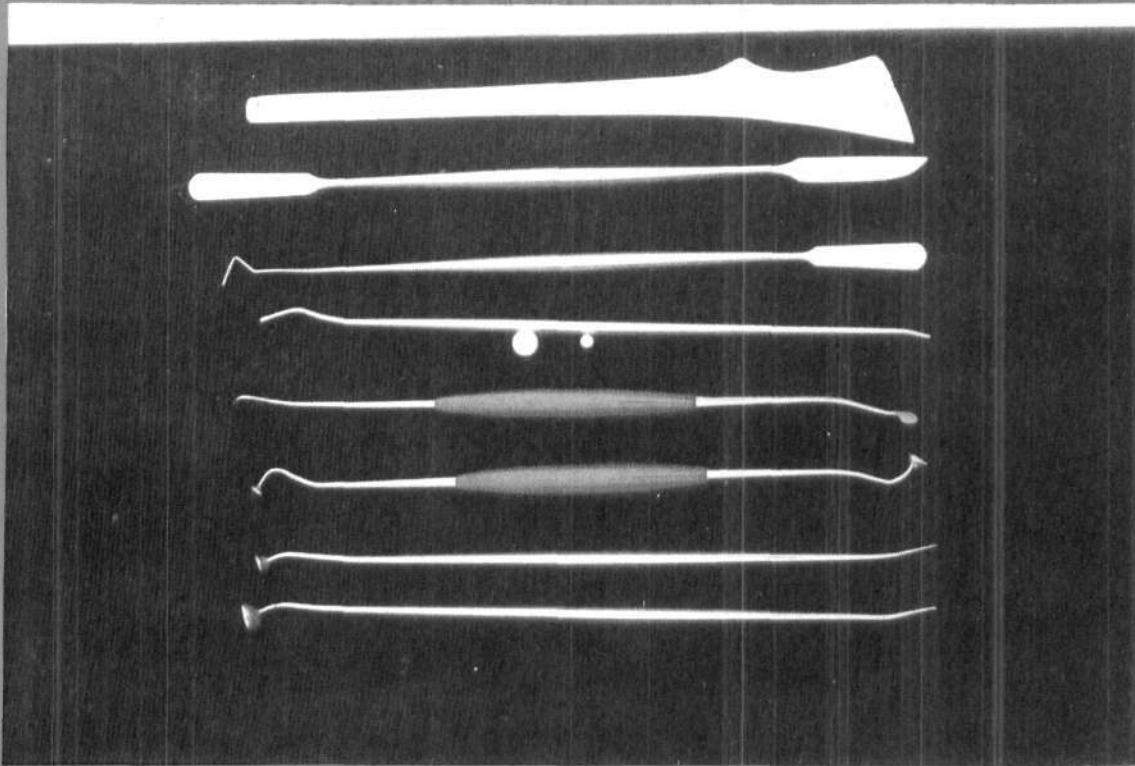




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भारतीय कृषि अनुसंधान परिषद
INDIAN COUNCIL OF AGRICULTURAL RESEARCH

REPORT ON THE INTERNATIONAL TRAINING COURSE ON PEARL OYSTER FARMING AND PEARL CULTURE ORGANISED BY FAO/UNDP REGIONAL SEA FARMING DEVELOPMENT AND DEMONSTRATION PROJECT (NACA) AND CONDUCTED BY CENTRAL MARINE FISHERIES RESEARCH INSTITUTE (ICAR) AT THE SHELLFISH RESEARCH LABORATORY OF THE TUTICORIN RESEARCH CENTRE OF CMFRI, TUTICORIN, FEBRUARY 1- 28, 1991

Introduction

The International Training Course on Pearl Oyster Farming and Pearl Culture was organised by FAO/UNDP Regional Sea Farming Development and Demonstration Project of Network of Aquaculture Centres of Asia (NACA) and the Central Marine Fisheries Research Institute, Cochin (CMFRI) at the Shellfish Research Laboratory of CMFRI at Tuticorin from 1 - 2 - 1991 to 28 - 2 - 1991. Among the NACA Member countries, very few countries possessed the know how of pearl culture and India came forward to disseminate the technology. The response to depute the candidates by member countries was overwhelming and one of the best for similar training programmes. Even France, a non member country was willing to depute candidates but they could not be accommodated. The FAO/UNDP provided the funding for the training course. Except for a couple of guest lectures, the entire training programme was conducted by the Scientists of CMFRI who have developed and continuously refined the pearl culture technology during the last 18 years.

Inaugural function

The inaugural function was held at Tuticorin on 1 - 2 - 1991 at 11.00 hrs.

Welcome address

Dr. P. S. B. R. James, Director, Central Marine Fisheries Research Institute, Cochin welcomed the gathering. In his welcome address he gave a brief resume of various mariculture activities of CMFRI. He stated that Tuticorin is one of the important centres of CMFRI and specialised in shellfish research especially in mariculture of molluscan species. Among the various technologies developed at the Institute, the one on pearl production achieved at Tuticorin in 1973 was unique. Given the erratic nature of pearl oyster fisheries in the natural beds of the

Gulf of Mannar, the Institute focussed its attention to hatchery technology for production of pearl oyster seeds which was successfully achieved in 1981. This success has helped to overcome the dependence on nature for pearl oysters and also helped the Institute to embark upon a programme of sea ranching of hatchery produced pearl oyster seed in the natural grounds so as to enhance the production from nature.

Presidential address

The function was presided over by Dr. P. V. Dehadrai, Deputy Director General (Fisheries), Indian Council of Agricultural Research, New Delhi. In his presidential address he thanked Dr. Chen Foo Yan for his efforts to organise the training programme at CMFRI. Then he recalled the story of pearl fishery at Tuticorin in the past and the productive nature of Gulf of Mannar. The traditional pearl fishery enjoyed an international pearl trade. For the past three decades, the pearl banks are barren with little hope of revival of pearl fishery in the immediate future. The situation, therefore, warranted to go for cultured pearl production which has been achieved in several countries. At this juncture he suggested two things i) to conserve the natural resources as they yield highly priced natural pearls and ii) to give biotechnological approach to the process of pearl production through specific studies on nature of nacre secretion, texture, colouration etc.

Inaugural address

Dr. V. Shanmugasundaram, Vice Chancellor, Manonmaniam Sundaranar University, Tirunelveli compared very fittingly the invocation song written by Sundaranar in his creation called 'Manonmaniam' to this function, concerned with pearl production. The poem depicts that Tamil Nadu was great at one time when the pearl trade was at its peak. Now, he said, Sundaranar's anxiety comes true by this training course. As an

economist he said that the need of the hour is 'Go for massive production of pearls ! Flood the market with pearls !! Bring back the glory of Tamil Nadu !!!!

Felicitations

Shri S. Ansar Ali, Collector, Chidambaranar District gave his felicitation address in which he told that Tuticorin, once famous for pearl oysters, pearl fisheries and natural pearls was badly affected on the ecological front. He cited an example of removal of coral reefs for lime and other purposes which greatly damaged the ecology of this region. He appealed that some action must be taken at higher level. He pointed out that prawn culture is gaining momentum in the district. Similarly, he wished that pearl culture should pick up and he assured his support.

Dr. Chen Foo Yan, Project Co-ordinator, Regional Sea Farming Development and Demonstration Project, Bangkok said that sea farming programmes under NACA have been undertaken in different parts of the world. He listed out the countries where training courses are offered on specific sea farming aspects. He said that very few countries possess the pearl culture technology but it was India which readily came forward to conduct this course. He thanked Dr. P. S. B. R. James, Director, CMFRI who is also the National Coordinator for the Project and Indian Council of Agricultural Research for kindly offering to conduct this programme. He exclaimed that of all the training courses under sea farming projects, this training on pearl oyster farming and pearl culture received tremendous response from South East Asian countries. As a result, two candidates from France could not be accommodated in the training.

Dr. K. Alagaraswami, Director, Central Institute of Brackishwater Aquaculture, Madras, during his felicitation address narrated the development of pearl culture project at Tuticorin under his leadership for 15 years and the efforts put by the team of scientists and technical staff. He recalled the help offered by Government of Tamil Nadu, Veppalodai Salt Corporation and the staff of Tuticorin Research Centre of CMFRI which helped in no small measure for the development of the pearl culture technology.

Shri V. Chidambaram, Managing Director, Southern Petro Chemical Industries Ltd., Tuticorin explained the establishment of the commercial firm namely 'Tamil Nadu Pearls Ltd.' at

Mandapam and the production of excellent cultured pearls. He declared that the technology adopted was the one developed by the CMFRI, is viable and yielded good results.

Shri S. Mahadevan, Retired Principal Scientist, CMFRI, Tuticorin, recalled the declaration made by Dr. P. V. Dehadrai, D. D. G, ICAR, at the National Seminar on Shellfish Resources and Farming at Tuticorin in 1987 that the Tuticorin Research Centre would be recognised as an international centre for molluscan research. This has come true now by this training course. The entire credit goes to the ICAR, Director of the Institute and the scientists of the pearl culture team. Therefore he appealed to the scientists, not only to think of crisis of Gulf war but also the crisis of Gulf of Mannar where the absence of pearl oysters causes great concern.

Dr. K. A. Narasimham, Principal Scientist and Officer-in-Charge of the Tuticorin Research Centre of CMFRI, introduced the trainees. Dr. K. Satyanarayana Rao, Head, Molluscan Fisheries Division, CMFRI, Cochin gave vote of thanks.

Countries participated

In this training programme, a total of 26 participants from ten countries participated. Among them, three came from Bangladesh; three from Peoples Republic of China; one from Malaysia; two from Philippines, two from Thailand, four from Indonesia three from Myanmar (Burma); three from Republic of Korea; three from Vietnam and two from India.

Accommodation and transport

The participants were accommodated in Hotel Sugam and Hotel Dhanam at Tuticorin. Boarding facilities were provided to suite the taste of different nationals at the respective hotels. On all the working days transport facilities were provided to the participants to come to the Laboratory and to go back to the hotels. During intervening holidays they were taken to different places of scientific and historical importance.

The training programme

The training course was of four weeks duration from 1 - 2 - 1991 to 28 - 2 - 1991. After the inaugural function, Dr. P. S. B. R. James, Director, CMFRI gave a lecture on the mariculture research in general and molluscan culture in particular in CMFRI. Dr. K. Alagaraswami, Director, C. I. B. A., Madras gave a talk on the indigenous pearl culture technology and status of

pearl culture in the world followed by guest lectures on pearl oyster resources and Indian pearl fisheries by Shri S. Mahadevan, Retired Principal Scientist, CMFRI. The topics on taxonomy and distribution of pearl oysters were dealt by Dr. K. Satyanarayana Rao, ecology of cultivable molluscs by Dr. K. A. Narasimham, phytoplankton culture by Dr. C. P. Gopinathan and nutritional physiology of pearl oysters by Dr. D. Kandasami, scientists of the Institute.

Regular classes

Regular lectures and practicals on pearl oysters were conducted by Dr. A. C. C. Victor, Mr. A. Chellam, Mr. S. Dharmaraj and Mr. T. S. Velayudhan, scientists of CMFRI. The theory aspects covered the morphology, anatomy and biology of pearl oysters, histology of mantle and pearl sac, ecology of pearl oyster beds, biofouling and boring, tissue culture, pearl oyster farming, post-operative culture etc. In all a total of 22 lectures each of 1 - 1½ hrs duration were given.

Emphasis was laid on practical aspects of pearl culture. The practical classes dealt with morphology and anatomy of pearl oyster *Pinctada fucata*; graft tissue preparation and related aspects; pearl oyster surgery which included single, double and multiple implantation; post-operative culture of seeded oysters etc. In pearl oyster surgery, the trainees operated large number of oysters, performing single, double and multiple implantations. The total hours for operation on pearl oyster surgery was 25. Much stress was given on practicals, particularly surgery so as to improve the skill and also generate the confidence in the trainees to undertake pearl culture programmes in their countries. With regard to pearl oyster farming, the participants were taught practicals on the fabrication of culture cages, construction and mooring of the raft in the farm, farming methods and maintenance of the pearl oyster farm.

Particals on pearl oyster hatchery

Practical aspects of pearl oyster hatchery were also taught. The aspects covered were induced spawning techniques, especially thermal stimulation, spawning behaviour of pearl oysters, fertilisation, cleavage, early development of larvae, estimation of larval density, feeding schedules and larval/spat rearing. The pearl oysters were spawned in their presence and they were able to

trace the early larval developmental stages. In all, a total of 22 practicals were conducted, each of 3 hrs duration extending for 66 hours.

Group discussion

A group discussion was held on 15. 2. 1991 for an appraisal of the progress made in the training course, to invite suggestions for improvement and to exchange ideas. This proved fruitful both for the faculty members and the trainees.

Seminar by trainees

A seminar was organised on 21. 2. 1991 in which 10 participants, representing the ten countries, presented scientific papers, some with visual aids, pertaining to the status of pearl culture in their countries. The staff of the Research Centre participated in the Seminar. The discussions were very lively and useful in updating the knowledge on pearl culture in this part of the world. This seminar evoked so much interest that it was carried on for the whole day. The advances made by China in the field of pearl culture and pearl oyster hatchery were greatly appreciated.

Study tours and sight seeing

The participants went on a study tour on 9. 2. 1991 to Mandapam to see the commercial pearl culture project run by Tamil Nadu Fisheries Development Corporation. The work on nucleus implantation by the technicians of the above farm was demonstrated. They visited the pearl oyster farm at Krusadai Island. The stake method of rearing of mother oysters and seeded oysters was seen by them. They were much impressed by the activities of the project. The participants were also shown the research activities of the Regional Centre of CMFR Institute at Mandapam Camp. They had an opportunity to visit the excellent library and museum at the Centre.

On 10 - 2 - '91 the trainees were taken to Rameswaram had shown the important fish landing centres and Rameswaram temple. On return trip they were taken to Madurai. They visited the famous historical Meenakshi Temple and other important places. On 18. 2. 1991 the Southern Petro Chemical Industries Pvt. Ltd., Tuticorin were kind enough to invite the participants to SPIC. They were taken around the factories and SPIC Complex. In view of their visit

to SPIC an exhibition of cultured pearls and pearl ornaments produced by Tamil Nadu Pearls Ltd., was arranged at SPIC. It was an opportunity for the participants to see for themselves the Indian cultured pearls. As the exhibits were for sale, many participants went on a purchasing spree. The Chinese participants showed their knowledge in evaluating the quality of the pearls, thus helping the buyers.

On the special invitation from the respected Vice Chancellor of Manonmainam Sundaranar University at Tirunelveli on 23 - 12 - 1991, the participants visited the University on the same day. The University had arranged cultural programmes at Sarah Tucker College, Palayamkottai and in honour of the trainees hosted a special dinner. Each participant was given a memento in the form of 'Kuttuvilakku' (a lamp used for offering prayer) to cherish the memory of their visit.

On 25 - 2 - 1991, the participants were taken to the 'Lands end of India' that is, Kanyakumari. During this full day programme, they visited Vivekananda Rock Memorial, Gandhi Mandapam and Kanyakumari temple. They relaxed at the beautiful sandy beach and had a spectacle of the sun-set at the horizon.

On 26 - 2 - 1991 they were taken to the Fisheries College at Tuticorin. The activities were explained to them with particular emphasis on the research programmes of the college.

Cultural programmes

It was a pleasant surprise for the participants to see the 'Bharatha Natyam' for the first time. This first cultural programme was arranged in the evening by C. Kamakshi Vidyalaya, Tuticorin, on 8 - 2 - 1991. The Bharatha Natyam performed by Miss Bharati, a teacher of the school, was an excellent piece of entertainment for the participants. The other group dances and individual dances by the children of Kamakshi Vidyalaya added splendour to the evening. The colourful costumes of the artists enthralled the foreign friends. On seeing the programmes the trainees admired them very much and spontaneously offered cash awards to the dancers as a gesture of their appreciation.

Another cultural programme was arranged in a Kalyana Mandapam owned by Madura Coats who were kind enough to spare the building for

the purpose on 15 - 2 - 1991. The participants, the staff of the Research Centre and their family members attended the function. This time the programme was performed by professionals namely 'Sivasakthi Dancing Group' of Tuticorin. A variety of typical tamil dances were performed. It was a treat for the visitors to watch the synchronisation of the movements in group dances. Enthusiastic participants gave cash awards and presentation materials to the artists and took a number of photographs. Participation of some of the trainees themselves in the cultural event was worth noting.

A final but small programme was arranged on 26. 2. 1991. During this programme Miss Bindu gave a dance recital and Miss Bharathi, a Bharatha Natyam and some other artists also gave dance performances. A song by Mr. Lid De Zheng, Chinese participant was a special attraction of this function.

Valedictory Function

Valedictory function of the International Training Programme on Pearl Oyster Farming and Pearl Culture was held at the Shellfish Hatchery Laboratory at 1000 hrs on 28 - 2- 1991. Dr. P. S. B. R. James, Director, CMFRI, Kochi, during his welcome address said that the training programme conducted there was a comprehensive one highlighting all aspect of pearl oysters farming and pearl production. This was the first international training course organised by the CMFR Institute. The sound technology developed at the Institute has been recognised the world over and the pearl oyster farming and pearl culture training course has been promoted as one of the important sea farming activities by the sponsors.

Valedictory address

Dr. S. N. Dwivedi, Additional Secretary, Department of Ocean Development, New Delhi, during his valedictory address, said that pearl oyster culture holds promise as an income generating activity in unpolluted coastal regions. He stressed for concerted action to have large scale demonstration units with people's participation. He emphasised two points. First is the research and development to attract the partnership of the farmers and the second is to demonstrate the economic viability of the project to make financial institutions interested in this venture. Pearl farming activity can be promoted as vocational training, leading to self-employment in

regions where the sea water is unpolluted. He stressed the need for transfer of technology to benefit the poor in the coastal regions. The pearl culture has the potential to open avenues for economic prosperity in rural coastal areas. He argued about the need for aquaculture estates and the partnership approach involving poor farmers and financial institutions. The group farming concept was ideal for getting institutional credit and research institutes should get the bankers and the farmers together. The course certificates and the surgical instruments sets were presented to the trainees by Dr. S. N. Dwivedi.

Presidential address

Shri R. Jayamohan Pillai, Chairman, Tuticorin Port Trust, Tuticorin presided over the valedictory function. In his address he expressed happiness that Tuticorin is internationally recognised as a centre for pearl culture programmes. It is no wonder that Tuticorin city itself is called 'PEARL CITY'. The city once famous for well organised pearl fisheries had a set back for the last three decades. It should not be long before the past glory is brought back to the city by CMFRI through pearl culture technology and pearl oyster breeding technology. He thanked Dr. P. S. B. R. James, for his efforts to impart the training to members from other countries. The scientists of the pearl culture project have brought out the manual on hatchery production of pearl oyster spat, *Pinctada fucata* and the Chairman released it on this occasion; he congratulated the scientists for their good work.

Report on the training

Dr. K. A. Narasimham, Officer-in-Charge, of the Research Centre of CMFRI, Tuticorin, presented the report on the training course. He brought to the notice of all concerned that the participants evinced keen interest in learning the techniques, extended full cooperation in the conduct of the programme and have put aside admirably all personal inconveniences.

Impressions of the participants

Shri M. N. Sarkar from Bangladesh said that the pearl culture technology developed here is something unique and should be useful for setting up of similar projects in his country. He further added that the techniques are quite simple and could be adopted easily.

Shri Li De Zheng of the People's Republic of China said that the four week training programme was useful and he would like to incorporate some interesting aspects learnt here in the pearl production in China.

Ms. Devakie, M. Nair from Malaysia told that it was a totally new experience for her and she was very confident of starting pearl culture in her country. At the moment there was no pearl culture activity in Malaysia. She would look for the availability of the species and would try to set up pearl culture, based on the technology learnt here.

Shri P. Shanmugam from Lakshadweep was confident of putting to use in the islands, what he learnt at Tuticorin.

For Ms. Daisy and Ms. Virginia from the Philippines, the training proved interesting but they were apprehensive to translate the technology in their country, as a different species of pearl oyster was cultured there, using the Japanese technology.

The overall impressions expressed by the participants were that the training programme was comprehensive and should be useful in developing pearl culture venture in their respective countries.

Vote of thanks

Dr. A. C. C. Victor, Scientist SG, CMFRI proposed vote of thanks to the Chief Guest, dignitaries, trainees and other members presented at the function.



Fig. 1. Dr. P. S. B. R. James, Director, CMFRI and National Co-ordinator FAO/UNDP Regional Sea Farming Development and Demonstration Project (NACA) welcomes the dignitaries, invitees and participants to the inaugural function.



Fig. 4. A view of the audience including the course participants.



Fig. 2. Dignitaries to the inaugural function : from left Dr. P. S. B. R. James, Dr. V. Shanmugasundaram, Vice Chancellor, Manonmaniam Sundaranar University, Tinnaveli (Chief guest), Dr. P. V. Dehadrai, Deputy Director General (Fisheries), ICAR and Dr. Chen Foo Yan, Project Co-ordinator, Regional Sea Farming Development and Demonstration Project, Bangkok.



Fig. 5. The trainees in the practical class.



Fig. 3. Dr. Chen Foo Yan makes the felicitation address.



Fig. 6. Trainees fabricating culture cages.



Fig. 7. The tissue grafting in progress.

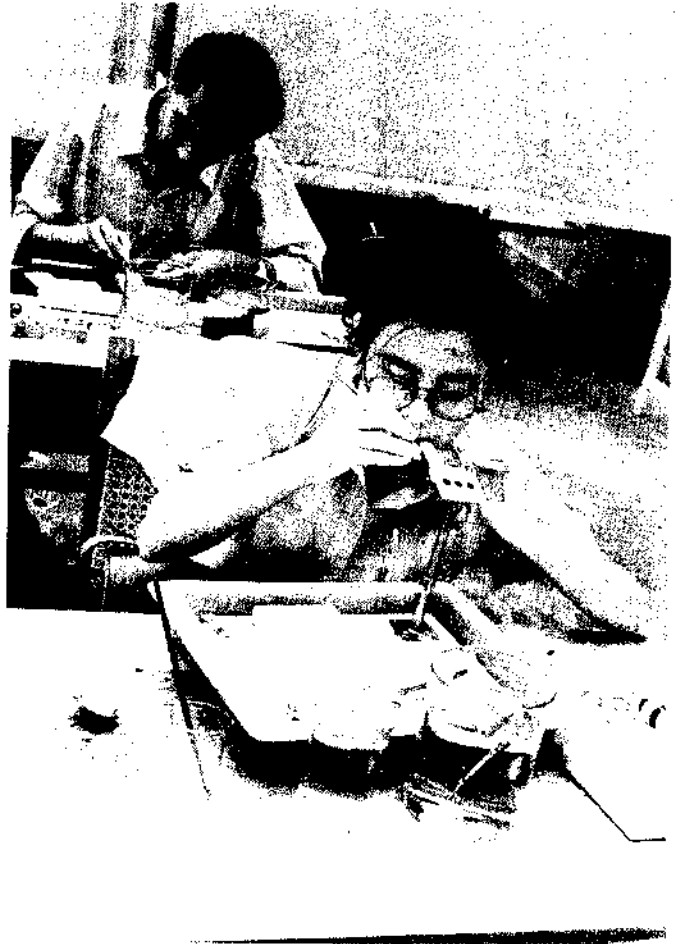


Fig. 9. The nuclei implantation process is being performed.



Fig. 8. Raft construction in progress.

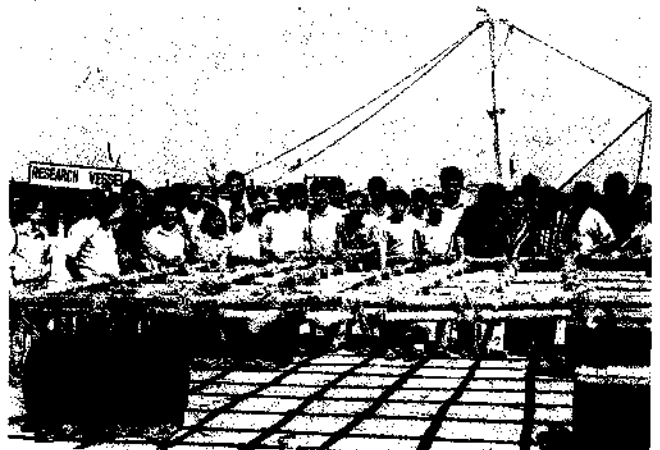


Fig. 10. The trainees with the newly fabricated raft.



Fig. 11. The floated raft anchored in the sea.

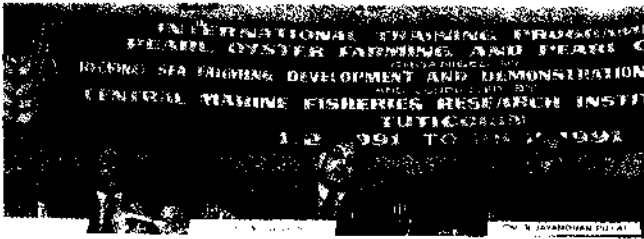


Fig. 12. At the valedictory function of the training course. Seated from left are Dr. P. S. B. R. James, Dr. S. N. Dwivedi, Additional Secretary, DOD and Shri R. Jaymohan Pillai, Chairman, Tuticorin Port Trust.



Fig. 14. One of the trainees giving his impressions on the course.



Fig. 13. The manual, "Hatchery Production of Pearl Oyster Spat: *Pinctada fucata*" prepared in the context of the training course is being released by the Port Trust Chairman by giving a copy to Dr. Dwivedi.



Fig. 15. The trainees were given kits containing the tools for tissue grafting and nucleus implantation.



Fig. 16. Mementos were presented to the trainees by the Director, CMFRI.



Fig. 17. A view of the gathering at the valedictory function.