CHAPTER II

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Eminent fishery technologists have carried out classification of fishing gears and crafts of the world since a long time. Umali (1950) presented a guide to the classification of fishing gears of Philippines. Bottemane (1951) and Burdon (1951) made attempts to classify the fishing gears and methods of the world. Laura E. Salt and Robert Sinclair (1952) described the history of fishing, made classification of fishing methods of the world in detail and published the same in the name of "Oxford Junior Encyclopedia". Swarangcharenphol (1955) classified the indigenous fishing gears of the world. Illustrations on Japanese fishing boats and gears were given (Anon, 1958).
Baranov (1960) described the techniques of Industrial Fishing. Andreev (1962) wrote a handbook on fishing gears and their rigging. Trechev (1962) gave general principles of designing and construction of fishing gears. A detailed glossary of Inland fishery terms was provided for reference by Leopold (1978). Nedlec (1982) defined and classified Fishing Gear categories of the world in detail and the same classification is being followed by most of the Fisheries Scientists of the world.

The major contribution on fishing gear and methods of the world are those of Brandt Avon (1984) and Sainsbury (1996). Brand Avon (1954 and 1984) has classified the fishing methods of the world into thirteen categories beginning with fishing without gear. This classification is based on different principles of capture of fish. Under each method of fishing, various fishing gears have been described. Sainsbury (1996) has given
an account of important commercial fishing methods of the world together with details of the vessel and gears like dragged gears, encircling gears, static gears like gill nets, traps, lines and other mobile gears like trolling, harpooning and pole and line used for them.

Sreekrishna and Latha Shenoy (1999) wrote a book on Fishing gear and crafts. The book bridges the gap of non-availability of information about recent developments in fish harvest technology and provides suitable literature on fishing gear and craft technology to the students and staff of Fisheries Science.

Compared to North America, the information on Fishing gear and crafts of South America is rather scarce. John (1953) described in detail the fishing gears employed in marine and freshwater fishing and also fishing nets operated for smelts
from water under Ice in the United States of America. Bents (1955) described fishing gears and methods for smelt fish below the Ice using gill nets and trap nets in the great Lakes of United States of America, when the water is covered with Ice. Gustaf T. Sundsrom (1957) described some of the important types of fishing gears and vessels in use in USA and Alaska in detail. Descriptions of representative types of fishing vessels are also included. Sylvester (1972) reported the importance of pots and traps in the commercial fishery of Virgin Islands and explained the importance of trap fishing over other fishery. Scofield (1951) described the construction and operation of round haul nets such as purse seines, lamparas, ring nets and bait nets in the state of California. Fishing gears like pound nets, gillnets, fyke nets, haul seines and otter trawls, which are operated in Maryland have been described by Coker (1949). The fishing gear and method of fishing in Cuba are described by Squarez Jose Carbro (1958). Berkeley et. al.,

Whiteleather and Brown (1945) have described the trawls, purse seines, gill nets, trolling lines and various types of hand lines and long lines operated on the coasts of Trinidad, Tobago and British Guiana. On the coasts of Brazil, beach seines, Parejas, purse seines, traps, gill and tangle nets, cast nets, long lines, hand lines and trawl nets are operated for harvesting fishery resources (Aparehlos De Pescon, 1945). Different fishing gears operated along the coast of Peru are described by Campbell (1976). Jimenez (1943) has mentioned about the fishing gears and methods and species caught by them in Chile.
European countries were the pioneers in fisheries development, as many major fishing grounds were first discovered around the European waters. Hence, considerable information on the fishing gear and methods of this region is available. Some of the important papers are as under. Davis (1937) classified and described the numerous types of gears used in Great Britain and Wales. Iverson (1937) has given a general account of the Norwegian fisheries, wherein he has mentioned about the variety of fishing gears used in both coastal and offshore waters of Norway. Anderson (1943) has described the Scandinavian fisheries with particular reference to Sweden. Novas (1944) reported different fishing gears and methods used in Spain. Deurs et. al., (1947) described the wide variety of fishing gears like traps, gill nets, seines, various types of trawls and long lines in his account on fishing gears of Denmark. Thomazi (1947) has given an account of fishing
gears now in use along the French coast. The gill nets and purse seines used in England are described by Knake (1950) and Good (1956). Dimmelen (1951) has described the use of light in catching eels in fyke nets in Netherlands canal. Traps, trolling lines and hand lines are employed for tuna fishery along the coast of Sicily (Priol, 1951). Bas et al., (1955) described the physical conditions of fisheries, fishing boats and gear, marine productivity, economics and present day fisheries of Spain. Bertuccioli (1955) has made a report on the fishing gear and methods of Italy. The long line fishing gear for halibut around Faroes, Iceland and Greenland has been described by McIntyre (1955).

The fishing gears and methods of fishing in African continent are less known. Williams (1963) gave the design and constructional details of long line operated for tuna fishing off East Africa. Otabo (1968) reported on the commercial fishery

A report on the fisheries of Farasan Islands (Saudi Arabia, Red Sea) is available (Gladstone, 2002). In this report, the Fisheries of Farasan Islands are described. The fishery resources are exploited by artisanal, investor and industrial sectors. The artisanal fishery consists of live fishing around Coral reefs. Activities of investor and industrial sector include line fishing, gill netting, fish trapping and demersal fish trawling.
Few references on Fishing gear and methods are available pertaining to the Asian continent. Mercer Adam (1910) and Annandale (1922) have reported on fishing gear and methods practiced in Inle Lake of Myanmar. Sandeman (1940) described in detail an indigenous Fish trap operated in Shan States of Myanmar. Faruqui and Sahai (1943) reported on the methods of catching fish in the United Provinces and scope of establishing Inland Fisheries in these provinces. Druzhinin (1968) has reported on the operations of Purse seines for mackerels in Burma waters.

drift gill nets operated for catching larger fishes of *Pangasius pangasius* while large seine nets and box traps are used for harvesting juveniles in the rivers and estuaries of Bangladesh.

Tham Akow (1949) has mentioned the use of various types of nets, lines and traps operated in Malayan Fisheries. Burdon and Parry (1954) also reported on Spears, lines, traps and seine nets employed along the Malayan coast for salt water fishes.


Descriptions of various types of fishing gear and methods of operation in Indonesian waters are available (Anon, 1955). Kunzamann (1988) constructed a coral reef longline and carried out commercial trials in coral reefs of Indonesian waters. Swarang Charenphol (1955) described in detail the indigenous marine fishing gear of Thailand. Sakurai (1972) has also described the fishing gear and fishing methods of Thailand. Tebero and Tabe (1993) described the flying fish gill netting practiced in South Tarawa in Kirbati Islands. Frusher and Subam (1981) described the
traditional fishing methods and practices in the northern Gulf of Papua. Zann (1980) carried out a detailed survey of canoes of Tuvalu, Fiji Islands. Same author (1981) described the Tonga's artisanal fisheries and also Fiji's artisanal fisheries and fishing methods employed.

Kask (1947), Miyamoto (1951 and 1956) have described various fishing gears and methods practiced in Japan. Seki et. al., (1981) described the Hobikiami sail trawling carried out in Japan.

Person (1922) described the fishing appliances of Ceylon. Canagaratnam and Medcof (1955) have reported on the Ceylon's beach seine fishery. Wijayaratne and Costa (1987) have described the various fishing gears of Negombo Lagoon of Srilanka. Jinadasa (1985) has described a freshwater prawn fishery existing in the Bolgode Lake of Srilanka. Nearly 95 per cent
of Freshwater prawns are caught at night using light traps called "Jakotu" made of Bamboo.

A brief account of main types of fishing gears operated along the Sind coast of Pakistan is given by Quereshi (1954). Fishing gears like traps, ring nets, beach seines, gill nets, cast nets, lift nets and longlines are operated in Black Sea (Caspers, 1951). Skozkiewicz (1954) has given an account of fishery resources of Russia and fishing methods employed for commercial fishery. Tsepkin (1980) reported on the origin and development of fishing in continental waters in the Asian regions of the USSR.

From the Australian waters, Hughes (1971) has reported on the longline operations for sharks. The operation of purse seines and mid-water trawls in Australia for exploiting tuna and horse mackerel has been described by Lorimer (1973). Young (1975) has mentioned about various fishing methods practiced for prawns in Australian waters. Campbell (1982) described the purse seining practiced for harvesting Skipzack in New Zealand waters.

When compared with the studies carried out in other branches of Fisheries science in India, the studies on fishing gear and crafts are rather scanty. The first report available on Indian Fishing is by Barton (1898) on Bahmeen fishing in Bombay Harbour. Comber (1908) described the fishing nets used by the fishermen of North Kanara. Dhu (1908) has given an account of estuarine fishing carried out in India. Hornell
(1924) described the fishing gears and crafts of River Ganga in detail. Gopinath (1953) described some interesting method of fishing in the backwaters of Travancore. Jones and Sujan singani (1951) and Mohapatra (1955) have described in detail different fishing nets namely Mani-Jal, Screen trap, and Cast nets operated in Chilka Lake. Job and Pantulu (1953) have reviewed the fish trapping methods of the Brahmaputra River system. Gulbadamov (1961 and 1962) submitted a detailed report on improvement of Fishing techniques in Inland reservoirs in India to the Government of India after visiting most of the reservoirs of India and studying the fishing gear and methods practiced in those reservoirs. The fishing gears used in estuaries, lagoons and backwaters in India are traps, barriers, cast nets, dip nets, dragnets and other miscellaneous gears (Anon, 1949, 1961 and 1962).
George (1971) published a detailed account of Inland fishing gears, fishing methods and crafts of India, covering representative centers in the country from Allahabad in Uttar Pradesh to Mettur Dam in Tamil Nadu, Jaisamand Lake in Rajasthan to Diamond Harbour in West Bengal. The various indigenous fishing gear and methods prevalent in various systems of Inland waters of India have been described with their classifications. Joseph and Narayanan (1965) have studied the fishing gear and methods of fishing in Brahmaputra River in detail. Krishnamoorthy and Prabhakara Rao (1970) gave a detailed description of the fishing gears of Pulicat Lake, as regards to their construction and mode of operation. Pandey (1994) has described in detail fishing craft and gears of river Padma used in the district of Murshidabad (West Bengal). Drag nets, gill nets, purse net, cast net, scoop net, hook and line and traps are operated round the year in the Parma reverine habitat.
Two types of boats called “Nauka” and “Dinghi” are used for fishing in the above river.


The Food and Agriculture organization, Rome has classified the fishing gear and fishing methods on the principles of how the fish is captured. The technological development of fishing gear and methods in the past aimed to increase production; the present situation with
many over fished stock, limited possibilities to expand fishing on under-exploited resources and concerns about the environmental impact of fishing operation, gear development is now very much focused on selective fishing and gears with less impact on the environment.

In the past several workers from India have included information on fishing gear and methods in their studies on fishery of a particular species or group. Such references are given below following the classification of Fishing gear categories by Nedlec (1982) of FAO, Rome.

Commercially important gears under surrounding nets are Purse seines. Annigeri (1969) has referred to the operations of experimental purse seines for mackerels at Karwar. Sadanandan (1975) has given the design, construction and operational details of purse
seines, which are operated along Goa coast for oil sardines and mackerels.

Several varieties of seine nets are operated in inland, estuarine and marine waters of India. Ramakrishnaiah (1994) has described the effect of Intensive fishing with shore seines on the stocks of Tungabhadra Reservoir.

Silas (1967) has mentioned about beach seines that are operated for tunas in Laccadive and Maldive Islands. Luther (1973) has mentioned about shore seines operated for mackerels in Andaman Islands.

Deshpande and George (1962) described in detail, the material, design, construction, preservation and method of operation of the "Kollachi vala" an indigenous two-boat seine net
operated along Kerala coast, for the capture of Gar fishes. Kuriyan et. al., (1962) gave the design and operational details of "Thanguvala", a single-boat seine net operated in Kerala waters. The boat seine nets like "Ara-kolli-vala", "Mathi-kolli-vala", are operated for oil-sardines off Cannanore (Bensam, 1973). Madhusudana Kurup and Rajashree (2003) conducted the performance analysis of Inboard diesel engine fitted canoes operating Ring seines along Kerala coast and reported the advantages of inboard fitted engine Canoes in harvesting fish resources from distant waters of Kerala more economically than out-board engine fitted Canoes.

Sekharan (1958) reported mackerel fishing of south Kanara coast, involving gears like "Rampani" and "Kai-rampani". In his study on mackerels, Noble (1965) has stated that shore seines like "Rampani" and "Yendi" are operated for mackerels at Karwar.
Amongst the general category of dragged gears, otter trawls occupy the prime place, considering its widespread use in commercial fisheries. Nair (1969) and Nair and George (1964) have classified the trawl nets of different categories based on their method of construction. They have also given the method of designing trawl and other constructional details suitable for different trawlers. Kuriyan et. al., (1964) developed new design of trawl nets suitable for mechanized boats up to 55 feet in length for operation along the south-west coast of India for catching prawns. Satyanarayana and Narayanappa (1976) gave the design and operational details of a three panel double trawl net operated off Kakinada.

Kertha and Sadanandan (1973) gave the design and operational details of 11 m dual-purpose trawl net operated off Cochin by small-
mechanised boats. Panicker et. al., (1977) have studied the efficiency of a conventional single rig trawling using 13.7m four-seam shrimp trawl and a double rig trawl using 6.8m four-seam shrimp trawl from a 15.2m fishing vessel. Their study has revealed that double rig trawling was more efficient than the conventional single rig trawling in catching shrimps. Verghese (1977) described the construction and rigging of one-boat mid-water trawl operated off Cochin. The details of two-boat mid-water trawl operated along the Kerala Coast are given by Verghese and Radhakrishna Nair (1977). Kartha and Rao (1991) designed two trawl designs and employed them for two-boat bottom trawling and discussed about two-boat trawling and midwater trawling carried out in Gandhisagar Reservoir.

Leela Edwin and Hridayanathan (1997) studied the operational efficiencies of the artisanal gears, ring seines and mini-trawl net.
The results of the above study show that ring seines were technically more efficient gears than mini-trawl net and also ring seines showed great economic viability with respect to operating costs. Brucelee (2003) studied the designs of trawl gears employed in 40 – 48 feet and 50 – 60 feet O.A.L. fishing boats operated in Kanyakumari district of Tamilnadu. Ramesan and Ramachandran (2005) described the design, operation and economics of mini-trawling carried out by a group of fishermen in the Kariangode and Chandragiri rivers of Kasargod district, Kerala. Pravin and Ramachandran (2005) described the shrimp harvesting methods carried out in traditional shrimp aquaculture Farms in Kerala.

Joseph (1969) operated 17m and 18.4m trawl nets along the coast of Karnataka to study potentiality of trawl fishery. Ramamurthy (1972) gave an account of trawl fishery of South-Kanara coast. He observed that fluctuations in trawl
catch consisting of prawns, flat fishes, silver bellies, sciaenids and other miscellaneous fishes. Sheshappa (1978) described the design, constructional and operational details of a mini-trawl net, which is operated in Gurupur-Netravati estuary for miscellaneous fishes.

Dip nets or lift nets are extensively operated on the banks of estuaries in Kerala and west Bengal to catch estuarine fishes. Large dip nets and other traditional fishing gears operated in estuaries, inland waters and backwaters of India are described (Anon, 1961 and 1962). Shyamsunder et. al., (1978) described fishing methods and gears practiced in Dal Lake, Srinagar along with their catch and catch composition. The dip nets in Srinagar are called as Khuni-jal and are operated during February to April.
Among falling gears, cast nets form an important category and are commonly operated in marine and inland water bodies of India. Mohapatra (1955) has described group fishing carried out with cast nets in Chilka Lake. The cast nets used in inland water bodies, estuaries, backwaters and lagoons of India have been described in detail (Anon, 1961 and 1962). Jones and Kumaran (1959) have reported on the operation of cast nets for tunas in Minicoy Island. George (1962) has reported the operations of cast nets for prawns in Thevara and Azhikal areas of Cochin. Sen (1973) has reported on cast nets operated in Andaman and Nicobar islands. Cast nets are operated at Calicut for flatfishes (Seshappa, 1974). Shyam Sunder et. al., (1978) described in detail with specifications of local types of cast nets operated in Dal Lake, Srinagar.

Pradhan (1956) and Radhakrishanan (1958) have given the operational details of cast nets
operated for catching oil-sardine and mackerels at Karwar. George and Ramesh Nayak (1962) have reported on crab catch in Mangalore waters by cast nets in addition to other gears. Ramamohana Rao et. al., (1965) reported on the operation of cast nets for mackerel at Ullal (Mangalore). Annigeri (1969) has referred to the cast net operation for catching oil-sardine at Karwar. Prabhu and Dhulkhed (1972) have given an account of “Koori-bale”, a small meshed cast net operated in Mangalore waters for oil-sardine. Sathyanarayanappa et. al., (1996) reported the results of experiments conducted with Mono and Multifilament casts nets operated in Netravati-Gurupur Estuary, Mangalore.

Different types of Gillnets are operated for the exploitation of fish resources available in rivers, tanks, and estuaries along the Indian coast.

Krishnamurthi (1957) has reported on gillnets "Kola-Valai" and "Ola-valai" which are operated for oil-sardine and Belonids around the waters of Rameswaram Island. Gillnets operated in estuaries, lagoons and backwaters in India have been described in detail (Anon, 1961 and 1962). Krishnamoorthy et. al. (1964) reported the results of experimental fishing with gill nets carried out in Tungabhadra Reservoir. Satyanarayana and Sadanandan (1965) described a gillnet called "Chala-vala", which is operated for oil-sardines and mackerels along the Kerala coast. The details of take-up, spread of the net in water, buoyancy and weight per unit length of ropes and variations observed in the nets are discussed in addition to the descriptions, design
and construction of the gear. Saxena (1966) while describing fishing nets and their operations in a section of the middle reaches of Ganga riverine system of India described two types of gillnets, species composition and size selectivity of fishes caught in them.

Ranganathan and Venkataswamy (1967) described in detail the efficiency of the "Mettur Rangoon Nets" operated in Bhavanisagar Reservoir. They have also reported that properly hanged Rangoon nets are the best gears for artificial impoundments in river basins characterised by uneven bottom and submerged fishing obstacles. Saxena and Chandra (1968) have reported on the introduction of "Phasla-Jal", a gillnet for catching Hilsa in the Ganga and Yamuna rivers near Allahabad. Banerjee and Chakrabarthy (1969) conducted fishing trials with gill nets in the lower Sunderbans of west Bengal to study the effectiveness of different
mesh sizes for capture of fishes of commercial importance. Ramaraju (1971) described a drag cum gillnet locally known as “Benduvala” for catching the major carp *Labeo fimbriatus* in river Godavari. Banerjee and Chakrabarthy (1969) described the operation of drift gillnets in Lower Sunderbans. He also studied the catching efficiency of gillnets having different mesh sizes for the exploitation of Sharks.

Dutta (1973) described gillnets of the Hooghly-Matlah estuarine system. They are broadly divided into drift and set gillnets. A different form of these two types of gillnets and their operations are given. Selectivity of gillnets for catching *Scomberomorus commersoni* has been studied at Cochin by Sulochanan et. al., (1975) with nets made of four different mesh and twine sizes. Jude (2000) conducted studies on the optimization of mesh size for the commercial exploitation of tuna in Thoothukudi waters.
Durve (1976) has described gillnets operated in Lake Jaisamandh, Rajasthan while describing fisheries of the Lake Jaisamandh, the oldest man made lake in India. Wishard (1976) gave an account of Roak fishing (construction of weirs-enclosing barrier nets) and also described gillnets operated in River Yamuna near Agra. Krishnan and Sampath (1976) while describing Pulicat Lake fishery dealt on gillnets operated in Pulicat Lake.

Khan et al. (1985) conducted comparative fishing experiments with Frame nets of 0.4 and 0.5 hanging coefficients in Hirakud Reservoir during 1971-1974. The results of the above experiments indicated that the net with hanging coefficient of 0.4 as more effective for better catch. Kartha and Rao (1991) worked on selectivity of gillnets for catla, rohu and mrigal in Gandhisagar reservoir and the result of the experiment was published. Khan et al., (1992) described different fishing gears and crafts operated in Hirakud Reservoir and gave recommendations for improving the fish

Detailed accounts of Pattabale an encircling gillnet operated for mackerels at Karwar is given by Pradhan (1956) and Radhakrishnan (1958). Prabhu and Dhulkhed (1970) described the operations of gillnets for oil-sardines around Mangalore waters during 1963 to 1967. Dhulkhed (1972) reported on Kanthabale a set gill net, which is operated in Ullal. Sathyanarayanappa and Sheshappa (1978) described different types of gillnet operated like drift gillnets, set gillnet and encircling gillnets operated in inshore waters of Karnataka during 1980. Further, Sathyanarayanappa et al., (1990) described the efficiencies of mono and multifilament gill nets operated in Netravati-Gurupur estuary, Mangalore.
Muddanna and Chandrashekaraiah (1973) while analysing the fish catches obtained from Bellandur Tank near Bangalore explained different types of gillnets operated in Bellandur Tank. Murthy et. al., (1986) described in detail the Fish and Fisheries of Kabini reservoir. Devaraj et. al., (1987) while describing fish and fisheries of the Hemavathy Reservoir gave the details of different types of gillnets operated in the above reservoir. Krishna Rao et. al., (1999) while reporting on the Limnology and fishery of Nelligudda Reservoir (Bangalore) explained about the mono-filament gillnet operated in the above reservoir.

Information regarding Trap Fishing is scanty. Job and Pantulu (1953) reviewed the fish trapping methods practiced in the Brahmaputra river system. Prabhu (1954) has given an account of perch fishery by special traps and the different...
methods of operating them in Gulf of Mannar and Palk Bay. Mohapatra (1955) described the design and operational details of Thatta-Khondaa, a screen trap operated in Chilka Lake and later in 1957 described a sink net called as Marala operated in the backwaters of Ganjam, Orissa. Pillay and Ghosh (1962) reported on the bag-net fishery of the Hooghly-Matlah estuarine system in detail. Miyamoto (1962) reported on traps used in lobster fishing off Southwest coast of India. Kuriyan (1965) has mentioned about stake nets, which are operated for prawns along the southwest coast of India. Saxena (1966) described six types of traps and their operations carried out in a section of the middle reaches of Ganga river system of India. George (1967) reported on the operations of traps for exploiting lobster resources off Kanyakumari. In Gulf of Cambay Jadijal a stake net is operated for mullets (Luther, 1967). Mohamed (1967) reported on the operations of stake nets for prawns along Gujarat and Maharastra coasts. Jhingran and

There are several commercially important species caught by line fishing along the Indian coast, inland water bodies like reservoirs, rivers, tanks and estuaries. Wallinger (1904) described Fly-fishing in the Bombay presidency- Megalops cyprinoids as a fly taker. Dracott (1915) described fishing without a fishhook practiced in Sikkim. Primrose (1921) reported on angling for Barbus hexagonolepis practiced in Assam.
Job et al., (1955) while describing fish and fisheries of Mahanadi gave an account of line fishing and rod and line practiced in riverine fishing centres. Jones and Kumaran (1959) and Putran and Narayan Pillai (1972) mentioned the operations of pole and line and hand line operated for tunas in Minicoy Island. Miyamoto and Shariff (1962) gave an account of lobster fishery by anchor-hook off southwest coast of India. Balasubramanyan (1964) described the operation of rod and line, handline and trolling line along the Indian coast, using different edible natural baits for capturing perches, carangids, sciaenids, scombroids and elasmobranches. George (1967) mentioned about the use of anchor-hooks off Kanyakumari district for capturing lobsters.

Silas (1967) mentioned about the operations of pole and line, long line, surface trolling and
hand lines for exploiting tuna resources around Laccadive and Maldive islands. Rajinder et al. (1969) described the trolling line operations conducted in Goa waters during the year 1965-68. Deshpande et al. (1970) conducted long line fishing experiments in Veraval waters in order to study the catch composition and effectiveness of various baits for capturing different species of Sharks.

Detailed description of design, construction and operation of long line for tuna off Cochin has been reported (Anon. 1973). Hook and line operated by plank-built boats for large size sciaenids in Gulf of Mannar and Palk bay (Bensam, 1973). Along the coasts of Orissa, Andra Pradesh, Tamil Nadu and in Andaman Islands hook and line are operated for exploitation of shark resources (James, 1973). Hook and line fishing has been carried out for tunas in Andaman and Nicobar islands quite successfully...
(Sen, 1973). Long lining and trolling have been tried in Port Blair for sharks, tunas, perches and carangids (Anon, 1975). Around Andaman and Nicobar islands, Kalava hand lining has been tried for capturing perches, sharks, carangids, tunas and barracudas (Anon, 1978).

Durve (1976) while describing the fisheries of Lake Jaisamandh, Rajastan, explained hook and line operated in the above lake. Shyam Sunder et. al. (1978) explained about the long line operated in Dal Lake, Srinagar during 1969-72, while describing fishing methods of the above Lake. Devaraj et. al. (1987) explained hook and line and rod and line fishing operated in Hemavathy reservoir. The method is indigenous and is exclusively for catching the minor catfish. Sharma (1994) made an attempt to give information on fishing methods adopted in Himachal Pradesh. Shyam Sundar et. al. (1995) reported illegal fishing methods practiced by
using explosives, bleaching powder, poisons, bunds for netting in captivity in the Ganga River not only to kill the large fishes but also to take the heavy toll of innumerable juveniles. Ramesh Rao (1998) described hook and line fishery for Sharks at Janjira-Mund region, Raigad district of Maharastra operated by migrated fishermen from Kanyakumari. Seenappa (2004) conducted experiments on validation of Googly a fresh water snail (Oyster) meat as bait for rod and line and hook and line for capturing fishes in Sankey tank, Bangalore. He has reported that most of the baits did not attract Indian major carps to bite. The ant egg based bait with wheat flour was successful in attracting common carp. Air-breathing fishes were attracted better by the earthworm bait than ant based bait.

The simple method of fishing consists of fishing without using any gears. This is commonly practiced for harvesting some molluscs
and crabs. Molluscs are fished in estuaries, backwaters and in littoral regions all along the Indian coast. Some authors have reported intensive fishing by hand picking in certain areas for bivalves (Venkataraman and Sreenivasan, 1955; Seshappa, 1967; Narasimham, 1972; Balakrishna Nair, 1972; Kewalaramani, 1972). David Thomas (1962) described fishing by Whiffing line while describing fishing methods for Scombroides in Madras coast. Armugam (1966) described catching murrels by enticing them by lights in the night and when they approach, they are speared with a crude steel weapon or a spear. This type of fishing is practiced in south Arcot district of Tamilnadu.

Shyam Sunder (1978) while describing fishing methods and fish catch composition of Dal Lake, Srinagar, reported “Narsoo” fishing where 7-9 headed spear fixed to pole is practiced for catching fishes.
Other unique fishing methods not included in the above classification are mentioned here. Jones (1946) described in detail the destructive methods of fishing in the rivers of the hill ranges of Travancore. Gopinath (1953) reported some interesting methods of fishing carried out in the backwaters of Travancore. Motwani and Srivastava (1961) explained a special method of fishing practiced for harvesting *Clupisoma garua* in the Ganga river system. Karamchandani and Pandit (1967) described a special fishing method and certain other interesting fishing methods practiced in river Narmada for harvesting *Mystus seenghala* and *Mystus aor*. Talwar (1968) described "Mural-Thoondai" a gear for harvesting half beak fishes. John Thomas (1971) described in detail crab fishing carried out in Pulicat Lake. The indigenous method of fishing by dropping a coir rope with baits suspended from it for catching crabs are described and discussed along with other minor fishing methods practiced for
harvesting other species of crabs around Pulicat Lake.

Banerji et al. (1979) described a special fishing device called "Khulnawa" operated for harvesting minnows in the river Ganga at Patna. Nirmal Thakur and Banerjee (1980) described a special fishing method practiced in North Bihar for catching air-breathing fishes. Yadav et al. (1981) reported on "KATAL" fishing for catching fishes in the Bheels of Assam. Ramamurthy and Pandurangan (1983) explained tree fishing carried out in Tamil Nadu that acts as Fish aggregating device. Different gears are operated around this submerged tree for catching fishes. Joshi (1988) has described a local device in vogue in western Himalayan hill streams called "Gamachha" cloth fishing for catching hill stream fishes. Ramesan and Ramachandran (2004) described an ancient fishing method locally known as 'Maadevalayal' practiced in the
Valapatanam river of Kerala. The design and operational details of the gear as well as the socio-economic condition of the fishermen are also described.

There is literature on the Fishing boats employed in marine waters of India but the same is lacking on the crafts employed in rivers, reservoirs, lakes and estuaries. Zeiner (1958), FAO expert for boat mechanization programme designed and introduced 5m and 7m OAL inland fishing boats in the reservoirs of Tamil Nadu and Orissa respectively. Tyagarajan and David Thomas (1962) described the fishing crafts of the erstwhile Madras state in detail. Hansda (1998) described fishing crafts of west Bengal, with special reference to the south 24 Paraganas district. Sakhare and Joshi (2003) have described the traditional and modern fishing crafts employed in Yeldari, Masoli and Karpara reservoirs of Parbhani district of Maharashtra.
Leela Edwin *et al.* (2005) conducted studies on the chemical preservation treatment for rubber wood for the purpose of its utilisation for fishing canoe construction.

Parameteran and Murugesan (1984) have described the leather coracle used by local fishermen in Sharavathy backwaters and also described a modified coracle and its advantages over leather coracle. Devaraj *et al.* (1987) described the coracles used by fishermen in Hemavathy reservoir. Naik and Neelakantan (1988) described the fishing crafts of Karwar region.

Sreekrishna and Latha Shenoy (1999) have described in detail different types of fishing crafts used in different states in India. The crafts employed in backwaters, reservoirs and other inland waters of India are also explained.
In this account an attempt has been made to review some of the important publications on fishing gears, methods and crafts. The review cannot be claimed to be complete as mention of fishing gears, methods and crafts may be found in all publications on fish and fisheries.