. Title of Project: FB/DR/1 Investigations on Major Demersal Fishery Resources.
- Title of Problem: FB/DR/1.1 Studies on the resources of cat fishes, perches and carangids.
- 
5. Name and designation of Principal Investigator: B. Krishnamoorthi, JFS
- 
6. Name(s) and designations of Associate(s) and Establishments on which borne:
- (a) Whole time: Nil (b) Part time:
- Cat fish investigations
- P. Mojumder, AFS } Waltair  
 S.S. Dan, AFS }  
 N.Gopinatha Menon, RA Mandapam Camp
- Carangid investigations
- P.V. Srinivasan, RA Vizhinjam
- 
7. Location of the research project: Mandapam Camp, Waltair, and Vizhinjam.
- 
8. (a) Objectives:
1. To evaluate the relative abundance of the resources of the cat-fishes at the Mandapam area and the carangids of the Andhra-Orissa coast, and the Vizhinjam coast both in space and time.
  2. To delimit new and/or under-exploited fishing grounds.
  3. To study the growth, feeding and reproductive biology of the commercially important species in the groups mentioned.
-



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### 8. (b) Practical Utility:

The knowledge gained as detailed in (a) has immediate application in the exploitation of the resources in the areas concerned besides helping in the formulation of management policies for a rational exploitation. Since the groups mentioned are edible, a knowledge of their availability would help in increasing harvests of food from the seas.

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### 9. Technical Programme:

1. Observations on the inshore and offshore catches.
  2. Collection of environmental data.
  3. Collection of representative samples of fish for examination at the laboratory.
  4. Collection of data on length, food and maturity cycles of the species concerned both at the laboratory and in the field.
  5. Application of growth models to understand the status of the fishery.
- 

10. Date of start:

1976

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11. Likely date of completion:

Continuing

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12. Estimated man months:

20 man months/year

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13. Facilities required:

i) land	--	iv) Foreign exchange	--
ii) labour		v) Estimated cost:	Institute
iii) special equipment	--		Project.

---

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

a) Name of the financing organisation	--
b) Title of the Project (if the Project forms a part of larger Project):	Investigations on major demersal fishery resources.

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15. Approximate cost:

Institute Project

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16. Signatures of:

Principal Investigator

Head of Division

Sd.  
Director

RESEARCH PROJECT - 1976

- 
1. Institute Code No: FB/DR/1.2
- 
2. I.C.A.R. Code No:
- 
3. Name and address of Research Institute/Centre: Central Marine Fisheries Research Institute, Cochin.
- 
4. Title of Project: FB/DR/1 Investigations on Major Demersal Fishery Resources.
- Title of Problem: FB/DR/1.2 Sciaenid and polynemid resources of the east and west coast of India.
- 
5. Name and designation of Principal Investigator: T. Tholasilingam, FS
- 
6. Name(s) and designations of Associate(s) and Establishment(s) on which borne:
- (a) Whole time: Nil
- (b) Part time:
- Sciaenid investigations
- |                             |   |          |
|-----------------------------|---|----------|
| S.J. Rajan, AFS             | } | Madras   |
| S. Srinivasarengan, RA      |   |          |
| V. Sriramachandra Murty, RA |   | Kakinada |
| K.V. Somasekharan Nair, RA  |   | Calicut  |
| A.A. Jayaprakash, RA        |   | Bombay   |
- Polynemid Investigations
- |                  |               |
|------------------|---------------|
| K. Dorairaj, AFS | Mandapam Camp |
|------------------|---------------|
- 
7. Location of the research project: Mandapam Camp, Madras, Calicut  
Bombay and Kakinada
- 
8. (a) Objectives:
1. To study the fishery and biology of commercially important species of sciaenid and polynemid fishes.
  2. To evaluate the changes in the stock characteristics.
- 
- (b) Practical Utility:
- The sciaenids form about 5.5% and the polynemids about 0.5% of the annual marine fish catch of the country. Both form important constituents of the trawl catches. Our knowledge of the species composition and characteristics of important stocks is still inadequate. The project will help to elucidate these aspects and indicate possibilities of increasing the catches. The effect of fishing on the stocks will be a subject of continuous study.
-

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9. Technical Programme:

1. Data on catch trend, relative abundance and biology of fish to be collected at the fish landing centres and on board exploratory fishing vessels.
2. Age, growth, food and feeding, maturation and spawning etc., of commercially important species to be studied.

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10. Date of start: 1969

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11. Likely date of completion: Continuing

---

12. Estimated man months: 28 man months/year

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13. Facilities required:

i) land	--	iv) Foreign exchange	--
ii) labour	--	v) Estimated cost:	Institute
iii) special equipment.	--		Project.

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

- a) Name of the financing organisation --
- b) Title of the Project (if the Project forms a part of larger Project): Investigations on the major demersal fishery resources.

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15. Approximate cost:

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16. Signatures of:

Principal Investigator

Head of Division

Sd.  
Director

RESEARCH PROJECT - 1976

1. Institute Code No:	FB/DR/1.3
2. I.C.A.R. Code No:	
3. Name and address of Research Institute/Centre:	Central Marine Fisheries Research Institute, Cochin.
4. Title of Project: FB/DR/1	Investigations on Major Demersal Fishery Resources.
Title of Problem: FB/DR/1.3	Studies on the resources of silver bellies and ribbon fishes.
5. Name and designation of Principal Investigator:	G. Venkataraman, JFS
6. Name(s) and designations of Associate(s) and Establishments on which borne:	
(a) Whole time:	(b) Part time:
<u>Silver bellies investigations</u>	<u>Ribbon fish investigations</u>
J.C. Gnanamuthu, AFS Madras	P.T. Meenakshisundaram, AFS Madras
	Y. Appanna Sastry, RA Kakinada
7. Location of the research project:	Mandapam Camp, Madras, and Kakinada.
8. (a) Objectives:	
1. To study the fishery and biology of silver bellies and commercially important species of ribbon fishes. 2. To keep a close watch on the catch trends. 3. To study the effect of fishing on the stocks.	
(b) Practical Utility:	
The introduction of trawl fishing has led to the development of a major fishery for silver bellies in the Mandapam area. Recently decline in the catch and catch per unit of effort of this group have been noted. It is necessary to keep a close watch on the development of the fishery. The ribbon fishes form important fisheries along both the coasts and the work proposed relates to monitoring of stocks at a few representative centres.	

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9. Technical Programme:

1. Data on fisheries to be collected at the fish landing centres and on board exploratory fishing vessels.
  2. Age, growth, reproduction and feeding of selected species under each group to be studied.
  3. The relation between fishing pressure and the changes in the characteristics of the stocks to be investigated.
- 

10. Date of start: 1969

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11. Likely date of completion: Continuing

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12. Estimated man months: 32 man months/year

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13. Facilities required:

i) land	--	iv) Foreign exchange	--
ii) labour	--	v) Estimated cost:	Institute
iii) special equipment	--		Project

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

- a) Name of the financing organisation --
  - b) Title of the Project (if the Project forms a part of larger Project) : Investigations on the major demersal fishery resources.
- 

15. Approximate cost:

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16. Signatures of:

Principal Investigator

Head of Division

Sd.  
Director

RESEARCH PROJECT - 1976

- 
1. Institute Code No. FB/DR/1.4
- 
2. I.C.A.R. Code No.
- 
3. Name and address of Research Institute/Centre Central Marine Fisheries Research Institute, Cochin
- 
4. Title of project: FB/DR/1 Investigation on Major Demersal Fishery Resources.  
 Title of problem: FB/DR/1.4 Evaluation of demersal resources of some selected areas
- 
5. Name and designation of principal investigator C.Mukundan, JFS
- 
6. Name(s) and designations of Associate(s) and Establishment(s) on which borne:
- (a) Whole time: nil
- (b) Part time
- |                            |              |
|----------------------------|--------------|
| V.M.Deshmukh, AFS          | } Bombay     |
| M.K.George, AFS            |              |
| A.Jayaprakash              |              |
| C.Muthiah                  |              |
| P.Karunakaran Nair, RA     | } Cochin     |
| M.M.Meiyappan, RA          |              |
| M.Vijayakumar, JSA         |              |
| P.Sam Bennet, AFS          | } Tuticorin  |
| K.Dorairaj, AFS            |              |
| M.Devarajan, SRA           | } Mandapam   |
| K.K.Appukuttan, RA         |              |
| N.Gopinatha Menon, RA      |              |
| P.N.Radhakrishnan Nair, RA |              |
| S.J.Rajan, AFS             | } Madras     |
| P.T.Meenakshisundaram, AFS |              |
| S.Srinivasa rangan, RA     |              |
| R.Sarvesan, SRA            |              |
| Y.Appannasastry, RA        | } Kakinada   |
| W.Venugopalan, RA          |              |
| B.Krishnamoorthi, JFS      | } Waltair    |
| V.Ramamohan Rao, AFS       |              |
| S.Reuben, AFS              | }            |
| S.S.Dan, AFS               |              |
| P.Mejunder, AFS            |              |
| D.B.James, SRA             | } Port Blair |
- 
7. Location of the research project: Cochin, Bombay, Tuticorin, Madras, Mandapam Camp, Kakinada, Waltair and Port Blair.
- 
8. (a) Objectives:
- To evaluate the area-wise and seasonwise abundance of the demersal resources by detailed investigations at selected centres.
-

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### 8. (b) Practical utility:

In any attempt to increase fish catch from the sea, the first need is to know the relative richness of the different fishing grounds so that any increased effort would be commercially justified. The present project, based on exploratory fishing of the coastal shelf areas, would provide such a picture. This would form the basis for later more comprehensive investigations on the whole of our exploitable fishery resources.

---

### 9. Technical programme:

1. To the extent the Institute's boats could be used, exploratory trawling would be carried out and the results analysed.
  2. By arrangement with such bodies as the EEP/IFP the log sheets of their boats operating trawls and other gear would be analysed.
  3. The data from the trawling operations by privately owned boats would also be covered to the extent feasible.
  4. The catch and effort data would be analysed from the respective fishery grounds, demarked into 10 mile squares, and the fish production evaluated in terms of month, type of vessel, fish category and area (unit square) (Grounds at least up to 75 m in depth are to be explored)
- 

10. Date of Start: 1976

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11. Likely date of completion: 1980

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12. Estimated man months: 150 annually

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### 13. Facilities required:

- |                        |    |                      |                   |
|------------------------|----|----------------------|-------------------|
| i) land                | -- | iv) Foreign exchange | --                |
| ii) labour             | -- | v) Estimated cost:   | Institute project |
| iii) special equipment | -- |                      |                   |
- 

### 14. If financed by an organisation other than the Institute,

- a) Name of the financing organisation: I.C.A.R.
  - b) title of the project (if the project forms a part of larger project): Investigations on major demersal fishery resources
- 

15. Approximate cost: Institute Project

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### 16. Signatures of:

Sd.  
Principal Investigator

Head of Division

Sd.  
Director

RESEARCH PROJECT - 1976

- 
1. Institute Code No. FB/DR/1.5
- 
2. I.C.A.R. Code No.
- 
3. Name and address of Research Institute/Centre Central Marine Fisheries Research Institute, Cochin
- 
4. Title of Project: FB/DR/1 Investigations on Major Demersal Fishery Resources:  
 Title of Problem: FB/DR/1.5 Studies on the resources of flat fishes and pomfrets
- 
5. Name and designation of Principal Investigator G.Seshappa, FS
- 
6. Name(s) and designations of Associate(s) and Establishment(s) on which borne:
- |                               |                                   |
|-------------------------------|-----------------------------------|
| (a) <u>Whole time:</u>        | (b) <u>Part time</u>              |
| <u>Pomfret investigations</u> | <u>Flat fish investigations</u>   |
| J.P.Karbhari, AFS - Veraval   | G.Nandakumar, RA - Mandapam Camp. |
- 
7. Location of the research project: Mandapam Camp, Calicut and Veraval
- 
8. (a) Objectives:
1. to study the fishery, biology and resource characteristics of commercially important flat fishes and pomfrets.
  2. to evaluate the change in the stock of the Malabar sole in relation to fishing.
- 
- (b) Practical utility:
- The Malabar sole (flatfish) forms an important single species fishery off the Malabar and South Kanara coasts and is expanding with the introduction of mechanised boats. A careful watch on the stock is necessary. The pomfrets are among the best quality table fishes of the country and are especially important along the Maharashtra and Gujarat coasts. There are considerable lacunae in our knowledge of their resource characteristics
- 
9. Technical programme.
- i. Data on the catch and relative abundance of the fishes to be collected at the landing places and also on board exploratory fishing vessels.
  - ii. Studies on age, growth, maturity, spawning, food and feeding etc. of commercially important species to be undertaken.
  - iii. The mortality rates of the Malabar sole to be estimated.
-



- 
10. Date of start: 1969
- 
11. Likely date of completion: Continuing
- 
12. Estimated man months: 24 annually
- 
13. Facilities required:
- |                        |    |                      |           |
|------------------------|----|----------------------|-----------|
| i) land                | -- | iv) Foreign exchange | --        |
| ii) labour             | -- | v) Estimated cost    | Institute |
| iii) special equipment | -- |                      | project   |
- 
14. If financed by an organisation other than the Institute.
- |   |  |
|---|--|
| a) Name of the financing organisation:                                  | I.C.A.R.   |
| b) Title of the project (if the project forms a part of larger project: | Investigations on major demersal fishery resources |
- 
15. Approximate cost: Institute Project
- 
16. Signatures of

Principal Investigator

Head of Division

Sd.  
Director

RESEARCH PROJECT - 1976

- 
1. Institute Code No. FB/OF/1
- 
2. I.C.A.R. Code No.
- 
3. Name and address of Research Institute/Centre Central Marine Fisheries Research Institute, Cochin.
- 
4. Title of Project: FB/OF/1 Investigations on Other Fishery Resources  
 Title of Problem: FB/OF/1.1 Studies on commercially important elasmobranch resources.
- 
5. Name and designation of Principal Investigator M.D.K.Kuthalingam, JFS
- 
6. Name(s) and designations of Associate(s) and Establishment(s) on which borne:  
 (a) Whole time: nil  
 (b) Part time  
 K.K.Appukuttan, RA } Mandapam  
 R.Soundararajan, RA } Camp.  
 M.E.Rajapandiyam, RA } Tuticorin
- 
7. Location of the research project: Mandapam Camp, Tuticorin and Vizhinjam
- 
8. (a) Objectives:
1. To find out the regional and species-wise abundance of sharks, rays and skates and their seasonal fluctuations.
  2. To elucidate the various biological aspects such as food and feeding habits, age and growth, reproduction and embryonic development of commercially important species of sharks, rays, and skates.
- 
- (b) Practical utility:  
 Although elasmobranchs form about 4% of the marine fish landings in India, the resource-oriented studies have not made much headway in the country. As a first step in this direction it is proposed to determine the relative abundance of sharks, rays, and skates, species-wise and season-wise, at a few selected centres. The data so gathered will be of use in developing the fishery.
-

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9. Technical programme:

1. Estimation of species-wise catch trends with reference to different types of gears at selected centres.
2. Determination of age and growth.
3. Study of length-weight relationship.
4. Analysis of gut contents
5. Observations on the maturity of gonads.
6. Investigations on fecundity, variation in the number of intrauterine embryos, duration and periodicity of gestation (in viviparous form) and other relevant aspects of study to determine the reproductive potentiality of the various species.

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10. Date of start: 1976

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11. Likely date of completion: 1980

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12. Estimated man months: 16 annually

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13. Facilities required:

- |                        |    |                      |           |
|------------------------|----|----------------------|-----------|
| i) land                | -- | iv) Foreign exchange | --        |
| ii) labour             | -- | v) Estimated cost    | Institute |
| iii) special equipment | -- |                      | Project   |

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14. If financed by an organisation other than the Institute,

- a) Name of the financing organisation: ICAR
- b) title of the project (if the project: Studies on major  
forms a part of larger project: demersal fishery  
resources

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15. Approximate cost:

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16. Signatures of:

Principal Investigator

Head of Division

Sd.  
Director

1. Institute Code No. FB/CUL/1.1
2. I.C.A.R. Code No.
3. Name and address of Research Institute/Centre Central Marine Fisheries Research Institute, Cochin.
4. Title of Project: FB/CUL/1  
Title of Problem: FB/CUL/1.1 Mariculture - Culture of fishes  
Culture of marine fishes.
5. Name and designation of Principal Investigator K.V.Sekharan, SFS
6. Name(s) and designation of Associate(s) and Establishment(s) on which borne:
  - (a) Whole time:
  - (b) Part time

P.Bensam, AFS	}	Tuticorin
R.Marichamy, SRA		
V.Ramamohana Rao, AFS	}	Waltair
T.Appa Rao, AFS		
S.Reuben, AFS	}	Mangalore
M.H.Dhulkhed, AFS		
N.S.Radhakrishnan, AFS	}	Cochin
A.Noble, AFS		
7. Location of the research project: Cochin, Waltair, Tuticorin and Mangalore.
8. (a) Objectives:
  1. To investigate the possibility of salt water culture of fishes in different centres.
  2. To assess the production potential of different groups of fishes in commercial culture.
- (b) Practical utility:
 

There are vast stretches of low lying areas along the coast of the country which lie fallow at present but could be converted into fish farms. The project is expected to help in this direction.
9. Technical Programme:
  1. Location of suitable sites for marine fish farms.
  2. Rearing of fry to fingerling stage and releasing them in salt and brackish water farms.
  3. Estimation of production under different conditions.

- 
10. Date of start: 1976
- 
11. Likely date of completion: 1980
- 
12. Estimated man months: 18 annually
- 
13. Facilities required:
- |                        |    |                      |           |
|------------------------|----|----------------------|-----------|
| i) land                | -- | iv) Foreign exchange | --        |
| ii) labour             | -- | v) Estimated cost:   | Institute |
| iii) special equipment | -- |                      | project   |
- 
14. If financed by an organisation other than the Institute:
- a) Name of the financing organisation:
- b) title of the project (if the project forms a part of larger project): Mariculture Investigations
- 
15. Approximate cost: Institute Project
- 
16. Signatures of:

Sd.  
Principal Investigator

Sd.  
Head of Division

Sd.  
Director

RESEARCH PROJECT - 1976

- 
1. Institute Code No: FB/CUL/1.2
- 
2. I.C.A.R. Code No.
- 
3. Name and Address of Research Institute/Centre Central Marine Fisheries Research Institute, Cochin
- 
4. Title of project:FB/CUL/1. Mariculture - Culture of fishes.  
Title of problem:FB/CUL/1.2 Running water culture of eel
- 
5. Name and designation of Principal Investigator R.V.Nair, Deputy Director
- 
6. Name(s) and designations of Associate(s) and Establishment(s) on which borne:
- (a) Whole time: nil (b) part time  
K.Dorairaj, AFS ) Mandapam  
R.Soundararajan, RA ) Camp
- 
7. Location of the research project: Mandapam Camp
- 
8. (a) Objectives:
1. To culture eels in running water
  2. To compound suitable feeds for the fish
  3. To estimate the growth rate and production potential of the fish under different conditions.
- 
- (b) Practical utility:
- Elvers command a good market in Japan, Similarly in foreign countries, the fresh water eel is a favoured item among food fishes.
- The elver resources of the country are practically unutilised at present.
- The present project is expected to result in development of the eel culture technology suitable to this country.
- 
9. Technical programme:
1. Elver resource survey will be conducted in important centres in Tamil Nadu
  2. Elvers and eels will be cultured in different densities in the laboratory tanks with running water.
  3. Suitable feeds will be compounded
  4. Production during different periods and with different types of feed will be estimated.
-

- 
10. Date of start: 1976
- 
11. Likely date of completion: 1980
- 
12. Estimated man months: 18 man months/year
- 
13. Facilities required:
- |                        |    |                      |           |
|------------------------|----|----------------------|-----------|
| i) land                | -- | iv) Foreign exchange | --        |
| ii) labour             | -- | v) Estimated cost    | Institute |
| iii) Special equipment | -- |                      | project   |
- 
14. If financed by an organisation other than the Institute:
- a) Name of the financing organisation:
- b) title of the project (if the project forms  
a part of larger project): Mariculture investigations.
- 
15. Approximate cost: Institute Project
- 
16. Signatures of:
- |                        |                  |          |
|------------------------|------------------|----------|
|                        | Sd.              | Sd.      |
| Principal Investigator | Head of Division | Director |

RESEARCH PROJECT - 1976

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1. Institute Code No.	CF/RE/1.1	
-----		
2. I.C.A.R. Code No.		
-----		
3. Name and address of Research Institute/Centre	Central Marine Fisheries Research Institute, Cochin.	
-----		
4. Title of Project	CF/RE/1 Crustacean Resources Investigations.	
Title of Problem	CF/RE/1.1 Assessment of Prawn Resources	
-----		
5. Name and designation of Principal Investigator	S. Ramamurthy, JFS	
-----		
6. Names and designations of Associates and Establishments on which borne:		
(a) <u>Whole time</u>		
M.M.Kunju JFS	} -Calicut	
K.Koumudi Menon JSA		
P.V.Kagwade JFS	} -Bombay	
M.Aravindakshan SRA		
V.Thangaraj		
Subramanian SRA		
K.K.Sukumaran RA	} -Goa	
P.A.Thomas SRA		
K.Y.Telang SRA	-Karwar	
K.Devarajan RA	-Madras	
A.E.Sampson SRA	-Waltair	
Manickam		
K.N.Rajan SRA	-Puri	
(b) <u>Part Time</u>		
M.S.Muthu JFS*	} -Cochin	
M.M.Thomas AFS		
N.S.Kurup SRA		
N.N.Pillai SRA		
C.Suseelan SRA		
M.Kathirvel RA		
K.V.George RA		
K.N.R.Kartha JSA		
K.N.Gopalakrishnan JSA		
S.Lakshmi JSA		
C.Nalini JSA		
M.Manickaraja, LFA		- Mangalore
J.P.Karbhari, AFS		- Veraval
S.Shunmugham RA		- Tuticorin
S.Nandakumar RA	- Mandapam	
G.Sudhakara Rao SRA	Camp	
	- Kakinada	

\*Associate Project Leader

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7. Location of the research project	Cochin, Mandapam Camp, Bombay, Karwar, Mangalore, Calicut, Tuticorin, Madras, Waltair, Veraval, Panaji, Kakinada and Puri
-----	

## 8. (a) Objectives

1. To study the relative abundance of the various species of commercially important penaeid and non-penaeid prawns along the Indian coast in space and time and to assess the magnitude of the exploitable resources.
2. To analyse and maintain on a continuing basis, data on resource characteristics such as size and age composition, sex-ratio, recruitment, growth and mortality of the



2. To get reliable indices of abundance of the postlarvae and juvenile prawns in the estuaries and backwaters and correlate them with the index of abundance of the adult prawns in the sea, with a view to predicting the magnitude of the marine prawn fishery.

4. To describe the salient features of the larval stages of various species of penaeid and non-penaeid prawns.

#### 8. (b) Practical Utility:

The Prawn fishing industry in India has expanded rapidly in recent years. New Fishing grounds have been discovered and exploitation in the existing grounds has increased considerably. The effect of increased fishing pressure on the magnitude of the prawn populations has to be studied to avoid overfishing. This project would help in monitoring the state of the prawn populations and provide scientific data for framing suitable management policies to obtain maximum sustainable yield from the prawn resources. The project also envisages the possibility of forecasting the magnitude of prawn catch four months in advance.

#### 9. Technical Programme:

1. Data on catch and effort for the prawn fishery in the sea (and brackishwater areas, if present) will be collected at the centres mentioned above, based on random sampling.
2. Data on species composition and seasonal abundance of the various species will be collected at each centre.
3. Data on size composition, sex-ratio and maturity will be collected for the important species of prawns.
4. Estimates of growth and mortality will be made for the important species.
5. Studies on recruitment of postlarval, juvenile and adult prawns in their respective environments will be undertaken.
6. Mature females of commercially important species of prawns will be bred in the laboratory to describe the larval stages.

10. Date of start : 1969

11.. Likely date of completion: Continuing

12. Estimated man months: 214 man months/year

#### 13. Facilities required:

- |                        |    |                      |           |
|------------------------|----|----------------------|-----------|
| i) land                | -- | iv) foreign exchange | --        |
| ii) labour             | -- | v) estimated cost:   | Institute |
| iii) Special equipment | -- |                      | project   |

14. If financed by an organisation other than the Institute

- a) Name of the financing organisation --
- b) title of the project (if the project forms a part of a larger project) --

15. Approximate cost: --

RESEARCH PROJECT - 1976

1. Institute Code No. CF/RE/1.2
2. I.C.A.R. Code No.
3. Name and address of Research Institute/Centre Central Marine Fisheries Research Institute, Cochin.
4. Title of Project CF/RE/1 Crustacean Resources Investigations
- Title of Problem CF/RE/1.2 Estimation of population parameters of prawns off Cochin by research vessel survey
5. Name and designation of Principal Investigator M.S.Muthu, JFS
6. Name(s) and designation(s) of Associate(s) and Establishments on which borne:
- (a) Whole time: nil
- (b) Part time
- |              |     |             |
|--------------|-----|-------------|
| M.M.Thomas   | AFS | } - Cochin. |
| N.S.Kurup    | SRA |             |
| C.Suseelan   | SRA |             |
| M.Kathirvel  | RA  |             |
| K.N.R.Kartha | JSA |             |
| K.N.Gopala   | JSA |             |
| krishnan     | JSA |             |
| C.Nalini     | JSA |             |
7. Location of the Project: Cochin.
8. (a) Objectives:  
To estimate the population size, growth rates and mortality rates of the commercially important prawns off Cochin from statistically designed sampling to be made during the cruises of the Institute's research vessel "M.V.Cadalmin". Estimates of these population parameters based on data obtained from commercial fisheries operations suffer from some limitations. But the research vessel data will be more precise and will serve as a check on the estimates calculated from the commercial fisheries data.
- (b) Practical Utility:  
This project will provide (1) an accurate estimate of the magnitude of the prawn resources off Cochin and (2) reliable data on the population parameters such as growth, mortality and recruitment useful for scientific management of the prawn resources.
9. Technical Programme
- (1) This survey will be combined with the survey for the other demersal fishes.

2. The area extending north and south of Cochin within the cruising range of M.V.Cadalmin will be divided into 10-metre depth strata (upto a depth of 80 metres) and the possible minimum number of trawl hauls ( $\frac{1}{2}$  hour hauls) that could be completed by the vessel in a month will be distributed among the different depth strata, according to the areal extent of each stratum and the abundance of the prawns in it.
3. The entire prawn catch of each haul or a sub-sample of it will be sorted out according to species, weighed and measured sex-wise. The weight and number of prawns in the sub-samples will be raised to the total catch of prawns in each stratum and an average estimate of the weight and number of prawns (size-group-wise) per hour of fishing effort for each stratum will be calculated every month.
4. These basic data will be used to estimate the population size, mortality rate and growth rate of the prawns. They would also throw light on the shoreward and seaward migration of prawns.

- 
10. Date of start: January 1976
- 
11. Likely date of completion: December 1978
- 
12. Estimated man months: 38 man months/year
- 
13. Facilities required:
- |                        |  |
|------------------------|--|
| i) land                | --   |
| ii) labour             | --   |
| iii) Special equipment | "R.V.Cadalmin fully equipped for trawling. |
| iv) foreign exchange   | --   |
| v) estimated cost      | Institute project                          |
- 
14. If financed by an organisation other than the Institute
- |   |    |
|---|----|
| a) Name of the financing organisation                                     | -- |
| b) title of the project (if the project forms a part of a larger project) | -- |
- 
15. Approximate cost: Institute project
- 
16. Signature of

Sd.  
Principal Investigator

Head of Division

Sd.  
Director

RESEARCH PROJECT - 1976

- 
1. Institute Code No. CF/RE/1.3
- 
2. I.C.A.R. Code No.
- 
3. Name and address of Research Institute/Centre Central Marine Fisheries Research Institute, Cochin.
- 
4. Title of Project. CF/RE/1 Crustacean Resources Investigations  
 Title of Problem. CF/RE/1.3 Assessment of Lobster and Crab resources
- 
5. Name and designation of Principal Investigator. M.S.Muthu, JFS
- 
6. Name(s) and designations of Associate(s) and Establishment(s) on which borne:
- | (a) <u>Whole time</u>              | (b) <u>Part time</u>            |
|------------------------------------|---------------------------------|
| K.M.S. Ameer Hamsa SRA - M. Camp   | J.P. Karbhari AFS - Veraval     |
| K.K. Balasubramanian - Calicut JSA | G. Sudhakara Rao SRA - Kakinada |
|                                    | M. Kathirvel RA - Cochin        |
|                                    | S. Shanmugham RA - Tuticorin    |
|                                    | M. Manickaraja LFA - Mangalore  |
- 
7. Location of the research project: Cochin, Mandapam Camp, Mangalore, Calicut, Tuticorin, Kakinada, and Veraval
- 
8. (a) Objectives: (°
1. To collect resources data on shallow water lobster, deep water lobsters and commercially important crabs.
  2. To elucidate the various biological aspects such as age and growth, food and feeding habits, maturation, spawning migration and behaviour of commercially important species of lobsters and crabs (such as Panulirus homarus, P. polyphagus, P. penicillatus, Puerulus sawelli).
- (b) Practical utility.
- Lobsters and crabs form about 10-15% of the total Crustacean landings in India and there is an export market for lobster tails. The characteristics of these natural resources have to be constantly determined for monitoring the resources to avoid over fishing.
- 
9. Technical Programme
1. Regular observations on species-wise abundance of the different groups.
  2. Studies on biological characteristics of concerned species.
  3. Larval development and rearing of the lobsters.
-

10. Date of Start: 1976.
11. Likely date of completion: Continuing
12. Estimated man months: 44/year.
13. Facilities required:
- |                        |    |                      |                    |
|------------------------|----|----------------------|--------------------|
| i) land                | -- | iv) Foreign exchange | --                 |
| ii) labour             | -- | v) Estimated cost    | Institute project. |
| iii) special equipment | -- |                      |                    |
14. If financed by an organisation other than the Institute,
- a) Name of the financing organisation:
- b) Title of the project (if the project forms a part of larger project)
15. Approximate cost: Institute Project.
16. Signature of:

Sd.  
Principal Investigator

Head of Division.

Sd.  
Director

RESEARCH PROJECT - 1976

- 
1. Institute Code No. CF/RE/1.4.
- 
2. I.C.A.R. Code No.
- 
3. Name and address of Research Institute/Centre Central Marine Fisheries Research Institute, Cochin.
- 
4. Title of Project. CF/RE/1 Crustacean Fisheries Investigations.  
Title of Problem. CF/RE/1.4 Prawn Fishery Atlas
- 
5. Name and designation of Principal Investigator E.G.Silas  
Director
- 
6. Name(s) and designations of Associate(s) and Establishment(s) on which borne:
- (a) Whole time - nil
- (b) Part time
- |                |     |            |
|----------------|-----|------------|
| K.H.Mohamed    | FS  | } - Cochin |
| M.S.Muthu      | JFS |            |
| S.K.Dharmaraja | AFS |            |
| K.Rengarajan   | RA  |            |
| I.David Raj    | RA  |            |
| and others.    |     |            |
- 
7. Location of the research project: Cochin
- 
8. (a) Objectives: (specify only 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 223, 224, 225, 226, 227, 228, 229, 230, 231, 232, 233, 234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 244, 245, 246, 247, 248, 249, 250, 251, 252, 253, 254, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 285, 286, 287, 288, 289, 290, 291, 292, 293, 294, 295, 296, 297, 298, 299, 300, 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 322, 323, 324, 325, 326, 327, 328, 329, 330, 331, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 343, 344, 345, 346, 347, 348, 349, 350, 351, 352, 353, 354, 355, 356, 357, 358, 359, 360, 361, 362, 363, 364, 365, 366, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381, 382, 383, 384, 385, 386, 387, 388, 389, 390, 391, 392, 393, 394, 395, 396, 397, 398, 399, 400, 401, 402, 403, 404, 405, 406, 407, 408, 409, 410, 411, 412, 413, 414, 415, 416, 417, 418, 419, 420, 421, 422, 423, 424, 425, 426, 427, 428, 429, 430, 431, 432, 433, 434, 435, 436, 437, 438, 439, 440, 441, 442, 443, 444, 445, 446, 447, 448, 449, 450, 451, 452, 453, 454, 455, 456, 457, 458, 459, 460, 461, 462, 463, 464, 465, 466, 467, 468, 469, 470, 471, 472, 473, 474, 475, 476, 477, 478, 479, 480, 481, 482, 483, 484, 485, 486, 487, 488, 489, 490, 491, 492, 493, 494, 495, 496, 497, 498, 499, 500, 501, 502, 503, 504, 505, 506, 507, 508, 509, 510, 511, 512, 513, 514, 515, 516, 517, 518, 519, 520, 521, 522, 523, 524, 525, 526, 527, 528, 529, 530, 531, 532, 533, 534, 535, 536, 537, 538, 539, 540, 541, 542, 543, 544, 545, 546, 547, 548, 549, 550, 551, 552, 553, 554, 555, 556, 557, 558, 559, 560, 561, 562, 563, 564, 565, 566, 567, 568, 569, 570, 571, 572, 573, 574, 575, 576, 577, 578, 579, 580, 581, 582, 583, 584, 585, 586, 587, 588, 589, 590, 591, 592, 593, 594, 595, 596, 597, 598, 599, 600, 601, 602, 603, 604, 605, 606, 607, 608, 609, 610, 611, 612, 613, 614, 615, 616, 617, 618, 619, 620, 621, 622, 623, 624, 625, 626, 627, 628, 629, 630, 631, 632, 633, 634, 635, 636, 637, 638, 639, 640, 641, 642, 643, 644, 645, 646, 647, 648, 649, 650, 651, 652, 653, 654, 655, 656, 657, 658, 659, 660, 661, 662, 663, 664, 665, 666, 667, 668, 669, 670, 671, 672, 673, 674, 675, 676, 677, 678, 679, 680, 681, 682, 683, 684, 685, 686, 687, 688, 689, 690, 691, 692, 693, 694, 695, 696, 697, 698, 699, 700, 701, 702, 703, 704, 705, 706, 707, 708, 709, 710, 711, 712, 713, 714, 715, 716, 717, 718, 719, 720, 721, 722, 723, 724, 725, 726, 727, 728, 729, 730, 731, 732, 733, 734, 735, 736, 737, 738, 739, 740, 741, 742, 743, 744, 745, 746, 747, 748, 749, 750, 751, 752, 753, 754, 755, 756, 757, 758, 759, 760, 761, 762, 763, 764, 765, 766, 767, 768, 769, 770, 771, 772, 773, 774, 775, 776, 777, 778, 779, 780, 781, 782, 783, 784, 785, 786, 787, 788, 789, 790, 791, 792, 793, 794, 795, 796, 797, 798, 799, 800, 801, 802, 803, 804, 805, 806, 807, 808, 809, 810, 811, 812, 813, 814, 815, 816, 817, 818, 819, 820, 821, 822, 823, 824, 825, 826, 827, 828, 829, 830, 831, 832, 833, 834, 835, 836, 837, 838, 839, 840, 841, 842, 843, 844, 845, 846, 847, 848, 849, 850, 851, 852, 853, 854, 855, 856, 857, 858, 859, 860, 861, 862, 863, 864, 865, 866, 867, 868, 869, 870, 871, 872, 873, 874, 875, 876, 877, 878, 879, 880, 881, 882, 883, 884, 885, 886, 887, 888, 889, 890, 891, 892, 893, 894, 895, 896, 897, 898, 899, 900, 901, 902, 903, 904, 905, 906, 907, 908, 909, 910, 911, 912, 913, 914, 915, 916, 917, 918, 919, 920, 921, 922, 923, 924, 925, 926, 927, 928, 929, 930, 931, 932, 933, 934, 935, 936, 937, 938, 939, 940, 941, 942, 943, 944, 945, 946, 947, 948, 949, 950, 951, 952, 953, 954, 955, 956, 957, 958, 959, 960, 961, 962, 963, 964, 965, 966, 967, 968, 969, 970, 971, 972, 973, 974, 975, 976, 977, 978, 979, 980, 981, 982, 983, 984, 985, 986, 987, 988, 989, 990, 991, 992, 993, 994, 995, 996, 997, 998, 999, 1000, 1001, 1002, 1003, 1004, 1005, 1006, 1007, 1008, 1009, 1010, 1011, 1012, 1013, 1014, 1015, 1016, 1017, 1018, 1019, 1020, 1021, 1022, 1023, 1024, 1025, 1026, 1027, 1028, 1029, 1030, 1031, 1032, 1033, 1034, 1035, 1036, 1037, 1038, 1039, 1040, 1041, 1042, 1043, 1044, 1045, 1046, 1047, 1048, 1049, 1050, 1051, 1052, 1053, 1054, 1055, 1056, 1057, 1058, 1059, 1060, 1061, 1062, 1063, 1064, 1065, 1066, 1067, 1068, 1069, 1070, 1071, 1072, 1073, 1074, 1075, 1076, 1077, 1078, 1079, 1080, 1081, 1082, 1083, 1084, 1085, 1086, 1087, 1088, 1089, 1090, 1091, 1092, 1093, 1094, 1095, 1096, 1097, 1098, 1099, 1100, 1101, 1102, 1103, 1104, 1105, 1106, 1107, 1108, 1109, 1110, 1111, 1112, 1113, 1114, 1115, 1116, 1117, 1118, 1119, 1120, 1121, 1122, 1123, 1124, 1125, 1126, 1127, 1128, 1129, 1130, 1131, 1132, 1133, 1134, 1135, 1136, 1137, 1138, 1139, 1140, 1141, 1142, 1143, 1144, 1145, 1146, 1147, 1148, 1149, 1150, 1151, 1152, 1153, 1154, 1155, 1156, 1157, 1158, 1159, 1160, 1161, 1162, 1163, 1164, 1165, 1166, 1167, 1168, 1169, 1170, 1171, 1172, 1173, 1174, 1175, 1176, 1177, 1178, 1179, 1180, 1181, 1182, 1183, 1184, 1185, 1186, 1187, 1188, 1189, 1190, 1191, 1192, 1193, 1194, 1195, 1196, 1197, 1198, 1199, 1200, 1201, 1202, 1203, 1204, 1205, 1206, 1207, 1208, 1209, 1210, 1211, 1212, 1213, 1214, 1215, 1216, 1217, 1218, 1219, 1220, 1221, 1222, 1223, 1224, 1225, 1226, 1227, 1228, 1229, 1230, 1231, 1232, 1233, 1234, 1235, 1236, 1237, 1238, 1239, 1240, 1241, 1242, 1243, 1244, 1245, 1246, 1247, 1248, 1249, 1250, 1251, 1252, 1253, 1254, 1255, 1256, 1257, 1258, 1259, 1260, 1261, 1262, 1263, 1264, 1265, 1266, 1267, 1268, 1269, 1270, 1271, 1272, 1273, 1274, 1275, 1276, 1277, 1278, 1279, 1280, 1281, 1282, 1283, 1284, 1285, 1286, 1287, 1288, 1289, 1290, 1291, 1292, 1293, 1294, 1295, 1296, 1297, 1298, 1299, 1300, 1301, 1302, 1303, 1304, 1305, 1306, 1307, 1308, 1309, 1310, 1311, 1312, 1313, 1314, 1315, 1316, 1317, 1318, 1319, 1320, 1321, 1322, 1323, 1324, 1325, 1326, 1327, 1328, 1329, 1330, 1331, 1332, 1333, 1334, 1335, 1336, 1337, 1338, 1339, 1340, 1341, 1342, 1343, 1344, 1345, 1346, 1347, 1348, 1349, 1350, 1351, 1352, 1353, 1354, 1355, 1356, 1357, 1358, 1359, 1360, 1361, 1362, 1363, 1364, 1365, 1366, 1367, 1368, 1369, 1370, 1371, 1372, 1373, 1374, 1375, 1376, 1377, 1378, 1379, 1380, 1381, 1382, 1383, 1384, 1385, 1386, 1387, 1388, 1389, 1390, 1391, 1392, 1393, 1394, 1395, 1396, 1397, 1398, 1399, 1400, 1401, 1402, 1403, 1404, 1405, 1406, 1407, 1408, 1409, 1410, 1411, 1412, 1413, 1414, 1415, 1416, 1417, 1418, 1419, 1420, 1421, 1422, 1423, 1424, 1425, 1426, 1427, 1428, 1429, 1430, 1431, 1432, 1433, 1434, 1435, 1436, 1437, 1438, 1439, 1440, 1441, 1442, 1443, 1444, 1445, 1446, 1447, 1448, 1449, 1450, 1451, 1452, 1453, 1454, 1455, 1456, 1457, 1458, 1459, 1460, 1461, 1462, 1463, 1464, 1465, 1466, 1467, 1468, 1469, 1470, 1471, 1472, 1473, 1474, 1475, 1476, 1477, 1478, 1479, 1480, 1481, 1482, 1483, 1484, 1485, 1486, 1487, 1488, 1489, 1490, 1491, 1492, 1493, 1494, 1495, 1496, 1497, 1498, 1499, 1500, 1501, 1502, 1503, 1504, 1505, 1506, 1507, 1508, 1509, 1510, 1511, 1512, 1513, 1514, 1515, 1516, 1517, 1518, 1519, 1520, 1521, 1522, 1523, 1524, 1525, 1526, 1527, 1528, 1529, 1530, 1531, 1532, 1533, 1534, 1535, 1536, 1537, 1538, 1539, 1540, 1541, 1542, 1543, 1544, 1545, 1546, 1547, 1548, 1549, 1550, 1551, 1552, 1553, 1554, 1555, 1556, 1557, 1558, 1559, 1560, 1561, 1562, 1563, 1564, 1565, 1566, 1567, 1568, 1569, 1570, 1571, 1572, 1573, 1574, 1575, 1576, 1577, 1578, 1579, 1580, 1581, 1582, 1583, 1584, 1585, 1586, 1587, 1588, 1589, 1590, 1591, 1592, 1593, 1594, 1595, 1596, 1597, 1598, 1599, 1600, 1601, 1602, 1603, 1604, 1605, 1606, 1607, 1608, 1609, 1610, 1611, 1612, 1613, 1614, 1615, 1616, 1617, 1618, 1619, 1620, 1621, 1622, 1623, 1624, 1625, 1626, 1627, 1628, 1629, 1630, 1631, 1632, 1633, 1634, 1635, 1636, 1637, 1638, 1639, 1640, 1641, 1642, 1643, 1644, 1645, 1646, 1647, 1648, 1649, 1650, 1651, 1652, 1653, 1654, 1655, 1656, 1657, 1658, 1659, 1660, 1661, 1662, 1663, 1664, 1665, 1666, 1667, 1668, 1669, 1670, 1671, 1672, 1673, 1674, 1675, 1676, 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1843, 1844, 1845, 1846, 1847, 1848, 1849, 1850, 1851, 1852, 1853, 1854, 1855, 1856, 1857, 1858, 1859, 1860, 1861, 1862, 1863, 1864, 1865, 1866, 1867, 1868, 1869, 1870, 1871, 1872, 1873, 1874, 1875, 1876, 1877, 1878, 1879, 1880, 1881, 1882, 1883, 1884, 1885, 1886, 1887, 1888, 1889, 1890, 1891, 1892, 1893, 1894, 1895, 1896, 1897, 1898, 1899, 1900, 1901, 1902, 1903, 1904, 1905, 1906, 1907, 1908, 1909, 1910, 1911, 1912, 1913, 1914, 1915, 1916, 1917, 1918, 1919, 1920, 1921, 1922, 1923, 1924, 1925, 1926, 1927, 1928, 1929, 1930, 1931, 1932, 1933, 1934, 1935, 1936, 1937, 1938, 1939, 1940, 1941, 1942, 1943, 1944, 1945, 1946, 1947, 1948, 1949, 1950, 1951, 1952, 1953, 1954, 1955, 1956, 1957, 1958, 1959, 1960, 1961, 1962, 1963, 1964, 1965, 1966, 1967, 1968, 1969, 1970, 1971, 1972, 1973, 1974, 1975, 1976, 1977, 1978, 1979, 1980, 1981, 1982, 1983, 1984, 1985, 1986, 1987, 1988, 1989, 1990, 1991, 1992, 1993, 1994, 1995, 1996, 1997, 1998, 1999, 2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019, 2020, 2021, 2022, 2023, 2024, 2025, 2026, 2027, 2028, 2029, 2030, 2031, 2032, 2033, 2034, 2035, 2036, 2037, 2038, 2039, 2040, 2041, 2042, 2043, 2044, 2045, 2046, 2047, 2048, 2049, 2050, 2051, 2052, 2053, 2054, 2055, 2056, 2057, 2058, 2059, 2060, 2061, 2062, 2063, 2064, 2065, 2066, 2067, 2068, 2069, 2070, 2071, 2072, 2073, 2074, 2075, 2076, 2077, 2078, 2079, 2080, 2081, 2082, 2083, 2084, 2085, 2086, 2087, 2088, 2089, 2090, 2091, 2092, 2093, 2094, 2095, 2096, 2097, 2098, 2099, 2100, 2101, 2102, 2103, 2104, 2105, 2106, 2107, 2108, 2109, 2110, 2111, 2112, 2113, 2114, 2115, 2116, 2117, 2118, 2119, 2120, 2121, 2122, 2123, 2124, 2125, 2126, 2127, 2128, 2129, 2130, 2131, 2132, 2133, 2134, 2135, 2136, 2137, 2138, 2139, 2140, 2141, 2142, 2143, 2144, 2145, 2146, 2147, 2148, 2149, 2150, 2151, 2152, 2153, 2154, 2155, 2156, 2157, 2158, 2159, 2160, 2161, 2162, 2163, 2164,

3. Preparation of charts illustrating the distribution of the environmental factors such as salinity, temperature, dissolved  $O_2$  primary productivity, upwelling and mud bank formation which affect prawn distribution.
4. Preparation of maps and charts to depict the progress made by the processing industry in exporting the prawn products to foreign countries.

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10. Date of start: 1976.
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11. Likely date of completion: December, 1976.
- 
12. Estimated man months: 10 man months/year
- 
13. Facilities required:
- |                        |    |                      |           |
|------------------------|----|----------------------|-----------|
| i) land                | -- | iv) Foreign exchange | --        |
| ii) labour             | -- | v) Estimate cost     | Institute |
| iii) special equipment | -- |                      | project   |
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14. If financed by an organisation other than the Institute,
- a) Name of the financing organisation
  - b) Title of the project (if the project forms a part of larger project)
- 
15. Approximate cost: Institute project
- 
16. Signature of:

Sd.  
Principal Investigator

Head of Division

Sd.  
Director

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1. Institute Code No. CF/RE/1.5
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2. I.C.A.R. Code No.
- 
3. Name and address of Research Institute /Centre Central Marine Fisheries Research Institute, Cochin.
- 
4. Title of Project: CF/RE/1 Crustacean Fisheries Investigations.  
Title of Problem: CF/RE/1.5 Status Report on Prawn Fishery
- 
5. Name and designation of Principal Investigator M.S.Muthu, JFS
- 
6. Name(s) and designations of Associate(s) and Establishment(s) on which borne:
- (a) Whole time: Nil
- (b) Part Time
- |             |     |            |
|-------------|-----|------------|
| C.Suseelan  | SRA | } - Cochin |
| M.Kathirvel | RA  |            |
| C.Nalini    | JSA |            |
- 
7. Location of the research project: Cochin
- 
8. (a) Objectives (usually briefly in about 100 words)
1. To indicate the trend of prawn landings along different sections of the coast.
  2. To collect and analyse the present knowledge regarding the relative abundance and distribution of the different species of prawns in different grounds.
  3. To evaluate the existing knowledge on the parameters of the prawn populations.
  4. To evaluate the possibility of increasing the landings of prawns from the different fishing grounds.
- 
- (b) Practical utility (about 100 words)
- To increase the production of prawns it is necessary to review critically the present catch trends, biological characteristics of the stocks and other related aspects. The preparation of the status report has also been strongly recommended by the 5th meeting of the Central Advisory Committee on Exploratory Survey of Marine Fisheries. The status report is expected to throw light on the possibility of future expansion of the fishery.
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9. Technical programme
- (The following are the main objectives of the project, as recommended by the Central Advisory Committee on Exploratory Survey of Marine Fisheries.)
1. The catch estimate for prawns from 1970 to 1974 available with the Survey Section will be analysed to indicate the trend of fishery in different seasons and years. The production figures thus derived at for different regions will be split into the component species to obtain species-wise distribution of the exploited populations





1. Institute Code No:	CF/Cul/1.1
2. I.C.A.R. Code No:	
3. Name and address of Research Institute/Centre:	Central Marine Fisheries Research Institute, Cochin.
4. Title of Project: CF/Cul/1	Mariculture - Culture of Crustaceans
Title of Problem: CF/Cul/1.1	Culture of Prawns and Crabs
5. Name and designation of Principal Investigator	M.S. Muthu, JFS
6. Name(s) and designations of Associate(s) and Establishments on which borne:	
(a) <u>Whole time:</u> Nil	(b) <u>Part time:</u>
	N.Neelakanta Pillai, SRA } Cochin
	K.V.George, RA } Cochin
	S.Ramamurthi, JFS } Mangalore
	N.S.Radhakrishnan, AFS } Mangalore
	K.A.Narasimham, AFS } Kakinada
	G.Sudhakara Rao, SRA } Kakinada
	M.S.Muthu, JFS } Madras
	K.Devarajan, RA } Madras
7. Location of the research project:	Cochin, Mangalore, Madras and Kakinada.
8. (a) Objectives:	
1. To investigate the possibility of large scale culture of prawns, crabs and other crustaceans at the above centres.	
2. To assess the production potential of different groups of crustaceans in commercial culture.	
(b) Practical Utility:	
The problems facing large scale culture of prawns, crabs and other crustaceans varies from place to place depending on the physico-chemical factors of the environment and the species of the crustaceans locally available. Hence by investigating the possibility of culturing the crustaceans at the various centres, the vast stretches of low lying brackish water areas along the coast of the country which lie fallow or are used for a short season for paddy cultivation at present could be utilised for culturing crustaceans.	

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9. Technical Programme:

1. Survey of suitable sites for culturing prawns and other crustaceans.
2. Induced spawning of the locally available commercial species in confined waters.
3. Rearing the early larvae to the fingerling stage suitable for stocking.
4. Estimation of production under different conditions.
5. Supply of prawn seed to farmers and follow up investigations.

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10. Date of start: 1976

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11. Likely date of completion: 1980

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12. Estimated man months: 20 man months/year

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13. Facilities required:

i) land	--	iv) foreign exchange	--
ii) labour	--	v) Estimated cost:	Institute's
iii) special equipment	--		Project.

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

a) Name of the financing organisation	--
b) Title of the Project (if the Project forms a part of larger project)	--

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15. Approximate cost: Institute Project

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16. Signatures of:

Sd.  
Principal Investigator

Head of Division

Sd.  
Director

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1. Institute Code No. CF/CUL/1.2
- 
2. I.C.A.R. Code No.
- 
3. Name and address of Research Institute/Centre Central Marine Fisheries  
Research Institute, Cochin
- 
4. Title of Project. CF/CUL/1 Mariculture-Culture of Crustaceans  
 Title of Problem. CF/CUL/1.2 Development of artificial feed  
for prawn larvae and juveniles
- 
5. Name and designation of Principal Investigator M.M.Thomas, AFS
- 
6. Name(s) and designations of Associate(s) and Establishment(s) on which borne:
- (a) Whole time: Nil
- (b) Part time
- D.C.V.Easterson RA  
 M.Kathirvel RA } Cochin
- 
7. Location of the research project: Cochin.
- 
8. (a) Objectives
1. To formulate suitable artificial feeds with cheap and readily available raw materials, to feed the prawn post-larvae and juveniles in prawn culture practices.
  2. To determine their efficiencies in promoting growth as a supplementary feed in cultivable species of prawns under laboratory conditions and find out the optimum rate of feeding in postlarval and juvenile stages.
  3. To estimate the conversion efficiencies of the feeds in different species in the laboratory.
- 
- (b) Practical utility
- Supplementary feeding of prawn larvae and juveniles in aquaculture will result in considerable increase of the growth rate. This will decrease the time required for getting prawn of marketable size and reduce the maintenance cost of these operations, making prawn culture more profitable.
- 
9. Technical Programme
- (1) Artificial feeds, binders, pellets, etc.
1. Artificial feeds will be prepared and pellatized using suitable binding agents.

2. Experiments will be conducted by feeding postlarvae and juveniles with these feeds, initially, in the aquarium tanks and then in the ponds at Narakkal, on a large scale and the growth promoting efficiencies of these feeds estimated. The requirements of the different species of prawns as well as the optimum rate of feeding under field conditions will be determined.
3. Conversion efficiencies of these feeds will be estimated, experimentally.

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10. Date of start: 1973
- 
11. Likely date of completion: 1978.
- 
12. Estimated man months: 10 man months/year.
- 
13. Facilities required:
1. Facilities for field trials on feeds at Narakkal.
- |                        |    |                      |           |
|------------------------|----|----------------------|-----------|
| i) land                | -- | iv) Foreign exchange | --        |
| ii) labour             | -- | v) Estimated cost    | Institute |
| iii) special equipment | -- |                      | Project   |
- 
14. If finance by an organisation other than the Institute,
- a) Name of the financing organisation
- b) title of the project (if the project forms a part of larger project) No.
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15. Approximate cost: Institute Project.
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16. Signature of:

Sd.  
Principal Investigator

Head of Division

Sd.  
Director

1. Institute Code No. CF/CUL/1.3
2. I.C.A.R. Code No.
3. Name and address of Research Institute/Centre Central Marine Fisheries Research Institute, Cochin
4. Title of Project. CF/CUL/1 Mariculture-Culture of Crustacean  
Title of Problem. CF/CUL/1.3 Investigations on salinity tolerance of penaeid prawns.
5. Name and designation of Principal Investigator C. Suseelan, SRA
6. Name(s) and designations of Associate(s) and Establishment(s) on which borne.  
(a) Whole time Nil (b) Part time Nil
7. Location of the research project: Cochin.

## 8. (a) Objectives

Most of the penaeid prawns contributing to the commercial fishery migrate during their early life into estuaries and backwaters, where they stay temporarily and grow fast until returning to the sea for maturation and breeding. Although this migratory behaviour of the prawns between marine and brackishwater environments has been studied by many workers, no attempt has been made so far to study the relative survival rate and distribution of different stages of these prawns under varying salinity conditions. The present study is aimed at investigating these aspects.

## (b) Practical utility

The study will indicate the optimum salinity ranges promoting the maximum survival rate of the prawns at different stages of their life cycle, which will be useful in prawn culture operations. The field data will also throw light on the possible influence of salinity on population distribution of the commercially exploited species in estuarine and marine environments.

## 9. Technical Programme

1. Prawns at different stages of lifecycle will be collected from natural habitat and systematically reared in the laboratory under different salinity conditions giving natural food. Data on salinity, temperature, moulting and survival rate in respect of all important species will be recorded.
2. In order to study the influence of salinity on the distribution of prawns in the natural environments, periodic samples of the wild population will be collected by try-net operations from fixed stations in the backwaters and the sea. Data on the bottom salinity of the try net population characteristics of all penaeid prawns will be recorded.

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10. Date of start: January 1976.
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11. Likely date of completion December 1978.
- 
12. Estimated man months: 4 man months/year
- 
13. Facilities required.
- |                        |    |                      |           |
|------------------------|----|----------------------|-----------|
| i) land                | -- | iv) Foreign exchange | --        |
| ii) labour             | -- | v) Estimated cost    | Institute |
| iii) special equipment | -- |                      | Project   |
- 
14. If financed by an organisation other than the Institute,
- a) Name of the financing organisation,
- b) Title of the project (if the project forms a part of larger project).
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15. Approximate cost. Institute Project.
- 
16. Signature of:

Sd.  
Principal Investigator

Head of Division

Sd.  
Director

RESEARCH PROJECT - 1976

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1. Institute Code No. CF/CUL/1.4
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2. I.C.A.R. Code No.
- 
3. Name and address of Research Institute/Centre Central Marine Fisheries Research Institute, Cochin.
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4. Title of Project. CF/CUL/1 Mariculture-Culture of Crustaceans  
 Title of Problem. CF/CUL/1.4 Some aspects of endocrinology in prawns.
- 
5. Name and designation of Principal Investigator P.Vijayaraghavan, JFS
- 
6. Name(s) and designations of Associate(s) and Establishment(s) on which borne.
- (a) Whole time - nil (b) Part time  
 N.S.Kurup, SRA - Cochin
- 
7. Location of the research project: Cochin.
- 
8. (a) Objectives ( )
1. Investigations on the topography and morphology of the endocrine complex.
  2. Preliminary studies on endocrine hormones and on the hormonal control of spawning, moulting and growth.
- 
- (b) Practical utility ( )
- Successful prawn farming depends on the development of a technology to control the entire life-cycle of a prawn in captivity. At present the rearing techniques are more or less perfected. But one of the major bottle necks is the non-availability of breeders at the proper time. At present, they are caught from the sea and allowed to spawn in the laboratory. A major hurdle will be overcome if the prawns can be induced to ripen their gonads in the laboratory itself. It has been found that the hormones in the eye-stalk are responsible for controlling the maturation of gonads and eye-stalk ablation has resulted in the growth of the ovary to the ripe stage in laboratory conditions. (Adiyodi and Adiyodi, 1970, Alikuhni et al, 1975).
- A Scientific study of the neurosecretory cells of the brain and the endocrine complex in the eye-stalk which produce the hormones responsible will be of help in perfecting these techniques.
-



9. Technical programme  
(Title of the project, objectives, instruments, special features, etc.)

1. Collection of experimental animals and growing them in aquaria.
2. Study of topography and morphology of endocrine organs by taking serial sections of the concerned tissues using microtechniques.
3. Study of histology and histochemistry of the endocrine organs by using different histological techniques.
4. Preliminary studies on the endocrine hormones based on the histology and histochemistry of the endocrine complex.
5. Conducting experiments on hormonal control of spawning moulting and growth.

10. Date of start: 1-1-1976

11. Likely date of completion: 31-12-1978.

12. Estimated man months: 8 man months/year.

13. Facilities required:

i) land	--	iv) foreign exchange	--
ii) labour	--	v) Estimated cost	Institute
iii) special equipment	--		Project

14. If financed by an organisation other than the Institute,

- a) Name of the financing organisation
- b) Title of the project (if the project forms a part of larger project)

15. Approximate cost. Institute Project

16. Signature of:

Sd.  
Principal Investigator

Head of Division

Sd.  
Director.

RESEARCH PROJECT - 1976

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1. Institute Code No.	MOL/RE/1		
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2. I.C.A.R. Code No.			
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3. Name and address of Research Institute/Centre	Central Marine Fisheries Research Institute, Cochin		
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4. Title of Project: MOL/RE/1	Molluscan Fisheries Investigations		
Title of Problem: MOL/RE/1.1	Resources survey of commercially important molluscs		
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5. Name and designation of Principal Investigator:	K. Nagappan Nayar, JFS		
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6. Name(s) and designations of Associate(s) and establishments on which borne:			
(a) <u>Whole time</u> : Nil			
(b) <u>Part time</u> :			
T. Appa Rao, AFS	} Waltair	K. Satyanarayana Rao, AFS	} Mandapam Camp
B. Narayana Rao, JSA		P. Sivalingam, SRA	
K.A. Narasimham, AFS	} Kakinada	K. Asoka Kumar	} Tuticorin
Y. Appanna Sastry, RA		Unnithan, JSA	
T. Venugopalam, RA		S. Mahadevan, JFS	
V. Sriramachandra Murty, RA		K. Ramadoss, RA	
		C.T. Rajan, JSA	
R. Sarvesan, RA	} Madras	G.P. Kumaraswami	} Vizhinjam
K.S. Sundaram, RA		Achari, SRA	
P. Natarajan, RA	Porto Novo	K. Prabhakaran Nair, RA	}
M.M. Meiyappan, RA	Cochin	Radhakrishnan Nair, LFA	
		P.S. Kuriakose, RA	Calicut
and others.			
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7. Location of the research project:	Waltair, Kakinada, Madras, Porto Novo, Mandapam Camp, Tuticorin, Vizhinjam, Cochin, Calicut (to be taken up at Mangalore, Karwar, Bombay, Veraval, Minicoy and Andaman).		
-----			
8. (a) <u>Objectives</u> :			
A survey of the commercially important molluscs other than cephalapods along the coasts of India is wanting and the project aims at undertaking a systematic survey which will enable the preparation of fishery atlases of our molluscan fishery resources.			
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8. (b) Practical utility:

At present there is no authentic record about the exact quantity of various molluscs fished in India (with the exception of chanks and pearl oysters). Therefore, the potentialities and the exact magnitude of the various molluscan fisheries still remain unknown. For the proper development, management and planning for the future expansion of these fisheries, this gap in knowledge will have to be first filled up. The resources survey becomes all the more necessary in view of the emphasis given by the industry towards export of edible molluscs and also shells to different countries. Potentialities for foreign exchange earning trade are thus involved in the project.

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## 9. Technical programme:

- (a) Survey of the molluscan resources of the coastal and offshore waters and the bay islands.
  - (b) Survey of backwater areas, mangroove swamps and intertidal zones for locating and demarcating clam, mussel and oyster beds for estimating the resources.
- 

10. Date of start: 1976

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11. Likely date of completion: 1980

---

12. Estimated man months: 60 man months/year

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## 13. Facilities required:

- |                             |    |                      |           |
|-----------------------------|----|----------------------|-----------|
| i) land                     | -- | iv) foreign exchange | --        |
| ii) labour- Casual labourer |    | v) estimated cost:   | Institute |
| iii) special equipment      | -- |                      | project   |
- 

## 14. If financed by an organisation other than the Institute:

- a) Name of the financing organisation: --
  - b) Title of the project (if the project forms a part of a larger project) --
- 

15. Approximate cost: Institute project

---

## 16. Signatures of:

Sd.  
Principal Investigator

Head of Division

Sd.  
Director

RESEARCH PROJECT - 1976

- 
1. Institute Code No. MOL/RE/1.2
- 
2. I.C.A.R. Code No.
- 
3. Name and address of Research Institute/Centre: Central Marine Fisheries Research Institute, Cochin
- 
4. Title of Project: MOL/RE/1 Molluscan Fisheries Investigations  
 Title of Problem: MOL/RE/1.2 Investigations on Cephalopod resources
- 
5. Name and designation of Principal investigator: E.G. Silas, Director
- 
6. Name(s) and designations of Associates and establishments on which borne:
- (a) Whole time: nil
- (b) Part time:
- |                           |               |
|---------------------------|---------------|
| B. Narayana Rao, JSA      | Waltair       |
| Y. Appanna Sastri, RA     | Kakinada      |
| R. Sarvesan, SRA          | Madras        |
| P. Natarajan, RA          | Porto Novo    |
| K. Satyanarayana Rao, AFS | Mandapam Camp |
| M.M. Meiyappan, RA        | Cochin        |
| and others.               |               |
- 
7. Location of the research project: Waltair, Kakinada, Madras, Porto Novo, Mandapam Camp, Cochin  
 (To be taken up at Calicut, Mangalore, Karwar, Malvan, Bombay and Veraval)
- 
8. (a) Objectives:
- The cephalopod resources (cuttlefishes, squids and octopuses) of the seas bordering India are under exploited. Recent exploratory surveys carried out have brought to light the availability of several species of squids and cuttlefishes which indicate the possibility for commercial exploitation. One of the important species of oceanic squids, Symplectoteuthis ovalaniensis was observed to occur in large quantities off the south west coast of India and in Laccadive sea. In order to exploit the cephalopod resources properly, the fishery and biology of component species and overall resources survey for cephalopods have to be carried out.
-

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8. (b) Practical utility:

Cephalopods form a very important potential resource in the seas around India. Squids and cuttlefishes form sustenance fishery in some areas along our coast. Coastal and oceanic squids form an important part of the food of fishes and some species are associated with particular water masses. Squid meat is also an ~~explrtable~~ commodity. Cuttlefish and cuttlebone are rapidly gaining in importance in the export trade. There is need for assessing the systematics, biology and distribution of various species of cephalopods, locating the fishing grounds and estimating the magnitude of this stock for exploitation.

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9. Technical programme:

1. To study the fishery and biology of species of cephalopods (cuttle fish, squids and octopuses) that are landed from mechanised vessels, exploratory and experimental fishing vessels, indigenous craft and other traditional methods.
  2. Collection of pelagic oceanic squids in exploratory surveys for studying the extent of resources, apatial and vertical distribution. Their life history studies, distribution and abundance of larval cephalopods in relation to hydrographical factors.
  3. To suggest exploitation of suitable species of cuttlefishes and squids on a large commercial scale for the purpose of exporting to foreign markets.
- 

10. Date of start: 1976

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11. Likely date of completion: 1980

---

12. Estimated man months: 34 man months/year

---

13. Facilities required:

- |                        |    |                              |    |
|------------------------|----|------------------------------|----|
| i) land                | -- | iv) foreign exchange         | -- |
| ii) labour             | -- | v) estimated cost: Institute |    |
| iii) special equipment | -- | project                      |    |
- 

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

- |   |    |
|---|----|
| a) Name of the financing organisation                                     | -- |
| b) Title of the project (if the project forms a part of a larger project) | -- |
- 

15. Approximate cost: Institute project

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16. Signatures of:

Sd.  
Principal Investigator

Head of Division

Sd.  
Director

RESEARCH PROJECT - 1976

1. Institute Code No.	MOL/RE/1.3		
2. I.C.A.R. Code No.			
3. Name and address of Research Institute/Centre.	Central Marine Fisheries Research Institute, Cochin		
4. Title of Project; MOL/RE/1 Title of Problem; MOL/RE/1.3	Molluscan Fisheries Investigation. Investigations on the pearl oysters and chanks.		
5. Name and designation of Principal Investigator	K.Nagappan Nayar, JFS		
6. Name(s) and designations of Associate(s) and Establishments on which borne:			
(a) <u>Whole time:</u> nil	(b) <u>Part time:</u>		
	S.Mahadevan, JFS	}	Tuticorin
	K.Ramadoss, RA		
	Pon Siraimetan, RA	}	M.Camp.
	C.T.Rajan, JSA		
	A. Sreenivasan, LFA	}	Vizhinjam
	K.Sathyanaarayana Rao, AFS		
	K.K.Appukuttan, RA	}	Porto- Novo.
	Ashok Kumar Unithan, JSA		
	D.Sivalingam, SRA	}	Vizhinjam
	G.P.Kumaraswami Achari, SRA		
	K. Prabhakaran Nair, RA	}	Porto- Novo.
	Radhakrishnan Nair, LFA		
	P.Natarajan, RA		
7. Location of the research project:	Tuticorin, Mandapam Camp, Porto Novo and Vizhinjam.		
8. (a) Objectives:	<p>In view of the great emphasis laid on the culture of pearls and also in the maintenance of a monitoring service on the commercial aspects of the important fisheries of pearl oysters and chanks it is proposed to collect data on various aspects of the above two groups both by means of SCUBA technique and by analysing the catch data from commercial landings.</p>		
(b) Practical utility:	<p>Pearl oysters and chanks are the two commercially very important molluscs of India. Data collected on these two groups of molluscs will be of practical importance in conducting the fisheries.</p>		

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9. Technical Programme:

- (a) Inspection of pearl oyster beds by SCUBA diving to assess the population and competing settlers.
  - (b) Study the pattern of pearl oyster settlement in the areas from Vizhinjam to Cape Comorin and to estimate the species composition and population.
  - (c) Investigate the settlement of pearl oysters in Palk Bay Zone and to study the species composition and population.
  - (d) Study the length frequency of chanks in commercial landings and also investigate the percentage of worming in different beds.
  - (e) Estimate the commercial landings of chanks along Ramnad coast.
  - (f) Estimate the landings of chanks by indigenous crafts and trawlers at Porto-novo and adjacent areas.
- 

10. Date of start: 1976

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11. Likely date of completion: 1979

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12. Estimated man months: 36 man months/year

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13. Facilities required:

- |   |    |                      |                     |
|---|----|----------------------|---------------------|
| i) land   | -- | iv) Foreign exchange | : Rs.85,000/-       |
| ii) labour: Casual labour   |    | v) Estimated cost    | : Institute project |
| iii) special equipment: under-water diving equipment (SCUBA), compressor and other accessories. |    |                      |                     |
- 

14. If financed by an organisation other than the Institute,

- a) Name of the financing organisation : --
  - b) title of the project (if the project forms a part of a larger project
- 

15. Approximate cost: Institute Project

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16. Signatures of:

Sd.  
Principal Investigator

Head of Division

Sd.  
Director

RESEARCH PROJECT - 1976

- 
1. Institute Code No. MOL/RE/1.4
- 
2. I.C.A.R. Code No.
- 
3. Name and address of Research Institute/Centre: Central Marine Fisheries Research Institute, Cochin
- 
4. Title of Project: MOL/RE/1 Molluscan fisheries investigations  
 Title of problem: MOL/RE/1.4 Pearl oyster Atlas
- 
5. Name and designation of Principal Investigator: K. Nagappan Nayar, JFS
- 
6. Name(s) and designations of Associate(s) and establishments on which borne:
- (a) Whole time: nil (b) Part time:  
 S. Mahadevan, JFS  
 S. Bastian Fernando, JSA } Tuticorin
- 
7. Location of the research project: Tuticorin
- 
8. (a) Objectives:
- The object of this line of work is to prepare an atlas on pearl oysters which will be very useful for all pearl oyster workers and also for pearl culturists who would like to take up pearl oyster culture on a large scale.
- 
8. (b) Practical utility:
- At present there is no pearl oyster atlas which contains a comprehensive account on all aspects such as systematics, biology, fishery, culture techniques etc. Such an atlas will be very useful for one who ~~wants~~ to start an industry on pearl culture.
- 
9. Technical Programme:
- To transfer all available data on pearl oysters such as distribution pattern, species composition, diagnostic characters of the different species of pearl oysters, biology of pearl oysters, pearl oyster fisheries, culture operations and techniques followed in producing spherical pearls etc., on a pictorial form with suitable descriptions.
-



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10. Date of start: January 1976
- 
11. Likely date of completion: End of 1977
- 
12. Estimated man months: 8 man months/year
- 
13. Facilities required:
- |                        |    |                      |           |
|------------------------|----|----------------------|-----------|
| i) land                | -- | iv) foreign exchange | --        |
| ii) labour             | -- | v) estimated cost:   | Institute |
| iii) special equipment | -- |                      | Project   |
- 
14. If financed by an organisation other than the Institute:
- |   |    |
|---|----|
| a) Name of the financing organisation:                                    | -- |
| b) Title of the project (if the project forms a part of a larger project) | -- |
- 
15. Approximate cost: Institute project
- 
16. Signatures of:

Sd.  
Principal Investigator

Head of Division

Sd.  
Director

RESEARCH PROJECT - 1976

1. Institute Code No:	MOL/CUL/1.1	
2. I.C.A.R. Code No:		
3. Name and address of Research Institute/Centre.	Central Marine Fisheries Research Institute, Cochin.	
4. Title of Project:	MOL/CUL1 Mariculture - Culture of Molluscs	
Title of Problem:	MOL/CUL/1.1 Edible Oysters	
5. Name and designation of Principal Investigator:	K. Nagappan Nayar, JFS	
6. Name(s) and designations of Associate(s) and Establishments on which borne:		
(a) <u>Whole time:</u>	Nil	
(b) <u>Part time:</u>		
	S. Mahadevan, JFS	} Tuticorin
	K. Ramadoss, RA	
	M.E. Rajapandiyan, RA	
	C.T. Rajan, JSA	
	Sreenivasan, LFA	} Mandapam Camp
	K. Satyanarayana Rao, AFS	
	D. Sivalingam, SRA	
	Ashok Kumar Unnithan, JSA	
7. Location of the research project:	Tuticorin and Mandapam Camp	
8. (a) Objectives:		
	(a) To evolve suitable farming techniques for oyster growing and spat collection.	
	(b) To study the oyster samples both from natural beds and farm area and work out the rate of growth.	
	(c) To study the meat-shell relationship and flesh values (protein content etc.) of different sizes in different seasons.	
	(d) To study the economics of large scale farming of edible oysters.	
	(e) To develop suitable hatchery techniques for the culture and propagation of edible oysters.	
(b) Practical utility:		
	Results obtained will help in farming edible oysters such as <u>Crossostrea madrasensis</u> on a large scale at selected centres along the Indian coast. The culture of edible oysters would be of considerable economic importance. It is aimed to produce low cost protein food.	

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9. Technical Programme:

- (a) Selection of suitable farm sites.
- (b) Designing suitable farm material for establishing farms.
- (c) Stocking, growing and harvesting the edible oysters.
- (d) Biological and ecological observations to be carried out.
- (e) Large scale rearing of edible oyster <sup>larval</sup> and development of suitable hatchery techniques.

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10. Date of start: 1976

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11. Likely date of completion: 1980

---

12. Estimated man months: 31 man months/year

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13. Facilities required:

- |                          |    |                      |           |
|--------------------------|----|----------------------|-----------|
| i) land                  | -- | iv) foreign exchange | --        |
| ii) labour casual labour | -- | v) Estimated cost:   | Institute |
| iii) special equipment   | -- |                      | Project.  |

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14. If financed by an organisation other than the Institute

- a) Name of the financing organisation --
- b) Title of the Project (if the Project forms a part of a larger Project) --

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15. Approximate cost: Institute Project

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16. Signatures of:

Sd.  
Principal Investigator

Head of Division

Sd.  
Director

RESEARCH PROJECT - 1976

- 
1. Institute Code No. MOL/CUL/1.2
- 
2. I.C.A.R. Code No.
- 
3. Name and Address of Research Institute/Centre: Central Marine Fisheries Research Institute, Cochin.
- 
4. Title of Project: MOL/CUL/1 Mariculture - Culture of Molluscs  
 Title of Problem: MOL/CUL/1.2 Mussels
- 
5. Name and designation of Principal Investigator: K. Nagappan Nayar, JFS
- 
6. Name(s) and designations of associate(s) and establishments on which borne:
- (a) Whole time: Nil
- (b) Part time:
- |                              |   |           |
|------------------------------|---|-----------|
| K. Rangarajan, AFS           | } | Madras    |
| K.S. Sundaram, RA            |   |           |
| T.S. Naomi, RA               |   |           |
| S. Muthuswami, RA            |   |           |
| G.P. Kumaraswami Achari, SRA | } | Vizhinjam |
| K. Prabhakaran Nair, RA      |   |           |
| N. Radhakrishnan Nair, LFA   |   |           |
| P.S. Kuriakose, RA           |   | Kozhikode |
| and others.                  |   |           |
- 
7. Location of the research project: Madras, Vizhinjam and Kozhikode
- 
8. (a) Objectives:
- To study the effectiveness of the farming techniques when compared with natural growth on crowded beds in these localities.
  - To study the shell-meat relationship, values of flesh (nutrients) at various sizes to determine the optimum size for exploitation.
  - To work out the economics of farming green and brown mussels.
- 
8. (b) Practical utility:
- At present mussels form a sustenance fishery at some places. However, the demand for mussels both in the internal as well as export market is bound to increase necessitating development of proper large scale culture techniques. The results thus obtained will enable us to take up farming operations on a large scale in the open sea.
-

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9. Technical Programme:

- (a) The data collection on the biology of the green and brown mussels from the natural beds and the stock kept in the farm area in the open sea are to proceed simultaneously at specific intervals.
- (b) Suitable farming techniques depending on the localities are to be developed for farm mussels.
- (c) Suitable periods for culturing the mussels, depending on the conditions of the sea of that area, to be studied so that farming of mussels on a large scale could be taken up in the open sea during the favourable periods.

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10. Date of start: 1976

---

11. Likely date of completion: 1980

---

12. Estimated man months: 40 man months/year

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13. Facilities required:

- |                              |    |                      |           |
|------------------------------|----|----------------------|-----------|
| i) land                      | -- | iv) foreign exchange | --        |
| ii) labour - Casual labourer |    | v) estimated cost:   | Institute |
| iii) special equipment       | -- |                      | project   |

---

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

- a) Name of the financing organisation --
- b) Title of the project (if the project --  
forms a part of a larger project)

---

15. Approximate cost: Institute project

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16. Signatures of:

Sd.  
Principal Investigator

Head of Division

Sd.  
Director

- 
1. Institute Code No. MOL/CUL/1.3
- 
2. I.C.A.R. Code No.
- 
3. Name and address of Research Institute/Centre: Central Marine Fisheries Research Institute, Cochin
- 
4. Title of Project: MOL/CUL/1 Mariculture - culture of molluscs  
Title of Problem: MOL/CUL/1.3 Clams and cockles
- 
5. Name and designation of Principal Investigator: K. Nagappan Nayar, JFS
- 
6. Name(s) and designations of Associate(s) and establishments on which borne:
- (a) Whole time: nil (b) Part time:
- K.A. Narasimham, AFS } Kakinada  
Y. Appanna Sastri, RA }  
P. Natarajan, RA Porto Novo  
and others.
- 
7. Location of the research project: Kakinada, Porto Novo and Cochin
- 
8. (a) Objectives:
- a) To transplant clams from thickly populated areas to suitable places and create new beds.  
b) To evolve suitable techniques in off-bottom culture.
- 
8. (b) Practical utility:
- Places where clams are not available could be profitably converted into new clam beds. Clam meat is a cheap source of protein food.
- 
9. Technical programme:
- (a) Special studies on the environmental conditions to be made.  
(b) Studies on gonadal maturity, growth rate, spawning behaviours, development and spatting of clams in both natural and farm areas to be carried out.  
(c) Shell-meat relationship of different sizes in different months and also the meat values of different size in different months to be estimated.
-

10. Date of start: 1976

11. Likely date of completion: 1978

12. Estimated man months: 24 man months/year

13. Facilities required:

i) land	--	iv) foreign exchange	--
ii) labour - Casual labourer		v) estimated cost:	Institute
iii) special equipment	--		project

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

a) Name of the financing organisation:	--
b) Title of the project (if the project forms a part of a larger project)	--

15. Approximate cost: Institute project

16. Signatures of:

Sd.  
Principal Investigator

Head of Division

Sd.  
Director

1. Institute Code No:	CMFRI/IDP/1																							
2. I.C.A.R. Code No:																								
3. Name and address of Research Institute/Centre:	Central Marine Fisheries Research Institute, Cochin.																							
4. Title of Project: CMFRI/IDP/1	Survey of molluscs and (bivalves) prawn and fish seed resources.																							
5. Name and designation of Principal Investigator:	E.G. Silas, Director																							
6. Name(s) and designations of Associate(s) and Establishment(s) on which borne:																								
(a) <u>Whole time:</u>	Nil																							
(b) <u>Part time:</u>	<table border="0"> <tr> <td>K.Rengarajan, AFS</td> <td rowspan="3">) Madras</td> </tr> <tr> <td>M.Rajagopal, RA</td> </tr> <tr> <td>K.S.Sundaram, RA</td> </tr> <tr> <td>K.M.S.Ameer Hamsa, SRA</td> <td rowspan="2">) Mandapam Camp</td> </tr> <tr> <td>P.Nammalwar, RA</td> </tr> <tr> <td>P.Bensam, AFS</td> <td rowspan="3">) Tuticorin</td> </tr> <tr> <td>S.Shanmugham, RA</td> </tr> <tr> <td>Bastin Fernando, JSA</td> </tr> <tr> <td>K.Prabhakaran Nair, RA</td> <td rowspan="2">) Vizhinjam</td> </tr> <tr> <td>S. Lazarus, RA</td> </tr> <tr> <td>K.J.Mathew, SRA</td> <td rowspan="3">) Cochin</td> </tr> <tr> <td>G.S.D.Selvaraj, RA</td> </tr> <tr> <td>K.N.Gopalakrishnan, JSA</td> </tr> <tr> <td>R.S.Lal Mohan, AFS</td> <td rowspan="4">) Calicut</td> </tr> <tr> <td>K.V.Somasekharan Nair, RA</td> </tr> <tr> <td>V.S.Rengaswamy, RA</td> </tr> <tr> <td>P.Ramadoss, JSA</td> </tr> </table>	K.Rengarajan, AFS	) Madras	M.Rajagopal, RA	K.S.Sundaram, RA	K.M.S.Ameer Hamsa, SRA	) Mandapam Camp	P.Nammalwar, RA	P.Bensam, AFS	) Tuticorin	S.Shanmugham, RA	Bastin Fernando, JSA	K.Prabhakaran Nair, RA	) Vizhinjam	S. Lazarus, RA	K.J.Mathew, SRA	) Cochin	G.S.D.Selvaraj, RA	K.N.Gopalakrishnan, JSA	R.S.Lal Mohan, AFS	) Calicut	K.V.Somasekharan Nair, RA	V.S.Rengaswamy, RA	P.Ramadoss, JSA
K.Rengarajan, AFS	) Madras																							
M.Rajagopal, RA																								
K.S.Sundaram, RA																								
K.M.S.Ameer Hamsa, SRA	) Mandapam Camp																							
P.Nammalwar, RA																								
P.Bensam, AFS	) Tuticorin																							
S.Shanmugham, RA																								
Bastin Fernando, JSA																								
K.Prabhakaran Nair, RA	) Vizhinjam																							
S. Lazarus, RA																								
K.J.Mathew, SRA	) Cochin																							
G.S.D.Selvaraj, RA																								
K.N.Gopalakrishnan, JSA																								
R.S.Lal Mohan, AFS	) Calicut																							
K.V.Somasekharan Nair, RA																								
V.S.Rengaswamy, RA																								
P.Ramadoss, JSA																								
7. Location of the research project:	Mandapam Camp, Madras, Tuticorin, Cochin, Vizhinjam and Calicut.																							
8. (a) Objectives:																								
	<ol style="list-style-type: none"> <li>1. To locate areas of abundance of cultivable species of marine molluscs, fishes and prawns in Tamil Nadu and Kerala.</li> <li>2. To estimate the species-wise season-wise and regionwise abundance of molluscan (bivalve) fish and prawn seed.</li> </ol>																							



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### 8. (b) Practical Utility:

The interest of the industry in culturing on a commercial scale marine fishes, prawns and bivalves is increasing. An essential pre-requisite for commercial culture is information on the relative abundance and availability of bivalves, prawns and fish seed. This project is expected to meet this requirement.

---

### 9. Technical Programme:

1. Survey will be undertaken to locate areas of abundance of bivalves such as mussels, clams and oysters of fish and prawns post-larvae and juveniles.
  2. The relative abundance of important species in various regions will be estimated by operating gear specially meant for the purpose.
  3. Suitable locations for taking up coastal aquaculture will be charted.
  4. Occurrence of ancillary resources such as seaweed in the area surveyed will be indicated.
- 

10. Date of start: 1976

---

11. Likely date of completion: 5 years

---

12. Estimated man months: 45 man months/year

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### 13. Facilities required:

i) land	--	iv) Foreign exchange	--
ii) labour		v) Estimated cost:	Institute
iii) special equipment	--		Project

---

### 14. If financed by an organisation other than the Institute:

- a) Name of the financing organisation --
  - b) Title of the project (if the project forms a part of larger Project): --
- 

15. Approximate cost: Institute Project

---

### 16. Signatures of:

Sd.  
Principal Investigator

Head of Division

Sd.  
Director

RESEARCH PROJECT - 1976

- 
1. Institute Code No. CMFRI/IDP/2
- 
2. I.C.A.R. Code No.
- 
3. Name and address of Research Institute/Centre: Central Marine Fisheries Research Institute, Cochin.
- 
4. Title of Project: CMFRI/IDP/2 Investigations on fish and shell fish diseases.
- 
5. Name and designation of the Principal Investigator: S. Mahadevan, JFS
- 
6. Name(s) and designations of Associate(s) and establishments on which borne:
- |                             |  |                  |   |        |                     |                  |                           |                    |  |        |                |  |           |                |  |           |                  |  |          |
|-----------------------------|--|------------------|---|--------|---------------------|------------------|---------------------------|--------------------|--|--------|----------------|--|-----------|----------------|--|-----------|------------------|--|----------|
| (a) <u>Whole time</u> : nil | (b) <u>Part time</u> :   |                  |   |        |                     |                  |                           |                    |  |        |                |  |           |                |  |           |                  |  |          |
|                             | <table border="0"> <tr> <td>K.J. Mathew, SRA</td> <td rowspan="4">}</td> <td rowspan="4">Cochin</td> </tr> <tr> <td>G.S.D. Selvaraj, RA</td> </tr> <tr> <td>M. Kathirvel, RA</td> </tr> <tr> <td>C. Thankappan Pillai, LFA</td> </tr> <tr> <td>K. Rangarajan, AFS</td> <td></td> <td>Madras</td> </tr> <tr> <td>P. Bensam, AFS</td> <td></td> <td>Tuticorin</td> </tr> <tr> <td>S. Lazarus, RA</td> <td></td> <td>Vizhinjam</td> </tr> <tr> <td>K. Dorairaj, AFS</td> <td></td> <td>Mandapam</td> </tr> </table> | K.J. Mathew, SRA | } | Cochin | G.S.D. Selvaraj, RA | M. Kathirvel, RA | C. Thankappan Pillai, LFA | K. Rangarajan, AFS |  | Madras | P. Bensam, AFS |  | Tuticorin | S. Lazarus, RA |  | Vizhinjam | K. Dorairaj, AFS |  | Mandapam |
| K.J. Mathew, SRA            | }  | Cochin           |   |        |                     |                  |                           |                    |  |        |                |  |           |                |  |           |                  |  |          |
| G.S.D. Selvaraj, RA         |  |                  |   |        |                     |                  |                           |                    |  |        |                |  |           |                |  |           |                  |  |          |
| M. Kathirvel, RA            |  |                  |   |        |                     |                  |                           |                    |  |        |                |  |           |                |  |           |                  |  |          |
| C. Thankappan Pillai, LFA   |  |                  |   |        |                     |                  |                           |                    |  |        |                |  |           |                |  |           |                  |  |          |
| K. Rangarajan, AFS          |  | Madras           |   |        |                     |                  |                           |                    |  |        |                |  |           |                |  |           |                  |  |          |
| P. Bensam, AFS              |  | Tuticorin        |   |        |                     |                  |                           |                    |  |        |                |  |           |                |  |           |                  |  |          |
| S. Lazarus, RA              |  | Vizhinjam        |   |        |                     |                  |                           |                    |  |        |                |  |           |                |  |           |                  |  |          |
| K. Dorairaj, AFS            |  | Mandapam         |   |        |                     |                  |                           |                    |  |        |                |  |           |                |  |           |                  |  |          |
- 
7. Location of the research project: Cochin, Madras, Tuticorin, Vizhinjam and Mandapam Camp
- 
8. (a) Objectives:
- The marine fish and shell fish diseases constitute one of the important factors in regulating the populations in natural environment and in aquaculture. Over the past few years, the documentation of various types of diseases in fish and shell fish has greatly increased. But in India, very little consideration and less attention have been devoted on this aspect.
- 
8. (b) Practical utility:
- The need for research on fish and shell fish as possible vectors of infectious diseases is of vital importance because of the increasing use of fish and shell fish as human food, high rate of pollution of the aquatic environment with human and industrial wastes and frequent contact between man and the aquatic environment.
-

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9. Technical Programme:

1. Collection of diseased specimens and parasites from the different environments including culture ponds.
  2. Classification of the different types of diseases, and determination of their probable effects on the population.
  3. Investigations on the aetiological factors responsible for the diseases.
  4. Development of preventive measures in the control of the documented diseases.
- 

10. Date of start: 1976

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11. Likely date of completion: 1980

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12. Estimated man months: 10 man months/year

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13. Facilities required:

i) land	--	iv) Foreign exchange	--
ii) labour	--	v) Estimated cost:	Institute
iii) special equipment	--		Project

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

- a) Name of the financing organisation --
  - b) Title of the Project (if the Project forms a part of the larger Project): --
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15. Approximate cost: Institute Project

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16. Signatures of:

Principal Investigator

Head of Division

Sd.  
Director

RESEARCH PROJECT - 1976

- 
1. Institute Code No. CMFRI/IDP/3
- 
2. I.C.A.R. CODE No.
- 
3. Name and address of Research Institute/Centre Central Marine Fisheries Research Institute, Cochin.
- 
4. Title of Project: CMFRI/IDP/3. National Programme of Tagging Oil sardine, mackerel and prawns.
- 
5. Name and designation of Principal investigator: P.Vijayaraghavan, JFS
- 
6. Names and designations of Associate(s) and Establishments on which borne:
- |                             |                      |          |
|-----------------------------|----------------------|----------|
| (a) <u>Whole time</u> : nil | (b) <u>Part time</u> | } Cochin |
|                             | A.Foble, AFS         |          |
|                             | M.M.Thomas, AFS      |          |
|                             | and others           |          |
- 
7. Location of the research project: Cochin.
- 
8. (a) Objectives:
1. To study the migration pattern of oil sardine, mackerel and prawns in space and time off the south-west coast of India, where these are of great commercial importance. Their movements both parallel to the coast and away or towards the coast are expected to be elucidated.
  2. The project will give direct evidence of the rate of growth of these fishes, with reference to time.
  3. Some indication of the present rate of fishing of these stocks is expected to be obtained, depending on the rate of recovery of tagged fish.
  4. It is expected to throw light on the shoaling behaviour of these fishes.
  5. Results of this study will help in extending the project to other centres and to other important groups of fishes.
- (b) Practical utility:
- Knowledge of the migratory movements will help in making forecasts of their appearance along the coast. Knowledge of their growth will help in determining the age composition of catches in different areas so as to introduce suitable a measures to ensure better yields. The data on the present rate of exploitation of the stocks are necessary to evaluate the limit of increasing the catch. The project, in short, will help in evolving management policies for these resources.
- 
9. Technical Programme:
1. At least 25,000 numbers each of sardine and mackerel and 50,000 numbers of prawns (belonging to the 4 important species) are to be tagged.

2. Loop tags are to be used for sardine and mackerel and Disc tags for prawns; trials, if possible, with a few other types of tags will also be undertaken.
3. Oil sardine and mackerel are to be procured from purse seiners and prawns from trawlers.
4. On each day of tagging, at least 2,000 numbers each of oil sardine and mackerel are to be tagged and released along with 3,000 untagged ones, so that the entire group may form a shoal when released. At least 2,000 prawns are to be tagged and released at the bottom of the sea, each day, with the help of special cages.
5. Wide publicity is to be given throughout the west coast by radio, mass media, wall posters, hand bills and lecture tours in the fishing villages, etc. Fishermen are to be requested to return the tagged fish caught by them, to the nearest fisheries office of the Central or State Governments.
6. For each tagged fish returned with details of capture, a reward of Rs.3/- is to be given.
7. The cooperation of the Central and State Government agencies in Tamil Nadu, Kerala, Karnataka, Goa and Maharashtra dealing with marine sciences is to be sought.

10. Date of start: January 1976

11. Likely date of completion: Continuing for 3 years.

12. Estimated man months: 50/year

13. Facilities required:

i) land	--	iv) Foreign exchange:	--
ii) labour	--	v) Estimated cost:	1.52 lakhs
iii) special equipment	--		

14. If financed by organisation other than the Institute

- a. Name of financing organisation: ICAR
- b. Title of the project (if the project forms part of a larger project)

15. Approximate cost: Rs.1.52 lakhs

16. Signatures of:

Sd.  
Principal Investigator

Head of Division

Sd.  
Director

RESEARCH PROJECT - 1976

1. Institute Code No.	MBO/ES/1.1
2. I.C.A.R. Code No.	
3. Name and address of Research Institute/Centre:	Central Marine Fisheries Research Institute, Cochin
4. Title of Project:	MBO/ES/1 Environmental studies - Physical and chemical aspects.
Title of Problem:	MBO/ES/1.1 Physical and chemical aspects of shelf and adjacent waters.
5. Name and designation of Principal Investigator:	A.V.S. Murty, FS
6. Name(s) and designations of Associates(s) and establishments on which borne:	
(a) Whole time:	nil
(b) Part time:	
	C.P. Ramamirtham, AFS { all
	D. Sadananda Rao, AFS { regions
	C.P. Ramamirtham, AFS { Inshore
	D. Sadananda Rao, AFS { waters
	P.M. Aboobaker, JSA { of
	R. Vasantha Kumar, JSA { Cochin
	N.P. Kunhikrishnan, JSA { Calicut
	D. Vincent, LFA {
	N.S. Radhakrishnan, AFS { Mangalore
	C.M. Alikunju, LFA {
	G.G. Annigeri, AFS Karwar
	S. Krishna Pillai, RA Bombay
	R. Marichamy, SRA { Tuticorin
	Pon. Siraimetan, RA {
	V.S.K. Chennubhotla, AFS { Mandapam
	M. Selvaraj, LFA { Camp
	K.G. Girijavallabhan, SRA { Madras
	S. Muthusamy, RA {
	P. Mojumder, AFS Waltair
7. Location of the research project:	Bombay, Karwar, Mangalore, Calicut, Cochin, Tuticorin, Mandapam Camp, Madras and Waltair.

## 8. (a) Objectives:

- a) Collection, processing and interpretation of data on physical and chemical properties of sea water such as temperature, density, salinity, oxygen, nutrients and on marine meteorological aspects.
- b) To assess the role of nutrients and phytoplankton productivity.
- c) To study the correlation between physical and chemical parameters and fishery data.

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8. (b) Practical utility:

Major fisheries of the country are confined to the inshore waters. Hence a continuous monitoring programme of the physical and chemical aspects of the inshore waters is necessary and the project will help in assessing the role of various environmental parameters in relation to fisheries.

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## 9. Technical programme:

1. Routine hydrographical data to be collected, processed and analysed for physical and chemical properties in the respective regions.
  2. Meteorological data to be collected wherever possible.
  3. The hydrographical data already collected by the Institute from Research Vessels will be processed and analysed for vertical and horizontal distribution patterns for temperature, salinity, dissolved oxygen and computed parameters will be charted out and made available for use in fishery investigations.
  4. The nutrient contents in the seawater will be analysed and processed for their seasonal distribution patterns in relation to the rate of primary organic production.
- 

10. Date of start: 1976

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11. Likely date of completion: 1980

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12. Estimated man months: 70 man months/year

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## 13. Facilities required:

- |                        |    |                      |           |
|------------------------|----|----------------------|-----------|
| i) land                | -- | iv) foreign exchange | --        |
| ii) Labour             | -- | v) estimated cost:   | Institute |
| iii) special equipment | -- |                      | project   |
- 

## 14. If financed by an organisation other than the Institute:

- a) Name of the financing organisation: --
  - b) Title of the project (if the project forms a part of a larger project) --
- 

15. Approximate cost: Institute project

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## 16. Signatures of:

Sd.  
Principal Investigator

Head of Division

Sd.  
Director

RESEARCH PROJECT - 1976

95

- 
1. Institute code No. MBO/ES/1.2
- 
2. I.C.A.R. Code No.
- 
3. Name and address of Research Institute/Centre: Central Marine Fisheries Research Institute, Cochin
- 
4. Title of Project: MBO/ES/1 Environmental studies - Physical and chemical aspects
- Title of Problem: MBO/ES/1.2 Investigations on ecological conditions of the Vembanad Lake and Cochin backwaters
- 
5. Name and designation of Principal Investigator: A.V.S. Murty, FS
- 
6. Name(s) and designations of Associate(s) and establishments on which borne:
- (a) Whole time: nil (b) Part time:
- V. Kunjukrishna Pillai, SRA }  
 K.J. Joseph, RA } Cochin  
 M. Bhaskaran, RA }
- 
7. Location of the research project: Cochin
- 
8. (a) Objectives:
- (a) Investigations on sedimentation
  - (b) Investigations on the environmental conditions existing in the backwaters and estuaries.
  - (c) Monitor ecological changes in the area resulting from man-made engineering works and from the rapid proliferation and spread of 'African payal.' Salvinia.
- 
8. (b) Practical utility:
- The Vembanad lake and Cochin backwaters support a good fishery of prawns, fishes and clams. Hence a continuous monitoring programme of the ecological conditions of the area will provide a useful information which has a bearing on the fishery of the area.
- 
9. Technical programme:
- 1. Sedimentation in estuaries will be studied by sounding method and also by analysis of suspended matter.
  - 2. Data on temperature, salinity, oxygen content, nutrient content, pH, alkalinity, conductivity, turbidity, plankton, primary productivity and fisheries of the Cochin backwater will be collected with special emphasis on the prawn and shell fish fisheries of the region.
  - 3. Monitor changes in ecological conditions due to weed infestation in the backwaters.
-



10. Date of start: 1976

11. Likely date of completion: 1980

12. Estimated man months: 12 man months/year

13. Facilities required:

i) land	--	iv) foreign exchange	--
ii) labour	--	v) estimated cost:	Institute
iii) special equipment	--		project

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

a) Name of the financing organisation:	--
b) Title of the project (if the project forms a part of a larger project)	--

15. Approximate cost: Institute project

16. Signatures of:

Sd.  
Principal Investigator

Head of Division

Sd.  
Director

1. Institute Code No.	MBO/ES/2.1
2. I.C.A.R. Code No.	
3. Name and address of Research Institute/Centre	Central Marine Fisheries Research Institute, Cochin
4. Title of Project: MBO/ES/2	Circulation and related phenomena
Title of Problem: MBO/ES/2.1	Currents and upwelling seasonwise in the region Cochin-Cape Comorin.
5. Name and designation of Principal Investigator:	C.P. Ramamirtham, AFS
6. Name(s) and designations of Associates(s) and establishments on which borne:	
(a) <u>Whole time</u> : nil	(b) <u>Part time</u> :
	D. Sadananda Rao, AFS
	R. Vasantha Kumar, JSA
	P.M. Aboobaker, JSA
	K.P. Viswanathan, LFA
	Cochin
7. Location of the research project:	Cochin
8. (a) Objectives:	
	To investigate the seasonal variations in circulation and to examine the influence of upwelling, sinking and related phenomena on the ecology of the region.
8. (b) Practical utility:	
	Phenomena such as upwelling and areas <sup>of</sup> convergence and divergence are of considerable importance in fisheries and year to year occurrence and the intensity of the phenomena have a bearing on the fishery.
9. Technical programme:	
	The oceanographic data collected by the C.M.F.R. Institute and relevant data available from the India Meteorological Department will be processed and analysed to investigate the circulation patterns in the region seasonwise.
10. Date of start:	1976
11. Likely date of completion:	1978
12. Estimated man months:	12 man months/year

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13. Facilities required:

- |                        |    |                       |                   |
|------------------------|----|-----------------------|-------------------|
| i) land                | -- | iv) foreign exchange: | --                |
| ii) labour             | -- | v) estimated cost:    | Institute project |
| iii) special equipment | -- |                       |                   |
- 

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

- |   |    |
|---|----|
| a) Name of the financing organisation:                                    | -- |
| b) Title of the project (if the project forms a part of a larger project) | -- |
- 

15. Approximate cost:

Institute project

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16. Signatures of:

Sd.  
Principal Investigator

Head of Division

Sd.  
Director

1. Institute Code No.	MBO/ES/2.2
2. I.C.A.R. Code No.	
3. Name and address of Research Institute/Centre:	Central Marine Fisheries Research Institute, Cochin
4. Title of Project:	MBO/ES/2      Circulation and related phenomena
Title of Problem:	MBO/ES/2.2      Circulation patterns in the region north of Cochin along the south west coast of India.
5. Name and designation of Principal Investigator:	C.P. Ramamirtham, AFS
6. Name(s) and designations of Associate(s) and establishments on which borne:	
(a) <u>Whole time</u> :	nil
(b) <u>Part time</u> :	
	D. Sadananda Rao, AFS
	R. Vasantha Kumar, JSA
	P.M. Aboobaker, JSA
	K.P. Viswanathan, LFA
	Cochin
7. Location of the research project:	Cochin
8. (a) Objectives:	
	To investigate the circulation patterns in the region Cochin to Karwar.
8. (b) Practical utility:	
	Phenomena such as upwelling and sinking are of considerable importance in fisheries. The intensity of these provide a useful information regarding the fertility of the waters of the region.
9. Technical programme:	
	The Oceanographic data collected by the CMFR Institute and relevant data available from the India Meteorological Department will be processed and analysed to investigate the phenomena like upwelling, sinking etc. and their intensity.
10. Date of start:	1976
11. Likely date of completion:	1978
12. Estimated man months:	8 man months/year

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13. Facilities required:

- |                        |    |                      |           |
|------------------------|----|----------------------|-----------|
| i) land                | -- | iv) foreign exchange | --        |
| ii) labour             | -- | v) estimated cost:   | Institute |
| iii) special equipment | -- |                      | project   |
- 

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

- |  |    |
|--|----|
| a) Name of the financing organisation:                                       | -- |
| b) Title of the project (if the project<br>forms a part of a larger project) | -- |
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15. Approximate cost: Institute project

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16. Signatures of:

Sd.  
Principal Investigator

Head of Division

Sd.  
Director

RESEARCH PROJECT - 1976

1. Institute Code No.	MBO/ES/3
2. I.C.A.R. Code No.	
3. Name and address of Research Institute/Centre	Central Marine Fisheries Research Institute, Cochin
4. Title of Project: MBO/ES/3	Preparation of fishery oceanography Atlas of south west coast of India
Title of Problem:	
5. Name and designation of Principal Investigator:	A.V.S. Murty, FS
6. Name(s) and designations of Associate(s) and Establishments on which borne:	
(a) <u>Whole time</u> :	nil
(b) <u>Part time</u> :	
C.P. Ramamirtham, AFS	} Cochin
D. Sadananda Rao, AFS	
7. Location of the research project:	Cochin
8. (a) Objectives:	
To prepare a Fishery Oceanographic Atlas of south west coast of India.	
8. (b) Practical utility:	
To make the processed Oceanographic data available for ready reference in allied research problems.	
9. Technical Programme:	
The Oceanographic data collected by CMFR Institute will be presented in pictorial form for various factors such as temperature, salinity, dissolved oxygen, currents, upwelling etc.	
10. Date of start:	1976
11. Likely date of completion:	1978
12. Estimated man months:	12 man months/year
13. Facilities required:	
i) land	--
ii) labour	--
iii) special equipment	--
iv) foreign exchange	--
v) estimated cost:	Institute project

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

- a) Name of the financing organisation:       --  
b) Title of the project (if the project       --  
    forms a part of a larger project)

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15. Approximate cost:                               Institute project  
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16. Signatures of:

Sd.  
Principal Investigator

Head of Division

Sd.  
Director

RESEARCH PROJECT - 1976

- 
1. Institute Code No. MBO/PP/1
- 
2. I.C.A.R. Code No.
- 
3. Name and Address of Research Institute/Centre Central Marine Fisheries Research Institute, Cochin
- 
4. Title of Project: MBO/PP/1 Phytoplankton and primary productivity.  
 Title of Problem: MBO/PP/1.1 Investigations on phytoplankton and primary productivity of the shelf and adjacent waters
- 
5. Name and designation of Principal Investigator: P.V. Ramachandran Nair, JFS
- 
6. Name(s) and designations of Associate(s) and Establishments on which borne:
- |                             |                                  |
|-----------------------------|----------------------------------|
| (a) <u>Whole time</u> : nil | (b) <u>Part time</u> :           |
|                             | G. Ragothaman, P.O. Tuticorin    |
|                             | C.P. Gopinathan, SRA             |
|                             | K.J. Joseph, RA } Cochin         |
|                             | V.K. Balachandran, JSA           |
|                             | K.G. Girijavallabhan, SRA Madras |
|                             | C.V. Mathew, RA Calicut          |
|                             | and others.                      |
- 
7. Location of the research project: Karwar, Mangalore, Calicut, Cochin, Tuticorin and Madras
- 
8. (a) Objectives:
1. To assess the potential productivity of the shelf waters along the west and east coasts of India.
  2. To determine the spatial variability of oceanic production and factors governing it.
  3. To estimate the standing crop of phytoplankton organisms and to determine the relationship between phytoplankton.
  4. To study the influence of isolated environmental factors on unialgal cultures.
- 
8. (b) Practical utility:
- Continuous study of the phytoplankton productivity of inshore waters is very essential as the major fisheries of the country are confined to coastal waters. This will enable an assessment of fluctuations in potential yield of demersal and pelagic fish stocks. Measurements of primary production is also essential in marine food chain studies.
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9. Technical programme:

1. Measurements of primary productivity by  $C^{14}$  technique in the in-shore waters.
2. Estimation of standing crop of phytoplankton by pigment analysis and by total cell counts.
3. Study of dissolved carbohydrates in the different environments.
4. Taxonomical and ecological studies on phytoplankton of inshore waters.
5. Measurements of contribution by nanoplankton in the total organic productivity.

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10. Date of start: 1976

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11. Likely date of completion: 1980

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12. Estimated man months: 23 man months/year

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13. Facilities required:

- |                        |    |                      |           |
|------------------------|----|----------------------|-----------|
| i) land                | -- | iv) foreign exchange | --        |
| ii) labour             | -- | v) Estimated cost:   | Institute |
| iii) special equipment | -- |                      | project   |

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

- a) Name of the financing organisation: --
- b) Title of the project (if the project forms a part of a larger project) --

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15. Approximate cost: Institute project

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16. Signatures of:

Sd.  
Principal Investigator

Head of Division

Sd.  
Director

RESEARCH PROJECT - 1976

- 
1. Institute Code No. MBO/PL/1
- 
2. I.C.A.R. Code No.
- 
3. Name and address of Research Institute/Centre Central Marine Fisheries Research Institute, Cochin
- 
4. Title of Project: MBO/PL/1 Secondary production  
 Title of Problem: MBO/PL/1.1 Investigations on secondary production of the shelf and adjacent waters.
- 
5. Name and designation of Principal Investigator: P. Parameswaran Pillai, SRA
- 
6. Name(s) and designations of Associate(s) and Establishments on which borne:
- (a) Whole time: nil
- (b) Part time:
- |                           |   |        |
|---------------------------|---|--------|
| K.J. Mathew, SRA          | } | Cochin |
| M.M. Meiyappan, RA        |   |        |
| K. Rengarajan, RA         |   |        |
| K.G. Girijavallabhan, SRA | } | Madras |
| S. Muthusamy, RA          |   |        |
| S. Krishna Pillai, RA     | } | Bombay |
| R. Marichamy, SRA         |   |        |
| Pon. Sirajmeetan, RA      |   |        |
| and others.               |   |        |
- 
7. Location of the research project: Cochin, Mandapam Camp, Bombay, Karwar, Mangalore, Calicut, Tuticorin and Madras
- 
8. (a) Objectives:
- This project is to assess the role of zooplankton in the complete marine food chain and elucidate ecological aspects such as secondary productions in relation to fisheries.
- 
8. (b) Practical utility:
- In any fishery oriented investigation, the proper understanding of the relationship between the fishes that constitute the fishery and zooplankton which constitute their food is an essential prerequisite. The most important factor that influence the fishery of a region is the plankton production. Apart from primary production which gives the first important link in the food chain of the sea, it is essential to follow the cycle of events and transformation of material of different trophic levels so as to give valid predictions regarding the natural fluctuations in the abundance of fish stock.
-

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9. Technical programme:

1. Collection of zooplankton samples using standard methods.
2. Estimation of zooplankton biomass.
3. Taxonomy and biology of important zooplankton groups.
4. Study of importance of zooplankton as indicators of water masses.
5. Study the distribution and abundance of these groups with special reference to hydrographic conditions.
6. Assess the role of zooplankton in the marine food chain.
7. Study the importance of bioscattering and to identify the biological constituents of deep scattering layers.

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10. Date of start: 1976

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11. Likely date of completion: 1980

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12. Estimated man months: 47 man months/year

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13. Facilities required:

i) land	--	iv) foreign exchange	--
ii) labour	--	v) estimated cost:	Institute
iii) special equipment	--		project

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

- a) Name of the financing organisation: --
- b) Title of the project (if the project forms a part of a larger project) --

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15. Approximate cost: Institute project

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16. Signatures of:

Sd.  
Project Investigator

Head of Division

Sd.  
Director

RESEARCH PROJECT - 1976

1. Institute Code No:	MBO/FEL/1															
2. I.C.A.R. Code No:																
3. Name and address of Research Institute/Centre:	Central Marine Fisheries Research Institute, Cochin.															
4. Title of Project: MBO/FEL/1	Investigations on fish eggs and larvae															
MBO/FEL/1.1	Investigations on the eggs and larvae of commercially important fishes from the shelf and adjacent waters.															
5. Name and designation of Principal Investigator:	E.G. Silas, Director.															
6. Name(s) and designations of Associate(s) and Establishments on which borne:																
(a) <u>Whole time</u> : nil	(b) <u>Part time</u> :															
	<table border="0"> <tr> <td>K. Rengarajan, RA</td> <td rowspan="3">}</td> <td rowspan="3">Cochin</td> </tr> <tr> <td>I. David Raj, RA</td> </tr> <tr> <td>G.S.D. Selvaraj, RA</td> </tr> <tr> <td>S. Krishna Pillai, RA</td> <td></td> <td>Bombay</td> </tr> <tr> <td>K.G. Girijavallabhan, SRA</td> <td rowspan="2">}</td> <td rowspan="2">Madras</td> </tr> <tr> <td>M. Rajagopalan, RA</td> </tr> <tr> <td>Pon. Siraimetan, RA</td> <td></td> <td>Tuticorin</td> </tr> </table>	K. Rengarajan, RA	}	Cochin	I. David Raj, RA	G.S.D. Selvaraj, RA	S. Krishna Pillai, RA		Bombay	K.G. Girijavallabhan, SRA	}	Madras	M. Rajagopalan, RA	Pon. Siraimetan, RA		Tuticorin
K. Rengarajan, RA	}	Cochin														
I. David Raj, RA																
G.S.D. Selvaraj, RA																
S. Krishna Pillai, RA		Bombay														
K.G. Girijavallabhan, SRA	}	Madras														
M. Rajagopalan, RA																
Pon. Siraimetan, RA		Tuticorin														
7. Location of the research project:	Cochin, Mandapam Camp, Bombay, Minicoy, Tuticorin and Madras.															
8. (a) Objectives:																
	<ol style="list-style-type: none"> <li>1. Quantitative assessment of total fish eggs and larvae in the plankton.</li> <li>2. To locate spawning grounds and study the spawning seasons and spawning intensities.</li> <li>3. To estimate the recruitment to the stocks.</li> <li>4. To make detailed life history studies on important species.</li> <li>5. To prepare charts showing the distribution of fish eggs and larvae in space and time.</li> <li>6. To study the influence and environmental factors affecting the abundance and distribution of fish eggs and larvae.</li> </ol>															

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8. (b) Practical utility:

Previous investigations on fish eggs and larvae from the Indian seas chiefly include the qualitative aspects such as the descriptive stages of eggs and larvae of some species. Very little information is available on the quantitative and seasonal abundance of fish eggs and larvae. One serious drawback has been the lack of information on the specific identity of fish eggs and larvae which is partly due to the paucity of information on the ichthyofauna. This project will help in understanding the occurrence and distribution of fish eggs and larvae, spawning areas and recruitment to fish stocks.

---

## 9. Technical Programme:

1. Sorting of fish eggs and larvae from the zooplankton samples.
  2. Estimation of abundance of total fish eggs and larvae for the preparation of synoptic charts.
  3. The subsorting of fish eggs and larvae and the study of seasonal abundance and fluctuations of major constituent species.
  4. Description of the various stages of life history.
  5. Preparation of keys for the identification of fish eggs and larvae.
  6. Abundance and distribution of fish eggs and larvae in relation to environmental factors.
  7. Determination of spawning periods and locate spawning grounds.
  8. Survey of eggs and larvae to study the survival and recruitment to the fishable stocks.
- 

10. Date of start: 1976

11. Likely date of completion: 1980

12. Estimated man months: 25 man months/year

## 13. Facilities required:

- |                        |    |                              |    |
|------------------------|----|------------------------------|----|
| i) land                | -- | iv) foreign exchange         | -- |
| ii) labour             | -- | v) estimated cost: Institute |    |
| iii) special equipment | -- | project                      |    |
- 

## 14. If financed by an organisation other than the Institute

- |   |    |
|---|----|
| a) Name of the financing organisation                                     | -- |
| b) title of the project (if the project forms a part of a larger project) | -- |
- 

15. Approximate cost: --

## 16. Signatures of:

Sd.  
Principal Investigator

Head of Division

Sd.  
Director

RESEARCH PROJECT - 1976

1. Institute Code No.	MBO/FEL/1.2
2. I.C.A.R. Code No.	
3. Name and address of Research Institute/Centre	Central Marine Fisheries Research Institute, Cochin
4. Title of Project:	MBO/FEL/1 Investigations on fish eggs and larvae.
Title of Problem:	MBO/FEL/1.2 Special survey of fish eggs and larvae off Cochin.
5. Name and designation of Principal Investigator:	C. Mukundan, JFS
6. Name(s) and designations of Associate(s) and Establishments on which borne:	
(a) <u>Whole time:</u>	(b) <u>Part time:</u>
7. Location of the research project:	Cochin
8. (a) Objectives:	To conduct an intensive survey of the fish eggs and larvae of the Cochin region with special reference to commercially important fishes.
9. (b) Practical utility:	Surveys on egg production, larval abundance and survival as also spawning areas are vital in fish stock assessments. At Cochin intensive surveys are possible with research vessel facilities available at the Institute.
9. Technical Programme:	Weekly or biweekly collections of eggs and larvae would be made covering as wide an area as is practicable with the boat and other facilities available. Qualitative and quantitative analysis of the sample would indicate the fluctuations in the availability of the eggs and larvae, as also a broad picture of the composition of the group.  Observations on other significant factors of environment, such as temperature, salinity, dissolved oxygen, dissolved nutrients etc., at the collection centres would also be made to find out possible correlations between availability of eggs and larvae and the environmental conditions.

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10. Date of start:	1976
-----	
11. Likely date of completion:	1978
-----	
12. Estimated man months:	6 man months/year
-----	
13. Facilities required:	
i) land	--
ii) labour	--
iii) special equipment	--
iv) foreign exchange	--
v) Estimated cost:	Institutes project
-----	
14. If financed by an organisation other than the Institute	
a) Name of the financing organisation	--
b) Title of the project (if the project forms a part of a larger project)	--
-----	
15. Approximate cost:	--
-----	
16. Signatures of:	

Sd.  
Principal Investigator

Head of Division

Sd.  
Director.

- 
1. Institute code No. MBO/SW/1.1
- 
2. I.C.A.R. Code No.
- 
3. Name and address of Research Institute/Centre. Central Marine Fisheries Research Institute, Cochin
- 
4. Title of Project: MBO/SW/1 Survey of Economically important seaweed Resources.  
Title of Problem: MBO/SW/1.1 Seaweed Resources Investigations.
- 
5. Name and designation of Principal Investigator: P.V.Ramachandran Nair, JFS
- 
6. Name(s) and designation of Associate(s) and Establishments on which borne:
- (a) Whole time: nil
- (b) Part time:
- V.S.K.Cheemubhotla, AFS - M.Camp  
P.S.Kuriakose, RA - Calicut  
N.Kaliperumal, RA - M.Camp  
S.Kalimuthu, JSA - M.Camp  
G.Ragothaman, Pool Officer  
Radhakrishnan, JSA -  
and others
- 
7. Location of the research project: Cochin, Mandapam Camp, Kozhikode, Tuticorin and Vizhinjam
- 
8. (a) Objectives:
- To study the Seaweed resources of the Tamil Nadu and Kerala coasts for estimating the standing crop and for mapping productive areas in order to provide basic information to sea-weed processing industries.
- 
- (b) Practical utility:
- Seaweeds yield agar agar, algin, and other chemicals. Recently industries have been started in Tamil Nadu and other states and the demand for seaweeds for industry is increasing.
- 
9. Technical Programme:
1. Survey of Seaweed resources to be undertaken along the coast and in the Bay Islands.
2. Seaweed sample to be collected along the transects from different stations.
3. Statistical analysis of the raw data.
-



- 
10. Date of Start: 1976
- 
11. Likely date of completion: 1980
- 
12. Estimated man months: 30
- 
13. Facilities required:
- |                        |    |    |                      |           |
|------------------------|----|----|----------------------|-----------|
| i) land                | -  | -- | iv) foreign exchange | --        |
| ii) labour             | -- | -- | v) Estimated cost    | Institute |
| iii) special equipment | -- |    |                      | Project   |
- 
14. If financed by an organisation other than the Institute,
- a) Name of the financing organisation
- b) title of the project (if the project forms a part of a larger project)
- 
15. Approximate cost: Institute Project
- 
16. Signature of:

Sd.  
Principal Investigator

Head of Division

Sd.  
Director

RESEARCH PROJECT - 1976

1. Institute Code No:	MSO/SW/1.2
2. I.C.A.R. Code No:	
3. Name and address of Research Institute/Centre:	Central Marine Fisheries Research Institute, Cochin.
4. Title of Project: MBO/SW/1 Title of Problem: MBO/SW/1.2	Seaweed Resources Investigations. Culture of economically important seaweeds.
5. Name and designation of Principal Investigator:	V.S.K. Chennubhotla, AFS
6. Name(s) and designations of Associate(s) and Establishments on which borne:	
(a) <u>Whole time:</u> Nil	(b) <u>Part time:</u>
	P.S.Kuriakose, RA                      Calicut
	N.Kaliaperumal, RA                  ) Mandapam
	S.Kalimuthu, JSA                      ) Camp
	Radhakrishnan, JSA
	G.Ragothaman, P.O                  Tuticorin
	and others.
7. Location of the research project:	Mandapam Camp, Kozhikode, Tuticorin, Vizhinjam.
8. (a) Objectives:	
	To carry out culture experiments under laboratory conditions on commercially important seaweeds to investigate the life history and to develop suitable techniques for seaweed farming.
(b) Practical Utility:	
	This will provide additional raw materials in off seasons and also production could be increased according to the demand.
9. Technical programme:	
	1. Laboratory culture of seaweeds to be maintained for studying the life history and physiological factors.
	2. Farming and culturing of economically important seaweeds by means of spores and vegetative propagation.
10. Date of start:	1976
11. Likely date of completion:	1980
12. Estimated man months:	28 man months/year

---

13. Facilities required:

- |                        |    |                      |           |
|------------------------|----|----------------------|-----------|
| i) land                | -- | iv) foreign exchange | --        |
| ii) labour             | -- | v) Estimated cost    | Institute |
| iii) special equipment | -- |                      | Project   |
- 

14. If financed by an organisation other than the Institute,

- a) Name of the financing organisation  
b) title of the project (if the project forms a part of a larger project)
- 

15. Approximate cost:

Institute Project

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16. Signature of:

Sd.  
Principal Investigator

Head of Division

Sd.  
Director

1. Institute Code No.	MBO/DF/1	
2. I.C.A.R. Code No.		
3. Name and address of Research Institute/Centre	Central Marine Fisheries Research Institute, Cochin	
4. Title of Project:	MBO/DF/1	Investigations on deep water fishes
Title of Problem:		
5. Name and designation of Principal Investigator:	E.G. Silas, Director	
6. Name(s) and designations of Associate(s) and Establishments on which borne:		
(a) <u>Whole time</u> :	nil	(b) <u>Part time</u> :
	G.S.B. Selvaraj, RA	} Cochin
	A. Regunathan, RA	
	I. David Raj, RA	
	M. Rajagopalan, RA	
	and others.	Madras
7. Location of the research Project:	Cochin and Madras	
8. (a) Objectives:		
1.	To investigate the qualitative aspects of demersal, midwater and pelagic fishes caught by various exploratory fishing gears employed by <u>R.V. VARUNA</u> and other vessels in the continental shelf, continental slope and oceanic waters.	
2.	To study the demersal fish complexes and associated organisms occurring at different depths of the continental shelf and continental slope	
3.	To investigate the different aspects of the biology of the dominant species.	
4.	To study the correlation between the occurrence of deep water fishes and the abundance of fish eggs and larvae.	
8. (b) Practical utility:		
	Systematic explorations of the continental shelf edge and the upper continental slope off the south west coast of India undertaken by <u>R.V. VARUNA</u> and other vessels in the depths range 75 to 450 m and in the Laccadive Sea have brought to light potential demersal and pelagic fish resources. Some of these resources have potential for commercial exploitation. In continuation of the work already carried out there is need for extending the work to adjacent areas. Since the distribution of several species of fishes from the continental slope and oceanic waters have been recorded for the first time in India the preparation of suitable taxonomic information will facilitate their future identification. Such works will also be helpful in the identification of eggs and larvae of fishes from the plankton.	

---

9. Technical Programme:

1. Participation in the exploratory surveys and experimental fishing for obtaining samples of the dominant species for studies on their feeding habits and spawning behaviours.
  2. Echo surveys for investigating the fish concentrations and fishing grounds.
  3. Assessment of potential fishery resources based on exploratory fishing data.
  4. Consolidation of the information collected during previous surveys.
- 

10. Date of start: 1969

---

11. Likely date of completion: 1977

---

12. Estimated man months: 18 man months/year

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13. Facilities required:

i) land	--	iv) foreign exchange	--
ii) labour	--	v) Estimated cost:	Institute project
iii) special equipment	--		

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

- a) Name of the financing organisation --
  - b) Title of the project (if the project forms a part of a larger project) --
- 

15. Approximate cost: Institute project

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16. Signatures of:

Sd.  
Principal Investigator

Head of Division

Sd.  
Director

- 
1. Institute Code No. MBO/EE/1.1
- 
2. I.C.A.R. Code No.
- 
3. Name and address of Research Institute/Centre. Central Marine Fisheries Research Institute, Cochin.
- 
4. Title of Project: MBO/EE/1 Ecological energetics.  
Title of Problem: MBO/EE/1.1 Ecological energetics in cultivable marine organisms.
- 
5. Name and designation of Principal Investigator: P.V.Ramachandran Nair, JFS
- 
6. Name(s) and designations of Associate(s) and Establishments on which borne:
- (a) Whole time: Nil
- (b) Part time:
- D.C.V.Easterson, RA - Cochin  
C.V.Mathew, RA - Calicut  
M.Vijayakumaran, JSA - Cochin
- 
7. Location of the research project: Cochin.
- 
8. (a) Objectives:
1. To study the energy budget for cultivable organisms.
  2. Assimilation and conversion efficiencies to different diet combinations.
  3. The optimum ration and cropping time.
  4. Energy transfer at different trophic levels as present in culture ponds and in near shore regions.
- 
- (b) Practical utility:
- This study will help in the proper management of culture practice and also in choosing the best artificial diet combination.
- 
9. Technical Programme:  
Investigations will be carried out on the following lines:
1. Biochemical composition and metabolism of culturable organisms.
  2. Biochemical composition of different compounded diets.
  3. Conversion efficiencies of different diet combinations.
  4. Feeding and filtering rate at different food concentrations.
  5. Food web as presented in the culture ponds and in the shallow regions.
- 
10. Date of start: 1976
-

- 
11. Likely date of completion: 1980
- 
12. Estimated man months: 26 man months/year
- 
13. Facilities required:
- |                        |    |                      |           |
|------------------------|----|----------------------|-----------|
| i) land                | -- | iv) foreign exchange | --        |
| ii) labour             | -- | v) Estimated cost    | Institute |
| iii) special equipment | -- |                      | Project   |
- 
14. If financed by an organisation other than the Institute,
- |  |  |
|--|--|
| a) Name of the financing organisation                                    |  |
| b) title of the project (if the project forms a part of a larger project |  |
- 
15. Approximate cost: Institute Project
- 
16. Signature of:

Sd.  
Principal Investigator

Head of Division

Sd.  
Director

- 
1. Institute Code No. MBO/EE/1.2
- 
2. I.C.A.R. Code No.
- 
3. Name and address of Research Institute/Centre Central Marine Fisheries Research Institute, Cochin
- 
4. Title of Project: MBO/EE/1 Ecological Energetics  
 Title of Problem: MBO/EE/1.2 Investigations on the production cycles (primary to tertiary levels) in the fishing grounds off Cochin.
- 
5. Name and designation of Principal Investigator: P.V. Ramachandran Nair, JFS
- 
6. Name(s) and designations of associate(s) and establishments on which borne:
- |                        |     |                       |                             |
|------------------------|-----|-----------------------|-----------------------------|
| (a) <u>Whole time:</u> | nil | (b) <u>Part time:</u> |                             |
|                        |     |                       | C.P. Ramamirtham, AFS       |
|                        |     |                       | P. Parameswaran Pillai, SRA |
|                        |     |                       | C.P. Gopinathan, SRA        |
|                        |     |                       | I. David Raj, RA            |
|                        |     |                       | M. Bhaskaran, RA            |
|                        |     |                       | V.K. Balachandran, JSA      |
|                        |     |                       | R. Vasanthakumar, JSA       |
|                        |     |                       | } Cochin                    |
- 
7. Location of the research project: Cochin
- 
8. (a) Objectives:
1. To study the rate of production at different trophic levels
  2. To estimate the conversion efficiency from primary to tertiary levels
  3. Integrated investigations on the complex of food chain and utilisation of energy in a fishing ground.
- 
8. (b) Practical utility:
- Studies on the production and conversion of energy at different trophic levels form a basic prerequisite for assessment of potential harvest. Only limited data are available in such aspects from the productive inshore waters of the upwelling areas of the west coast of India. The present investigation is aimed at understanding the rate of production at different trophic levels, their quantitative assessment and estimation of resources available.
- 
9. Technical Programme:
- I. Primary level:  
 Measurements of:
- i. Depth of euphotic zone-seasonal and diurnal variation.
  - ii. Phytoplankton standing crop in terms of chlorophyll.
  - iii. Composition and relative abundance of phytoplankton organisms.



- iv.  $^{14}\text{C}$  uptake and proportion of dissolved carbohydrate (extra-cellular products).

## II. Secondary Level:

### Determination of:

- i. Zooplankton biomass (gravimetric and volumetric) including micro-and macro zooplankters.
- ii. Total abundance of individual groups-trophic structure.
- iii. Generation length, larval composition and breeding of selected groups.
- iv. Bio-chemical composition (Protein, Carbon and Lipids)
- v. Composition and quantitative distribution of benthic organisms at secondary level.

## III. Tertiary Level:

### Determination of:

- i. Relative composition of pelagic and demersal organisms-their food composition.
- ii. Wet weight, and other biometric studies.
- iii. Protein content of selected species.

## IV. Hydrography:

Determination of: Salinity, temperature, dissolved oxygen and Carbon-di-oxide and nutrients at different depths.

- 
10. Date of start: 1975
- 
11. Likely date of completion: 1978
- 
12. Estimated man months: 31 man months/year
- 
13. Facilities required:
- |                        |    |                      |            |
|------------------------|----|----------------------|------------|
| i) land                | -- | iv) foreign exchange | --         |
| ii) labour             | -- | v) Estimated cost    | Institutes |
| iii) special equipment | -- |                      | Project    |
- 
14. If financed by an organisation other than the Institute.
- a) Name of the financing organisation: --
  - b) title of the project (if the project forms a part of a larger project: --
- 
15. Approximate cost: Institutes Project
- 
16. Signatures of:

Sd.  
Principal Investigator

Head of Division

Sd.  
Director

RESEARCH PROJECT - 1976

- 
1. Institute Code No. MBO/MB/1
- 
2. I.C.A.R. Code No.
- 
3. Name and address of Research Institute/Centre Central Marine Fisheries Research Institute, Cochin
- 
4. Title of Project: MBO/MB/1 Mud banks and their influence on fisheries
- Title of Problem: MBO/MB/1.1 Investigations on the mud banks of the Kerala coast and their influence on the fisheries.
- 
5. Name and designation of Principal Investigator: A.V.S. Murty, FS
- 
6. Name(s) and designations of Associate(s) and Establishments on which borne:
- (a) Whole time: nil
- (b) Part time:
- |                           |   |        |
|---------------------------|---|--------|
| D. Sadananda Rao, AFS     | } | Cochin |
| K.J. Mathew, SRA          |   |        |
| C.P. Gopinathan, SRA      |   |        |
| A. Regunathan, RA         |   |        |
| V.K. Balachandran, JSA    |   |        |
| C. Thankappan Pillai, LFA |   |        |
- 
7. Location of the research project: Cochin
- 
8. (a) Objectives:
- The formation of mud banks is an interesting phenomenon specific to the Kerala coast. It has a very important bearing on the fishery in some parts of Kerala and needs intensive investigation on their formation, existence and dissipation and their influences on the fishery.
- 
8. (b) Practical utility:
- The mud bank formation along the Kerala Coast has profound influence on major fisheries such as that of prawns. The ecology of the mud banks and the various factors contributing to their formation and their influence on the fisheries are of vital importance.
-

---

9. Technical programme:

1. Survey of the frequency of formation of mud banks and their extent in the region from Purakad to Tanur during the mud bank seasons.
2. Intensive investigations on the Purakad Mud banks on the following aspects.
  - a) Current measurements
  - b) Physical factors such as temperature, salinity and density
  - c) Chemical factors such as oxygen, phosphate, nitrite, nitrate and silicate
  - d) Echo surveys
  - e) Phytoplankton - primary production
  - f) Zooplankton
  - g) Fishery
  - h) Benthic flora-fauna
  - i) Bacteriological investigations

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10. Date of start: 1976

---

11. Likely date of completion: Three years

---

12. Estimated man months: 26 man months/year

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13. Facilities required:

- |                        |    |                      |           |
|------------------------|----|----------------------|-----------|
| i) land                | -- | iv) foreign exchange | --        |
| ii) labour             | -- | v) Estimated cost:   | Institute |
| iii) special equipment | -- |                      | project   |

---

14. If financed by an organisation other than the Institute,

- a) Name of the financing organisation --
- b) title of the project (if the project forms a part of a larger project) --

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15. Approximate cost: Institute project

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16. Signatures of:

Sd.  
Principal Investigator

Head of Division

Sd.  
Director

- 
1. Institute Code No. MBO/BF/1
- 
2. I.C.A.R. Code No.
- 
3. Name and address of Research Institute/Centre Central Marine Fisheries Research Institute, Cochin.
- 
4. Title of Project: MBO/BF/1 Benthos of the Fishing Grounds  
Title of Problem: MBO/BF/1.1 Investigations on the benthos of the fishing grounds off Cochin with particular reference to their relation to fisheries.
- 
5. Name and designation of Principal Investigator: V.Kunjukrishna Pillai, SRA
- 
6. Name(s) and designations of Associate(s) and Establishments on which borne:
- (a) Whole time: nil (b) Part time:
- C.P.Gopinathan, SRA - Cochin  
A.Regunathan, RA - Cochin  
M.Bhaskaran, RA - Cochin
- 
7. Location of the research project: Cochin.
- 
8. (a) Objectives:
1. To investigate the components of benthic communities and estimate their biomass.
  2. To estimate the benthic productivity
  3. To assess the role of benthic communities in the fishing ground with special reference to the abundance and fluctuations of commercially important fish stock.
- 
- (b) Practical utility:  
Preliminary studies on the bottom fauna and bottom deposits of the south west coast of India have been carried out previously in the shallow inshore regions, but our knowledge of the biology and ecology of the marine benthic community is far from complete. As the demersal resources (fishes and prawns) form a large part of the total landings of marine products, the studies on the ecology and distribution of benthos are of much importance. Further, these studies are essential for exploring the possibilities of farming of different benthic groups like molluscs and other invertebrates.
- 
9. Technical Programme:
- Investigations will be carried out using M.V.Cadalmin I in the inshore waters will be followed for qualitative and quantitative estimation of the benthic communities in relation to ecological factors and to correlate benthic production with fish production.

- 
10. Date of start: 1975
- 
11. Likely date of completion: 1978
- 
12. Estimated man months: 14 man months/year
- 
13. Facilities required:
- |                        |    |                      |           |
|------------------------|----|----------------------|-----------|
| i) land                | -- | iv) foreign exchange | --        |
| ii) labour             | -- | v) Estimated cost    | Institute |
| iii) special equipment | -- |                      | project   |
- 
14. If financed by an organisation other than the Institute,
- a) Name of the financing organisation
  - b) title of the project (if the project forms a part of a larger project.
- 
15. Approximate cost: Institute Project
- 
16. Signatures of:

Sd.  
Principal Investigator

Head of Division

Sd.  
Director

RESEARCH PROJECT - 1976

1. Institute Code No.	MBO/MCP/1
2. I.C.A.R. Code No.	
3. Name and address of Research Institute/Centre	Central Marine Fisheries Research Institute, Cochin-18
4. Title of Project: MBO/MCP/1	Mass culturing of <b>Plankters</b> .
Title of Problem:	
5. Name and designation of Principal Investigator:	E.G. Silas, Director
6. Name(s) and designations of Associate(s) and Establishments on which borne:	
(a) <u>Whole time</u> :	nil
(b) <u>Part time</u> :	
	P.V. Ramachandran Nair, JFS P. Parameswaran Pillai, SRA K.J. Mathew, SRA D.C.V. Easterson, RA K.J. Joseph, RA V.K. Balachandran, JBA M. Ayyappan Pillai, JSA
	Cochin
7. Location of the research project: Cochin	
8. (a) Objectives:	
To develop mass culture of various organisms at different trophic levels and to study their growth rate and conversion efficiency, and for determining their utility as feed for the rearing of cultivable food fishes, crustaceans and molluscs.	
8. (b) Practical utility:	
Culture of phytoplankton organisms for use as feed for rearing of some important species of fishes and prawns has already been attempted in this laboratory. There is need for developing techniques for the mass culture of selected phytoplankters and zooplankters for utilisation as food for cultivable marine organisms as well as for experimental investigations on the uptake of <b>toxic</b> substance at different trophic levels in the marine food chain. Large scale culturing of plankters is a new line of development which is now been attempted in other countries also with similar objectives <b>in</b> view. The techniques evolved for successful culturing organisms will have wide applications.	

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### 9. Technical Programme:

1. Isolation and development of phytoplankters with lower generation time and higher growth constants. Determination of the point of maximum economically viable harvesting and their energy values.
  2. Selection of suitable organisms from zooplankton (micro and macro-zooplankters) for culturing.
  3. Evolving suitable techniques for mass culture of micro and macro zooplankters.
  4. Determination of feeding, growth, reproduction rates and ecological efficiency of these organisms under optimum conditions.
  5. Determination of the conversion factor of the cultured plankton on selected fishes, crustaceans and molluscs used in aquaculture.
- 

10. Date of start: 1974

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11. Likely date of completion: 1978

---

12. Estimated man months: 26 man months/year

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### 13. Facilities required:

- |                        |    |                      |                   |
|------------------------|----|----------------------|-------------------|
| i) land                | -- | iv) foreign exchange | --                |
| ii) labour             | -- | v) estimated cost:   | Institute project |
| iii) special equipment | -- |                      |                   |
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### 14. If financed by an organisation other than the Institute,

- a) Name of the financing organisation: --
  - b) Title of the project (if the project forms a part of a larger project) --
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15. Approximate cost: Institute Project

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16. Signatures of:

Sd.  
Principal Investigator

Head of Division

Sd.  
Director

RESEARCH PROJECT - 1976

- 
1. Institute Code No. MBO/MP/1.1
- 
2. I.C.A.R. CODE No.
- 
3. Name and address of Research Institute/Centre Central Marine Fisheries Research Institute, Cochin.
- 
4. Title of Project: MBO/MP/1 Marine Pollution.  
 Title of Problem: MBO/MP/1.1 Marine Pollution in relation to protection of living resources.
- 
5. Name and designation of Principal Investigator E.G.Silas, Director
- 
6. Name(s) and designations of Associate(s) and Establishments on which borne:
- (a) Whole time: nil
- (b) Part time
- |                            |          |
|----------------------------|----------|
| M.V.Pai, JFS               | } Karwar |
| G.G.Annigeri, AFS          |          |
| V.S.K.Chennubhotla, AFS    | } M.Camp |
| P.V.Ramachandran Nair, JFS |          |
| M.S.Rajagopalan, AFS       | } Cochin |
| V.Kunjukrishna Pillai, SRA |          |
| C.P.Gopinathan, SRA        |          |
| A.Chandrika, RA            |          |
| C.Thankappan Pillai, LFA   |          |
| S.Muthuswamy, RA           | } Madras |
- 
7. Location of the research project: Cochin, Karwar, Madras and M.Camp.
- 
8. (a) Objectives:
- To identify sources of marine pollution, assess their effect on living organisms, and to suggest preventive and remedial measures for protecting the living resources of the Seas, especially fisheries.
- (b) Practical Utility:
- In recent years there has been a world-wide awareness of the problems of marine pollution because of the immense growth of human population and industries, large scale application of pesticides and several other forms of human interference with the natural environments. Apart from these, certain biological phenomena like phytoplankton blooms create condition which lead to pollution and ultimately deoxygenation of water and mortality of fish and other marine life, hence studies on marine environmental damage by different sources become an obvious necessity.
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9. Technical programme:

1. The main sources of marine pollution are: domestic sewage discharge into the sea; direct effluents from industrial plants; pesticides such as DDT; oil spills from tankers and biological phenomena like blooming of phytoplankton. To begin with, investigations will be taken up on the deleterious effects on phytoplankton, zooplankton and fishes as a result of man-made changes in the environment
2. In areas where other forms of pollution occur, suitable surveys will be conducted to identify the type of pollution and to suggest remedial measures.
3. Studies will be conducted on some organisms in the environment to measure the effects of pollution (bioassay) on their survival, growth and re-production

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10. Date of start: 1971

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11. Likely date of completion: Continuing

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12. Estimated man months: 58 man months/year

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13. Facilities required:

i) land	--	iv) foreign exchange	--
ii) labour	--	v) Estimated cost	Institute
iii) special equipment	--		project

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14. If financed by an organisation other than the Institute,

- a) Name of the financing organisation
- b) title of the project (if the project forms part of a larger project.

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15. Approximate cost: Institute Project

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16. Signature of:

Sd.  
Principal Investigator

Head of Division

Sd.  
Director

RESEARCH PROJECT - 1976

- 
1. Institute Code No. MBO/CR/1.1
- 
2. I.C.A.R. Code No.
- 
3. Name and address of Research Institute/Centre. Central Marine Fisheries Research Institute, Cochin.
- 
4. Title of Project: MBO/CR/1 Investigations on the coral reef resources.  
 Title of Problem: MBO/CR/1.1 Ecology and resources of the fringing reefs and atolls.
- 
5. Name and designation of Principal Investigator C.S.Gopinatha Pillai, AFS
- 
6. Name(s) and designations of Associate(s) and Establishments on which borne:  
 (a) Whole time: nil (b) Part time:  
 K.K.Appukuttan, RA - M.Camp.
- 
7. Location of the research project: Cochin, Mandapam Camp, Tuticorin and Lakshadweep.
- 
8. (a) Objectives:  
 A study of the zonation, and ecology of the reefs and their major associated marine animals of the southeastern coast of India and the atoll reefs of Lakshadweep will be carried out. The environmental damage to reef ecosystem due to quarrying of corals for industrial purposes will be assessed with special reference to the reefs of Gulf of Mannar and Palk Bay.
- 
- (b) Practical utility:  
 Information gained on the occurrence and abundance of economically important reef associated animals will be of importance to their rational exploitation. Ecological data will be of practical utility in considering coral reefs as potential grounds for mariculture. The environmental effect of coral quarrying will help us to formulate measures of conservation.
- 
9. Technical Programme:  
 The accessible reefs will be qualitatively and quantitatively surveyed by unit sampling and traverse survey. Comparative studies on the undisturbed and quarried reef sites will be carried out to assess the ecological changes and environmental damages.
- 
10. Date of start: 1975
- 
11. Likely date of completion: 1977
- 
12. Estimated man months: 10 man months/year.
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13. Facilities required:

- |                        |    |                      |           |
|------------------------|----|----------------------|-----------|
| i) land                | -- | iv) foreign exchange | --        |
| ii) labour             | -- | v) Estimated cost    | Institute |
| iii) special equipment | -- |                      | Project   |
- 

14. If financed by an organisation other than the Institute,

- |  |    |
|--|----|
| a) Name of the financing organisation:                                   | -- |
| b) title of the project (if the project forms a part of a larger project | -- |
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15. Approximate cost: Institute Project

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16. Signatures of:

Sd.  
Principal Investigator

Head of Division

Sd. .  
Director

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1. Institute Code No. MBO/CR/1.2
- 
2. I.C.A.R. Code No.
- 
3. Name and address of Research Institute/Centre Central Marine Fisheries Research Institute, Cochin
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4. Title of Project: MBO/CR/1 Investigations on coral reef resources  
-- Title of Problem: MBO/CR/1.2 Survey of turtle resources
- 
5. Name and designation of Principal Investigator: C.S.Gopinatha Pillai, AFS
- 
6. Name(s) and designations of Associate(s) and Establishments on which borne:  
(a) Whole time: (b) Part time: nil  
A.A.P.Mudaliar, JSA - M.Camp  
A.Bastian  
Fernando, JSA - Tuticorin
- 
7. Location of the research project: Mandapam Camp, Tuticorin and other areas.
- 
8. (a) Objectives:  
1. To assess the turtle resources of the south eastern coast of India.  
2. To study the annual turtle landings, the species composition, size, sex ratio and seasonal fluctuations in the turtle fishery.  
3. To locate the conventional turtle nesting grounds along the coast.
- 
- (b) Practical utility:  
Information on the turtle fishery and the revenue obtained from it along the south east coast is of importance.  
Locating the nesting grounds will enable the marking of areas to be protected. This will be helpful in conservation and rational exploitation of this resource. Information on the biology will be of utility in turtle farming.
- 
9. Technical Programme:  
1. Location of nesting ground and breeding seasons.  
2. Collection of data on Turtle landings.  
3. Biological studies to enable taking up turtle farming.
- 
10. Date of start: 1974
- 
11. Likely date of completion: 1978
- 
12. Estimated man months: 26 man months/year
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13. Facilities required:

- |                        |    |                      |           |
|------------------------|----|----------------------|-----------|
| i) land                | -- | iv) foreign exchange | --        |
| ii) labour             | -- | v) Estimated cost    | Institute |
| iii) special equipment | -- |                      | project.  |
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14. If financed by an organisation other than the Institute,

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|--|----|
| a) Name of the financing organisation  | -- |
| b) title of the project (if the project forms a<br>part of a larger project: | -- |
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15. Approximate cost: Institute Project.

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16. Signatures of:

Sd.  
Principal Investigator      Head of Division

Sd.  
Director

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1. Institute Code No. MBO/MS/1.1
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2. I.C.A.R. Code No.
- 
3. Name and address of Research Institute/Centre. Central Marine Fisheries Research Institute, Cochin.
- 
4. Title of Project: MBO/MS/1 Ecological studies of mangrove swamps.  
 Title of Problem: MBO/MS/1.1 Ecology of the mangrove swamps and their associated fauna and flora in the Cochin area.
- 
5. Name and designation of Principal Investigator: C.S.Gopinatha Pillai, AFS
- 
6. Name(s) and designations of Associate(s) and Establishments on which borne:
- |                             |                            |           |
|-----------------------------|----------------------------|-----------|
| (a) <u>Whole time</u> : Nil | (b) <u>Part time</u> :     |           |
|                             | M.S.Rajagopalan, AFS       | } -Cochin |
|                             | P.Parameswaran Pillai, SRA |           |
|                             | C.P.Gopinathan, SRA        |           |
|                             | C.S.Daniel Selvaraj, RA    |           |
|                             | P.M.Aboobaker, JSA         |           |
|                             | and others.                |           |
- 
7. Location of the research project: Cochin
- 
8. (a) Objectives:
1. To investigate the formation and zonation of mangroves and their part played by local ecological conditions in the development of vegetation.
  2. To determine qualitatively and quantitatively the mangrove associated fauna and their inter-relationships and influence on local fisheries.
- 
- (b) Practical utility:  
 The third "All India Symposium on Estuarine Biology" (Cochin, 1975) has stressed the importance of investigating our mangrove swamps to elucidate the various ecological aspects on their formation, development and associated fauna and flora. At present practically very little is known on these aspects of mangroves associated with estuarine and coastal waters along the Kerala coast.
- 
9. Technical Programme:  
 Detailed survey on the mangrove vegetation and associated fauna will be carried out in the Cochin area with special reference to succession of animal and plant communities, faunal and floral associations, influence of non-biological parameters if any and trophic cycles. The extent to which mangrove swamps form nursery grounds for fish and shellfish will also be investigated.
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- 
10. Date of start: 1975
- 
11. Likely date of completion: 1978
- 
12. Estimated man months: 12 months/year
- 
13. Facilities required:
- |                        |    |                      |           |
|------------------------|----|----------------------|-----------|
| i) land                | -- | iv) foreign exchange | --        |
| ii) labour             | -- | v) Estimated cost    | Institute |
| iii) special equipment | -- |                      | Project   |
- 
14. If financed by an organisation other than the Institute,
- a) Name of the financing organisation --
- b) title of the project (if the project forms a part of a larger project : --
- 
15. Approximate cost: Institute Project
- 
16. Signatures of:

Sd.  
Principal Investigator

Head of Division

Sd.  
Director

RESEARCH PROJECT - 1976

- 
1. Institute Code No. MBO/MM/1
- 
2. I.C.A.R. Code No.
- 
3. Name and address of Research Institute/Centre. Central Marine Fisheries Research Institute, Cochin.
- 
4. Title of project: MBO/MM/1 Investigations on marine mammals with special reference to lesser cetaceans.
- Title of problem: MBO/MM/1.1 Investigations on the distribution biology, feeding habits and behaviour of dolphins and porpoises.
- 
5. Name and designation of Principal Investigator: E.G.Silas, Director
- 
6. Name(s) and designations of Associate(s) and establishments on which borne:
- (a) Whole time: (b) Part time: nil
- Two Research Fellows.
- 
7. Location of the research project: Cochin.
- 
8. (a) Objectives:
- Processing of data available on lesser cetaceans (dolphins, porpoises and smaller whales) of the Indian Seas and to study the distribution, biology and feeding habits of some species. To examine whether conservation measures are necessary for the protection of lesser cetaceans.
- 
- (b) Practical utility:
- There is hardly any information available on dolphins, porpoises and smaller whales except for records of strandings. Dolphins constitute an important link in the trophic cycle in our shelf waters. No estimates are available about the populations of different species of dolphins in our coastal waters nor their role as predators of fishes such as mackerels and sardines. Often damage to fishing gear is also caused by dolphins. A proper study of animals and the species occurring in our waters, their biology and abundance will help considerably in evolving suitable management measures for proper conservation and utilisation of this resource.
- 

/these



### 9. Technical Programme:

1. Processing and writing up of data already collected by the Principal Investigator on marine mammals from the Indian Ocean.
2. Observations on the ecology and biology of marine mammals, particularly of dolphins along the south-west coast of India.
3. Special emphasis will be given to study their reproduction, growth, food and feeding habits and behaviour.

10. Date of start: 1976

11. Likely date of completion: 1980

12. Estimated man months: 25 man months/year

13. Facilities required:

- |                        |    |                      |             |
|------------------------|----|----------------------|-------------|
| i) land                | -- | iv) foreign exchange | --          |
| ii) labour             | -- | v) Estimated cost    | -Institutes |
| iii) special equipment | -- |                      | Programme.  |

14. If financed by an organisation other than the Institute,

- a) Name of the financing organisation: --
- b) Title of the Project (if the project forms a part of a larger project: --

15. Approximate cost: --

16. Signatures of:

Sd.

Principal Investigator

Head of Division

Sd.

Director