

RESEARCH POLICY
REPORT ON THE CONCLUDED PROJECTS
ON-GOING PROJECTS
&
PROGRESS OF ON-GOING PROJECTS

FACULTY OF FISHERIES

205 263

DIRECTOR OF RESEARCH
KERALA AGRICULTURAL UNIVERSITY
VELLANIKKARA-680 654,
TRICHUR, KERALA

KAU
Research

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FISHERIES RESEARCH

Research Policy and Strategy for Fisheries Research by the
Kerala Agricultural University.

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Eventhough Kerala is the foremost State in India as regards marine fish production, her production from inland waters is rather poor, amounting to only about 5% of the total catches as against the all India average of about 40%. Kerala is endowed with extensive inland water resources and the prospects are good for increasing fish production from inland waters through scientific fish culture. The Central Inland Fisheries Research Institute does not have any research unit in Kerala except for the AICRP on Brackishwater Fish Farming at Vyttila. Research function under the State Department of Fisheries has since been transferred to the KAU. Therefore a lot of research to support developmental work in inland fisheries has to be done urgently.

As regards marine fisheries research, especially assessment of abundance and distribution of marine fish populations, changes in their spatial and temporal distribution, their breeding habits and migration, food and feeding habits, larval development, pressure of fishing on the population density etc., such studies could be undertaken in a fruitful way only by a Central Research Institute with units all along the Indian coast and with the help of several costly research and exploratory fishing vessels. That being the case, the extent of ~~useful~~ ~~marine fisheries~~ research that the University could undertake is only limited. However, in order to provide the essential research support for education, limited marine fisheries research also could be undertaken by the University, especially in collaboration with the Central Fisheries Institutes. Mariculture is a prospective field for research under such collaboration. Quality control of fish and fishery products also deserves close studies. Management studies like fisheries economics, rural sociology of the fishing villages, fisheries co-operatives and marketing etc. which are not getting sufficient coverage at present could also be taken up for detailed studies by the University.

With reference to fisheries research, the policy of the University would be to intensify research leading to the development of viable technologies for the commercial production of seed of esteemed species of cultivable fishes and prawns, so that fish and prawn farming could be popularised in the State. A sound basis for the establishment of a 'Fish Seed Trade' in the State would be urgently provided. The research programme would also include standardisation of intensive nursery and culture practices for the different cultivable species, formulation of a package of practices on the basis of experiments for the polyculture of fishes and prawns, paddy-cum-fish and prawn culture, and integrated farming of crops, livestock and fish based on the principle of quick organic recycling. In short, the University's attention on fisheries research would be centred around 'Culture fisheries' rather than "Capture fisheries". The main aims of this programme of research would be to improve the economic returns of the farmer through scientific integrated farming, to provide new job opportunities to

the fishermen through fish farming and fish Seed Trade, to make available more and more fish in the diet of the interior rural population, to support the export industry with farmed fin fish and shell fish and to provide the essential research support to the programmes of fisheries education under this University. With a view to avoid duplication of work as far as possible and at the same time to organise strong fields of research support to the development of culture fisheries in the State, the following major research projects are proposed to be undertaken by the University.

I. Research leading to commercial production of seed of Macrobrachium rosenbergii and standardisation of intensive nursery and culture practices.

Preliminary trials conducted by the Kerala Agricultural University in the Kuttanad have shown that M. rosenbergii could be cultured very profitably in the low lying paddy fields under intensive stocking and artificial feeding. The juveniles were collected from fields which were dewatered for cultivation of paddy and stocked in paddy fields with raised bunds. It was observed that a net return of Rs.1600/- could be obtained from 0.1 ha. of field in about 5½ month's time. The only restriction for the wider practice of Macrobrachium culture is the dearth of seed. So this is a priority item for research since the extensive paddy fields of the Kuttanad and the Kole lands could be brought under fresh water prawn culture if sufficient number of seed are available.

This is a project which has received good attention in countries like Malaysia, Taiwan, Japan, U.S.A. etc. Commercial hatcheries on the public and private sectors are working in Hawaii. In India work is undertaken at CIFRI. In Kerala, partial success was reported by Meeran & Sebastian (1972) and Joseph (1974). At Azhikode an improvised hatchery is run on a seasonal basis by Sri.K.H.Alikunhi. The technique has to be improved very much through intensive and sustained research. The problem of larval feeding without pollution of the culture media requires urgent attention. As the University has in its fold scientists with background experience in the field and since this is the most important research field in culture fisheries with prospects of profound impact on the cropping pattern of the Kuttanad and Kole lands in Kerala, this project deserves to be taken up on a priority basis.

Sub Projects

1. Screening of larval food organism and artificial feed to find out a cheap and reliable food source for larval rearing of the prawn.
2. Assessment of bacterial and fungal contamination of the culture media and development of corrective measures including use of antibiotics in the media for control of larval mortality.
3. Culture of phytoplankton in the medium in order to purify the culture medium.

4. Cheap food as artificial feed for juvenile and adult prawn in intensive culture systems.
 5. Polyculture of Macrobrachium with selected fish species for maximum production per unit area.
 6. Layout, design and construction of Macrobrachium hatcheries solving bioengineering problems.
 7. Economics of construction and operation of Macrobrachium hatcheries as a rural industry.
 8. Diseases and their control.
 9. Recommending a package of practices for intensive Macrobrachium culture.
 10. Induced breeding of Macrobrachium during off-season through eye stalk ablation.
- II. Research leading to the commercial production of seed of Mugil cephalus and standardisation of intensive nursery and polyculture practices.

M. cephalus is a very good brackishwater species for culture. But the species do not breed in confinement in ponds and the seed availability from natural sources is very irregular and insufficient for extensive culture. By making available the seed of M. cephalus in sufficient quantities brackishwater fish farming could be made very profitable. The species grows well in freshwaters also.

The induced breeding of M. cephalus was attempted in Taiwan, Israel and Hawaii with success, through injection of piscine pituitary extract and HCG. However, commercial production of seed could not be obtained. Attempts are underway in Hawaii in this direction. In India M. macrolepis could be induced to breed in captivity (Sebastian & Nair 1973). Similar success of repeated spawning with certainty in M. cephalus is yet to be achieved and a system for large scale larval rearing has to be developed. In view of the prospects for development of culture fisheries through results of this project, it is proposed to take up this work on a priority basis. Some financial assistance was availed from the IFS, Sweden for this work and preliminary experiments on the use of anaesthetics in handling of breeders were conducted. The aim of establishment of M. cephalus hatchery is to be achieved through a series of smaller research projects as shown below.

Sub Projects

1. The use of anaesthetics in handling the M. cephalus breeders for hormonal treatment and assessment of gonado-somatic index.
2. Identification of cheap food and manuring for intensive rearing of M. cephalus.

3. The effect of various gonadotropic hormones on gonadal development in M. cephalus.
 4. Assessment of ecological factors conducive for larval survival.
 5. Identification of larval food at different stages of development.
 6. Mass culture of larval food organisms.
 7. Construction and commissioning of a system of ponds and lift nets for frequent examination of G.S.I. of breeders.
 8. Development of a hatchery system: solving bioengineering problems.
 9. Nursery rearing of M. cephalus.
 10. Systematics of the Mugilidae : studies through Cytotaxonomy and electrophoresis.
- III. Adaptive Trials on Composite Fish Culture, under different species combinations, stocking densities and under different soil and hydrobiological conditions.

The main aim is to increase fish production, through intensive farming of compatible species including the major carps and the local desirable species. Such trials will be undertaken in household and village ponds, temple tanks, paddy fields, etc. As part of the project a Carp Hatchery will be established in the College Campus at Panangad or at a suitable place.

This is more of the nature of application of a known technology under the present conditions in order to circumvent the cumbersome procedures in the conventional hatchery work and to work out the economics of establishing a Hatchery on modern lines. This is also intended to support education and to provide sufficient major carp seed for experimental works. The seed produced will be used for undertaking related projects on Composite Fish Culture in household and village ponds, paddy-cum-fish culture etc.

1. Establishment of a carp hatchery : economics.
2. Adaptive trials on fish culture in household and village ponds.
3. Fish culture as a followup crop or as an alternate crop in paddy fields.
4. Paddy-cum-Fish culture : simultaneous farming.

IV. Brackishwater Fish Farming : Biological Studies.

A unit of the All India Co-ordinated Research Project on Brackishwater Fish Farming is run at Vyttila. The main research works undertaken under this project are the following.

1. Survey of seed resources of cultivable species of prawns and fishes.
2. Nursery rearing of prawns and fishes.
3. Studies on the ecology of brackishwater ponds related to productivity.
4. Prawn culture in pokkali rice fields after the harvest of paddy.
5. Studies for the identification of suitable varieties of fishes which can be cultured alongwith rice in paddy fields.
6. Adaptive trials for introducing fish culture in pokkali fields.
7. Studies on mono and polyculture of finfish and shell fish with and without artificial feed.

Studies on the intensive farming of Penaeus monodon and P. indicus and hatchery production of their seed will be taken up at the Puduveypu fish farm.

V. Brackishwater Fish Farming : Studies on Engineering and Economic aspects

The tidal amplitude in Cochin is less than 1 metre and as such if the ponds are to be retain^{ed} about a metre of water throughout the culture period and are to be completely dewatered during the period of harvest, pumping would be necessary either for filling in the water or for dewatering, as the case may be, depending upon the level fixed for the pond bottom. This poses engineering problems and seemingly the economics of pond construction could be favourably altered through digging of channels within the ponds to retain a minimum of 1 meter of water even during the lowest low tide. With a view to study the economics of fish pond construction and to assess the efficiency of operation and management of brackishwater ponds, fish ponds having their bottom level fixed at different levels in relation to the MSL will be constructed and put under operation. Cheaper methods of construction of sluice gates will also be examined. On the basis of these studies technical advice could be given to the prospective brackishwater fish farmers of the state.

VI. Frog Farming.

An ICAR sponsored scheme on artificial propagation of frogs is implemented at Kumarakom. The aim of the project is to artificially induce breeding in the cultivable species of frogs and to produce their young ones in large quantities in order to replenish the overfished natural population. Prospects of rearing the frogs for the market will also be examined. Close liason will be established with institutions like the MPEDA, which has shown interest in this work.

Sub projects.

1. The induced breeding of ^e cultivable species of frogs and the standardisation of dose.
2. Larval rearing of frogs on artificial feed.
3. Rearing of frogs for the market : preparation of suitable artificial feed.
4. Introduction of the exotic species Rana catesbaena for large-scale culture.

VII. Miscellaneous Research Projects.

1. Reservoir fisheries management studies.
2. Fish culture in sewage-fed tanks.
3. Experiments on fish hybridisation.
4. Monosex culture of Tilapia mossambica.
5. Intensive farming of Channa spp.
6. Intensive farming of Lates calcarifer, a predatory species with Tilapia mossambica, a prolific breeder.
7. Economics and technical feasibility of introducing fish culture in Padasekherams of the Kuttanad.
8. Farming of Brackishwater species like Chanos and Mugil cephalus in freshwaters in the paddy fields of the Kuttanad.
9. Assessment of the salinity tolerance of the tiger prawn, Penaeus monodon.
10. Paddy-cum-fish culture : standardisation of stocking density and species composition.
11. Standardisation of modifications required for conversion of paddy fields into fish ponds.
12. Introduction of Macrobrachium malcomsonii for farming in Kerala.

13. Studies on water quality with reference to fish mortality with the onset of the monsoon rains.
14. Adaptive trials on fish culture in village ponds, temple tanks and in household ponds.
15. Integrated farming of crops, livestock and fish ; standardisation of the technology.
16. Use of rubber seed cake in fish nutrition.
17. Research leading to semi-commercial production of a compounded and balanced fish and prawn feed.
18. Screening of the local plants and plant products to find out a substitute for Mohna oil cake for eradication of predatory species.
19. Survey of seed resources of Macrobrachium rosenbergii in the rivers of Kerala.
20. Oceanographic studies on the mudbanks of the Kerala coast.
21. Assessment of the extent of pollution of the backwaters by the setting of coconut husks, with special reference to aquaculture.
22. Studies on the impact of the Thanneermukkom bund on the fisheries of the Vembanad lake.
23. Survey of the status of inland fisheries of Kerala.
24. Dietary habits of the fishermen of a particular locality (Puduveypu/Malippuram/Narakkal).
25. Monetary indebtedness of the fishermen of the Puduveypu/Malippuram area.
26. Impact of fishermen co-operatives on the socio-economics of the fishermen (Puduveypu/Malippuram/Narakkal).
27. The social life of fishermen in a particular locality (Puduveypu/Malippuram).
28. Factors influencing the price of fish in the internal market.
29. Credit utilisation by the fishermen.
30. Cost-benefit analysis of mechanised fishing.
31. Cost-benefit analysis of indigenous fishing.

KERALA AGRICULTURAL UNIVERSITY

FINAL REPORT

Faculty of Fisheries

Department of Aquaculture.

- 1. Name of the Research Centre : Fisheries Unit, Rice Research Station, Vyttila.
- 2. Project No. & Title : VA-F-5-18-3A
"Studies for the identification of suitable varieties of fishes which can be cultured along with rice in paddy fields".

3. Objectives:

To identify suitable varieties of fishes which can be cultured along with rice in the Kayal lands taking into account of the various limitations in existence there.

4. Name(s) & Designation of:

- a) Project Leader : Dr.D.M. Thampy, Associate Professor.
- b) Associates : 1. Smt. Susheela Abraham, Asst. Professor.
2. Sri.C.G. Rajendran, Junior Asst. Professor (Biology)
Sri.M.M. Jose
3. Sri.P.S. Mrithunjayan, Junior Asst. Professor (Chem.)

5. Date of start : July, 1977

6. Date of termination : February 1980

7. Technical programmes:

The field No.13 of the Rice Research Station, Vyttila having an area of 0.12 ha. was divided into 8 plots (A to H). In plots B to F different species of fishes such as Tilapia, Pearl spot, common carp, mullets and milk fish were stocked separately at a concentration of 2000/ha. in each of these plots after the spreading operation of the paddy. In one plot all these fishes were stocked together to study the compatibility keeping the concentration the same. Plots A and H were treated as controls.

8. Results obtained:

During the first year out of the 5 varieties of fishes such as Tilapia, pearl spot, common carp, mullet sp. and milk fish stocked in plots B to F, only Tilapia survived. During 1978-79 goramy which was introduced instead of Chanos common carp, Etrophus and Tilapia survived. During 1979-80 out of the 5 species of fishes viz. pearl spot, Etrophus Mugil,

(Contd....2)

Tilapia, the common carp Cyprinus carpio and Osphronemus goramy, only the exotic fish goramy survived showing 50% survival.

From the results of the work done during the three year period of the project, it could be seen that fishes such as Pearl spot (Etrophus suretensis) Tilapia, goramy (Osphronemus goramy) and common carp (Cyprinus carpio) are suitable for culture along with paddy in the pokkali areas, provided there is 30 cm. of water in the fields, the fields are well bunded to prevent the escape of fishes during flooding and the growth of salvinia is controlled.

9. Future lines of work:

Adaptive trials on farmers' fields are to be conducted with common carp and goramy to establish the possibility of their culture in pokkali fields along with paddy.

10. Publications:

a) Research paper: A paper entitled "Preliminary trials on culturing fishes along with paddy, in pokkali rice fields" has been presented to the National Symposium on Fresh water Biology held at Salem, during January, 1981.

- 11. Detailed project records and where deposited : The basic record and the field note book deposited at Rice Research Station, Vyttila.
- 12. Follow up action taken to disseminate the results achieved. : 1. Adaptive trials in farmers' fields using common carp and goramy are planned.
2. The technology is being made use of under the Lab to Land Programme.

13. Signature:

(Sd/-) (Sd/-)

Project Leader Head of Department Director of Research

KERALA AGRICULTURAL UNIVERSITY
FINAL REPORT

Faculty of Fisheries

Department of Aquaculture

1. Name of the Research Centre: Fisheries Unit,
Rice Research Station,
Vytila.
2. Project No. & Title : VA-F-6-18-38
"Adaptive trials for introducing
fish culture in pokkali fields".

3. Objectives:

1. To take up fish culture along with paddy in the pokkali fields with a view to increase the revenue realised from such fields.
2. To bring under fish cultivation areas which are presently not utilised for prawn filtration.

4. Name(s) and designation of:

- a) Project leader : Dr.D.M. Thampy,
Associate Professor (Fisheries)
- b) Associates : 1. Dr. Susheela Abraham,
Assistant Professor.
2. Sri.C.G. Rajendran,
Junior Asst. Professor
(Biology)/
Sri.M.M. Jose
3. Sri.P.S. Mrithunjayan,
Junior Asst. Professor (Chem.)

5. Date of start : July 1977

6. Date of termination : February, 1980

7. Technical programme:

The fish *Etrophus suratensis* had been stocked in 3 or 4 pokkali fields owned by farmers along with paddy, after the spreading operation of the paddy. The fishes were stocked at the fingerling stage at a concentration of 2000/ha. The farmers were asked to raise the bunds, to provide channels and also to provide a small sluice through which water exchange could be made.

8. Results obtained.

During 1977-78 out of the 4 fields, three representing low saline interior pokkali areas and one high saline area, only in the high saline area the fish *Etrophus* survived registering a very appreciable growth of 152 mm and 135 gm on 25.11.77 from 52.1 mm and 6.1 gm. they had on 2.8.77. During 78-79 the experiment was conducted in three farmers' fields, and in two places they survived registering better growth. During the third year this fish was stocked at the same concentration of 2000/ha.

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at three places. In all the three places they survived the rate of survival being 8.4%, 53.75% and 61%. In the field at Pattanakkad where the conditions were almost ideal it has registered a growth of 150 gm. on 17.12.79 from 10.0 gm as on 30.3.79.

9. Future lines of work:

The results obtained for the last three years had convincingly proved the possibility of utilizing the fish Etrophus, for culture along with paddy in the pokkali fields which are protected with high bunds and which have atleast 30 cm. of water always. As such this can be popularised for culture in pokkali fields.

10. Publications:

a) Research Paper: The paper entitled "Preliminary trials on culturing fishes along with paddy in pokkali rice fields" which has been presented to the National Symposium on Freshwater Biology incorporates the results of this project.

11. Details of project records and where deposited : One field book and one basic record deposited in the Rice Research Station, Vyttila.
12. Follow up action taken to disseminate the results achieved : The technology is being made use of under the Lab to Land Programme.

13. Signature of:

(Sd/-) (Sd/-)
Project Leader Head of Department Director of Research

KERALA AGRICULTURAL UNIVERSITY
RESEARCH PROJECT

Faculty of Veterinary & Animal Sciences, Department of Fisheries.

- 1. Name of the Research Centre: All India Co-ordinated Research Project on Brackishwater Fish Farming, Vyttila.
- 2. Project No. : VA-F6-18-1B
- 3. Title of the project : Nursery rearing of prawns and fishes.
- 4. Name(s) and designation of:
 - a) Project Leader : Dr.D.M. Thampy, Associate Professor(Fisheries).
 - b) Associate(s) : Shri.C.G. Rajendran, Junior Instructor (Biology)

5. Objectives:

To find out the best nursery rearing practices suitable to the locally available species of prawns and fishes in order to obtain maximum survival rate during nursery rearing.

6. Practical utility:

Since most of the brackishwater fishes and prawns breed only in the sea and their young ones migrate into the estuary, the seeds will have to be collected from the estuary. If they are directly stocked in the stocking ponds there will be high mortality. In order to minimise this, acclimatisation in the nursery ponds prepared for that purpose is essential. This will help to achieve a survival rate upto 95 per cent.

7. A short review of literature:

Central Inland Fisheries Research Institute, Barrackpore has done some work in this direction and has reported that they could achieve survival rates upto 80% in the case of prawns and 60-80% in the case of mullets. No such work has so far been done in Kerala involving the locally available cultivable species.

8. Technical programme:(in brief):

Three ponds (I, II & III) will be prepared after draining, liming and manuring to be used as nurseries. In these ponds, different species of fishes and prawns will be stocked at different concentrations in order to find out the most suitable stocking rate. The percentage of survival and the average increment of growth will also be assessed. Nursery rearing experiments will also be conducted using cement tanks and plastic pools.

- 9. Date of start : April 1977.
- 10. Likely date of completion : March, 1984
- 11. Additional facilities required: 6 Cement tanks and 6 plastic pools.
- 12. Approximate cost: Rs. Ps.

1. Cost of tanks and pools	..	800.00
2. Labour charges	..	500.00
3. Cost of lime, manures, artificial feed etc.	..	3000.00
Total		<u>4300.00</u>

13. Signature of:

(Sd/-) (Sd/-)
Project Leader Head of Department Director of Research.

KERALA AGRICULTURAL UNIVERSITY

RESEARCH PROJECT

Faculty of Veterinary & Animal
Sciences.

Department of Fisheries.

1. Name of the Research Centre: All India Co-ordinated Research Project on Brackishwater Fish Farming, Vyttila.
2. Project No. : -- VA-F6-18-1C
3. Title of the Project : Studies on mono and polyculture Project on Brackishwater Fish Farming, Vyttila.
4. Name(s) and designation of:
 - a) Project Leader : Dr.D.M. Thampy,
Associate Professor (Fisheries)
 - b) Associate/s : Shri.C.G. Rajendran,
Junior Instructor (Biology)

5. Objectives:

1. To find out the best species and species combinations in order to achieve maximum productivity at a minimal cost.
2. To formulate a cheap nutritive supplementary food readily acceptable to the prawns and fishes utilising the locally available agricultural by-products.

6. Practical utility:

Finding out of the most compatible combinations of economically important prawns and fishes which can utilise all the trophic levels available in the ponds, is an important aspect in brackishwater fish farming for obtaining a higher yield. Since it is known that supplementary feeding will help in augmenting production, feeding with artificial feed will have to be resorted. When this is done, the cost should be kept to the minimum possible. For this, feeds of different compositions taking into account of the cost, acceptability and conversion ratio will have to be tried.

7. A short review of literature:

Central Inland Fisheries Research Institute has conducted several experiments on mono and polyculture using prawns such as Penaeus monodon and P. indicus and fishes such as Liza persia, L. tade and Chanos chanos and achieved production upto 2000 kg/ha. with artificial feed. Different artificial feed materials were also used by them. No work has so far been done on this ~~xxxxxx~~ aspect in Kerala.

8. Technical programme (in brief):

Fishes such as Etroplus, Mugil and Chanos and prawns such as Metapenaeus dabsoni, M. Monoceros, Penaeus indicus and P. monodon will be stocked in the ponds at different combinations and concentrations in order to study the compatibility

(Contd....2)

and productivity. Artificial feeding using different feed combinations will also be tried to find out the suitable ones under laboratory and field conditions.

9. Date of start : June 1976.
10. Likely date of completion : March 1984
11. Additional facilities : Nil
12. Approximate cost:

Wages for stocking operation:	.1500.00
Cost of artificial feed:	.1500.00

Total	.3000.00
	=====

13. Signature of:

(Sd/-)
Project Leader

(Sd/-)
Head of Department Director of Research.

KERALA AGRICULTURAL UNIVERSITY

RESEARCH PROJECT

Faculty of ~~Veterinary & Animal Sciences~~. ~~Department of Fisheries~~

1. Name of the Research Centre: All India Co-ordinated Research Project on Brackishwater Fish Farming, Vyttila.
2. Project No. : -- VA-F-6-18-1D
3. Title of the Project : Studies on the ecology of the brackishwater ponds related to productivity.
4. Name(s) and designation of:
 - a) Project Leader : Dr.D.M. Thampy, Associate Professor (Fisheries)
 - b) Associate/s : Shri.C.G. Rajendran, Junior Instructor(Biology).
5. Objectives:

To find out the optimum dosage of lime, manure, supplementary feed etc. required in each pond with a view to achieve maximum production.
6. Practical utility:

Analysis of soil for assessing the pH and the nutrient levels is of much importance to fix up the manurial dosage. Any application of manure without taking into account of their existing levels is of no use. So a detailed knowledge of the different ecological factors in operation is a must for an efficient management of the ponds.
7. A short review of literature:

The Central Inland Fisheries Research Institute has carried out different experiments related to pond fertility at their brackishwater farm at Kakdip (Ghosh, 1976) and has recommended dosage of different fertilizers for brackishwater ponds. But no such study was made here in Kerala, where the soil conditions are quite different.
8. Technical programme (in brief):

Before the application of lime and manure, the pH and the nutrient levels will be studied. The changes brought about as a result of their application will be assessed after a time, so as to evaluate the correct dosages of manure required to keep a sustained fertility in the ponds. The constituents of the bottom biota will be studied periodically to assess the productivity of the ponds.
9. Date of start : March 1976.
10. Likely date of completion : March, 1984.
11. Additional facilities required: Nil
12. Approximate cost:

1. Labour charges for manuring:		300.00	
2. Cost of lime and manure:		4500.00	
	Total	4800.00	=====

13. Signature of:

(Sd/-)
Project Leader

(Sd/-)
Head of Department

Director of Research

KERALA AGRICULTURAL UNIVERSITY

RESEARCH PROJECT

Faculty of Veterinary & Animal Sciences. Department of Fisheries.

1. Name of the Research Centre: All India Co-ordinated Research Project on Brackishwater Fish Farming, Vyttila.
2. Project No. : --
3. Title of the project : Seed resources survey of cultivable species of prawns and fishes in the Cochin backwaters.
4. Name(s) and designation of:
 - a) Project Leader : Dr.D.M. Thampy, Associate Professor (Fisheries)
 - b) Associate(s) : Shri. C.G. Rajendran Junior Instructor (Biology)
5. Objectives:
 1. The survey is intended for locating the most suitable collection centres for prawns and fishes during the different seasons.
 2. To work out the economic feasibility so as to commercialise seed collection.
6. Practical utility:

This survey will help to prepare a seed collection calendar of the Cochin backwaters near the farm area. This information is of vital importance for the procurement of quality seeds of brackishwater prawns and fishes for stocking purposes.
7. A short review of literature:

The Central Marine Fisheries Research Institute, Cochin has done work in this direction and has collected information about the overall availability of seeds in the Cochin backwaters. A much more detailed survey is necessary for purposes of making seed collection on a commercial scale.
8. Technical programme (in brief):

For prawn seed Hapa net, 2x1x1 m, made of fine mosquito net will be used which will be operated at 3 different places by two men at fortnightly intervals during difference tides. This is intended to give an idea of the species composition, availability during different lunar phases and tides and also the catch per net per hour. For collection of fry of fishes such as Etroplus, Mugil and Chanos, drag net of 7x1x1 m made of nylon net having a mesh size of 10 x will be used.
9. Date of start : April 1976.
10. Likely date of completion : March 1984
11. Additional facilities : Nil
12. ^{required} Approximate cost : .1200/-
13. Signature of:

(Sd/-)
Project Leader

(Sd/-)
Head of Department

Director of Research

RESEARCH PROJECT

Faculty of Veterinary & Animal Sciences. Department of Fisheries

1. Name of Research Centre: Department of Fisheries.
(Adaptive trials in farmers' fields in Kole lands and in the Kuttanad)
2. Project No. VA-F-6-18-4A
3. Title of the Project: Farming of fish as a follow-up crop in paddy fields.
4. Names & designation of:
 - a) Project Leader: Dr.M.J. Sebastian,
Professor of Fisheries.
 - b) Associates:
 1. Dr.D.M. Thampy,
Associate Professor(Fisheries).
 2. C.G. Rajendran,
Junior Instructor(Biology)
5. Objectives:
To assess the commercial viability of raising an alternate crop of fish after the harvest of paddy in the freshwaters of the Kuttanad and the Kole lands.
6. Practical utility:
There are about 12,000 ha. of kole lands in Trichur District and 52,000 ha. of kayal reclaimed fields in the Kuttanad where one or two crops of paddy is raised annually. These fields lie fallow during 6 to 9 months of an year. This period is quite sufficient for raising a single crop of fish. At a time when paddy cultivation is not reported to be economical, a crop of fish is supposed to bring in financial relief to the farmer, produce more animal protein which the country needs and check on the spread of insect pests.
7. Review of literature:
In the vast agricultural economy regions of the Far East, paddy-cum-fish culture has reached a high degree of technical perfection. The selection of suitable species depends to a large extent on the height of water that can be retained and the duration of crop. In the alternate production of paddy and fish, aimed at producing fish for the consumer market about 2000 fingerlings/ha. are stocked for raising in about 3 months time. Generally recovery is only about 20 to 30% for fish for the table because of the presence of predatory species of fishes and animals such as Cormorants, Otters, frogs and snakes.

(Contd.....2)

8. Technical programme:

After the harvest of paddy, the fields will be either drained and dried or all the predatory species will be eliminated by suitable means. The bunds will be strengthened. Water will be let in gradually and the fields will be manured with cowdung and synthetic fertilizers on the basis of soil analysis. This is to produce a good growth of algae.

The fingerlings of Catla, Rohu, Mrigal, Common Carp, Karimeen etc. will be introduced in the fields, at predetermined stocking densities.

On the basis of the rate of growth of the different species and their survival rate, the stocking density will be modified during the subsequent years with the most suitable species at the optimum stocking density.

The economics of fish culture in paddy will be worked out and suitable recommendations will be made.

9. Date of Start: June 1978 (Started in anticipation of approval)

10; Likely date of completion: May 1983.

11. Additional facilities required:

The following new posts are required to be sanctioned.

Assistant Professor	..	1 No.
Fisherman-cum-Watchman	..	2 Nos.

12. Expenditure:

	<u>1978-79</u>	<u>79-80</u>	<u>80-81</u>	<u>81-82</u>	<u>82-83</u>	<u>Total</u>
(. in lakhs)	0.10	0.45	0.60	0.65	0.65	2.45

13. Signature of:

(Sd/-)
Project Leader

(Sd/-)
Head of Department

Director of Research

RESEARCH PROJECT

Faculty of Veterinary & Animal Sciences. Department of Fisheries.

1. Name of Research Centre : Department of Fisheries
(Adaptive trials in farmers' fields).
2. Project No. : VA-F-6-18-4C.
3. Title of the Project : Adaptive trials for simultaneous farming of fish and prawns with paddy.
4. Names & Designation of:
 - a) Project Leader : Dr.M.J. Sebastian,
Professor of Fisheries.
 - b) Associates: : C.G. Rajendran,
Junior Instructor (Biology)
P.S. Mrithunjayan,
Junior Instructor(Chemistry).

5. Objectives:

To assess the economics of culture of fish and prawn alongwith the water resistant tall-growing varieties of paddy like the Kolappala.

6. Practical utility:

The indogenous water-resistant tall-growing varieties of paddy afford the retention of 45 to 60 cm of water in the paddy fields for enabling fish and prawn culture along with the paddy. These varieties of paddy normally do not require the use of insecticides. The low yield of rice, however, could be compensated by the yield of fish and prawn. Therefore suitable species of fishes and prawns could be identified for this type of simultaneous farming which avoids pollution of the environment through the indiscriminate use of insecticides.

7. Review of literature: Growing of seed of carps for a few months along with paddy to raise them to fingerlings stages has been successfully practised in the South-east Asian countries.

8. Technical programme:

The paddy fields after proper preparations will be sown with the Kolappala and similar varieties of paddy. After the seedlings have grown to about 15 cm. in height water will be let in gradually. The paddy grows tall according to the gradual increase in height of water. When about 30 cm. of water is retained in the fields, fry of

(Contd.....2)

different cultivable species of fishes will be introduced. After the harvest of paddy, the water will be retained for some more months until the fish have grown to marketable sizes.

On the basis of the survival and rate of growth of the different species, the stocking will be modified during the subsequent years with the most suitable species at the optimum stocking density. The economics of paddy-cum-fish culture will be worked out.

9. Date of start: June 1978 (Started in anticipation of approval)
10. Likely date of completion: June 1983
11. Additional facilities required:

The following new posts are required to be sanctioned:

1. Junior Instructor .. 1 No.
2. Fisherman-cum-Watchman.. 2 Nos.

12. Expenditure:

	<u>1978-79</u>	<u>79-80</u>	<u>80-81</u>	<u>81-82</u>	<u>82-83</u>	<u>Total</u>
(. in lakhs)	0.10	0.45	0.60	0.65	0.65	2.45

13. Signature of:

(Sd/-) (Sd/-)
Project Leader Head of Department Director of Research

RESEARCH PROJECT

Faculty of Veterinary & Animal Sciences.

Department of Fisheries.

- 1. Name of Research Centre : Brackish water Fisheries Research Station, Vyttila.
- 2. Project No. : VA-F-6-18-8
- 3. Title of the Project : Induced Breeding of the Grey Mulletts.

4. Names & Designation of:

- a) Project Leader: Dr.M.J. Sebastian
Professor of Fisheries.
- b) Associate :

5. Objectives:

To develop a technology for the induced breeding of the Grey mullets of Kerala and for the hatchery production of their seed.

6. Practical utility:

The development of Brackish water Fish Culture in India depends to a great extent on the availability of seed of cultivable species of fishes. Mugil cephalus is one of the most suitable species of fishes for brackish water fish culture. The Hatchery production of its seed will enable wide commercial farming of the species.

- 7. Review of literature: The induced breeding of grey mullets have been successfully conducted in the species, Mugil macrolepis in India (Sebastian & Nair, 1973). Mugil cephalus has been bred by hypophysation in Hawaii, Israel and Taiwan.

8. Technical Programme:

A good stock of breeders will be raised in the ponds at Vyttila Station. Experiments will be conducted to induce spawning in ripe females by pituitary extract injections and by synthetic hormones. Large scale larval rearing will be conducted in specially built outdoor tanks. Suitable larval food will be reared for feeding the larvae.

- 9. Date of start : September 1978.
- 10. Likely date of completion : September 1983.

(Contd.....2)

11 .Additional facilities required: Nil

The following new posts are required to be sanctioned:

Instructor	..	1 No.
Fisherman-cum-Watchmen	..	3 Nos.

12. Expenditure::

	1978-79	79-80	80-81	81-82	82-83	Total
(.. in lakhs)	0.10	2.00	2.00	1.00	1.00	8.10

13. Signature of:

(Sd/-)	(Sd/-)	
Project Leader	Head of Department	Director of Research

KERALA AGRICULTURAL UNIVERSITY
RESEARCH PROJECT PROPOSALS

Faculty of ~~Animal Husbandry~~ Department of Fisheries

1. Name of Research Centre : Coconut Research Station,
Kumarakom.
2. Project No: :
3. Title of Project : Pig-cum-fish culture
4. Name and designation of
a) Project Leader : H.N. Jose, Junior Instructor
(Fisheries)
b) Associate : G. Mathai, Assistant Professor
(Plant Pathology)
5. Objectives: : Development of intensive farm-
ing to enhance profit from
fish culture.
6. Practical utility:

It is reported that pig manure (wastes from pig sty) can be used as a good feed for fish. At present these manures are not utilised properly and are being wasted. In order to study the efficiency of the manure on the fish farms the present study was taken up. If the trial is observed to be promising the results can be passed to the farmers.

7. Short review of literature:

Pig cum fish culture is in vogue in certain parts of India especially in West Bengal. Rabanal (1966), Buck and Barr (1973), Jhingran (1974), B.K. Sharma (1977) studied the different problems of pig cum fish culture and developed methodology.

8. Technical programme (in brief):

0.1 hectares area at the Coconut Research Station, Kumarakom will be cleared and will be cleared and will be protected with live fence against the attack of others. The ponds will be properly prepared and fingerlings of common carp at the stage of 150 mm will be introduced at a stocking rate of 8,000 nos./hectare.

A temporary pig sty will be built with locally available materials near the pond. Five piglets having an average weight of 5-6 kg will be reared. This will be fed with pig feed and suitable materials available locally. For 6 months these pigs will be reared and then sold out.

During the rearing period, measured quantities of the pig dung will be dumped in 4 corners of the fish pond. Urine and wash water also will be allowed to flow into the fish pond. The fishes will feed these pig dung as such and no other supplementary feed will be provided.

.....2/-

A control pond having same size and same number of fingerlings will also be maintained side by side. Feeding with coconut oil cake and rice bran (1:1) at 2% of the total body weight of fish, will be done to compare the performance and economics.

Since the decaying organic matter cause depletion of oxygen in pond, periodical checking will be conducted in pond water.

9. Date of start : November-December 1978
10. Likely date of completion : 1981.
11. Additional facilities required : Facilities available in the station can be utilised. (Management of piggery will be done by Veterinary Doctor and Livestock Assistant attached to this station under Integrated Research Project).
12. Approximate cost : 1.5,000/-
13. Signature of

Sd/-
Project Leader Head of Department Director of Research

KERALA AGRICULTURAL UNIVERSITY
RESEARCH PROJECT

Faculty of : ~~Veterinary and~~ Department of : Fisheries
Animal Sciences.

- 1. Name of the Research Centre : Rice and Fisheries Research Station, Vyttila.
- 2. Project No: : VA-F-6-18-13
- 3. Title of the project : "Adaptive trials on fish culture in homestead ponds in the sandy coastal belt of Kerala".
- 4. Name(s) and designation of
 - a) Project Leader : Dr. Susheela E. Abraham, Asst. Prof. (Fish culture)
 - b) Associates : 1. Dr. U. M. Thampy, Assoc. Prof. (Fisheries)
2. Mr. P. S. Mrithunjayan, Jr. Asst. Prof. (Chemistry)

5. Objectives:-

- 1. The study is intended to find out the feasibility of fish culture in homestead ponds in the coastal belt.
- 2. To find out the suitable species for culture taking into consideration the physico-chemical and biological limitations in such ponds.

6. Practical utility:

In Kerala most of the houses in the coastal belt have ponds of varying dimensions. The water in most of these ponds is not used for drinking purposes, but sometimes used for washing purposes, only. If these ponds can be utilised for fish culture, it will not only be a source of proteinaceous food to the people but also provide an additional income. Besides, the ponds can be kept clean, and can be got ridden of pests and mosquito larvae. This will also help in controlling the mosquito borne diseases.

7. (a) A short review of literature:

Although inland fish culture is very popular in the States of West Bengal, Bihar and Orissa, Kerala is still far backward in this respect. A number of publications from the Central Inland Fisheries Research Institute give information regarding the culture practices that can be adapted in different environments. But there is a paucity of information in this field in Kerala. This will be a preliminary attempt on the possibility of fish culture in our homestead ponds, along scientific lines using fast growing major carps and exotic carps.

7.b) List of References:

- 1. Alikunhi, K.H. et.al. 1971. Studies on Composite fish culture: Production by Compatible combinations of Indian and Chinese carps. J. Indian Fish. Assoc. 1 (1): 26-57.
- 2. Lakshmanan, M.A.V. et.al. 1971. Preliminary observations on intensive fish farming in fresh water ponds by the composite culture of Indian and exotic species. J. Inland Fish. Soc. India, 2:1-21.

3. Sarig, S. 1965. Determining the influence of various fertilizers in fish ponds, *Bamidgeh*, 7(1):3-9.
4. Yashouv, A. 1967. Mixed fish cultures - an ecological approach to increase pond productivity. *JAD Fish. Rep.* (44) 4:258-73.

8. Technical programme:-

Six homestead ponds of 100 to 200 sq.m. will be selected for culture trials. Measures will be taken to clean the ponds of weeds and unwanted debris, and removal of predatory and weed fishes. Indigenous plant poisons such as Mahua oil cake or other locally available plant poisons will be applied to kill the unwanted fishes. The ponds will then be manured with an initial basic dose of lime (500 kg/ha), raw cow dung (2000 kg/ha) urea (200 kg/ha), super phosphate (200 kg/ha). Three repeated doses of manuring will be done which will be 50% of the basic dose. Fishes such as Catla, Mrigal, Rohu, Common Carp, Etroplus or Gourami will be tried. In place of grass carp and silver carp used in composite culture Etroplus and Gourami will be tried. In order to avoid chances of predation by predatory fishes which may enter the ponds during the rainy months the fishes will be released in the fingerling stage after one month's rearing in nursery ponds. The above combination of fishes will help to utilise all the available food resources in the pond, since each fish has a different food habit. Periodical assessment of the growth of the fishes will be made and growth of weeds will be controlled. Harvesting will be done after 6-7 months in those ponds which may dry up early and in others later. In all the six ponds, the same species of fishes in the same ratio will be stocked. Fingerlings will be stocked at densities of 5000 per ha. in three ponds (which may dry up early) and 10,000 per ha. in the remaining ponds. These data will give us information about the optimum stocking density.

The farmers will be asked to bear the cost of draining and cleaning the ponds and harvesting. Since they are homestead ponds watch and ward is not needed. Cost of fertilizers, seed, Mahua cake, service of implements and labour charges for periodical growth assessment will be met by the University. A nursery pond will be maintained in the office compound to rear the fish fry so that they can be introduced in the ponds in fingerling stage.

9. Date of start : 10.7.1980.

10. Likely date of completion : 31-3-1982.

.....3/-

11. Approximate cost:

<u>Particulars</u>	<u>Amount</u>
1. Cost of Mahua cake 2 kg/pond .800/tonne	98.00
2. Cost of manure (lime, urea, rock phosphate, and cowdung), basic dose and 3 repeated doses @ 50 % of basic dose)	165.00
3. Charges for making 6 display boards	120.00
4. Transportation charges	250.00
5. Cost of labour required for man ring stocking and periodical growth assessment	163.50
6. Cost of seed-lings (3750 nos.)	375.00
7. Preparation of nursery ponds, in the office compound, manuring, cost of feed and labour charges (lump sum)	100.00
Grand total;	<u>1269.50</u>

Rounded off to : .1300.00

12. Additional facilities required : Nil

13. Signature of:

Sd/-

Sd/-

Project Leader

Head of the department

Director of Research

KERALA AGRICULTURAL UNIVERSITY
RESEARCH PROJECT

Faculty of : ~~Veterinary & Animal Sciences.~~ Department of : Fisheries

- 1. Name of Research Centre : Rice Research Station, Vyttila.
- 2. Project No: : VA-F6-18-14
- 3. Title of the Project : Seasonal changes in water quality of brackishwater fish ponds and their influence on fish production.
- 4.(a) Name and designation of Project Leader : P.J.Mrithunjayan, Junior Assistant Professor (Chemistry)
- (b) Name and designation of associates : Dr.D.M.Thampy, Associate Professor (Fisheries)
Sri.H.M.Jose, Junior Assistant Professor (Fisheries)
- 5. Objectives : To find out the seasonal changes in chemical composition of water and their impact on fish culture in brackishwater fish ponds.

6. Practical utility:

Distress and mass mortality of prawns and fishes are observed at the time of sudden changes in water quality especially at the onset of first monsoon rains associated with sharp fall in pH and salinity in brackishwater fish ponds. Various physico-chemical changes are possible in brackishwater fish ponds associated with fall in pH and salinity.

A detailed study regarding the various chemical changes in pond water brought about by the seasonal variation will help to find out some precautionary and remedial measures to tide over the untoward effects and thus to save fish crop. The work will be useful to standardise the water quality suitable for different types of fish culture and it will also help the fish farmer to adopt feasible and viable culture practice using suitable varieties of fishes compatible to water quality of the particular season.

7. Short review of literature:

Changes in Physico-chemical factors and nutrient level of Cochin backwaters during seasonal variation have been studied by Sankaranarayanan and Quasim (1969);

.....2/-

Shynamma and Balakrishnan (1973). Relation of water quality to fish culture has been reported by Banerjee (1967). The importance of study of water chemistry and its seasonal variation in brackishwater fish and prawn culture has been pointed out by CIFRI (1978). Chemistry of Estuarine environment is described by Viswanathan (1975) and chemical processes taking place in estuarine conditions are described by Emery (1969), Cronin (1975) and Burton and Liss (1975).

There is a paucity of information regarding the water chemistry and its seasonal variations in the brackish water culture ponds of Kerala where the soil is highly acidic and saline.

b) List of references:-

1. Banerjee S.M. (1967).

Water quality and soil condition of fish ponds in some states in India in relation to fish culture. Indian J. Fish. 14 (1 and 2): 115-44.

2. Burton J.O. and P.S. Liss (Eds) (1976) Estuarine chemistry - Academic Press Inc. (London) Ltd., 229 pp.

3. CIFRI (1978) : Training in brackishwater prawn and fish farming, August 1 - September 30, 1978. CIFRI, Barrackpore.

4. Cronin. L.E. (Ed) (1975) Estuarine Research Vol.I - Academic Press Inc.

5. Emery. K.D. (1969).

A coastal pond studied by oceanographic methods. American Elsevier Publishing Company Inc. New York, pp. 80.

6. Viswanathan R. (1975): Chemistry of Estuarine environment Bull. Dept. Mer. Sci. University of Cochin 7 (2): 231-234.

8. Technical Programme:-

Qualitative and quantitative chemical analysis of pond water at regular intervals will be carried out round the year and at the time of sudden changes in season.

The following physico-chemical parameters and their effect on growth rate and mortality of brackishwater cultivable fishes and prawns (*Btroplus suratensis*, *Mugil cephalus*, *M. dussumieri*, *Chanos chanos*, *Penaeus monodon*, *P. indicus*, *Metapenaeus monaceros* and *M. dobsoni*) will be studied.

:3:

<u>Physico-chemical parameters</u>	<u>Method of Testing</u>
1. pH	Electrometric method
2. Red-ox potential	
3. Conductivity	
4. Salinity	Volumetric method
5. Acidity & Alkalinity	
6. Heavy metals	Colourimetric method after pre concentration using chelating agents/ion exchange resins.
1. Lead, ii. Zinc, iii. Copper	
iv. Mercury	
7. Dissolved gases	
i. Ammonia and ii. Hydrogen sulphide	: Colourimetric method.
iii. Carbondioxide and iv. Oxygen	: Volumetric method.
8. Inorganic salts and Major Nutrients.	
i) Calcium, ii) Magnesium, iii) Sulphate, iv) Chloride	: Volumetric method.
v) Iron, vi) Nitrite, vii) Nitrate, viii) Phosphate, ix) Organic carbon, x) silicate	: Colourimetric method.
xi) Sodium and xii) Potassium	: Flame Photometric method.
9. Organic substances:	
i) Carboxy rates & ii) Humic Acid	: Colourimetric method.
9. Date of start	: 1930
10. Likely date of completion	: 1932
11. Additional facilities required	: Analytical instruments Facilities of other Laboratories will also be utilised.
12. Details of expenditure:	

Approximate cost

a) Non-recurring (instruments)	
1. Spectrophotometer (Spectronic 20 type)	10,000
2. Vacuum pump (Laboratory model)	<u>3,000</u>
	13,000
	=====

.....4/-

b) Additional recurring expenditure for 3 years

3. Chemicals and glasswares	2,000

Grand Total	15,000
	=====

13. Signature of:

Project Leader Head of Department Director of Research.

KERALA AGRICULTURAL UNIVERSITY
RESEARCH PROJECT PROPOSAL

Faculty of : ~~Veterinary and~~ Department of : Fisheries.
~~Animal Sciences.~~

- 1. Name of Research Centre : All India Co-ordinated Research Project on Brackishwater Fish Farming at Rice Research Station, Vyttila.
- 2. Project No. : VA-F6-18-15
- 3. Title of Project : Techniques for transportation of brackishwater fish and prawn seed.
- 4. Name and designation of
 - a) Project Leader : M.H. Jose, Junior Assistant Professor (Fisheries).
 - b) Associates : P.S. Mrithunjayan, Junior Asst. Professor (Chemistry).
- 5. Objective : To find out suitable methods for transporting fish and prawn seed with minimum mortality.
- 6. Practical utility:-

The ~~practive~~ results of this project will have direct application on fish culturists, since the techniques evolved as results of this project may enable to transport the fish and prawn seed from distant place of collection to the fish farm without mortality.

7. Short review of literature:-

Oxygen packing method was introduced for transporting the fish seed. But due to high mortality rates the use of anaesthetics became prevalent. Recent investigations by various scientists suggest the mixture of oxygen and nitrogen as better medium of transportation than pure oxygen.

b) List of references:-

- 1. Datta. S.H. (1976) Transport of carp seed (unpublished communication).
- 2. DE. D.K. (1977) On the procurement and transportation of chapra Penaeus indicus (H. Milne-Edwards) seed under oxygen packing. J. Inland Fish. Soc. India IX - 189-190.
- 3. Jhingran. V.G. (1977) Fish and Fisheries of India Refer page - 634-650.
- 4. Nair, R.V. (1973) On the export potential of elvers and cultured eels from India - Indian Journal of Fisheries - 20 - 610-616.
- 5. Ramanathan.S., D.E.S. Jayamaha (1975) On collection, transportation and acclimatization of fry of Chanos chanos for brackish water pond culture in Ceylon. Coastal Aquaculture in Indo-Pacific Region - 244-250.
- 6. Rangan Kr. Chakraborti, M. Sudramanyam, S.B. Paknasi (1977). A note on the collection and segregation of prawn seed for selective stocking. J. Inland Fish Soc. India IX - 181-183.
- 7. Singh. B.N. (1977) Oxygen consumption and the amount of oxygen required for transport of Rohu and Mrigal fingerlings. J. Inland Fish Soc. India 98-104.

8. Technical programme:-

The available fish and prawn seeds will be experimented. These include the seeds of Etropolis suratensis, Mugil Sp., Chanos chanos, Tilapia mosambica, Panaeus monodon and P. indicus. The collected fingerlings will be segregated according to size and species. Five polythene bags with capacity of 18-20 litres each, will be filled with water at its 1/3 capacity. In these bags fingerlings of one species of fish will be introduced at a standard density and will be filled with compressed air, oxygen, mixture of oxygen and air (50% air and 50% oxygen), mixture of oxygen and nitrogen (80% oxygen and 20% nitrogen) and a bag will be kept as control without filling any of the gases. The same procedure will be adopted for transporting the fish fingerlings before and after conditioning.

Suitable anaesthetising agents will be identified and sedative doses for each species will be found out. Fish fingerlings will be transported after adding the sedative in the medium before conditioning the fingerlings and after conditioning of the fish fingerlings.

After finding out suitable medium of transportation the density of fingerlings in each bag will be enhanced to find out the maximum carrying capacity without mortality of fish seed.

Physico-Chemical conditions also will be studied to reveal their respective roles in mortality or survival of the fish fingerlings.

9. Date of start : 1955

10. Likely date of completion : 1961

11. Additional facilities required : Facilities available at Rice Research Station, Vyttila can be utilized.

12. Details of expenditure : 1.2,500/-

13. Signature of:

Sd/-

Project Leader

Head of Department

Director of Research.

KERALA AGRICULTURAL UNIVERSITY
Rice Research Station, Moncompu

STANDARDISED PROJECT REPORT

1. Institute Code : VA-F-10-18-08
2. Name and address of the Research Station. : Rice Research Station, Moncompu.
3. Title of the Project : Rice-cum-fish culture in Punja fields of Kuttanad as standardisation of culture practices"
4. Name and designation of Principal investigator : Girija Sankara Narayanan M. Junior Assistant Professor (Fisheries).
5. Name and designation of associate : Dr. M.J. Thomas, Associate Professor (Entomology)
6. Location of the Research Project : Rice Research Station, Moncompu.
7. Objectives of the research:
 1. To see whether fish can survive in paddy fields with judicious application of insecticides.
 2. To see whether fish culture in paddy fields can reduce pest infection.
8. Practical utility :
 1. If this is found successful fish can be cultured along with paddy where the below mentioned insecticides are being applied.
 2. If this is found successful the application of insecticide can be reduced to a considerable level, thereby, reducing the cost of farming resulting in the economic gain of farmers.
 3. Reduction in pesticide application will also minimise environmental pollution and toxic hazards to the eco-system.
9. Previous work done : Studies conducted in IRRI Philippines, showed that carbofuran granules broadcast after fish seeding killed the fish (Annual Report 1976). In the 1976-77 dry season a foliar spray treatment at 192 g.a.i/ha was applied four times included along with

(Contd...2+

a single broadcast treatment before fish seeding and rootzone treatment before and after fish seeding. No treatment caused fish mortality.

10. Technical programmes: 1. Plots of 2 cents each, provided with trenches of 25 cm width and 25 cm depth will be prepared in the periphery as well as in the centre.

Rice seedlings will be transplanted. Fingerlings of Catla catla will be introduced in the plots fifteen days after transplanting. The experiment will have the following treatments.

Treatments:

1. BHC spray @ 1.25 kg/ha.
2. Carbaryl spray @ 1.25 kg/ha.
3. Ekalux spray @ 1000 ml/ha.
4. Nuvacron spray @ 500 ml/ha.
5. DVP spray @ 500 ml/ha.
6. Pyrethrin/Permethrin spray at 0.04% concentration.
7. Hinosan spray @ 500 ml/ha.
8. Carbofuran broadcast application 1.5 kg a.i/ha before fish seeding. All the above treatments will have fish fingerlings in addition to insecticides.
9. Paddy alone.
10. Paddy + fish, without insecticide application.
11. The treatments 1 to 7 will be applied two times i.e.
(i) 23 days after planting (ii) 40 days after planting.

Design: 1. 10 x 3 R.B.D. (2) Variety : Jaya.
3. Fingerlings will be introduced at the rate of 25000/ha.

11. Observations to be recorded:

- 1) Pest incidence will be recorded in individual plots.
- 2) Mortality of the fish, if any; will be observed twelve-hours after the application of insecticides.
- 3) Out contents of fingerlings of Catla will be examined periodically to see whether they are consuming any pest insects.
- 4) The yield of grain and fish per plot will be recorded.
- 5) The economics of the different treatments will be worked out.

12. Date of start : October 1979.

13. Likely date of completion: 3 Years.

(Contd....3)

14. Facilities required:

1. Existing facilities at Rice Research Station, Moncompu will be utilised.
2. Fish fingerlings required for the experiments will be purchased from fish farmers.

15. Name of the financing organisation : Kerala Agricultural University.

16. Approximate cost : .6000/-

17. Signature of:

(Sd/-)

(Sd/-)

Principal Investigator Head of Division Director of Research.

KERALA AGRICULTURAL UNIVERSITY

Faculty of : Fisheries Department of : Aquaculture

1. Name of Research Centre : Coconut Research Station,
Kumarakom

2. Project No:

3. Title of the Project : Studies on propagation and farming of frogs.

4. Name(s) and designation of

a) Project Leader : Dr.D.M.Thampy, Professor of Aquaculture.

b) Associates : 1. Shri.C.S.Rajendran, Asst. Prof: (Aquaculture)
2. Shri.V.Jayaprakash, Junior Asst.Prof:(Fisheries)

5. Objectives:

1. Propagation of commercially important varieties of frogs so as to produce a large quantity of juvenile frogs to be released in the paddy fields and natural waters in order to replenish their stock.

2. To work out economically feasible methods to culture them upto the adult stage for maintaining a breeding stock.

6. Practical utility:

Frozen frogleg is exported in large quantities from India, especially from our state. Owing to the indiscriminate nature of capture, there is a depletion in the stock which in turn is said to affect agricultural crops also adversely. In order to offset this trend of depletion of the stocks and to increase the quantity for export, it is necessary to initiate steps to replenish the stocks by releasing frogs at a stage of their life in which they are less susceptible to natural hazards and predators. By natural breeding under controlled conditions and by adopting induced spawning through hypophysation it is possible to produce quality seed of frogs in large numbers and release in natural waters.

7. Review of literature:

Research work done in this line is very limited. In U.S.A. and Japan indoor culture of frogs is practised mainly for supplying to research laboratories. In U.S.A bull frog Rana catesbiana is cultured artificially by collecting tadpoles from their natural habitats and rearing them by giving different feeds such as boiled potatoes, meat scraps and chicken viscera. The adults of Bull frogs are fed by stocking or attracting live food. The Japanese feed adult frogs with silkworm pupae kept in trays oscillating slowly. In India some pioneering work in the field of induced breeding had been done by the scientists of the Central Inland Fisheries Research Institute at West Bengal (Mandal A.K., and R.K.Jana, 1972, Mondal, 1974).

8. Technical programme:

First year

1. Collection and identification of the adults, juveniles and tadpoles of the different commercial varieties of frogs available near the farm area.
2. Collection and maintenance of breeding stock of adults of commercially important species.
3. Undertaking a survey of the present day availability of the frogs, in areas in the vicinity of the farm and in two or three areas meant for future release of juvenile frogs.
4. Conducting experiments with different feeds to the tadpoles collected from wild and the stock of adults maintained in the farm.

Second year

1. Production of seed of economically important varieties of frogs by induced spawning.
2. Rearing of tadpoles produced, under controlled conditions.
3. Continuation of feeding experiments for tadpoles and adults.
4. Release of young frogs in some selected natural bodies of water and paddy fields.

Third year

1. Continuation of works started in the second year.
2. Assessment of the results brought about as a result of the release of young frogs in the natural bodies of water and paddy fields.

9. Date of start : February 1983.

10. Likely date of completion : February 1983.

11. Additional facilities required : Expenditure on equipments and construction of ponds will be borne by ICAR

12. Approximate cost : Rs. 2,32,500/-

13. Signature of

Sd/-

Sd/-

Project Leader Head of the Department Director of Research

KERALA AGRICULTURAL UNIVERSITY

FACULTY OF FISHERIES

REPORT ON THE STATUS OF ON-GOING RESEARCH PROJECTS

1. VA.F.6-18-4A: Farming of fish as a follow up crop in paddy fields (College of Fisheries, Mannuthy)

The aim of the project is to find out the feasibility of raising a crop of quick growing fishes, after the harvest of paddy, in some of the paddy fields of the Kuttanad and the Kole fields of Trichur.

The experiment is being conducted in a farmer's field (1.8 ha) at Pulinkunnu in Kuttanad, by stocking the fishes Cyprinus carpio and Labeo fimbriatus during November '80 at a stocking density of 5000/ha. and at 5:1 ratio, after the harvesting of paddy.

The experiments conducted so far had indicated that culture of fresh water fishes such as Catla, Rohu, Mrigal and the common carp can be very profitably taken up in the paddy fields of Kuttanad as a follow up crop.

2. VA-F-6-18-4C: Adaptive trials for simultaneous farming of fish and prawns along with paddy (College of Fisheries, Mannuthy)

This project is aimed at finding out the possibility of raising a crop of fish along with paddy by growing tall varieties of paddy like Kolappala in the Kuttanad and kole lands.

A field at Ramankari in Kuttanad is being used for this experiment. In that field of 2.4 ha, area 2000 nos. of Catla and 5000 nos. of Mrigal were stocked on 17-10-79 and 3000 nos. of common carp on 12-2-80. An assessment made on 15-4-1980 had shown that Catla had grown to a size of 370 mm and 1.2 kh. and Mrigal 350 mm 300 gm.

The growth obtained for both these fishes in the paddy field conditions is quite appreciable.

3. VA-F-6-18-2: Survey of seed resources of cultivable species of prawns and fishes in the Cochin backwaters (Vytila)

The survey is intended for locating the most suitable collection centres for prawns and fishes during the different seasons and to work out the economic feasibility so as to commercialise seed collection.

The seed collections used to be made with different nets such as Midnapore shooting net, hapa net and drag net. The data of seed resource survey conducted during the last 4 years at Puthuvyppeen had given a lot of information as to the season as well as the quantum of availability of seed of different cultivable prawns and fishes in the area. As such now it is possible to predict

the availability of different seed with much accuracy.

4. VA-F6-18-IB: Nursery rearing of prawns and fishes (Vytttila)

The objective of the project is to find out the best nursery rearing practices suitable for the locally available species of prawns and fishes in order to obtain maximum survival rate during nursery rearing.

Nursery rearing experiments are continued with the fishes such as Mugil sp. Chanos and the prawn Penaeus monodon in plastic pools as well in prepared nursery ponds. It has been found that by rearing in well prepared nurseries the growth and survival obtained for Mugil sp. can be substantially improved.

5. VA.F.6.18.IC: Studies on mono and polyculture of fin fish with and without artificial feed(Vytttila)

The scheme was initiated with a view to find out the best species and species combination in brackish-water fish farming in order to achieve maximum productivity at a minimal cost.

Series of experiments of monoculture of the fish Etrophus suratensis at varying stock densities with and without supplementary feed resorting to different stock manipulations were conducted. As a result, production of about 1200 kg/ha/year could be achieved. Monoculture and mixed culture of prawns like Penaeus monodon and Penaeus indicus were conducted. Production upto 2165 kg/ha/year could be obtained in experiment in which fishes such as Etrophus suratensis Chanos chanos and Mugil cephalus were stocked at a ratio of 5:5:1 at 5500/ha concentration. It has been found that by culturing Chanos and Mugil cephalus the most fast growing brackishwater fishes along with Etrophus at different combinations and concentrations with supplementary feeding, production in brackishwater fish farming could be increased substantially.

6. VA-F-6-18-ID: Studies on the ecology of the brackishwater ponds related to productivity(Vytttila)

This study was initiated to find out the optimum dosage of lime, manure, supplementary feed etc. required in each pond with a view to achieve maximum production.

The physico-chemical factors of the pond water were recorded regularly. The maximum salinity of around 18‰ was found during April and the minimum which is near freshwater condition during June-July. The pH of the pond water was found to drop below 5, during the first heavy rains. It was found that the leaching of salts from the pond bunds contributes to the lowering of pH of pond water.

The biomass and constitution of benthic fauna, the primary production and the zoo plantation biomass were recorded regularly in order to have an understanding of the production status of the ponds.

7. Prawn culture in pokkali rice fields after the harvest of paddy(Vyttila)

This study is aimed at finding out ways and means to improve the prawn filtration practices in Kerala by inducting scientific methods.

This experiment is being conducted in the field of the Rice Research Station, Vyttila. This being an interior place, besides the normal practice of filtering out the prawns already entered in the field from January onwards in one of the control fields, the harvesting was done only towards the end i.e. during March. It was found that at least in such interior fields where production is very low, harvesting of the prawns towards the end of the season is more advantageous from the production point of view as well as economy of labour input. It was also found that even if the salinity condition is favourable only for two months, Penaeus indicus can be profitably cultured.

9. VA-F-6-18-13: Observational trials on fish cultures in homestead ponds(Vyttila)

This study is intended to find out the feasibility of fish culture in homestead ponds available in plenty in the coastal district of Kerala and to find out suitable species for culture, taking into consideration of the physico-chemical and biological limitations in such ponds.

In six small household ponds which had been prepared after manuring, fingerlings of freshwater fishes such as Labeo fimbriatus, Mrigal and Cyprinus carpio were released during October 1980. The size at the time of stocking was 7.3cm and 8gm for Cyprinus, 6.6cm and 4gm for Mrigal and 5.7cm and 3g for Labeo fimbriatus. The experiments are in progress.

10. VA-F6-18-14: Seasonal changes in water quality of brackishwater fish ponds and their influence on fish production(Vyttila)

This study is to find out the various seasonal changes in the chemical composition of water and their impact if any, on fish production in brackishwater ponds.

Studies conducted so far were only of preliminary nature. They had shown that during the period of heavy monsoon in June-July there used to be a drop in pH of pond water and this could be controlled by giving thorough and frequent exchange of water.

11. VA-F-6-18-15: Studies on transportation of brackishwater fish and prawn seed.

The objective of this project is to evolve techniques for the large scale transportation of brackish-water fish and prawn seed.

Of the different packaging methods such as air, oxygen and mixture of air and oxygen, oxygenpacking was found to be better. Tertiary butyl alcohol was tried as a sedative agent for Chanos fingerlings of the size of 35 mm and 4.5gm was found to be 0.4%.

12. VA-F-9-18-6A(ii): Pig-cum-fish culture(Kumarakom)

This study is meant to find out the extent to which fish production could be increased by utilizing pig-dung and urine as manure in fish ponds.

It has been found that fishes such as Etrophus Suratensis, Cirrhina mrigala and Cyprinus carpio stocked at a concentration of 3750/ha and at 5:4:4 ratio in a pond wherein 5 kg of pig dung was dumped daily had achieved better growth than those(control) which are fed with a feed comprising of rice bran and coconut oil cake at 1:1 ratio, at daily rate of 2% of the body weight.

13. VA-F-9-18-78: Composite fish culture of Indian major carps and exotic carps(Kumarakom)

The objective of the study is to find out the best system of culture of freshwater fishes in the channels available in coconut grooves as in Kumarakom.

The study has been initiated by stocking Catla, Mrigal and Common carp at the rate of 120:160:260 numbers in channel having an area of 0.1ha. The growth measurements taken had indicated that Catla has the maximum growth rate, followed by Mrigal.

14. Propagation and Farming of Progs(Kumarakom)

The project has two objectives in view, viz:(1) to artificially propagate commercially important species of frogs so as to produce a large quantity of juvenile frogs for release in the paddy fields and natural waters(2) to develop commercially feasible methods to culture them upto the adult stage.

The survey to find out the species of commercially important frogs available in the locality was done. The sex ratio food and feeding habits, breeding period and fecundity have also been studied in respect of Rana hexadactyla and R.tigrina the two commercially important frogs.

15. VA-F-10-18-16: Rice-cum-fish culture in paddy fields at Kuttanad as a standardization of culture practices.

The aim of the project is to improve the fish culture practices in paddy fields so as to enhance the production level achieved at present.

An experiment using the fish Cyprinus carpio had been taken up and it has been found that the growth of this fish, in the paddy field condition, wherein there is very little depth of water, is very low.