BAY OF BENGAL PROGRAMME

DEVELOPMENT OF SMALL-SCALE FISHERIES

INVENTORY OF KATTUMARAMS AND THEIR FISHING GEAR IN ANDHRAN PRADESH AND TAMILNADU

BOBP/WP/2

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INVENTORY OF KATTUMARAMS AND THEIR FISHING GEAR IN ANDHRA PRADESH AND TAMIL NADU

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by
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PREFACE

During the second half of 1979 and the first quarter of 1980 a survey was carried out in some fishing villages of Andhra Pradesh and Tamil Nadu, to obtain information on the types of kattumarams used on the East Coast of India, the kinds of fishing gear used with the kattumaram, the methods of operation, catches and costs. This working paper presents the results of the survey. The text and the photographs give a brief summary of kattumaram types and their economic importance. A comprehensive pictorial record of the kattumaram types is also available.

For those requiring more detailed data on materiats, construction, fishing gear, operations and costs, a comprehensive record of the information obtained during the survey is to be found in the appendices.

The survey was carried out by Mr. T. R. Menon, Chief Instructor (Craft and Gear), Central Institute of Fisheries, Nautical and Engineering Training (CIFNET), Cochin. He was deputed to the Bay of Bengal Programme during July-September 1979 and in March 1980.

The Bay of Bengal Programme and FAO express their gratitude to the Government of India, Ministry of Agriculture, and to the Director of CIFNET for making Mr. Menons services available to carry out the work.

The views expressed in the paper are those of the author and do not represent the official views of the Government of India, CIFNET or the FAO.

The survey and the preparation of this paper were undertaken as part of a project designed to improve the kattumaram, prepared by the Bay of Bengal Programme for the Development of Small-Scale Fisheries (referred to in brief as the Bay of Bengal Programme). The programme is funded by the Swedish International Development Authority (SIDA) and executed by the Food and Agriculture Organisation of the United Nations (FAO). Its main aims are to develop and demonstrate technologies to improve the conditions of small-scale fishermen and the supplies of fish from the small-scale sector in five countries that border the Bay of Bengal Bangladesh, India, Malaysia, Sri Lapka and Thailand.

CONTENTS

I INTRODUCTION

The bulk of marine food fish on the East Coast of India is landed by traditional craft. Of these craft, the "kattumaram" is the most widely used type. The kattumarams are used from Puri (Orissa) in the north to Kanyakumari (Tamil Nadu) in the south. On this stretch of coast there are over 40,000 units as against only 15,000 units of other types of traditional craft. In terms of employment, the estimated 40,000 operational kattumaram units directly engage same 120,000 fishermen with 500,000 direct dependents.

The entire east coast of India is surf beaten. Kattumarams are built of shaped logs lashed together, propelled by oar, paddle, pole and sail. They represent an effective solution to the problems of producing a tow-cost fishing platform capable of negotiating moderate surf and landing on beaches without suffering permanent damage. They are constructed of local materials using simple tools. There are various types, developed over the centuries to suit local requirements; some types can be adapted in size, sail rig and equipment according to the needs of the moment. They are, however, limited in carrying capacity and offer no shelter to the fishermen or protection for the catch. Productivity is low. For the foreseeable future, however, beach landing craft based in local fishing villages will continue to produce the greater proportion of the marine food fish catch of the east coast.

It is desirable to improve the earnings and conditions of work of the individual fisherman. One possible way of achieving this outcome is by technical development of the fishing craft and gear, and this is part of the task undertaken by the Bay of Bengal Programme. Among the lines of investigation being pursued is the possibility of developing improved kattumarams. First, however, it is necessary for those engaged in this activity to have available an account of what existing kattumarams are like, how they are used and what they are capable of doing; also of the operational and environmental factors governing the selection of design, materials of construction and methods of use of both craft and gear.

This report summarises the results of a study of the different types of kattumarams in use in several fishing villages of Andhra Pradesh and Tamil Nadu.

2 PRINCIPAL CHARACTERISTICS

2.1 *Types of kattumaram:* All kattumarams are made up of solid logs lashed together. The entire flotation is derived from the buoyancy of these logs. There are two basic types in use, the raft type and the boat type. The former is widely used on the Coromande} Coast of Tamil Nadu. The latter is used in Andhra Pradesh. Boat kattumarams are also used in the Palk Bay region of Tamil Nadu but they differ in shape and construction from the ones used in Aridhra Pradesh. The different types and sizes have various local names which may also depend on the method of fishing. A glossary of these terms is provided in Appendix 11.

2.2 *Size:* Kattumarams range in length from 5 to 10 metres. The overall dimensions of the craft depend on the size of Logs available and the number of logs utilised. Generally the size of the kattumaram depends on the fishing method employed and the amount of gear carried. Very often, the money available *for* craft and gear decides the size of the craft and the fishing method employed.

2.3 *Materials:* Wood for kattumarams should be (ight and with a low rate of water absorption; weight not only affects the carrying capacity but also handling on the beach. The preferred species is *Me/ia Dubia,* which is found in Sri Lanka. However, on account of import restrictions, other species like *Albizzia Stipulata* and *Bombax malabaricum* have had to be used. These have densities of from 23 to 26 lb/ft^3 (368-415 kg/m^3).

Masts, paddles and other accessories are usually made from bamboo or casuarina. Second-hand plastic sheeting or sacking is sometimes substituted for sailcloth.

2.4 *Fishing gear and methods:* The most widely used fishing gear is the gilinet. Other fishing methods like boat seining, scoop netting and *line* fishing are used to a lesser extent. Cotton nets have nearly aU been replaced by synthetic nets (PA nylon multifilament). The nets vary in yarn size, mesh size and length according to the species sought and season.

Given below are data on the kattumaram gill nets most commonly used. The data is only indicative as the design and size may vary from area to area and often from fisherman to fisher-man. More detailed information on the nets inspected during the survey is given in Appendix 9.

KATTUMARAM GLL NETS

Material	Twine Size R Tex	Mesh size	Length (meshes)	Depth (meshes)	Cost Rs.	Length of kattumaram	Catches
PA Nylon	227(210d 9)	145 mm	7500	100	7000	8.5 *m*	Pomfret, seer, shark, catfish
PA NyLon	**101 (210d 4)**	**30 mm**	**3500**	**300**	**2500**	**7.0 m**	**Sardine,** ribbon fish, silver belly, small mackerel
PA Nylon	76(210d 3)	45 mm	14000	100	2500	7.5 m	Prawns, sardine, ribbon fish, Indian mackerel
PA Nylon	303(210d 12)	100mm	4000	50	2200	7.0 m	Seer, horse mackerel, pomfrets
PA Nylon	1138(210d45)	150mm	200	20	1000	6.5 m	Perches. rays

2.5 *Operations:* The majority of kattumarams are used only for day fishing due to limitations in carrying capacity and exposure and the fact that these craft are non-motorised and rely on sail for their propulsion. However, a few kattumarams in Tamil Nadu venture out for longer periods to catch flying fish in season. Sometimes, unexpected strong offshore winds blow the kattumarams out to sea.

2.6 *Economics:* The quantity of gear carried is largely limited by capita) costs, though in a few places it is also limited by other factors — such as damage to nets from trawlers and cargo vessels. The size and carrying capacity of the craft in any case severely Umit the amount of gear and other supplies and equipment, and therefore constitutes one of the important constraints on productivity—and thereby on the availability of capital for better craft and gear.

Estimation of costs and earnings is complicated by the fact that in some cases the kattumaram has no permanent identity: the fisherman selects from a stock of shaped logs those that best suit his present purpose and constructs a larger or smalier craft accordingly. Some of the togs at any time will be put out on the beach, under shade, to dry. As individual logs deteriorate, they will be trimmed and eventually replaced. The "life" of a log or of a kattumaram is not easy to ascertain. It is therefore more appropriate in these cases to think in terms of incomes and expenditures of typical individuals rather than in terms of life-costs and earnings of vessel types.

Construction of complete new kattumarams is also undertaken. The following figures will be useful as a guide to the level of costs that will have to be attained for new or improved designs if they are to be readily acceptable. Fuller details of materials, first costs and maintenance costs of kattumarams inspected durktg the survey are given in Appendix 8.

	Andhra Pradesh Boat Type	Tamil Nadu Raft Type	Tamil Nadu Boat Type
Length	6.50 m	8.5 m	6.8 m
Breadth (maximum)	1.25m	1.8m	1.Om
Number of logs	**4**	**5**	**5**
Timber cost (Rs.)	2,500	2,500	1,500
Labour (Rs)	500	500	150
Sail and accessories (Rs)	700	1,000	400
Total cost (Rs)	3,700	4,000	2,050

3 BOAT KATTUMARAMS OF ANDHRA PRADESH

(See illustrations opposite; and Appendices 2A to 20, 7. 8 and 9)

3.1 *General:* Known locally as teppams, these craft range in length from 5 to 8 m. Irrespective of the size, they are constructed in a similar fashion with very little change in shape from place to place. When assembled, these craft take up a boat form with a rockered bottom (that is, with a pronounced line of sheer to make manhandling of the craft easier), sharp stem, and narrow stern with maximum beam amidships.

3.2 *Construction.'* The craft is designed to split into two longitudinal halves. Each half is made up of two logs shaped and pegged together with a fifth centre log if necessary to attain the desired beam width. A wash strake is sewn to the edge of the outboard log and held in shape by wooden struts. The stem pieces are also pegged to each half. While assembling the two halves by lashings, two crosspieces are provided at the stem and stern.

3.3 *Accessories:* Kattumarams are rowed while crossing the surf. Paddles or oars are used depending on the size of the craft. Steering is by means of a steering oar.

A large centreboard is provided amidships and a smaller one is provided at the stern. The aft centreboard is held in the slot by a wedge and is quickly released when it strikes the bottom during beachianding.

Mast, sails, balance board and an anchor form the rest of the accessories.

Boat Kattumarams of Andhra Pradesh

One half of an Andhra Pradesh boat kattumaram. Note the wash strake.

Sail rig. Note the centreboard forward and the wedged centreboard aft.

An assembled Andhra Pradesh boat kattumaram, known locally as a "teppam".

4 RAFT KATTUMARAMS or TAMIL NADU

(See illustrations opposite,' and Appendices 3A to 3F, 4, 5, 7, 8 and 9)

4.1 *General:* These craft range in length from 3 to 9 metres. They are all essentially *raft*-shaped. An intriguing feature of these units is their flexibility; being built up of individually shaped log pieces, they can virtually be transformed into bigger or smaller units overnight. It is not possible to speak of a distinct kattumaram since owners generally own several sets of logs and can therefore create different units as fishing requirements dictate.

Locally, kattumarams are classified as either big or small (periamaram, chinnamaram). The number of logs used to make up a unit depend on their size and the dimensions of the raft desired for a particular fishing method. Line fishing for example can be done from a smaller kattumaram than gillnetting. The minimum number of logs used is three and the maximum nine. The most common unit however is a five-log kattumaram.

4.2 *Construction:* Each log is individually shaped with a definite fore and aft curvature in the vertical plane. The bigger logs are placed inboard and the smaller logs placed outboard and the whole assembly lashed together. While all the logs meet at the stem, the stern ends in a series of steps. The bow is formed of several shaped prow pieces which are lashed to the logs forward. When assembled, the kattumaram resembles a surf board with the prow up-turned to provide lift when encountering waves.

4.3 *Accessories:* These craft are paddled or rowed through the surf zone; punting poles are also frequently used. Steering is by means of a broad-bladed steering oar.

Mast, sails, balance board and an anchor form the rest of the accessories.

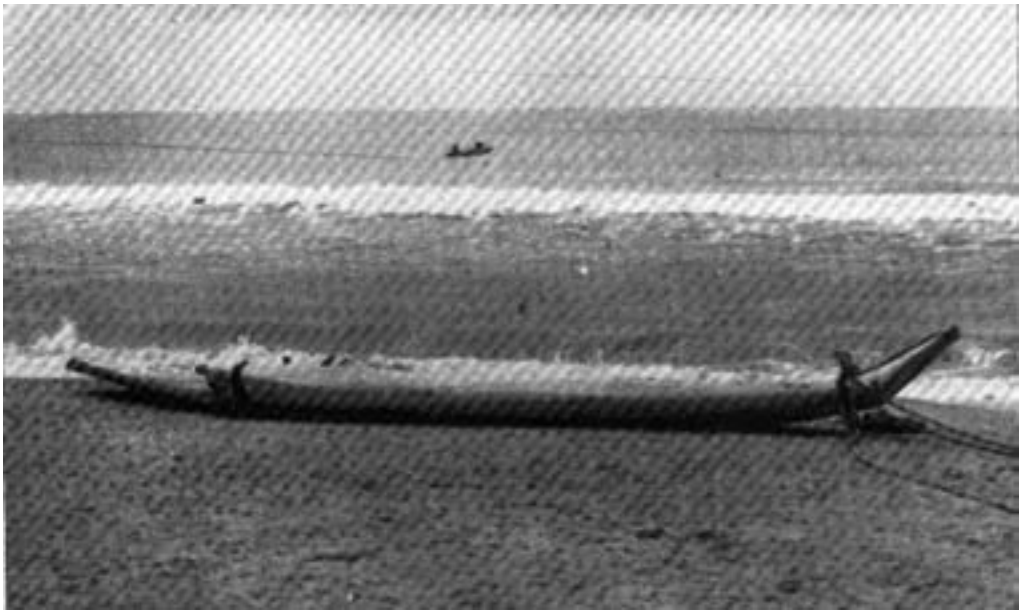
In larger kattumarams where oars are used, a rowing sail is provided on one side of the craft. This is usually a bamboo pole positioned to give a convenient pivot point for the oar and is held in place by wooden supports and lashing to the logs. Another less common feature is the provision of a bamboo crosspiece at the stern lashed to the logs. Food containers and other personal effects are tied to this crosspiece.

Some kattumarams tie a bamboo pole of 150 to 200 mm diameter on the leeward side to provide extra buoyancy when the craft heels under sail.

Raft Kattumarams of Tamil Nadu

The most common Tamil Nadu raft kattumaram is a five-log kattumaram (below).

Sail rig. Note the leeboard attached to the mast.



Note the shape of the prow piece at right—upturned to provide the needed lift when the Icettumaram encounters waves.

5 BOAT KATTUMARAMS OF TAMIL NADU

(See illustrations opposite,' and Appendices 6A to 6C, 7, 8 and 9)

5.1 *General.'* These craft range from 6 to 8 metres in length. They are quite different from the Andhra Pradesh boat types. They are similar to the raft kattumarams except that the out-board logs are placed higher to form a structure with a roughly U-shaped cross-section; a rudimentary boat.

5.2 *Construction.'* Up to five logs are used to make up the unit depending on the log sizes available. Unlike a raft kattumaram all the logs are of the same size and there is no separate prow piece. The logs are lashed together forward and aft to two cross pieces that hold the logs in the desired conformation. The craft is slightly wider aft than at the forward end.

5.3 *Accessories.'* Split bamboo poles are used for paddling and steering the craft. Two centreboards are used, one forward and one aft. Mast, sails and an anchor are the other accessories.

6 PROPULSION

(See illustrations opposite; and Appendices 2A, 3A, 3F, 4, 6A, 6C, 7, 10)

Kattumarams are propelled through the surf by paddle and punting pole. Oars are used at sea in some instances. Steering is also by oar.

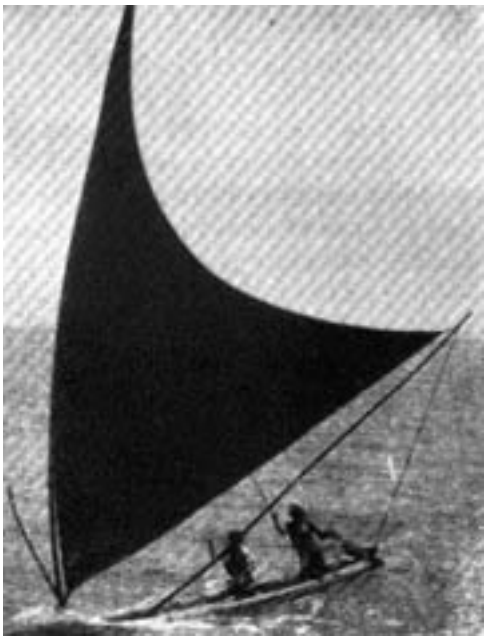
Very small raft kattumarams sometimes use a square sail, otherwise all kattumarams use the lateen sailing rig as their principal means of propulsion. Kolamarams may hoist sails on two masts, otherwise all kattumarams are single-masted. The principal advantage of the lateen rig is the large area of sail that can be set on a short, unstayed (or lightly stayed) mast.

A major inconvenience compared to other sailing rigs is the comparatively unhandy performance windward. In the raft kattumaram, for example, the sail is usually furled, the simple shrouds loosed and the mast shifted from one side of the hull to the other as the kattumaram passes or is paddled through the eye of the wind.

With a constant wind system of ihe monsoon or trade wind type which provides a comparatively stable wind direction parallel to or at no more than 45 degrees to the general direction of the coastline, this is not such a great disadvantage and it is usually under these conditions that the rig has developed as a means of propulsion. Larger craft have traditionally followed the mon-soon systems and their seasonal changes to avoid the need for periods of beating into head winds.

6.2 *Sails and spars:* Sails are traditionally made of cotton which is tanned with a preservative to increase the woking life. At present, with the advent of synthetic materials for packing a wide variety of industrial and agricultural goods, the fishermen have adopted and modifed certain of these materials for use as sail cloth. Among the most common is a fairly loosely woven polyethene sacking material used in industrial bags which are opened up and sewn up into sail panels. Also widespread is the use of heavy black plastic sheeting which is cut to shape and sewn up into a one piece sail. Both materials have the initial advantage of cheapness and availability but both also have disadvantages. The woven sacking material is of course more permeable than tight woven cotton and is thus less efficient as a sail cloth, while the black

Sail rig. Note the vertical yard.



Assembled kattumaram. Note horns forward and aft to facilitate the lashing of logs.

plastic, although impermeable, is easily torn and requires frequent repair. It would appear that fishermen attach prime importance to low first cost; the reduced efficiency, increased labour of fabrication and repair are regarded as acceptable inconveniences.

The sail yard and boom are fabricated of bamboo of 6-8 cm (2½'-3") in diameter, frequently with extension pieces of smaller diameter inserted in the ends of the larger bamboo. Wooden reinforcement pieces are frequently lashed to the yard at this point and also to reduce chafe. The mast itself is a simple pole which can vary in length according to the size of the sail set, about 2 m (6' 6") being a common size with diameter of around 60 mm (2½"). The raft kattumaram is fitted with a leeboard.

6.3 *Sail Rigs:* The boat kattumarams of southern Tamil Nadu have a large sail area in relation to boat size. The stump mast is very short, canted strongly to the windward side and held in place by short shrouds from the mid point of the mast to the port and starboard horns of the forward crosspiece. There is also a supplementary shrcud carried to the after lashing. The long yard has a tack lashing to the windward side of the forward crosspiece and is hoisted by a halliard which passes through a hole in the head of the mast. Both this halliard and the aft shroud are carried well aft and attached to the aft crosspiece. The sail is triangular, loose footed and the clew is boomed out with a bamboo pole. This pole is used off the wind, jammed between the centre and side log and with a fork at the outer end which is forced against the mainsheet close to the clew of the sail. The mast foot is positioned in a hollowed-out block which can move across the boat according to which is the leeward side.

The Tamil Nadu boat kattumarams do not use a hiking board but the crew lean out windward to balance the boat. These craft tend to capsize more easily than the raft kattumaram.

The boat kattumaram of Andhra Pradesh usually carries a smaller sail than the equivalent size of raft kattumaram. The mast is centrally stepped just aft of the forward lashing and raked forward with shrouds set up to the port and starboard sides of the crosspiece of the forward lashing. An additional shroud is taken aft on the windward side and the heel of the yard and boom end are lashed to the windward and leeward sides of the forward crosspiece.

6.4 *Sailing:* The methods of setting, shortening and striking sail and of manoeuvring under sail, are described fully in Appendix 10.

7 EARNINGS

The arrangements for sharing the earnings from kattumarams vary from region to region and even village to village; they also vary according to the type of fishing gear in use at the time. Some kattumarams are owned by working fishermen, others by entrepreneurs who remain on shore. The entrepreneur may be the sole customer for the catch. The craft and the gear may be owned by different persons. Many of the fishermen own neither craft nor gear, and are employees of the owners, remunerated as a rule by some agreed share of the proceeds of the catch. The terms of the agreement may depend upon whether there is competing alternative local employment, for example, on board mechanized fishing vessels.

It is therefore not possible to give an accurate and complete account of how the proceeds from the sale of fish catch are shared in the kattumaram fisheries. The information gathered during the survey is available at the BOBP.