

1.1 Research Activities

The following research programmes were executed during 1984.

- a. Study of the Tuna Fishery.
- b. Study of the Beach-seine and small-mesh gill net fishery.
- c. Study of the prawn fishery
- d. Study of the Beche-de-mer Fishery.

1.1.1 Tuna Fishery Project

Field work in connection with this project has been conducted un-interrupted during the year. The study of the tuna fishery extends from Kalpitiya to Hambantota and an average of 20 to 22 sampling days per month have been achieved by a team of 3 Research Officers, assisted by two Research Assistants.

With the assistance of the Bay of Bengal Programme, this study has been extended to the Eastn Coast. Some of the officers involved in this project have registered for their post-graduate degrees at Ruhuna University and their research work involved spin offs from the Tuna Fishery study project. Biologists working on this project participated in a workshop held at NARA on Tuna Fisheries in the EEZ's of India, Maldives and Sri Lanka. This workshop was convened by B.O.B.P in order to streamline research on tuna in the three countries for better regional management of the resource.

Based on research activities carried out in this project following publications were brought out during 1984.

- i. Drift net fishery for Tuna in the western coastal waters of Sri Lanka.
- ii. A review of Tuna fishery in Sri Lanka
- iii. An Analysis of Length Frequency data of Skipjack Tuna (Katsuwonus pelamis) from the gill net fishery using ELEFAN programs.
- iv. The Tuna Fishery in India, Maldives and Sri Lanka.

1.1.2 Beach-seine and Small mesh gill net fishery project

The study of the beach-seine and small mesh gill net fishery covered the same area as the tuna project and averaged 15 sampling days a month by a team of 2 Research Officers and two Research Assistants.

The Comparison of data from the gill net fishery during 80-84 and 83/84 has revealed that with the increase in fishing pressure from 200 boats (FRP) in 1980/81 to 600 in 1984/84 the exploitation rate has increased from 0.40 to 0.53.

The catch per unit effort has, however, decreased from 58.5 kg. to 31.6 kg. Since in a multispecies fishery the trends in the exploitation of a dominant variety may reflect the trends in the whole fishery, further investigation of this nature are urgently needed before the fishery is allowed to expand.

The following publications have been completed, embodying information collected from this project.

- i. A preliminary analysis of Length Frequency data of Sardinella sirm from Negombo, Sri Lanka using ELEFAN Programme.
- ii. A preliminary Report on small-mesh gill net fishery in the western coastal waters of Sri Lanka.

1.1.3 Study of the Prawn Fishery

The study of the prawn fishery was at Mutuwal, Negombo and Chilaw, and averaged 10 sampling days a month by a team of three research officers, assisted by two Research Assistants. In addition to the regular program of work, a two week trawl survey of the Chilaw prawn grounds was conducted during this year to assess the stocks of commercially important prawns. A research grant was also obtained from the Natural Resources, Science and Energy Authority of Sri Lanka to study the recruitment pattern of prawns in the Negombo Lagoon. This study commenced in September 1984 and will be continued for a period of two years.

A paper was presented at the 40th session of Sri Lanka Association for the Advancement of Science. "Stock Assessment of commercially important prawn in Chilaw lagoon using a commercial trawler".

The major findings of this paper were the southward migration of P. indicus as they grow and signs of over - exploitation in the fishery when compared with the fishery in late 70's.

1.1.4 Study of the Beache-de-mer Fishery

This project has been incorporated into the activities of this unit since August , 1984. The Natural Resources, Energy and Science Authority of Sri Lanka has made available a Research Grant to a officer of this unit to study the fishery in the North-Western area, from Kalpitiya to Mannar in order to formulate a management strategy for the conservation of the resource. The Officer concerned has been averaging 8 to 10 days field work per month, in connection with this project.

1.2 Participation at Training courses/Workshops

- a. Leslie Joseph and M.S.M.Siddeek - Computer Training Course for fishery biologists 27th August - 7th September BOBP Colombo.

- b. D.S.Jayakody - Research Officer. Mr. D.S.Jayakody left for Norway in August to follow a ten month training course in Fish Biology

2.0 INLAND FISHERIES AND AQUACULTURE UNIT

During the period under review officers of this Unit have been involved in following research projects.

2.1 Artemia Culture

Field studies on the natural population of Artemia at the Hambantota salterns were carried out. Extensive sampling of the organism along with data on the physico-chemical parameters were collected and analysed. From this study the natural cysts production of Artemia was worked out which amounts to 38 Lg/ha/season. The details of this study have been given in the manuscript entitled "THE BRINE SHRIMP ARTEMIA AND ITS CULTURE POTENTIAL IN SRI LANKA". The Artemia cysts processed at NARA laboratories were extensively used at the aqua culture unit for feeding prawn larvae and they were also used in ornamental fishery unit for feeding.

An Air water Lift Raceway system (AWL) for the batch culture of Artemia was tried at the aquaculture laboratory. The construction, working procedure and advantages of this system are detailed in the manuscript entitled -

"BATCH CULTURE OF ARTEMIA WHICH IS BEING PUBLISHED IN THE OCCASIONAL PAPERS OF NARA 1985"

Detailed laboratory studies on the Sri Lankan strain of Artemia were undertaken which included collection, cleaning and processing of cysts.

Experiments revealed that this strain requires 35% salinity, 29°C temperature and a light source for maximum hatching. Further, it was found out that the Sri Lankan strain taken about 24 days to grow from nauplius to adult; The average number of nauplii released by each female Artemia was 20. Biochemical analyses showed that protein was the major constituent amounting to an average of 60.

Fatty acid and Amino acid contents of the Sri Lankan strain of Artemia have been determined.

Attempts are being made to demonstrate a pilot scale project on Artemia culture at Hambantota and Palavi.

2.2 Studies on the Primary Productivity of Kelaniya Estuary

The relative importance of net and Nanoplankton to total Primary Production in the waters of Kelaniya Estuary was assessed by C^{14} technique from October '83 to September 1984. There was no definite correlation between primary production and physicochemical factors indicating that it is probably the collective influence of various factors that give rise to production values in the Kelaniya Estuary. These studies showed that in order to get a realistic picture of productivity it is essential to estimate both net and annoplankton production as the nanoplanktons were the major contributors to primary production. Due to the abundance of nonnoplankton it would be advantageous to carry out growth experiments in this estuary with fish species which are predominantly herbivorous.

2.3 Culture of Milkfish in a Brackishwater pond

This work was carried out in a pond adjoining the Negombo lagoon from October, 1983 to March 1984. Fingerlings of average 7.5 g and 90 mm length were stocked in October 1983 and harvested after 8 months. Average monthly increase in length and weight amounted to 23.6 mm and 17-81 g respectively. The productive capacity of the fish pond estimated by C^{14} technique was 31680.6 gC for the entire culture period. Fish production worked out to be 700 Kg/ha.

2.4 Fish Feed Studies

Fingerlings of different types of fish were fed with two types of formulated feed containing a low protein (12%) and high carbohydrate content (70%).

The results showed that high food conversion efficiencies were obtained by feeding the fingerlings. The fingerlings accepted the feed, converted efficiently and there was no mortality.

2.5 Growth Studies on Ornamental Fish and Other Fish Species

Growth assessment in 17 varieties of ornamental fishes has been studied using freeze dried tubifex, minced ox heart, Artemia cysts and four formulated feed. Growth responses have been found to be good with reference to Artemia and a formulated feed which contained soya flour as a major ingredient in combination with ox heart and fish meal. This formulated feed has been found to be satisfactory for some varieties of ornamental fishes by the local breeders and is being commercialized.

Furthermore effect of different feeding levels on growth and food utilization by *Tilapia nyotica* using two formulate feed have been studied. The data is being processed.

2.6 Studies on Acid Sulphate Soils

Studies on the acid sulfate soils in the upper reaches of the Negombo lagoon were completed. Growth, production and survival of some cultivable fish and prawn species were studied together with the chemical properties of soil. The results of the above study was reported in paper which was presented at 40 SLAAS sessions.

2.7 Polyculture of Finfish and Crustaceans

Attempts were made to culture fin fish and crustacean in a pond enriched with swine manure. An integrated farming system was studied in a pond treated with swine manure. A pond was stocked with P. indicus, P. Mondon & C Chanos Their growth together with the environmental parameters were monitored. The harvesting will be done in April 1985.

2.8. Studies on the recruitment mechanism of economically important prawn species (NARESA GRANT)

This project is funded by NARESA and was started in October. By weekly samples are being collected from ^Kattudal, Driftnet and Dragnet to find out the recruitment mechanism of major prawn species in the west coast of Sri Lanka.

2.9 Survey of culturable fish fingerlings in brushphile fishery

A survey was initiated to assess the occurrence and the populations of culturable fish fingerlings using brushphile samples. Samples were collected randomly from the lower reaches of the Negombo lagoon. Siganus sp., Etroplus sp. Mugil sp. were the most abundant species, Signaids predominated in S.W. monsoonal period while Etroplus predominated in 2nd inter monsoonal and North West Monsoonal months.

2.10 Mollusc Culture Project Trincomalee

Officers attached to the Trincomalee research station were involved entirely on the mollusc culture project and following studies have been carried out.

- a. Hydrobiology of Trincomalee Bay
- b. Experimental oyster culture.
- c. Experimental mussel culture.

a. Hydrobiology of Trincomalee Bay

Hydrobiological data were collected from statistics where culture experiment are in progress.

Priorities were given in respect to the following:

I. Temperature, salinity and turbidity measurements.

It was found that the surface salinity varied from zero to 40‰ throughout the study period.

II Plankton-Zoo and phytoplankton samples were collected from all stations to find the generic composition and seasonal fluctuations in abundance.

III Benthic fauna and Flora -- Mud samples were collected from all stations (including both deep and shallow) in order to investigate the particle size, species composition and seasonal variation in abundance of benthic fauna and flora. Samples analysed, indicated that the clams and cockle spat settlement is high in shallow waters.

b. Oyster culture experiment

Asbestos collectors were replaced fortnightly with new collectors and the spat, foulings etc. on collectors were counted separately for different species. The length and width of each individual oyster on growth plates at different stations were measured and found that different species have different growth rates.

Studies on the growth of oyster spat in trays have revealed that the mortality was high when the water is muddy and turbid.

Fouling organisms, predators and parasites of oysters were collected for identification and for further analysis. Fauna and flora associated with oysters were also studied.

Growth experiments were also carried out at Clappenburg bay for pearl oyster species using trays.

c. Mussel Culture

Polycoco ropes were used for collecting mussel spat at all culturing sites, and they were fortnightly replaced with Asbestos plates. It was found that spawning of mussels is very seasonal and only a few number of spat were collected at Thambalagam Bay and Clappenburg bay. Starting from August, the growth of mussel spat in trays at Clappenburg and Thambalagam bay was studied in terms of increase in length, width weight and volume.

A stake culture of mussels was also tried at Clappenburg bay using bamboo stakes and found that it was very successful with zero mortality.

Fouling organisms, parasites and predators of Mussels were also studied.

3.0 INSTITUTE OF POST HARVEST TECHNOLOGY

Given below is an account of the progress made in various projects in the year 1984.

3.1 Quality Improvement of Traditional Fishery Products

Fish 'Pickle Cured' in the traditional method has poor storage properties due to fat oxidation and mold growth. The use of Sodium Benzoate and Vacuum packing gave a product which has better storage properties. About 400 packets of the Pickled Cured, vacuum packed product was prepared using 'Kumbalawa' (*Rasterliger Kanagurata*) and 'Hening' (*Amblygaster sirm*) and a test marketing trial was carried out using a questionnaire. The 250 gm. packet was sold at Rs.6.50. Consumers are of the opinion that the price is reasonable and the packaging attractive and convenient. This salt content of the product apparently is too high and has to be reduced. Laboratory studies are in progress to understand the Physical, chemical and microbiological changes which takes place in the pickle curing process.

3.2 Quality and Storage life of wet fish under various conditions

During the year, two studies were carried out under this project. In the first study ice containing Chlorotetracycline was used in the storage of 'Salaya' (*Sardinella longiceps*). A qualitative difference of the effect of antibiotics on the bacterial flora of fish was noted.

In the other study the seasonal variation in the proximate composition of 'Hurulla' was studied for a period of 9 months i.e. during the full life-cycle of the fish. The oil content was shown to vary from 3.5% in July to 1% February soon after spawning. The storage life and chemical composition other than the content of oil did not show a significant seasonal variation. The fish had a storage life of 6 days on ice through out the period. The findings were submitted to FAO for publication.

3.3 Quality Control Work Related to Marine Product Exports

In addition to the routine sampling and testing of samples of prawns and lobsters collected from the factories and export consignments the officers of the marine products laboratory were involved in outlining a tentative scheme for routine quality testing of marine product exports from Sri Lanka. The scheme was discussed with the BCS and Marine Product Exporters Association and was adopted in principal. However, there were difference on the method implementation and the discussion ended in a dead lock. The Institute is presently working on a scheme to be adopted with Cabinet approval to declare the IPHT as the licensing organisation for Marine Product exports from Sri Lanka.

The two officers working in the marine products quality control Laboratory are also involved in their Post Graduate Studies.

3.4 Packing Materials and Methods Used for Canning.

Studies related to the storage characteristics of vacuum packed/ refrigerated 'Hurulla' was carried out. The fish was shown to have different storage properties depending on the type of treatment given to the fish.

- a. Refrigeration at 15°C - 13 days.
- b. Brining (over night) at 4°C temperature - 2 months.
- c. Tradition and at 15°C - 12 days.
- d. Potassium Sorbate and stored at 1.5°C - 18 days.
- e. Partial freezing - 3 months.

The microflora at the beginning and at the end of these period were studied for the following:

- a. Stain
- b. Glue fermentation
- c. Indole
- d. Catalase
- e. Oxidase
- f. Spores
- g. mortality
- h. Colony appearence etc.

Over 200 pure cultures will be studied for above.

3.5 Use of Enzymes in the Hydrolysis of Fish Flesh

The use of under utilized and economically under valued fish varieties in the production of fish sauces and hydrolysates was studied under this project.

The fish species 'sudaya' was used in these studies and enzyme papain was used to hydrolyse the fish flesh.

The method yielded product with approximately 25% H₂O and the following composition.

Protein	66%
Moisture	25%
Oil	0.31%

The product was also tested for its amino acid composition.

3.6 Smoked Fish

Smoked fresh water fish is a product popular in the fresh water fish producing areas of the country and the production is carried out mainly during the rainy season when the conditions are not suitable for sun drying of fish.

The cod smoked fish is marketed in the urban areas and has a demand among tourists. The traditional product has poor storage properties due to the high water content and low salt content of the product.

Studies were carried out with 'Hurulla' and the fish was smoked in the Torry Kiln.

a.	Dry salted - Moisture	39.8%
	Ash	8.8%
	Protein	51.0%
	Fat	5.6%
b.	Brined - Moisture	43.4%
	Ash	7.3%
	Protein	46.0%
	Fat	4.8%

Brined product had better organoleptic properties but had poor storage properties. The product should either be chemically treated or salt content of the product increased if we were to get a product with better keeping qualities. The vacuum packing of the product in the other alternative. The work came to a halt in July as the officer concerned left the services of NARA.

3.7 Improvement to the fish Transport box used in the Fishery Industry.

The wooden fish transport boxes presently used in the industry are an important source of bacterial contamination of fish. The rough, wet surface of the box harbours bacterial and as there are used over and over again without adequate cleaning these have become an important source of bacterial contamination of fish transported in them. Attempts were made to improve the water resistance of the box and reinforce the box with a view to minimise the contamination and increase the period of usage of the box respectively. These boxes were applied with a water resistant material and the interior was made smooth and these improved boxes were given to fish transporters for use. Due to high cost of fabrication the improved box did not have the extra mechanical reinforcement and hence was not accepted by the trade. The mechanical strengthening of the box is fairly costly and hence at present a feasibility study is being carried out on the introduction of plastic boxes to the trade.

3.8 Other work

The other activities under taken by the officers of the division in 1984 are as follows:

1. Wellawatta Canal Study
2. Kelani River Study
3. Maldiva fish Training Programme at Trincomalee
4. Analysis of samples submitted by the Industry.
5. Fish inspection work
6. St. John's Market Survey.

4.0 OCEANOGRAPHY UNIT

During the period 1983 - 1984 the following activities were undertaken by this unit.

- 4.1 The report on the coastal survey from Kelaniya to Negombo was further updated and sent for publication to the NARESA journal. The paper has been accepted for publication in the next issue of the Journal. Furthermore, information on Oceanographic data available in various institutions were obtained and a report was prepared on aspects concerning the Trincomalee Canyon.
- 4.2 A map showing the location of bottom sediments in the continental shelf of Sri Lanka has been prepared for publication. This map contains over 3000 sample locations and the bottom sediments have been classified according to their origin (terrigenous biogenic), grain size colour and composition. This map incorporates all available information gathered by various foreign oceanographic institutions together with data collected during surveys undertaken by NARA. Arrangements have been made to get 500 copies of this map published at the Survey Department.
- 4.3 The first Hydrographic and Oceanographic Survey conducted by the Oceanography Unit was undertaken during the period 23rd January to 31st January 1984. A detailed report on work carried out during this period has been published.

Following reports are available on this survey.

- (i) Report on the Pilot Project for a Hydrographic and Oceanographic Survey off Negombo.
Part I - Hydrography
Part II - Oceanography
- (ii) Bathymetric chart of the survey area - Negombo

4.4 The National Hydrographic office was established on the 13th of March, 1984.

- 4.5 Two field surveys around Trincomalee and Muthur were completed during the period under review. A geological map on a 1:10,000 scale has been prepared covering the survey areas. A report on this survey was submitted to SLAAS as a paper and was read at the annual sessions.
- 4.6 A programme for offshore heavy mineral exploration off the Kalutara Ambalangoda coast has been initiated. The first stage of this project was completed in August 1984, and 60 bottom samples were collected from depths of 10 - 15 meters. Granulometric analysis, heavy mineral separation and mineralogical studies have been completed. These studies have shown that along a stretch of the southwest coast off Beruwala bottom sediments are enriched with the heavy minerals ilmenite and monazite. The second stage of this project will commence in March 1985 and preparations are underway using Remote Sensing Techniques for studying the movement and distribution of sediments in the areas where concentrations of heavy minerals have been located. A survey of the coastal stretch from Kalutara to Devinuwara will also be initiated next year.

5.0 STATISTICS AND DATA PROCESSING UNIT

5.1 Documentation of data

This project was formulated with the intention of developing a data base on aquatic resources and their exploitation.

In this connection, documentation of 1950 - 83 fish production data and 1976 - 83 craft data has been completed.

5.2 Socio - economic survey in Puttalam Lagoon area.

This study was initiated to study the socio-economic factors involved in the Puttalam lagoon fishery in order to optimize production, uplift living conditions of the fishing community and to foster ethnic and communal harmony in exploiting the resources.

This project started in May 1984 and completed the frame survey in July 1984. This study consisted of the following major topics.

1. Fish production survey to assess the net income of fishermen and to assess the economics of various types of fisheries.
2. Fish marketing survey - to estimate the distribution of income among the fishermen.
3. Fishing house-hold survey - to assess the socio economic conditions of the fishing community.

Questionnaires were prepared to gather the above information and the sample survey was completed in six months. Work on this project will resume with the recruitment of new staff to the unit.

5.3 Evaluation of existing fishing practices in the South West and South coast of Sri Lanka.

This project was initiated at the request of the West Coast Fishery project with the following in view:

1. To categorize and quantify the known exploited and unexploited fisheries resources in the region.
2. To assess the impact of existing fishing practices in the region.
3. To carry out sensitive analysis of fishing enterprises with respect to capital cost.

In this connection data on fish production, effort and fish prices for the period 1976 - 1982 were obtained from Ministry of Fisheries and were analysed. Catch per effort by in-board craft indicated the possibility of expansion of their utilization in Kalutara and Galle regions. The economic analysis also indicated the potential gains in expanding this fishery in these two regions.

5.4 Mesh selection studies in Prawn trawls in the Palk Bay Region

The main objective of this project was to find out the optimum codend mesh size and mesh selection studies were carried out at Pesalai in association with BOBP. Monthly visits were made during April to July 1984 to undertake mesh selectivity experiments. The information collected indicated that 40 mm mesh cod end is not ideal for prawn trawlers at Pesalai and a smaller mesh size was recommended. Accordingly 30 mm cod end is now being used.

6.0 ENGINEERING AND TECHNOLOGY UNIT

In this unit following programmes were carried out during 1984.

6.1 Development of Bottom Trawl Fishing by 38 footers in the Northwest Coast of Sri Lanka.

Traditionally ADB type 38 footer gillnetter/long liner vessels are used as coastal bottom trawlers in the NW Coast around Kalpitiya. It was observed that these vessels which have 65 hp engines use trawlnets of much smaller sizes resulting in less efficiency and smaller catches. Although these trawlers were operating more viably than when they were engaged in drift netting/long lining, if they have had more efficient trawl nets to match their engine power the maximum efficiency level could have been reached.

In order to arrive at gear best suited for these vessels, six different types of high opening bottom trawls were introduced to the fleet at Kalpitiya. One design was a shrimp trawl, another a fish trawl and the rest were either fish cum shrimp trawls or shrimp cum fish trawls. The trials were conducted on a commercial basis during the period January to October. These trials were carried out by NARA Engineering and Technology division with the collaboration of FAO/BOBP.

The high opening trawls introduced were so efficient that within a month or so after the introduction the fishermen were reluctant to use their old nets. The fish cum shrimp trawls and shrimp cum fish trawls were catching as much twice the amount of fish and silver belly caught by the traditional trawl nets.

The fish trawl used was effective during the period January to March while the shrimp trawl was effective during July to September. The fish cum shrimp trawls and the shrimp cum fish trawls were showing a good efficiency through out the trial period.

The analysis of catch data has lead to the following conclusions. The best period of time to operate each type of trawl to achieve the best catch, rates hence the best economic viability would be as follows:

January to March	- Fish trawl
March to July	- Shrimp cum fish trawl Fish cum shrimp trawl
July to September	- Shrimp trawl
September to December	- Shrimp cum fish trawl fish cum shrimp trawl.

A mesh size selectivity experiment too was carried out using a codend cover to gauge differences in escape rates through codend mesh sizes of 30mm and 40 mm. During the few trials carried out no significant difference in percentage escaped of marketable shrimp could be observed. However the smaller mesh size appear to retain more shrimp of small sizes which are below the marketable size. This study could be of importance to the industry as it could give indication as to which mesh size would be optimum in the capture of marketable size shrimp while reducing the percentage of smaller shrimp to a minimum.

In addition to above activities efforts were also made to train fishermen in construction, rigging and mending of trawl nets and certain modifications on deck layout were done to improve handling of gear.

6.2 Fish Aggregating Devices (Low Cost FADS)

In February during phase I of this programme one unit was deployed off Panadura.

The platform was in the form of a raft made of bamboo while 18 mm dia pp rope x 2 was used as the main suspension. Anchors were in the form of concrete barrels (70-80 kg) and grapnel anchors made of steel fish strips (50-60 kg). Local 3½ tonner fishing boats were used for deployment. Coconut pronds hung below the platform were used as the appandages. The fish catches near the FAD were follected regularzly and the behavious of this platform was observed regularly. This FAD lasted till mid May and disappeared without trace. Most probably it would have got destroyed due to collission with a ship or by rough seas prevailed during this season.

Although it was intended to deply few units off East Coast this had to be abandoned due to non availability of materials in that area, and other factors such as security.

Instead, it was decided to deploy 5 - 6 units using different locally available materials, off the west coast. Bamboo rafts, steel barrels log rafts and tyres were used in these platforms. Improvements were made in the design of anchors to have better anchor properties and to be able to deploy off a 28' fishing vessel. Construction detials of the FADS were studied and were improved further.

6.3 Management of NARA vessels etc.

Work in connection with maintenance, repair and crew management of NARA vessels were done by personnel of this division.

7. LIBRARY

Organization of the Library

The organisation of the library was planned in three stages. Stage I of this scheme has been completed and almost all the services planned in stage 2 have commenced in 1984.

Stage I

7.1 Books - Accessioning, cataloguing and classification of all books in the library was completed by July 1984. All books were processed and shelved and the relevant cards filled in the "AQUAINDEX". The total number of the books in the library now stands at 1985. During this year 98 books were added to the collection which were gifts from FAO, IDRC and similar organisations.

Periodicals - All periodicals were sorted into bound and unbound issues. The Bound Periodicals were accessioned into a separate register and the total collection stands at 1376. Woods Hole Institute of Oceanography has gifted 34 volumes of collected Reprints and they have been added to the bound volumes. 24 periodical titles were subscribed to in 1984.

Three Periodicals titles were received free of charge upon request in 1984.

Another 182 titles are received in exchange for the Fisheries Bulletin and also free of charge. It is hoped to acquire more titles on exchange once the NARA Journal is published. Thus the library received altogether 209 periodical titles in the Library in 84.

AQUAINDEX

This is a colour coded card index to all material in the library. Index cards for books (white) periodical articles (pink) reprints (green) FAO Reports (Yellow) and Phamphlets (Blue) are all inter filed in the same alphabetical sequence in the same sort of catalogue drawers.

Newspapers

In 1984 an index to all newspaper clippings in the NARA Library was made. In Stage I of the Organisation the following services of the Library were streamlined.

1. Lending.

That concluded the stage I of the Organisation of the Library.

7.2 Stage II - Following activities have been attended to under Stage II of the re-organisation of the library.

a. Building up of the collection

1. Purchase of books and Periodicals.

b. Commencement of new services

1. Inter Library loan services.

2. Request for reprints.

3. Publications i. Quarterly accession lists.

ii. "From the Aquaindex of the NARA Library"

4. Compile Bibliographies.

5. Requests for information.

6. AGRINED/SDCP.

7. TRAINING

The librarian underwent 10 days training course in Information Analysis and Consolidation for small specialised information centres, organised by IDRC/AIT at the Asian Institute of Technology (AIT). Bangkok.

7.4 PRINTING OF THE NARA JOURNAL

Printing of the "Journal of the National Aquatic Resources Agency" which commenced publication in 1984 is also the responsibility of the library. The 1st issue includes 11 articles and one "Note", and would be out in February 1985.
