DEVELOPMENT OF MECHANISED FISHING FLEETS IN THE INDO-PACIFIC COUNCIL REGION

by

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INTRODUCTION

"World fisheries form an important sector of the food front and there is much evidence to encourage us to hope that food from the seas and inland waters of the world can be drawn in substantially increasing quantities" states Dr. D.B. Finn, Director of Fisheries Division, Food & Agriculture Organization (1961), in an article on "Fisheries and Freedom from Hunger Campaign" in the opening issue of the Fishing News International. The record of post-war years points to the possibility of gradually increasing food supply through fisheries, The total commercial fish catch before the Second World was 20,000,000 metric tons a year and at present the catch has increased to over 35,000,000 tons. It is believed that with appropriate international control and management of resources, it should be possible to achieve the target of 60,000,000 tons of fish from the sea in a year without affecting the fish stocks. One of the important aspects today is to increase the catch of the underdeveloped countries. The nutritional standards in most of the countries in this region require to be raised considerably to give the people a balanced diet and fish forms an important source of protein. It has been proved that substantial increase in fish catches can be achieved in many parts of the world through mechanization of small fishing boats and the introduction of improved nets, gear and other equipment. This has been demonstrated well in India, Ceylon and other Asian countries as well as in some of the countries of Africa and Latin America.

In most of the countries of the Indo-Pacific Region, the programme of mechanisation of fishing craft was initiated after the Second World War and the efforts undertaken by different Government agencies have met with varying degrees of success depending on local economy, suitability of boats, organisation and planning, adequate financing and the response from the fishermen. Many mistakes have been committed but many valuable lessons have also been learnt.

Mechanisation of fishing crafts consists of installation of engines for propulsion and mechanical devices for handling fishing gear. Increased fish production alone may not justify mechanisation of fishing craft. It must also give a higher economic return to the industry and a greater safety to the fishermen. The mechanisation of indigenous craft has enabled fishermen to fish in offshore waters, which were previously inaccessible to them, to save time taken in going to and returning from the fishing grounds and to fish for longer hours. Mechanisation produces quick results and causes least amount of dislocation in the existing economy. However, indigenous crafts have their own limitations because of the weak construction and the design for inshore fishing, but it is necessary to appreciate the fact that in the long run mechanised fishing will come to stay as an economic unit with suitable designs of craft capable of operating more units of fishing gear by means of mechanisation for a major part of the year, with adequate facilities for storage of fish and gear.

It is easy to formulate a programme for complete mechanisation based on the concept that all that is needed is highly mechanised boats with all modern improvement. This can create economic disaster and delay a sound commercial fisheries growth. Improvement of fishing boats, particularly extensive mechanisation, is very expensive, compared to the cost of primitive craft in an area. Utmost caution should, therefore, be exercised so that the fishing boat owner is not over capitalised in an effort to get a most developed boat. To some extent, the development of fishing craft in a given area must be slightly behind that of improvement in other aspects such as marketing, dis-

tribution, fish handling, storage, fish supply etc. An integrated fisheries improvement plan is an absolute necessity (Chapelle, 1960, 736).

Some of the important limiting factors for undertaking fisheries programmes are lack of improved types of fishing gear, lack of power fishing vessels, lack of adequate storage and transport, lack of communication and lack of trained personnel. With regard to the development of marine fisheries, most of the countries have experienced difficulties in supply of marine diesel engines, fishery requisites, lack of communication between production and consumption centres, provision of certain rules and regulations relating to shipping, ports and customs clearance of fishing vessels, lack of special shore facilities for landing and berthing of mechanised fishing vessels, high cost and duty on oil, lack of financing facilities to fishermen cooperatives for purchase of fishing equipment, storage and marketing and also shortage of technical personnel.

When I received the request from the Indo-Pacific Fisheries Council to present a paper on "Development of mechanised fishing fleets in the IPFC region-Government's services (Technical, Financial and Administrative)" at the symposium to be held during the 10th Session of the Indo-Pacific Fisheries Council meeting in Korea in October 1962, I was naturally reminded of a request of the IPFC in February 1951 to present a technical paper on the "Experimental introduction of power fishing vessels within India and Ceylon" at the 4th meeting of the Council held in 1952. I had the pleasure of presenting this paper indicating the then existing conditions of power fishing and making recommendations for proper development of mechanised fishing on a planned basis. Now, after ten years it is really encouraging to see that most of the recommendations made by me earlier have borne interesting results in the various countries of the Indo-Pacific Fisheries Council region. It is indeed a pleasure to recapitulate the progress of mechanisation in the region and in India in particular, as the author had close association with the planning, implementation and coordination of the various activities relating to the development of mechanisation of fishing fleet in India for over ten years.

TECHNICAL ASSISTANCE

1. Benefits of Mechanisation :–

Mechanisation of indigenous fishing craft has enabled the fishermen to fish in offshore waters, which were previously inaccessible to them. It also reduces the time necessary for travelling to and returning from the fishing grounds and saves the physical efforts of the fishermen. Since time involved in transporting the fish back to the shore is short, fishing can be carried on for longer periods without jeopardising the quality of fish (Traung, 1961, 1). However, indigenous craft have their own limitations, as they have been designed for limited fishing activities. This, therefore, leads to introduction of new designs capable of operating more units of fishing gear by means of mechanisation for a major part of the year and adequate facilities for storage of fish and gear. When fishing craft are suitably designed for operating gear of varied types to meet the specific requirements of fisheries and the regions, it will definitely be possible to increase the earnings of the fishermen and better their socio–economic conditions. Mechanisation of small fishing boats in most of the underdeveloped countries has resulted in raising the standard of the fishermen community. The progress of mechanisation in the region is indicated in Table 1 by the number of mechanised boats operating.

2. Mechanisation in India :—

Mechanisation of fishing craft was initiated in India in the First Five Year Plan period. The maritime State Governments launched programmes for mechanisation of indigenous craft and/or of improved designs of fishing crafts with the experience and guidance of Naval Architects procured under foreign aid programmes during the last ten years. By the end of the First Five Year Plan about 650 boats were mechanised in India, most of which were in Bombay State. Due to incentives offered in the shape of technical and financial assistance by the Central and State Governments, new designs of mechanised boats have been developed in the States of Gujarat, Maharashtra, Mysore, Kerala, Madras, Andhra Pradesh, Orissa and West Bengal. At present there are over 2500 mechanised boats in this country. Some of the designs drawn up earlier have already been

improved in some sectors with the experience gained in the operation of different types of fishing gear. This programme has already attracted attention of most of the fishermen in the states and there is great demand for the new designs of boats. A provision of Rs. 555,000/-was made in the Second Five Year Plan for this programme and in the Third Five Year Plan, it has been increased to Rs. 25,000,000/—.

With the development of mechanisation it is essential to undertake programmes simultaneously for introduction of improved types of fishing gear and provision of safe anchorages and berthing facilities and suitable arrangements for effective handling of fish and fishery products, transport and marketing. Government of India and the State Fisheries Departments anticipated the necessity for proper integration of various activities and obtained services of experts in Fisheries Engineering, Fishing Harbour Science, Fishing Boat Designs and Fishing Technicians from International Organisations, like Food & Agriculture Organization, Colombo Plan, T.C.M., and Indo-Norwegian Project.

F.A.O. experts provided under ETAP for Naval Architecture, Fishing and Fisheries Engineering, Training and Fishing Harbour Science have advised the Governments in the Mechanisation of indigenous craft, modifying the existing ones and introducing new types of boats and also facilities for berthing and landing. The U.S. Government under the T.C.M. have provided equipment to the value $2,200,000/—. Under the Indo-Norwegian Project engines and boats were given to fishermen of the State of Kerala at subsidised rates. More than Rs. 20,000,000/-had been spent to date on the various programmes by the Indo-Norwegian Project.

2.1 Existing types of boats suitable Mechanisation :—

Fishing boats constitute a major investment in the fishing industry of the country and with mechanised fishing, they will probably represent the largest single investment (Gnanadoss, 1960). The designs of boats cannot, therefore, be looked upon as an isolated problem. It is integrated with the development of all phases of fishing industry.

In a country, like India, development of fisheries has to go through step by step approach, as the fishermen are not educated enough to understand the implications of mechanisation. Under this programme, the mechanisation of existing crafts was therefore taken as a first step. A list of existing types of boats in India is given in Table 2. The States of Gujarat, Maharashtra, Madras, Andhra Pradesh, and West Bengal were fortunate to have some of the existing craft suitable for mechanisation. In other areas, the craft have to be modified and in certain cases drastically altered. The "Lodhias" and "Machwas" of Saurashtra coast, "Satpati" and "Versova" types of Maharashtra, "Tuticorin" types of Madras, "Navas" of Kakinada of Andhra Pradesh and "Batchari" type boats of West Bengal were mechanised sucessfully in the early stages (Ziener & Rasmussen, 1958, 49).

It has been found that some of these types, even though suitable for mechanisation, are capable of improvement without making drastic alterations. These alterations were made to suit the installation of engines, fitting of the propeller and rudder and arrangment for deck equipment.

2.2 New Boat Designs :—

No fishing boat type will ever remain permanent. Fishing boats are improved gradually on the basis of experience gained in the course of fishing operations and the improvement of fishing gear. Normally, fishermen are reluctant to get a new design, unless and until it is proved by demonstration that the new craft is more efficient than the craft they are using. With the active application of principles of naval architecture, international cooperation and demonstration, it has been possible to show to the fishermen the advantages of new designs, their fishing efficiency, handling of the gear and the coverage.

Many boats in India like "Machwas" are very well developed from the modern naval architectural point of view. Still, they could be improved by sharpening the stern post, by modifying the distribution of displacement, by introducing strong and lighter construction of boat and by provision of suitable deck equipment to increased working efficiency of the crew and to provide more comfort. These improvements add up

to the great efficiency, increased catches and larger earnings—Table 3. (Ziener and Rasmussen 1958, 87).

At present suitable designs of fishing craft have been developed in India to meet the requirements of different regions and conditions of fishing. Training for technical officers of the Fisheries Departments was given for designing suitable types of craft and also for construction of boats. Modern boat building yards have been constructed by most of the Fisheries Departments of States, so as to enable local builders to follow improved designs. Cooperatives and private yards are now coming forward to take up construction of improved types of fishing boats on commercial lines. It is essential not only to educate the cooperatives and boat builders on the advantages of the improved designs but also to make the fishermen appreciate increasing efficiency of the craft for fishing.

With the construction of new types of fishing boats and introduction of improved types of gear, it is also necessary to train young fishermen in the use of these boats, their operation and maintenance, Local fishermen were not used to marine diesel engines, nor in the use of deck equipment for handing gear. It was therefore imperative to provide adequate training to sufficient number of fishermen in this branch, before they are supplied with mechanised boats. At present there are 12 fishermen training centres in the different states in India, which extend these facilities to over 450 fishermen candidates a year. These centres were organised with the guidance of experts provided by F.A.O. and the Indo-Norwegian and now taken over by the State Fisheries Officers.

Based on the surveys made by the Harbour Engineers, plans and estimates for construction of fishing harbours in most of the States have been finalised and work initiated in some of the important centres.

2.3 Improvements on newly designed Boats :—

Further steps have been taken in India in the development of fishing boats by improving the new designs, after carefully conducting experiments and tests and by experience. The new boats have to combine the best of every desired aspect. The development of Pablo boats and proto-type surf boats are best examples. The Pablo boats designed on the basis of Danish built boats, sent to India by FAO in 1953. were modified and improved upon by naval architects in 1956, 1958 and 1960. These newly designed boats are now fairly successfully operating in Kerala, Madras and Mysore.

The need for developing a suitable boat to operate from surf beaten coast was raised by FAO, as early as 1949 and with the assistance of FAO, Indo-Norwegian Project and the Government, series of trials were made with four types of boats in 1960. (Gurtner 1959). These trials are of particular interest to under-developed countries, as they deal with different types of boats used for different beaches, weather and surf conditions, hull shape, handling of the boat etc. On the basis of these trials, it has been recommended that a pilot project should be undertaken in a coordinated manner for assessing the economic possibility of these boats in different countries.

New designs of fishing boats have already been improved in the States of Orissa, Kerala, Madras, Mysore, Maharashtra, Andhra Pradesh and Gujarat. The sizes are becoming larger and in the development of these designs, the programme has been closely coordinated with the Crafts Design Section of the Central Institute of Fisheries Technology at Cochin. A list of new fishing craft which has been further improved is given in Table 4 (Gurtner, 1959).

3. New Designs of Boats in Indo Pacific Region :—

New types of fishing boats have been designed in Ceylon, Korea, Netherlands, New Guinea, West Pakistan, Hong Kong and Indonesia. In Hong Kong, the boats are suitable for mechanisation but considerable improvements have been made to increase the efficiency. In West Pakistan, the deck arrangements for the trawlers, ranging from 30-70 feet, have been improved for operating trawl winch and providing insulated fish holds. In Ceylon, 26 and 32 feet boats have been developed for gill netting.

4. Mechanisation of Fishing Crafts with Outboard Motors :—

Outboard motors were used for a long time mostly to serve limited requirements. During

the last 10 years, these motors are used in mechanising small craft for fishing. They have been found to be successful in countries like Malaya, Chile, Ceylon, West Indies and in some countries in Africa. In Malaya, 65% of the boats have been mechanised with outboard motors; in Ceylon it has been demonstrated that a boat fitted with outboard motor can catch 7 times more than a single boat without outboard motor. In India, the first outboard motor was fitted in Jaleswar (on Saurashtra coast) in 1953. The result of the operation of this boat attracted other fishermen and at present there are over 300 boats fitted with outboard motors on Saurashtra coast. Fishermen could increase their fishing hours and also their earnings. These engines have proved so far economical only in Saurashtra in India.

5. Boat Building Yards :–

Fishing boat building industry in India is mainly carried on on a cottage industry basis. Fishing boat building yards exist in Madras, Gujarat, Mysore, Kerala, Andhra Pradesh and Orissa, but some of the yards are not exclusively for fishing boats. Most of the small yards are confined to traditional methods of boat building. Construction methods can be improved by applying principles of naval architecture. The special courses of training in fishing boat designs and construction at the Central Institute of Fisheries Technology, Cochin, where officers from various states received training on rudiments of naval architecture, designs of fishing crafts and construction have contributed to the development of boat building practices. Provision has been made in the Third Five Year Plan for the establishment of boat building yards either by the Government or by cooperatives or private sector in most of the states.

6. Standardisation of Fishing Boats :–

Even though sufficient interest has been created amongst fishermen in the advantages of mechanisation of fishing craft and there is increasing demand for such craft, it is important to see that the number of types of designs and craft is restricted to a selected, efficient and standard few. This aspect is now engaging the attention of the State Fisheries Departments and the Central Institute of Fisheries Technology in Cochin. With the standardisation of boats, it will be possible to construct a larger number of boats at cheaper rates and also to handle them on a commercial basis.

7. Role of Fisheries Technological Research Station :–

With the mechanisation of fishing crafts and the introduction of improved types of fishing gear, the need for proper investigations and research on the designs of fishing craft suitable for different fishing conditions, the deck equipment required, the power required for these boats etc. is stressed. It has been found necessary to establish a central institution for undertaking researches on fishing craft and the Government of India established the Institute for Fisheries Technology in 1957, its Craft Wing dealing with problems connected with hull designs, designs of new boats, testing of boats for performance and stability, selection of engines and propellers, improvement of boat building practices and selection of timber etc. The officers in charge of craft and gear in the different states are closely coordinated with the investigations undertaken by this institute. Seminars and symposia are arranged periodically for exchange of experience and knowledge.

FINANCIAL ASSISTANCE

Mechanisation of fishing crafts is a new item of development in most of the countries in the region. For introducing this programme, more capital outlay is required. If capital outlay is enhanced, then the progressively increased outlay should not only be productive at the same basic rate as before but also yield a further increment over it. For example, if a unit outlay of Rs. 5000/–yields Rs. 2000/ -per year of fish, then the ratio of capital outlay to production is 40%. If in reorganising, the capital outlay is increased by Rs. 1000/–, then the basic rate of increase in production will be Rs. 400/–; in planned economy this should not be 40%, but something more so as to attract the fishermen to take to improved methods (Srivatsa, 1969).

It has been demonstrated that if a fisherman is given a mechanised boat costing Rs.

18,000/—and fishing gear worth Rs. 2500/—he is able to produce fish worth Rs. 25,000/—(in 210 fishing days in a year with the assistance of 5 fishermen). Allowing a sum of Rs. 15,000/—for 5 fishermen as net income required, a sum of Rs. 10,000/—is available for the purpose of amortisation, depreciation, repayments etc. Allowing 3% of the gross income for repairs and replacements, the balance available is Rs. 9450/—. Depreciation will be 8½% for boat and 50% for gear. With the balance of Rs. 6700/—, the fisherman has to meet the items of expenditure on fuel oil, maintenance of boat etc.; this will cost approximately Rs. 4000/—a year. Still he has to reserve a sum of Rs. 700/—towards repayment of interest to Government loan and also Rs. 2000/— towards loan instalments for the boat and gear. The loan instalments will have to be worked out in such a manner that the amortisation is payable within 10 years and the sum by which he falls short will have to be subsidised, till he is able to raise his earnings by increased production (Srivatsa 1960). Government of India and the State Governments are therefore granting subsidies to fishermen on hull, engines and fishing gear.

In the mechanisation programme, each recurring capital outlay becomes a new investment with a higher ratio of production. Therefore when such a scheme is planned, it is essential to work out the increase in the catching capacity of a unit before such a unit is recommended. Normal net production ratio to capital outlay is more than the existing ratio and if depreciation on the capital is much less and amortisation towards capital can be easily absorbed from the profits, then the scheme would be successful.

1. Investment :—

If the fishermen have to equip themselves with modern mechanised boats and the improved types of fishing gear, they require capital for investment. Majority of the fishermen in this region are poor and in general cannot afford to invest large amounts for this purpose. For instance, an average mechanised boat in India will cost about Rs. 12,000/— to Rs. 20,000/—. Private credit facilities are, no doubt, available but this reflects on the economic conditions of fishermen. The rates of interest are too high and the terms and conditions of such credit are such that fishermen become permanently indebted to the so called middlemen. Further the fishermen who are accustomed to certain types of gear, would hesitate to adopt new types unless demonstrated and provided with certain financial assistance. In most of the countries Government have to give financial assistance in the shape of loans and subsidies, not only to help them but to create an incentive to produce more. The steadily worsening position of small fishermen vis-a-vis private non-institutional lenders had necessitated Government to allot funds for giving financial assistance to fishermen. Even in many developed countries like Japan, United States, United Kingdom, Norway etc., Government had to intervene when the economic conditions of the fishermen were becoming bad.

2. Credit facilities given by Countries in the Indo-Pacific Region :—

Government extends public credit facilities in all countries of the Indo-Pacific region directly or indirectly for mechanisation and/or for improvement of fishing crafts. In some of the states of Australia, Indonesia, Japan and Philippines, there is a kind of legislation pertaining to organisation of Government Credit Institutions or provision of specific financial assistance by Government to the industry. In Hong Kong, there are three revolving funds, two of which are administered by the fish marketing organisation. Philippines provides loans for craft and engines through the Farmers & Fisheries Bank. In Malaya loans are advanced through cooperative societies. In India loans and subsidies are granted through the State Fisheries Departments and cooperative organisations. In Japan, the Agriculture, Forest and Fisheries Financing Corporation extends loans to the fishermen.

In some of the advanced countries in the West, commercial banking institutions, cooperatives and non-institutional lenders are of substantial importance and suppliers of credit—Table 5. However, in countries of Indo-Pacific region, the Government participates directly in the administration of financial loans (Table 6). The Fisheries and Cooperative Departments are normally the agencies through whom financial assistance is extended to the fishermen. These loans are

further channelled through apex cooperative organisation or cooperative banks. Details of countries which advance loans, types of loans, lending agency, terms and conditions of loan etc. are given in Tables 7 and 8.

Loans for fishing industry are provided by Government in various ways, such as funds provided from general revenues, funds appropriated from specific sources of income and funds raised as special levies. But funds are allocated under the budget of the Government agency administering the loan. Even under the system different methods are adopted. Some countries make a lump sum appropriation; some have revolving funds wherein the money collected through the repayment of loans, could be used again. In certain cases, Government administers loan, where finances are received from abroad in the form the loans and gifts. Special banking institutions also administer credit, which are financed by Government. But this will be in the form of short term loans. But for mechanisation of fishing craft and construction of boats, of loans required are of long term nature.

In India, the bulk of public loan capital is provided by the Ministry of Food and Agriculture, Government of India to be administered by State Governments. The Government of India and State Governments have set aside certain amounts for development under Five Year Plans for granting loans and subsidies.

The loan funds are mainly administered by the State Fisheries Departments, which vary slightly from State to State. In some States like Gujarat and Maharashtra, loans and subsidies are granted directly to the fishermen. In Madras, Kerala, Mysore, Orissa and Andhra Pradesh, mechanised boats are constructed by Government Departments at Government or private boat building yards and then distributed to the fishermen in kind. The procedure adopted for distribution of loan in the various states in India is given in Table 9.

In all cases of loan and subsidies, the fishermen have to execute an agreement with the Government for repayment of the loan in instalments over a period of five to seven years-not counting the non-fishing season.

3. Rates of Interest :—

In India, on loans issued by Central and State Governments, the rates of interest charged vary from 4 to 4½%. Interest charged by State Governments to the fishermen on the loans issued to them would be from 5 to 5½%.

4. Insurance :—

Insurance of the mechanised boats by fishermen is insisted on by State Governments with a view to safeguard the interest of not only fishermen but also the Government. In most of the States, the fishermen have to insure the boats and assign the policy to Government against loan. In Maharashtra and Gujarat, the rates of interest charged on the loans are 5% on boat insured and 9% on those not insured. In Kerala, the State pays the premium towards insurance, but this amount is recovered in instalments before the boat is actually handed over to the fishermen on full repayment. It has been found essential to provide for insurance of fishing boats at reasonable rates of premium, especially when the fishermen do not have adequate security in the form of immovable property and also to safeguard the loan granted by Government.

5. Repayment of loans :—

Loans for engines and boats are to be repaid in a period of 5 to 7 years. The amount is recovered in 8 to 10 months instalments every year, with the interest due. No instalments are recovered for two to four months in a year during the off season. The District Fisheries Officers watch regularly the repayments and if there is any default, a penalty interest of 1% is charged on the outstanding amount. If the recovery is very irregular or if there is any default, legal action is taken against the party under "Arrears of Land Revenue Act". Fortunately, such cases have been very few.

In the method of recovery of the loan, the practice varies from state to state. In some states like Gujarat, Maharashtra and Madras the recovery is made directly from the fishermen or the cooperative society of which he is a member. In Mysore and Kerala the recovery is effected from the sale proceeds of the catch; the value of a certain

percentage of the catch of the boat is paid to Government towards the loan recovery.

In India, the grant of financial assistance in the form of loan and subsidy was introduced in 1950 and continued till now with the object of providing the fishermen some relief from the high cost of equipment like engines, and also to give him an incentive to take to improved boats and gear. Subsidies are granted for the construction of improved fishing boats, mechanisation of craft, mechanisation of fishing methods and on fuel. The rate of subsidy on hull is 25%, on engines 33-1/3% to 50%, on winches and gurdies 25% etc. As regards subsidy on diesel oil, Government of India have offered 16 Np. per gallon oil consumed by mechanised boat, subject to a ceiling of Rs. 150/—per boat per year as a Central share, and subject to the condition that the state would meet an equal amount of subsidy. The quantum of subsidy given by different states on these items is shown below:

Name of item	Govt. of India	Govt. of Maharashtra	Govt. of Kerala, Madras, Andhra, Orissa & Mysore	Govt. of Gujarat	
				2nd plan	3rd plan
1. Mechanisation of fishing craft.					
a) Inboard engines	50%	50%	50%	33—1/3%	40%
b) Outboard Motors	(NO OUTBOARD MOTORS)			33—1/3%	25%
2. Improved designs of boats	25%	25%	25%	25%	25%
3. Winches, Gurdies & accessories	25%	25%	25%	12½%	25:

6. Financial Assistance in other parts of the world:–

In countries, where fisheries is highly developed the Government continues to provide loans for fisheries for future development. In Europe and North America, the problem of rising cost of production being one of critical importance has effects on the structure of the industry. Many measures are introduced both by Government and private enterprise to keep the cost down. Collective organisations like producers' Association and fishermen cooperatives supply fuel, ice, equipment, provisions etc. on a non-profit making basis. The Government offers special concessions to the industry, for instance, remission of taxes on fuel and on certain imported supplies, special freight rate etc. In most developed countries, modernisation of fisheries and facilities for the promotion of new large scale undertaking were dependent on Government credit and subsidy. Credit schemes have been extended or new ones introduced for boat construction in Belgium, Canada, Denmark, France, Germany, Iceland, Netherlands, Sweden, United Kingdom and Japan. This dependance on credit to some extent has permitted a degree of rationalisation on restriction of investment to approved designs and operations. These have also the objectives of encouraging ownership of crafts and gear by the working fisherman, increasing thereby his economic independence and social security.

In Norway and Iceland, where fisheries are of utmost importance in the national economy, the Government bear direct influence on the development plans, which are executed in close consultation with the industry. In Norway a public corporation was formed in 1954 and developments are financed by mortgage loans from the National Fishery Bank. In Iceland the National and Fisheries Banks provide much of the finance required for the improvement of the industry. In Canada, a federal subsidy for the construction of new crafts of approved designs was introduced and administered in conjunction with provincial low interest loans and other aids to new construction. In United Kingdom financial help for construction or replacement of fishing craft and gear,

guarantee of minimum price, market promotion, etc. were extended by the Herring Industries Board and White Fish Authority established in 1935 and 1938 respectively. In Japan, the Government had allowed subsidies during the early prewar period for various items, but in 1957 the policy had been revised, so that only certain kinds of indirect loans are made available. The State provides loans to companies and fishermen through Agricultural Credit Bank. The introduction of new fisheries loans revising licence and permits, fisheries cooperative association law & fishing boat law in 1950 accelerated the pace of rehabilitation of fisheries in Japan.

The mechanisation of fishing crafts in most of the countries of the Indo-Pacific region, excepting Japan where it is highly developed has just now entered an interesting phase of development, which requires further encouragement and consolidation. The principles of financial assistance provided in the various countries should be continued with gradual scaling down in certain cases and relaxation in the case of others. Fishing industry, which has just started to take to development on modern lines has to be given relief from payment of duties on oil, fishing twine etc. It is therefore necessary to continue the assistance, till the economic conditions of fishermen are further improved.

ADMINISTRATION

1. Administrative Body :–

The importance of Goverment's fisheries administration in effective planning and successful execution of mechanisation programme need not be over emphasised. Fishermen are backward and form a neglected community in most of the countries in this region. They have been accustomed to traditional practices and it is, therefore, essential that the administrative organisations have to do a lot of preliminary work to impress on the fishermen the advantages of mechanisation of fishing crafts and assist them in taking to this programme, both technically and financially and serve as a friend, philosopher and guide. Administration of mechanisation programmes involves the following aspect, viz., planning provision of funds, distribution of loans and recovery, supply of fishing requisites at the appropriate time. servicing and maintenance, training and demonstration etc.

2. Planning :–

In a subsistance economy like fishing one is to follow a variety of occupations in order to satisfy most of the needs of the fishermen. In other types of economy viz. exchange economy one follows a single occupation and satisfies his other needs by selling his own products and buying products of others. In a subsistance economy, nearly all members are engaged in production and collection of food. Therefore, to achieve better remuneration a high degree of planning is essential for fishing industry.

3. Machinery for distribution of funds :–

The administration of mechanisation loan funds falls into three main categories (1) funds administered directly by Government department, (2) specialised credit institutions and (3) statutory authorities.

The system of fisheries credit is of relatively recent origin in most of the countries and when organised has to be superimposed in the existing administration and financial systems. Most economically developed countries have separate fisheries administration as part of the machinery of Government. Its functions vary from country to country. In some countries, the credit facilities are administered by Government itself, whereas in other countries separate organisation are set up for operating the funds. In some countries like United Kingdom, both systems are in vogue.

In India, the programme is administered by Fisheries Departments of the States. It has been possible to give special training regarding the procedure adopted in banking and cooperation to Fisheries Offices. Some States are channelling the loan funds through cooperative banks and fishermen's cooperative federations.

In India the method of linking credit with marketing has been met with success. In Gujarat State an apex marketing cooperative federation with a share capital of Rs. 10,00,000/–has effectively undertaken marketing of fresh and dry fish,

and also provided timely loans and credit to the fishermen and the supply of fishing requisites.

The success of the loan schemes is dependent on recoveries of loans from the fishermen. This is effected through cooperative organisation as in Gujarat. In other states like Madras, Kerala and Mysore, the mechanised boats are supplied to groups of fishermen on hire purchase basis. Part of the sale proceeds of the catch is remitted to the Government.

4. **Machinery for supply of materials (Boats, Engines and deck equipment):–**

Although the Department of Fisheries provides loans and subsidies for boats, engines, deck equipment, etc., the machinery required for the construction of boats, supply of engines, manufacture of deck equipment, has to be organised properly in view of the varying degrees of development in different countries. The boat building yards have to be reorientated to the construction of new designs of fishing crafts. If no engines are manufactured in the country, arrangements are to be made for procurement and supply. The deck equipment is also to be manufactured within the country, if possible, to suit the special requirements. In India, efforts are being made for the establishment of fishing boat building yards, manufacture of marine diesel engines and supply of deck equipment. These items are normally channelled through Fisheries Departments or cooperative organizations, who could undertake such programmes.

5. **Training and Demonstration:–**

In view of the specialised nature of mechanisation and improved types of fishing, the States have already provided facilities for training of fishermen in the handling of mechanised boats and maintenance of boats and introduction of new types of gear. In most of the states these training centres also act as demonstration centres.

6. **Organization:–**

Success of mechanisation in new developing areas is dependent to a large extent on proper organization and planning.

In the organization and planning of improved types of fishing crafts, it is very important to have close coordination and integration of the development programmes of the various sections like transport and communications, railways, commerce and industry etc. These sections handle different aspects required by the fishing industry, for instance, the need for communications and transport is to be linked with the production and consumption centres. The transport authorities have to plan the introduction of refrigerated or insulated rail cars. The industrial sector will have to arrange for supply to fishery requisites like marine diesel engines, fishing twine, fishing gear, ice and cold storage plants, canning and freezing units etc. either from indigenous sources or by import.

The mechanisation programme has faced in almost all the countries the problem relating to the application of Merchant Shipping Rules to mechanised fishing boats. The existing non-mechanised fishing craft are not covered by Rules and Regulations of Merchant Shipping Act in force in most of the countries. In some countries, these regulations, though not applicable to any sailing fishing craft, are being enforced in a fishing craft of the same size, when it is fitted with a motor. The provision of the motor, far from affecting the seaworthiness of the boat adds to its advantage. The regulations under the act which are intended more for meeting the requirements of cargo and passenger vessels plying from port to port can hardly be applied appropriately to vessels whose function is to provide a platform for operation of fishing gear at sea. The fishing vessels commences its work, when it leaves the port, whereas cargo and passenger vessels have only to steam to the next port. The rules with regard to registration of fishing vessels, manning of the vessels, pilotage, life saving appliances, fire protection etc., have to be different in the case of fishing vessels, from those of Merchant Navy vessels. In some countries, special rules and regulations have been drawn up for the special requirements of the fishing vessels based on their functions. In India, a special committee was formed in 1958 to enquire into, review and assess the difficulties of the fishing industry in relation to the existing rules and regulations applicable to the motor fishing vessels. This committee went into details of the difficulties experienced by power fishing vessels with regard to

application of rules under Merchant Shipping Act, port clearance, port facilities, etc. and recommended a set of draft rules for mechanised fishing vessels.

CONCLUSION

Fishing methods determine the layout of fishing boats (Traung, 1961). For designing new boats, points to be considered are fishing methods, local economic conditions, landing facilities, availability of timbers and accessories, existence of modern boat building yards etc. In the construction of new type of boats, the position of engine room, wheel house, arrangement on the deck etc. are also to be designed, depending on the fishing methods. It also involves the selection of proper types of engines and propeller.

In underdeveloped fisheries, the factors influencing productivity will naturally be different from those in well developed fisheries. In areas, where primitive craft are being replaced by mechanised craft, special factors governing the development may likely supersede or upset the contributions of naval architects. Mr. Zeiner (1969, 750) has pointed out that the troubles facing the development programme of mechanised boats in such areas range from lack of landing facilities, unsuitable fuel oils, customs regulations impeding movements, lack of reserve capacity of workshop during the peak season etc. Further, lack of supply facilities and trained personnel are the most obstinate bottlenecks to sustained performance of otherwise good and suitable fishing boats. But, it was encouraging to observe that fisheries leaders in these areas are becoming increasingly aware that boat designs for developing countries must compromise with special factors, characteristic of such areas. In order to assist Naval Architects with experience in designing fishing boats, it is necessary that fisheries officers collect data on the existing types of fishing boats and the requirement of boats including those of new boats on fishing conditions, operational requirements, economic factors and other factors like the capacity for boat building, skilled operators and mode of payment towards boats. If fishing boat Naval Architects would take up the task of providing the operational facilities and promote technical training, hand in glove, with Fisheries Departments, it will be possible to raise the productivity of fishing boats in such areas.

In the organisation and planning of improved types of fishing crafts, it is essential to have close coordination and integration of the development programmes of the various sectors. In administering the scheme, planning, provision of finance and credit, supply of requisites, service and maintenance, training etc. are important.

The main recommendations made by the author ten years ago were the provision of power to existing types of crafts to increase their efficiency and coverage, introduction of new designs of larger size, the need for raising the socio-economic structure of fishermen and to adjust to the changes in development, adequate training to the fishermen in handling power vessels and mechanised gear, operation of smaller vessels through cooperatives with the aid of the Government in the initial stages and by providing adequate loans, facilities for anchorage in harbours and for handling preservation, storage transport and marketing. (Chidambaram, 1952). The steps taken by the Government of India and the State Fisheries Departments on these recommendations have been explained clearly in the various chapters connected with technical and financial assistance and administrative procedure. Planning and coordination of the various activities have been followed effectively during the last five years and progress in the course of next five years should be much more effective.

The mechanisation of fishing craft in most of the countries of Indo-Pacific Region has just now entered an interesting phase of development, which requires further encouragement and coordination.

BIBLIOGRAPHY

Chapelle, H.I. 1960 — *Fishing Boats of the World*. pp. 736. Fishing News, London,

Chidambaram, K. 1952 — The Experimental Introduction of Powered Fishing Vessels within India and Ceylon *IPFC Proc.*, 4(2): 225-233, 3 tables.

Finn, D.B. 1961 — Freedom from Hunger. *Fishing News International*, I(1): 10-15.

Fisheries Research Division 1959 — Fisheries Statistics of Philippines. *Bureau of Fisheries*, Philippines.

Fisheries Enquiry Committee 1959 — Rules and Regulations applicable to motorised Fishing Vessels. *Ministry of Food & Agriculture, Government of India.*

Gartner, P. 1959 — Second Report to Government of India on Fishing Boats. *Food and Agriculture Organization EPTA Rept.* No. 1096.

——— 1959 — Development of Boat for Indian Surf Coasts. 2nd World Fishing Boat Congress, *Food and Agriculture Organization Paper* No. 38.

Hamlishch, R. 1960 — *Report of the Technical Meeting on Credit for Fishery Industries.* Food and Agriculture Organization.

IPFC 1961 — *Proceeding of the Indo-Pacific Fisheries Council, 9th Session, Karachi, Sect. 1.* Indo-Pacific Fisheries Council and Food and Agriculture Organization, pp. 103-120, 135-138. 176-196.

Srivatsa, K.R. 1960 — *Planning in Fisheries,* Souvenir of Fishing Industry of Gujarat, Directorate of Fisheries. Gujarat State.

Traung, J.O. 1960 — *Fishing Boats of World No, 2·* fishing News, London.

——— 1961 — *Experience in Fishing Boat Building applicable to Indo-Pacific Fisheries Council Region,* IPFC 9th Session mimeo document IPFC/C61/TECH 4:

Ziener, P.B. 1960 — *Fishing Boats of the World 2,* pp. 736. Fishing News, London.

Ziener, P.B & K. Rasmussen — Report No. 1 to Government of India on Fishing Boats. *Food & Agriculture Organization EPTA Rept.* No. 945, 1958.

TABLE 1
PROGRESS OF MECHANISATION

Sr No.	Name of Country	No. of boats mechanised	Remarks
1.	Ceylon	500 boats (1960)	The majority are 26 footers; the boats are given to fishermen on hire purchase system.
2.	Japan	165,000 boats (1958)	Total number of boats, in Japan is 400,000; 40% of the boats are mechanised; 84% of the mechanised boats are below 5 tons.
3.	Korea	4,900 (1959)	Total number of boats is 38,000; 13% of the boats are mechanised; 75% of the mechanised boats are below 3 tons.
4.	Malaya	3,123 inboard (1959) 4,761 outboard	Total number of boats is 22,263; 35% of the boats are mechanised. 60% of the mechanised boats are with outboard motors and 40% with inboard motors.
5.	Netherlands–New Guinea	50 boats	Total number of vessels are about 110. Over and above, dug out canoes are mechanised with outboard motors.
6.	Pakistan	220 boats (1960)	About 180 are gill netters and 40 are stern trawlers.
7.	Philippines	1,198 boats (1959)	Nonpowered boats are only 279. Thus 81% are mechanised boats. Majority of the boats are dug out canoes.
8.	Hong Kong	2,366 boats	The mechanised boats are mainly trawlers. liners, seiners and collecting vessels.
9.	Vietnam	1,700 boats	Total number of fishing boats is 37,000, Only 5% is mechanised.
10.	India	Above 2,500 boats	Total number of boats is estimated to be 89,000. About 2.5% of the boats have been mechanised.

Maharashtra	1400
Gujarat	700
Kerala	180
Madras	110
Mysore	60
Andhra Pradesh	60
Orissa	15
West Bengal	6
	2531

TABLE 2

LIST OF EXISTING TYPES OF FISHING BOATS IN INDIA

Sr. No.	Place	State	Name of boat	Characteristics	Length
1	Jamnagar	Gujarat	Machwa	Plank built square stern	31'
2	Veraval	Gujarat	Lodhiya	– do –	35'
3	Malia	Gujarat	Flat bottom boat	Carvel planked double ended.	18'
4	Surat Billimora	Gujarat	Gujarat Machwa	Plank built	
5	Satpati Bassein	Maharashtra	Bombay Machwa	Carvel planked	47'
6	Bombay	Maharashtra	Hodi	Double ended carvel shaped; out rigger used.	22' to 40'
7	Ratnagiri	Maharashtra	Pattemar	Stern rounded, two masted.	
8	Ratnagiri	Maharashtra	Ratnagiri type outrigger canoe	Dug out canoe.	
9	Ratnagiri	Maharashtra	Ratnagiri Machwa	Single masted lateen rigged	
10	Honavar	Mysore	Beppa dug out odam	Dug out	
11	Kozhikode	Kerala	Odam-dug out & small dug out.	Dug out canoe no rudder.	20' to 40'
12	Cape Comorin to Ramnad & East coast	Madras, Andhra Pradesh, & Orissa	Catamaran	Raft type	20' to 40'
13	Tinnevelly	Madras	Vallam	Boat canoes sides round	29'
14	Tuticorin	Madras	Turicorin boat	Plank built both ends sharp.	
15	Kilakarai	Madras	Kilakarai boat	Dug out canoes without rigger	
16	Pamban to Muthuped	Madras	Palk Bay & Strait boat	Dug out with long out riggers. Plank built also are there	
17	Vizakapatam	Andhra Pradesh	Masula type	Planks stitched	
18	Masulipatam & Kakinada	Andhra Pradesh	Navas	Narrow & keel less boat	31'
19	Kakinada	Andhra Pradesh	Shoe Dhoni	Wide & flat forward and foredecked	31'
20	Calcutta	West Bengal	Batchari boats	Stern as high as bow	28' to 60'
21	Calcutta	West Bengal	Chot boats	Carvel planked	34'
22	Diamond Harbour	West Bengal	Diamond harbour boat.	The boat has a fore deck and aft deck.	20'

TABLE 3

NEW FISHING BOATS DESIGNS

Sr. No.	State	Type of boat	Length	Characters	Remarks
1	Madras	Inland fishing	15'	V bottom open boat for oar and outboard propulsion.	Speedy and sturdy boat for lakes & reservoirs. Till 1959-10 boats have been built.
2	Orissa	—do—	22'	For stern trawling.	For operation in reservoir fisheries for trawling with an engine of 10 to HP.
3	Madras	Pablo boat	24'-7"	Danish type with shallow draught for gill net fishing.	Speedy boat and well suited for Coramandal coast. By 1958 about 50 such boats were operating 10 HP Seffle engine; cost Rs. 15,000/-.
4	Madras	Open fishing boats	22'	Transom stern, outside rudder and without covering boat and half decking. Used for gill netting.	This is further improvement on Pablo boat to reduce the cost by 20 % Engine used is 8 to 10 HP.
5	Gujarat	Machwa	28'	An improved design of Machwa to suit local condition.	17 H Daiya diesel engine was installed. Fishing was successful.
6	Madras	Coastal fishing boat	30'	A further improvement of Pablo boat. Stern is transom which means more deck space.	Bigger type. Engine used is 20 to 25 HP, cost will be Rs. 23,000/-. Successful for long lining and drift netting, with engine driven winch.
7	Madras & Kerala	Coastal fishing boat	31'-9"	Boat for the fishermen training centre. The boat was specially designed to take up 30 HP. BUKH engine with controllable pitch propeller.	Fitted with winches & heavy trawl gallows on the aft deck. Five more such boats have been built for the various training centers.
8	Kerala	Shrimp trawler	32'	The boat was designed for stern trawling with 36 HP. engine.	This is to investigate the possibilities of using shrimp trawl on the West coast. The design was modified later.
9	Bombay Maharashtra	Monsoon boat	44'	A strongly built boat of Satpati type with shallow draught; fully decked; engine used is 45 to 50 HP and for trawling 60 to 80 HP.	The boat is for fishing in Konkan area during monsoon. A winch was fitted to be driven from the main engine. The boat has fish hold of 4 tons capacity with cork insulation & thick cement ceiling for hold. The was built by Maharashtra Government.
10	Madras	Surf boat proto type 1954	20'	Boat measuring 20' x 5'. 9" x 2'.1" with engine of water cooling system. Transverse system.	The boat was successful in negotiating moderate surf but proved to be too heavy for hauling on the beach.

TABLE 4

IMPROVEMENTS UPON THE NEWLY DESIGNED BOATS

Sr. No.	State	Type of boat	Length	Characters	Remarks
1	Kerala	Open fishing boat	25'	Open boat prepared on the lines of Pablo boat; Transverse stern with a sharp forebody; Engine and gear and catch space are in the middle.	The boat will work in all harbours, inlets, sheltered water. Mainly used for gill netting and long line fishing; 8 boats were built till March 1959.
2	Kerala	Multipurpose	32'	Based on the design of 32' shrimp trawler. Fully sharp forebody engine installed aft with generous fish hold. Cork insulation with proper air circulation. Engine is 40 HP., with accessories for electrical starting, fuel lift pump, power take off for winches etc,	Used for trawling, purse ceiling and gill netting, 6 such boats have been built. The cost of one boat will be Rs. 50,000.
3	Madras	Training vessels	38'	Flush deck, transom stern, engine installed amidship. Space provided for trainees and crew to stay. A small fish hold is provided. Deck equipment consists of trawl winch, gurdy gallows etc. There will be all navigation equipment.	It is for demonstration purposes and suited for all methods of fishing; HP of the engine is 50.
4	Kerala	Trawler purse seiner.	40'	Engine is installed in front; is wide so as to give sufficient buoyancy; the buttocks are flat, draught is kept minimum, engine used is of 60 HP, deck equipped for stern trawling and purse seining.	For operation in West coast for shrimps sardines and mackerels. The boat is likely to cost Rs. 150,000/—.
5	Mysore	Boat for shrimp trawling.	24'-7"	This is modification of Pablo boat. The stern of the boat was altered and transom stern introduced; Engine was installed; further engine used is 15 HP.	The boats are used in Mysore for stern trawling for shrimps. The operations are successful.

TABLE 4 (Contd.)

Sr. No.	State	Type of boat	Length	Characters	Remarks
6	Kerala & Madras	Open fishing boat.	30'	Modified boat of the 25' type of suit trawling with small nets.	The boats are used in the fishermen training centres at Madras, Kerala & Mysore.
7	Mysore	Training centre boat.	31'-9"	This is modification of coastal fishing boat mentioned in item No. 7. of statement No. 2 designed for only features are a lower deck aft nc cockpit and a small fish hold.	This is for training centre for trawling and purse seining.
8	Madras	Surf boat proto-type 1955	18'-3"	A lighter boat than proto-type 1954, having the same shape. A 3½ HP air-cooled diesel engine was used.	It was found that the boats were of too light construction and would have to be reinforced.
9	Madras & Kerala	Surf boat proto-type 1957 BB-57	24'	A further modification of proto type 1955 clinker planing, frame to be steam bent. An air cooled diesel of 15 HP to 18 HP was proposed on the port side with shaft parallel to the central line.	The boat was tried in several places. Slight modifications were made here and there based on the experience. The main difficulty was beaching the boat as it was too heavy.
10	Madras	Surf boat proto-type 1958 BB.58.	24'	Further modification of the above, with more beam and more free board aft. An aircooled 10 HP. engine is installed.	Under trials.
11	Madras	Surf boat proto-type 1959 BB. 59.	24'	Plywood constrution and a hard chine hull. A 10 HP diesel engine is installed off centre.	Trials to be conducted.
12	Mysore	Training boat for Mysore.	28'	This is desired to take 20 EP. marine diesel engines. They are too powerful for 25' boat and too weak for 30' vessel. This is designed on the basis of 30' bessel.	Trials to be conducted.
13	Andhra Pradesh	Training Centre trawler.	37'	A vessel designed mainly for other trawling.	

TABLE 5

SOURCES OF FINANCE

Sr. No.	Country	Government	Special Government Institution		Central Bank	Co-operative Bank/Societies	Commercial Bank	Others	Remark
			Fisheries	Agri. & fisheries					
1	2	3	4	5	6	7	8	9	10
1	Argentina	–	–	B	–	–	-	-	A : for acquisition of boats.
2	Australia	–	A.C.D.	–	–	–	–		
3	Belgium	A.B.C.D.E.	–	–	–	–	A.B.C.D.	–	B : for improvement of boats.
4	Br. Guina	–	–	A.B.C.D.	–	C.D.	–	–	
5	Burma	–	–	A.B.C.D.	–	–	–	–	C : Loans for acquisition of
6	Canada	A B.C.D.	A.B.C.D	–	–	–	–	–	Engines.
7	Ceylon	A.B.C.E.E.	–	–	–	–	–	–	
8	Chile	A.C.D.	–	A.C.D.	–	–	–	–	D : For acquisition of gear
9	Denmark	A C.	A.C.	–	–	–	–	–	
10	France	–	A.B.C.D.	–	–	–	–	–	E : Mechanisation of gear.
11	Germany	A.B.C.	–	–	–	–	–	–	
12	Greece	–	–	B.C.	–	–	–	A.B.	
13	Hongkong	B.C.	A.B.C.D.	–	–	–	–	–	
14	Iceland	–	A.B.C.	–	–	–	–	–	
15	India	B.B C.D.E.	–	–	–	–	–	–	
16	Indonesia	A.C.	–	–	–	–	–	–	
17	Ireland	–	A.B.C.D.	–	–	–	–	–	
18	Israel	–	–	A.B.C D.	–	–	–	–	
19	Italy	A.B.C.D.E.	–	–	–	-	-	–	
20	Japan	–	–	A.B.C.D.E.	–	–	–	A.B.C.D.	
21	Malaya	A.C.D.			–	–	–	-	
22	Netherlands	–	–	–	–	–	–	A	
23	Norway	–	A.B.C.D.E.	–	D.E.	–	–	–	
24	Pakistan	C.D.	–	–	–	–	–	–	
25	Philippines	–	–	C	A.B.C.D.E.	–	–	–	
26	Portugal	–	A.B.C.D.	–	–	–	–	A.B.C.E.	
27	Spain	–	A C.D E.	–	–	–	–	–	
28	Sweden	A.C.D.E.	–	–	–	–	–	–	
29	Thailand	–	–	–	–	–	–	A.C.D.	
30	Turkey	–	–	A.B.C.D.	–	–	–	–	
31	U.K	A.C.D.	A.B.C.D.	–	–	–	–	–	
32	U.S.A.	A.B.C.D.E.	–	–	–	–	–	–	

TABLE 6

GOVERNMENT CREDIT FOR MECHANISATION OF FISHING CRAFT

Sr. No.	Country	Loan for acquisition of boat	Loan for improvement of boats	Loan for engines	Mechanisation of gear	Other purposes	Remarks
1	2	3	4	5	6	7	8
1	Argentina	–	×	–	–	–	
2	Australia	×	–	×	×	–	
3	Belgium	×	×	×	×	–	
4	Br. Guiana	×	×	×	×	×	Second hand boats also can be acquired.
5	Burma	×	×	–	×	–	
6	Canada	×	×	×	×	×	Loans for tools and equipment for building boats.
7	Ceylon	×	×	×	×	×	
8	Chile	×	–	×	×	–	
9	Denmark	×	–	×	–	–	
10	France	×	×	×	×	–	
11	Germany	×	×	×	–	–	
12	Hongkong	×	×	×	×	–	Engines and winches.
13	Iceland	×	×	×	–	–	
14	India	×	×	×	–	@	@ L.S.A. in Gujarat only.
15	Ireland	–	×	×	×	–	
16	Israel	×	×	×	×	–	
17	Italy	×	×	×	×	×	Loans for life saving appliances.
18	Japan	×	×	×	×	–	
19	Malaya	–	–	×	×	–	
20	Netherlands	×	–	–	–	–	
21	Norway	×	×	×	×	–	
22	Pakistan	–	–	×	×	–	Hire purchase and loan for teak wood.
23	Philippines	×	×	–	×	–	
24	Portugal	×	×	×	×	–	
25	Spain	×	–	×	×	–	
26	Sweden	×	–	×	×	–	
27	Thailand	×	×	×	×	–	
28	Turkey	×	×	×	×	–	
29	U.K.	×	×	×	×	–	
30	Union S. Africa	×	×	×	×	–	
31	U.S.A.	×	×	×	×	–	For operation maintainance replacement.
32.	West India	×	×	×	×	–	

TABLE 7

Country	Lending Agency	Source of funds	Terms & conditions	Remarks
Australia	1) Commonwealth (thro') 2) State Govt. a) Fishermen's development trust account. b) Fish Board c) State Bank d) Agri. Bank.	1) Appropriated from general revenue. 2) Loan capital derived from profit of fish marketing fund.		Direct Govt. assistance is limited. Major portion of finance has come from private sources and trading banks. The scheme is satisfactory.
Burma	1) Agricultural rural development corp. 2) Cooperative Dept.	Appropriation from general revenue. No revolving funds.	1) Coop. should provide immovable property as security. 2) Individual fishermen has to give joint security. 3) ¾loan is given for crafts and 20¾ of the operating expenses is also given as loan. 4) 6¼ ¾ interest to individual fisherman and coop. federation. The Coop. federation gives to the producers society affiliated @ 12½¾. 5) Short term & medium term loans. Recovery is made from sale proceeds.	
Ceylon	1) Dept. of Fisheries 2) Coop. Dept.	Loan funds voted from Parliament and are provided in the form of advance account.	1) Loans to coop. given on the basis of borrowing capacity. 2) For mechanised boats, no other security is required other than the boat.	1) Loans are also given towards the insurance premium of the boat for the first year. 2) For repair of boats to Coops. 3) Coop. societies have progressed but not individual fisherman.

TABLE 7 (Contd.)

Country	Lending Agency	Sources of funds	Terms & conditions	Remarks
Indonesia	1) The Central Sea Fisheries Service & the Central Coop. Service. 2) The Farmers & Fishermen's Bank. 3) The Indonesia People's Bank. 4) The Govt. Pawn Service. 5) Institute for credit guarantee.	1) Annual budget appropriation. 2) Govt. share in the form of capital.	1) The property for which loan has been granted will be mortgaged by Government. 2) Vessels are to be insured. 3) Rate of interest is 12%. 4) Repayment 3 to 6 years.	It has been ascertained that hire purchase system is the best system assisting the fishermen. Scheme by Institute for credit guarantee is reported to be not successful.
Japan	1) Agriculture, Forestry Fisheries Financing Corporation. 2) Japan Development Bank. 3) Peoples' Finance Corp.	1) From Govt. appropriation used on revolving fund basis & loans from other Govt. sources. 2) Share capital of the bank subscribed by Government.	1) Loan given for construction, improvement and acquisition of craft. 2) Borrowing capacity is assessed on the basis of three C's. 3) Repayment through sale proceeds of catches. 4) Securities as well as collateral or fixed property are to be furnished for loan. 5) Interest is 7½%. 6) Repayment in 10 years.	A.F. & F.F.C. advanced Rs. 14.144 million between 1951 to 1957 for fishing boats.
Malaya	1) Dept. of Coop. Devl. 2) Rural Coop. Apex Bank (for cooperative).	Revolving fund.	1) Fishermen should be members of Coop. 2) They must be able to get up 10% of the amount of loan applied. 3) Govt. retains title of boats until full value is paid. 4) Interest is 1% per month on the outstanding balances. 5) Loans repaid in 3 years.	

TABLE 7 (Contd.)

Country	Lending Agency	Source of funds	Terms & conditions	Remarks
Ceylon (Contd.)			3) 3 % interest to individual fisherman and 20% to cooperatives. 4) Repayment date for mechanised boat is 5 years for boat 3 years and for engine 3 years.	
Hong Kong	1) The Coop. Development & Fisheries Dept. 2) Fish Marketing Organization.	1) Loans from revolving fund financed from Colonial Devl. & Welfare fund. 2) From revolving fund financed by F. M. O. from their revenues fund and from donation of U.S.A.	1) For construction of new boats, repair of old boats and installation of engines, winches, carrier launches. 2) Repayment is made through FMO. 3) Loans are given on the basis of borrowing capacity. 4) Security is mortage of vessels. Loans are given to fishermen who own fishing vessels. 5) Engines are to be insured. 6) Loans given by FMO is 80 to 90% on the cost required. 7) Interest rate is ½% per month on the outstanding balance and ¼% on loans issued to coops. The FMO loans to individual fisherman on interest of 10% per annum. 8) Repayment 5 to 10 years depending upon the loan. 9) Recovery made through FMO by deduction from sale proceeds.	1) Loans from coop. development and Fisheries Dept. has to be recommended by the Advisory committee appointed by Govt. 2) Considerable amount of loan has been advanced. 3) Commercial firms also have started supplying engines to fishermen on hire purchase system on the same basis.

TABLE 7 (Contd.)

Country	Lending Agency	Source of funds	Terms & conditions	Remarks
Pakistan	Central Fisheries Dept.		1) Interest free loan are given. 2) The applicants have to produce two securities. 3) The boat & engine are mortgaged to Govt. 4) Repayment 3 to 5 years for engines. 5) Repayment effected through coops.	For importing the items licences are issued to coops. The scheme has been successful with regard to mechanisation programme.
Philippines	1) Philippine National Bank. 2) Agricultural Credit & Coop. Financing Administration.	Revolving fund	1) Borrowers capacity of repayment, character etc. are the basis. 2) Vessel has to be mortgaged and also other immovable properties. 3) Interest varies from 6 to 8%. 4) Repayment varies from 5 to 10 years.	The loan is also given to merchants. Recovery is reported to be not very regular. It is felt that the fishermen have to be educated which will be the only remedy.
Thailand	Department of Fisheries (Min. of Agri.)	Revolving Fund.	1) Loan for acquisition of craft, improvement and purchase of engines. 2) Security of loan is bank guarantee or mortgage of properties. 3) Loan cannot exceed 50% of the value of the property assessed. 4) Interest is 8% per annum. 5) Repayment within two years.	
U.S.A. (Hawaii)	Secretary Interior of U.S.	The Fisheries Loan fund. This is a revolving fund.	1) Any person conducting business in fisheries is eligible to get the loan. 2) His boat and other properties will be mortgaged. 3) Persons' borrowing capacity. 4) Interest is 5% per. annum. 5) Period is 10 years.	The scheme has been successful.

TABLE 8

TERM OF PUBLIC LOANS FOR MECHANISATION

Country	Percentage of loans in total cost (%)	Interest	Repayment	Security
1	2	3	4	5
Argentina	60 to 80%	10	5	Mortage of the units for which loans have been applied.
Australia	50	2 to 5	10	Mortgage of unit, land, building and fixed assets and personal guarantee.
Belgium	70	5.75	10	Mortgage of immovable properties or guarantee.
Br. Guiana	90	6.0	15	Mortgage or vessel or immovable property or life insurance and character of fishermen.
Burma	100	6.25	—	Mortgage of immovable property and joint surety.
Canada	50 to 90	2 to 6.5	8 to 20	Mortgage of land, building, insurance.
Ceylon	100	3	1 to 5	Mortgage of vessel and personal surety.
Denmark	80	5 to 6	6 to 15	Mortgage of vessels and other equipment.
France	85	4 to 5	5 to 10	Mortgage of insurance policy of vessel.
Germany	75	4 to 4	6-15	Mortgage or other security.
Greece	50	6-7	8	Mortgage or other security.
Iceland	66 to 75	6.5	7 to 15	First mortage of the vessel.
Israel	95	4	15	First mortgage on vessels, lien on proceeds of income.
Italy	80	2	5 to 10	Mortgage on vessel and other immovable properties first claim against sale of machinery.

TABLE 9

PROCEDURE ADOPTED FOR DISTRIBUTION OF LOANS IN INDIA

1.	Gujarat	Loans granted on production of Solvency Certificate 1½ times the loan -- repayable in 7 years at 5% interest. Recovery made in cash in monthly instalments or through cooperative societies. 9% interest, if not insured.
2.	Maharashtra	Loans granted by mortgaging immovable property to the extent of 1½ times the value of the boat. To be repaid in 5 years—40 instalments—at 5% interest—9% if not insured.
3.	Mysore	Boats constructed and given by the Department to trained hands--share of the catch taken towards the payment of instalments; catches marketed through coop. societies.
4.	Kerala	Boats constructed by the Department and sold on hire purchase system. Share of the catch adjusted towards cost recovered during nine months of the year. In Indo-Norwegian project a minimum wage and share of the catch to the fishermen and the remainder towards cost of the boat and equipment.
5.	Madras	Boats constructed and given to trainees on hire purchase system. A deposit and a monthly instalment—share of the catch towards the payment.
6.	Andhar Pradesh	Boats constructed by the Department and given to trained candidates. Share of the catch paid towards instalments. Catches sold by the Fishermen's Association.
7.	Orissa	Boats constructed by the Department and given to fishermen. 1/3rd of the value of the catches towards hire charges, 1/3 for fishermen and 1/3rd for reserve fund.