3.1 Introduction
3.2 Concept of Mechanisation
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3.4 Mechanisation in Indian Fisheries
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3.6 Summary
3.1 Introduction

The history of mechanisation process of fishing industry in Kanyakumari district is parallel to the history of the same in India. This chapter highlights the background and the various developments in the mechanisation process of fishing industry in Kanyakumari district.

3.2 Concept of Mechanisation

Mechanisation of the production process is one of the main avenues for raising efficiency of production and development of any industry. Mechanisation means use of mechanical implements in a production process instead of the traditional simple methods involving human and animal labour. It leads to a transformation from biological sources of energy to mechanical source of energy. Mechanisation can be partial or complete. When machines are used along with traditional implements the mechanisation is partial and when all operations are mechanised, animal labour is completely eliminated and human labour is reduced to the minimum, it is complete mechanisation\(^{152}\). In other words mechanisation refers to replacement or supplementation of animate power with electrical mechanical power. This replacement or supplementation may be partial or integrated. The distinction is made between partial and integrated mechanisation of production process depending on the degree to which technical means are provided for production process and also on the types of jobs. In partial mechanisation, production operations are mechanised but manual labor continues to play a significant part, especially in auxiliary jobs. In integrated mechanisation of production process, manual labor is replaced by machine power in all basic operations of the production process and also in auxiliary jobs. In

\(^{152}\) Uma Kapila, 2001-02, Understanding the problems of Indian economy, Academic foundation, Ghaziabad, 2\(^{nd}\) Edition, p. 245.
the context of the fishing industry, mechanisation refers to application of machine power in propulsion of the craft and in fishing operations. On the basis of this, the mechanised crafts can be categorized into 3 types: crafts with inboard engines where machine is used for propulsion as well as fishing (trawler, purse seiner etc), crafts with inboard engine where mechanical power is used only for propulsion (drift/set gill netter) and the crafts with out-board engines where mechanisation is used only for propulsion\(^{153}\).

### 3.3 Mechanisation in fishing

Fishing with craft propelled by wind and sails by muscle was the original method of fishing till the 19\(^{\text{th}}\) century. Many of the most noticeable and important charges in the fishing industry have come in the past 150 years only\(^{154}\). The modernization and other various developments in fishing industry what we see today have happened only at the advent of mechanisation of fishing crafts. By the late 1800’s sailing boats were replaced by steamships. The era of steamers, however was short as they were quickly replaced by motor driven vessels early in the 20\(^{\text{th}}\) century. The next major advancement came in the 1940’s when instrumentation was introduced into the fishing industry. During this time, technologies such as echo-sounder and sonar were introduced\(^{155}\).

An era of rapid technological development in vessel design began with the British factory trawler experiment in the late 1940’s, which demonstrated the great advantage of large stern trawlers that processed their catch on board. The idea was

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\(^{155}\) John Kurien et al., op.cit.
quickly developed by countries seeking to fish distant sources, and by the mid 1960’s these large vessels (up to 100 meters long) were operated by the Soviet Union, the United Kingdom, Japan, Poland, East Germany and Spain.\(^\text{156}\)

### 3.4 Mechanisation in Indian Fisheries

#### 3.4.1 The Beginning

The subject of marine fisheries in India was a deferred state subject until the early forties of the 20\(^{th}\) century\(^\text{157}\). The attempts to mechanize fishing crafts have been made in the beginning of 20\(^{th}\) century. In 1900, the Govt of Bombay made first attempt at trawling by engaging a steam trawler. Subsequently, several experimental and survey fishing operations were made till 1947\(^\text{158}\). The concerted efforts at development of Indian marine fisheries were initiated only after the country became independent in 1947, through the national five years plans scheme which commenced in 1951.\(^\text{159}\) The history of programmed mechanisation process in fishing industry can be traced back to 1950’s. As soon as after the second world war, when the country faced with severe food shortage, the programme of mechanisation of fisheries was also conceived as a part of the ‘Grow more food Campaign’. Its main objective was to increase the production of the fish and also the income of the fishermen.\(^\text{160}\) At the dawn of independence, in some of the princely states like Travancore and British ruled states like Madras, some initiatives were taken to examine the possibilities of

\(^{156}\) Ahilan B. Felix R.Santhanam, pp. 39-40.


\(^{159}\) Bensam P, op.cit.

technological improvements in fishing\textsuperscript{161}. As a stand of the nation’s drive towards industrialization that took off during the decade after independence, mechanisation programme was emphasized in Indian fishery. The national planning commission proposed a radical transformation of capture fisheries that paralleled India’s Green revolution in agriculture. It was on the hope that the mechanised fishing technologies would boost catches to the level commensurate with the postulated wealth of the ocean, to contribute to the economic development of the country, and help to feed its burgeoning population. This radical transformation – which refers to the ‘Blue Revolution’ - was to be an all Indian affair, promoted by the Central Government and adapted with variation in every coastal state\textsuperscript{162}.

### 3.4.2 Initiatives for Mechanisation

In the above context, in 1953 the government of India requested the FAO (UN) for assistance to improve available boats and design new improved types of fishing boats. The Government of India and FAO made an agreement and the FAO appointed Paul B. Ziener – the most reputed boat designer of the time – to advise and assist the Government of India on problem of boat designing. Later, FAO sent a second naval architect Kjeld Rasmussen in 1955\textsuperscript{163}. They spent a total period of 60 man months in India between 1953 and 1958. They were travelling extensively along the coastline of all the maritime states of India with the exception of Kerala. Kerala was excluded in order to prevent overlapping with the works of Indo- Norwegian Project (INP) which was expected to undertake a similar exercise\textsuperscript{164}.

\begin{flushright}

162 Ajantha Subramanian, Op.cit


164 John Kurien, op.cit, PP.47-48
\end{flushright}
Ziener and Rasmussen identified that six of the traditional crafts could be economically mechanised while a large number of crafts could easily be motorised with out-board motors. Between 1954 and 1958, they tried to develop three prototypes of mechanised surf boats for India. But each one of these had some technical snags and operations from these prototypes proved financially unsound. Besides attempting to develop the mechanised surf boats, they had also tried to develop a number of new designs of mechanised boats from 1953 to 1963. In 1962, a finalized design of the craft was developed. It had a 40 HP diesel engine, a crew requirement of 5 persons and could fish at a depth of 20 fathoms (120 feet) and could stay in the sea for about 65 hours.\textsuperscript{165}

Among the various crafts standardized, the four most important designs that became very popular among the fishermen are the 25 feet gillnetter, the 32 feet trawler and 32 feet gillnetter and 36 feet trawlers\textsuperscript{166}. Ziener and Rasmusen suggested a step by step approach rather than the sudden introduction of large, complicated and expensive machinery. They were of the opinion that staffing men with good understanding of commercial fisheries in the fisheries department, boats which can be driven by engine, facilities for engine installation and maintenance and financial facilities and training for fishermen are the requirements for a successful mechanisation scheme. These factors seemed to have existed in the state of Bombay and the Director of Fisheries took initiatives of mechanisation of existing boats called ‘Lodhias’ and ‘Machwas’ by merely strengthening the framework of the vessel to fit an engine. The experiment was an instant success. In a decade (by 1961) as many as

\textsuperscript{165} John Kurien, op.cit, pp. 48-49.
\textsuperscript{166} Bindhu George, op.cit. p. 61.
1500 boats were mechanised. But the efforts to modify the existing crafts in the other states met with limited success only\textsuperscript{167}.

The period from 1963-1979 marked the development of medium and large fishing vessels, indigenous engine for fishing vessels, research on alternative materials for boat building, new and efficient designs of fishing gear and new methods of fishing. These developments were in response to the development of export market, especially for shrimps which resulted in increased capture fisheries and increased need for fishing vessels\textsuperscript{168}. As a result of the growth of capture fisheries and increased need for fishing vessels, local capitalists entered into the development and production of indigenous engines for mechanised boats. It also brought in the development of suitable net making materials stronger than treated cotton and also the evolution of suitable designs of nets for various types and sizes of boats. Another important outcome of these developments is the use of alternative materials on cost and efficiency grounds such as fiberglass, ferro cement, aluminum alloy and steel for construction of vessels. It also let to introduction of new gear designs and changes in methods of fishing. The fishing methods developed along with improvements in crafts are: gill netting, boat seining, bottom trawling, and purse seining, long lining etc\textsuperscript{169}.

\subsection*{3.4.3 Indo – Norwegian Project}

Another major initiative towards the mechanisation of fishing industry in India was the Indo-Norwegian project (INP). After World War II the United Nations had

\begin{footnotesize}
\begin{itemize}
\item \textsuperscript{167} John Kurien, op.cit., pp. 48-49.
\item \textsuperscript{168} Bindhu George, op.cit., p. 61.
\item \textsuperscript{169} Bindhu George, op.cit., p. 64.
\end{itemize}
\end{footnotesize}
initiated several technical assistance programmes for the benefit of developing countries, providing technical experts, services and training. Norway had participated in these programmes from the beginning. As that country is experienced in fishing, it was considered to be able to give technical assistance in this industry. India, with a tremendous potential for fishing and the growing demand for protein food, had to find the way to increase fish production. This brought India and Norway together under the auspices of the UN\textsuperscript{170}. In order to get their assistance in the programmes of development projects, the Government of India signed a tripartite agreement with FAO and the Government of Norway on October 17, 1952. The supplementary agreement signed on January 24, 1953 gave shape to a project called Indo-Norwegian Project. This project was introduced in Needakara in Trivancore – Cochin state aiming at development of fisheries and fishermen community. Its original project area was some 10 square miles including villages Puthenthura, Neendakara and Sakthikulangara in Quilon district\textsuperscript{171}. Subsequently, it was extended to Cochin in 1957. Then the activities were extended to adjoining states of Tamil Nadu and Karnataka\textsuperscript{172}.

Under INP attempts were made to improve and motorise some of the existing fishing boats in order to enable them to fish longer and further out sea. A model of the dug-out canoe of Quilon district of Kerala was taken to Fjods of Norway and got motorised. After a few months, it was pronounced that it was unsuitable for motorisation. This pronouncement by INP foreclosed the possibility of improving the

\textsuperscript{170} Kare Larssen, March 1966 “Indo-Norwegian Project Develops Indian West Coast Fisheries”, Fishing News International, Vol. 5, No. 3.

\textsuperscript{171} Jones S, 1958, “Fisheries of West Coast of India”, Central Marine Fisheries Research Station, Manadapam Camp, p. 118.

\textsuperscript{172} http://ifpKochi.gov.in/h history.htm.
existing craft designs in this region. As an alternative to motorizing the traditional
dugout canoes, the INP introduced a smaller flat bottom boat, motorised with a small
5 HP engine. Sixty-seven such boats (22 feet and 8 HP) were constructed between
1956-57 and distributed to fishermen at a highly subsidized cost of RS 2000.  They
did not take off as fishermen were not convinced of the economic superiority of these
boats over their traditional canoes and their unfitness for the rough surface condition
and as there were no adequate landing facilities available for these boats 174.

After 1959, INP began to introduce the larger type of mechanised boat with
more powerful engines. In 1963, another mechanised boat of 25 feet was introduced.
Until 1963, larger boats were above 22 feet length (ranging from 23.5 feet to 36 feet)
and with the engine power of above 8HP (ranging from 16HP to 48HP) 175. From
1962 onwards, the activities of INP located in Quilon were handed over to the
Department of Fisheries, Kerala. Aspects of the project that remained were then
renamed as the Integrated Fisheries Project (INP) and came under the control of
Government of India after 1972. Thereafter, efforts in India were made without any
foreign help under the auspices of the Central Institute of Fisheries Technology
(CIFT) based in Cochin.

During 1963-1979, the CIFT carried out research and development activity in
craft and gear technology on the aspects of new designs of mechanised crafts,
indigenous engines for crafts, alternative materials for boat building, new materials
and designs of nets and innovative methods of fishing. It resulted in 12 standard

173 John Kurien, op. cit., p. 57
174 Marine Fisheries Information Service, May 1982, Technical and Extension service, No 38,
CMFRI, Cochin, p. 8.
24 John Kurien, op. cit., p. 58.
designs capable of trawling as well as hand lining, gill netting and purse seining. It introduced some important vessel modification, developed cheaper and suitable boat building materials as well as engine designs for better performance.\textsuperscript{176} During the period 1963-67, the CIFT standardized the design of four new mechanised boats. The first was a 30 feet vessel filled with a 30-35 HP diesel engine that could fish up to a depth range of 15 fathoms with a crew size of 6 and stay at sea for 20-24 hours. The other three belonged to a class of vessels which could be used for a variety of fishing operations; stay out at sea for 3-7 days and fish at depth beyond 25 fathoms.\textsuperscript{177}

Thus, as a result of the governmental initiatives and various research and development activities under Indo-Norwegian Project, various designs and sizes of mechanised crafts were introduced besides specialized fishing vessels like trawler-cum-fish carrying, trawler-com-purse seining, boats for long line fishing and trawling etc. This led to the shift of Indian fishermen from traditional fishing to mechanised fishing year by year. The number of mechanised boats effectively in operation on 1-3-1969 in the eight coastal states, stood at 6515. Of the total number of boats in operation, 75\% were in the private sector, 20\% in the co-operative sector and the remaining 5\% in the public sector\textsuperscript{178}. The number increased by 292\% in one decade and stood at 19000 in the year 1979. It increased to 23000 in late eighties 35000 in 1992. Between 1960 and 1999 the mechanised crafts have increased 570\% (It was only 110\% in case of artisanal crafts)\textsuperscript{179}. The number of mechanised crafts stood at 59000 in 2006. In the year 2010 the number of mechanised crafts in India increased to

\begin{flushright}
\textsuperscript{176} Pillai N.G.K., 2011., Marine Fisheries and Mariculture in India, Narendra Publishing House, Delhi.
\textsuperscript{177} John Kurien, op.cit., p. 58.
\textsuperscript{178} Evaluation of the Program of Mechanization of Fishing Boats, 1971, PEO Study, No 83, www.planningcommission.gov.in
\end{flushright}
72559 (CMFRI 2010) and in the year 2007 mechanised fishing contributed to about 71 % of the total marine fish landings of the country (CMFRI 2007)

3.4.4 The Motorisation Era

The mechanised crafts were first employed for demersal trawling, targeting mainly shrimps. The lucrative world market for penaeid prawns in 1960s led to the introduction of small 32feet coastal trawler capable of catching them. Government’s interest to promote export gave the further boost to trawling. A number of outside investors moved into reap the profits. Government’s attempts to supply trawler to the actual working fishermen proved a failure and about 1000 trawlers distributed through co-operatives went into the hands of middlemen and outsiders creating a new class of absentee owners who had no long term stake in fishing but were after profit only. While various new types of mechanised crafts were introduced through various governmental initiatives, most of the fishermen have confined themselves to fishing in shallow waters for various reasons thereby competing with traditional sector for the dwindling fish resources and creating conflicts.

The keen competition from shrimp trawlers in the inshore waters prompted many traditional fishermen to adapt motorisation of crafts to expand their fishing operation area which led to better financial returns. Simultaneously, the declining resources and increasing fuel cost compelled many traditional fishermen to prefer installation of out-board motors rather than adapting mechanisation. Therefore, since 1979 the focus shifted to motorisation of traditional crafts especially along the

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180 Biswass K P, op.cit.
182 Pillai N.G.K., op.cit.
183 ibid.
south-west coast of India. Pushed to the wall by these developments, the artisanal fishermen reacted strongly in the 1980’s. Their response took two forms: Unionisation and motorisation. Unionisation was for pressurizing the government for their rights in sea vis a vis mechanised boats. Motorisation was for competing more effectively and to reach distant waters in search of new fish resources \(^{184}\).

Motorisation is used to denote the use of motors on beach landing artisanal crafts to enhance their capabilities. This is to contrast it with ‘mechanisation’ which created new sector with larger harbor based boats\(^{185}\). In motorisation, traditional crafts such as plank built boats, dugout canoes and catamarans are fitted with Out-Board Engines (OBE). In a motorised craft human labor power is substituted by mechanical power for propulsion and fishing continues to be done through human labor. The engine is fixed to a bracket fitted on the starboard side of the craft. The motorised fishing has contributed 24% of the total marine fish landings of the country (CMFRI 2006) and 75591 motorised crafts were in operation accounting for 28.55% of the total marine fishing fleet size in India (CMFRI 2005).

3.4.5 Trend and present status

The various research and development initiatives on mechanisation of fishing crafts and the emphasis on fisheries development as a focal theme of five year plans (Table 3.1) in India have grown the marine fisheries sector in India to the level of a major industry over the years. The increased fishing efficiency and range of operations have pushed a large number of fishermen to adapt to mechanisation of fishing crafts. As a result, there is a phenomenal increase in the number of

\(^{184}\) Nizha Elizabeth, op.cit.
\(^{185}\) Cassandra de Young, op.cit.
mechanised crafts in India over a short span of time. In the year 1950-51 there were only 13 mechanised fishing crafts in operation in India. The number increased to 1390 crafts in 1960-61, i.e., around 107 times, within a decade. In the late 1970’s (1979), it increased to 19,000, in the late 1980’s (1987), it increased to 24,000 and in late 1990’s (1997-98), it rose upto 47,078. In the year 2001, the number of mechanised fishing crafts in India was 53,684. Thus, within five decades, there was an unimaginable increase in the number of mechanised fishing crafts in India. The growth rate in this period is registered as 4130 times (Table 3.2). The motorisation era of traditional crafts which began in 1979 and registered substantial growth in 1990s also contributed to the enormous growth in mechanised fishing industry. By the end of 1990s (1997-98), the total number of crafts motorised along Indian coast were 31,726 which rose to 44,578 in 2001 and 71,961 in 2010 (Table 3.3).
<table>
<thead>
<tr>
<th>Plan period</th>
<th>Duration</th>
<th>Major development</th>
</tr>
</thead>
<tbody>
<tr>
<td>I Five Year Plan</td>
<td>1951-1955</td>
<td>1. Mechanisation of Indigenous artisanal craft</td>
</tr>
<tr>
<td>II Five Year Plan</td>
<td>1956-1960</td>
<td>1. Introduction of mechanised fishing vessels</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2. Introduction of modern gear materials</td>
</tr>
<tr>
<td>III Five Year Plan</td>
<td>1961-1965</td>
<td>1. Substantial increase in the use of synthetic gear materials</td>
</tr>
<tr>
<td>Three annual Plans</td>
<td></td>
<td></td>
</tr>
<tr>
<td>IV Five Year Plan</td>
<td>1969-1973</td>
<td>1. Imports for traveler for deep-sea fishing</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2. Indigenous construction of deep sea travelers</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3. Fishing harbor at major &amp; minor ports</td>
</tr>
<tr>
<td>V Five Year Plan</td>
<td>1974-1978</td>
<td>1. Diversification of fishing, introduction of purse seining</td>
</tr>
<tr>
<td>One Annual Plan</td>
<td>1979</td>
<td>1. Motorisation of artisanal craft</td>
</tr>
<tr>
<td>VI Five Year Plan</td>
<td>1980-1984</td>
<td>1. Exploratory survey in offshore grounds</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2. Declaration of EEZ in 1977</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3. MZI Act 1981 for regulation of foreign fishing vessels</td>
</tr>
<tr>
<td>Two Annual Plans</td>
<td>1990-1991</td>
<td>1. Substantial growth in motorised artisanal fleet of ring seiners on west coast</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2. Introduction of Beach landing crafts on east coast</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2. Development of Coastal aquaculture</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3. Substantial growth in motorised artisanal fleet of ring seiners</td>
</tr>
<tr>
<td>IX Five Year Plan</td>
<td>1997-2002</td>
<td>1. Stay-over fishing</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2. Growth of motorised sector</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3. Resource specific fishing by travelers and drift grill nets</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4. Installation of artificial Reefs/FADs</td>
</tr>
<tr>
<td>X Five Year Plan</td>
<td>2002-2007</td>
<td>1. Development of ocean fisheries and deep-sea resources like Shrimps and lobsters</td>
</tr>
</tbody>
</table>

**Source:** Evolution of Fisheries and Aquaculture in India, Pillai N.G.K & Pradeep K. Katiha, CMFRI, Kochi; 2004 (Modified)
With the increased mechanisation of fishing crafts, the fish production in India also increased and there has been a considerable increase both in the quantum and value of export of fish and fish products since 1960-61. The total fish production in India during 1950-51 was 5,34,000 tones which increased to 8, 80,000 tones in the year 1960-61. Within another two decades (By 1980-81), it is increased to 15,55,000 tones and during 2000-01 the total fish production in India was 28,11,000 tones. Thus within a five decades of mechanisation era the fish production has increased by 5.3 times (Table 3.4). Obviously, this increase in fish production is attributed to mechanisation of fishing industry. However, the percentage of marine fish production in total fish production in India has decreased constantly due to the rise inland fish
production which attributed to the development of aquaculture in our country\textsuperscript{186}. The mechanisation of the fishing industry also has resulted into a considerable increase both in the quantum and value of export of fish and fish products from India. In 1960-61 the total quantity of marine products export from India was 19,900 tones which had a value of 10 million US $. Within a decade from the introduction of mechanisation, marine products export from India increased by 64 per cent in terms of quantity and by 4 times in terms of value (Table 3.5). The marine products export in terms of quantity increased to 75,591 tons in 1980-81, 1,37,667 tones in 1990-91, 4,40,473 tones in 2000-01 and 8,13,091 tones in 2010-11 which represent 3.23 %, 2.95%, 3.18% and 3.14 % respectively of the total exports from India. The marine products export from India had a humble beginning in 1960’s with shrimp export. But today the export basket of fisheries includes more than 60 items. However, shrimps remains the major items of fisheries export in terms of both quantity and value\textsuperscript{187}. The diversification in the items and increase in quantity of marine products export is obviously due to the increase in the mechanisation of fishing crafts which has led to large scale fishing activities.

\textsuperscript{186} Anjani Kumar, Pradeep Kumar, Jul-Sep 2003, Food Safety Measures: Implications for Fisheries sector in India, Indian Journal of Agricultural Economics, Vol 58, No.3.

\textsuperscript{187} Anjani Kumar op.cit
Table 3.2
Number of Mechanised Boats in India 1950-51 to 2009-10

<table>
<thead>
<tr>
<th>Year</th>
<th>Number of Boats</th>
</tr>
</thead>
<tbody>
<tr>
<td>1950-51</td>
<td>13</td>
</tr>
<tr>
<td>1955-56</td>
<td>463</td>
</tr>
<tr>
<td>1960-61</td>
<td>1390</td>
</tr>
<tr>
<td>1965-66</td>
<td>3045</td>
</tr>
<tr>
<td>1968-69</td>
<td>4456</td>
</tr>
<tr>
<td>1973-74</td>
<td>10413</td>
</tr>
<tr>
<td>1976-77</td>
<td>11352</td>
</tr>
<tr>
<td>1978-79</td>
<td>19000</td>
</tr>
<tr>
<td>1985-86</td>
<td>22906</td>
</tr>
<tr>
<td>1986-87</td>
<td>24000</td>
</tr>
<tr>
<td>1991-92</td>
<td>35000</td>
</tr>
<tr>
<td>1994-95</td>
<td>47788</td>
</tr>
<tr>
<td>1997-98</td>
<td>47098</td>
</tr>
<tr>
<td>2000-01</td>
<td>53684</td>
</tr>
<tr>
<td>2004-05</td>
<td>58911</td>
</tr>
<tr>
<td>2005-06</td>
<td>59799</td>
</tr>
<tr>
<td>2009-10</td>
<td>71961</td>
</tr>
</tbody>
</table>

Source: Indian Fisheries 1947-77, Indian Ocean Fishery Commission
         Marine Fisheries Census -CMFRI (1979 onwards)
**Table 3.3**
Number of Motorised Crafts in India 1994-95 To 2009-10

<table>
<thead>
<tr>
<th>Year</th>
<th>Number of Crafts</th>
</tr>
</thead>
<tbody>
<tr>
<td>1994-95</td>
<td>31726</td>
</tr>
<tr>
<td>1997-98</td>
<td>31726</td>
</tr>
<tr>
<td>2000-01</td>
<td>44578</td>
</tr>
<tr>
<td>2004-05</td>
<td>75591</td>
</tr>
<tr>
<td>2005-06</td>
<td>75057</td>
</tr>
<tr>
<td>2009-10</td>
<td>71961</td>
</tr>
</tbody>
</table>

Source: Marine Fisheries Census -CMFRI

**Table 3.4**
Marine Fish Production in India 1950-51 to 2010-11

<table>
<thead>
<tr>
<th>Year</th>
<th>Fish Production (in 000 tones)</th>
<th>Annual Growth rate (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1950-51</td>
<td>534</td>
<td>--</td>
</tr>
<tr>
<td>1955-56</td>
<td>596</td>
<td>2.32</td>
</tr>
<tr>
<td>1960-61</td>
<td>880</td>
<td>9.53</td>
</tr>
<tr>
<td>1965-66</td>
<td>824</td>
<td>-1.27</td>
</tr>
<tr>
<td>1970-71</td>
<td>1086</td>
<td>6.36</td>
</tr>
<tr>
<td>1975-76</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>1980-81</td>
<td>1555</td>
<td>4.22</td>
</tr>
<tr>
<td>1985-86</td>
<td>1716</td>
<td>1.06</td>
</tr>
<tr>
<td>1990-91</td>
<td>2300</td>
<td>1.10</td>
</tr>
<tr>
<td>1995-96</td>
<td>2707</td>
<td>0.56</td>
</tr>
<tr>
<td>2000-01</td>
<td>2811</td>
<td>-1.44</td>
</tr>
<tr>
<td>2005-06</td>
<td>2816</td>
<td>1.33</td>
</tr>
<tr>
<td>2010-11*</td>
<td>3220</td>
<td>-</td>
</tr>
</tbody>
</table>

Source: Handbook on Fisheries statistics 2008
* Annual Report 2011-12, Department of Animal Husbandry, Dairying and fisheries, Ministry of Agricultural, Delhi.
### Table 3.5

**Export of Marine Products from India 1980-81 to 2010-11**

<table>
<thead>
<tr>
<th>Year</th>
<th>Quantity (Tonnes)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1980-81</td>
<td>75591</td>
</tr>
<tr>
<td>1985-86</td>
<td>83651</td>
</tr>
<tr>
<td>1990-91</td>
<td>137667</td>
</tr>
<tr>
<td>1995-96</td>
<td>296277</td>
</tr>
<tr>
<td>2000-01</td>
<td>440473</td>
</tr>
<tr>
<td>2005-06</td>
<td>512163</td>
</tr>
<tr>
<td>2010-11</td>
<td>813091</td>
</tr>
</tbody>
</table>

**Source:** Handbook of Fisheries Statistics 2014

### 3.4.6 Post-Mechanisation Development

The advent and spread of mechanised fishing technology has completely transformed the fishing sector in India. Mechanisation led to industrialization of fishing. It has led to the development of new fishing technologies, designing of new crafts, development of different types of fishing gears and opened the way for mechanisation of fishing process and developed it as a mass production and capital intensive industry. It led to the development of different types of fishing gears like trawls, purse seines, hand lines and traps and diversified fishing techniques such as single boat and two boat mid water trawling and light attracted purse seiners. Motorisation of traditional crafts have improved the mobility of fishing crafts and the productivity of the fishing operation. It increase the physical productivity and harvesting of new species. It has given a big boost to the use of ‘ring seines’. Ring seine is an offshoot technology from the motorisation process and they were nothing but a smaller version of the larger distractive purse seine nets and it was adapted in large scale by traditional fishermen in Kerala. Motorisation increased the

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189 Pillai N.G.K., op.cit.
190 John Kurien et al., op.cit.
mobility, enhanced the accessibility of fishing ground, increased job opportunity, increased return increased wage to labor etc. Due to motorisation, employment opportunity is doubled since the motorised catamarans requires 3-5 persons instead of only 2 for non motorised units. The increased mobility and the easy accessibility of fishing ground for the motorised catamarans resulted in higher gross return of almost 6 times as compared to the returns of catamarans without Out Board Engines. The wage earners of motorised units earn about 30% higher than those of the non motorised units 191.

Motorisation has resulted into rapid changes in the 1990’s in the fisheries sectors, particularly small scale fisheries. Boat building (wood to FRP), propulsion system (sail power to motor power), fishing gears (organic fiber to Synthetic yarn) net making (manual to factory made), specialization of fishing method (multi gear to species specific gear), fishing distance (on shore to mid water), fishing duration, on board and on shore preservation and processing systems have all undergone many changes 192. It enabled to exploit the rich grounds of deep sea resources and economically valuable species such as lobsters, shrimps, large perches, squids etc and export of diversified marine products from the deep sea such as prawn, frozen lobster tails, lobster meat, kheema etc. 193. On contrary to the above, it created a lot of conflicts with the traditional fishermen and between fishermen using motorised crafts and those using trawlers 194.

192 Srinath and Pillai, op.cit.
193 Bensam P., op.cit.
194 John Kurien et al., op.cit.
3.5 Mechanisation in Kanya Kumari District

3.5.1 The beginning

Mechanisation of fishing in Kanyakumari was introduced under Indo-Norwegian Projects in early 1960s. Mrs. Lourdammal Simon, then Tamil Nadu State Minister for Rural Development and Fisheries (1957-1962) under the chiefministership of Mr. K. Kamaraj, took initiatives to introduce mechanised boats and nylon fishing nets in Kanyakumari District. By the time, the efforts were not much appreciated by the fishermen.\(^{195}\)

Motorisation of fishing crafts in the district also has a long history. Attempts at motorisation begun one decade after introduction of mechanised boats in the district. As the sea in the district is rougher, particularly in its deeps out, catamaran is the logical craft for year round operations. In the fishermen in the district, who are the most versatile fishermen in the country using hooks and wide variety of gillnets and with a wide range of sea faring and fishing skill, have been traditionally migrating to central and northern Kerala during the lean season (November to February) to tap the off shore resources. It is this set of fishermen who started using motors initially on catamarans and subsequently on plank built and plywood boats.\(^{196}\)

Introduction of machine boats in the 1950’s created a new class of fishermen in the district as in case of other parts of India and Tamil Nadu. While the rush for catching prawns which was called ‘Pink Gold Rush’ attracted outside entrepreneurs and non operating merchant capitalist towards mechanised fishing in other parts of India and Tamil Nadu, in Kanyakumari district the class of mechanised trawler

\(^{195}\) Vareethaiah Konstantine, 2010, “Meenavar Munnodi Lourdammal Simon (Tamil), Neithal Veli, Nagarcoil, p. 17.

\(^{196}\) John Kurien et al, op.cit., p. 9.
owners arose from within the catholic fishing population. There were a wide spread
attacks on trawlers by artisanal fishermen in the late 1970’s as incase of the entire
Tamil Nadu coast. Therefore, 3 miles inshore zone was reserved for artisanal fishing
in Tamil Nadu by enactment of Marine Fisheries Regulations Act, 1983. It became a
territorial marker for the divisive hostility between mechanised and artisanal
villages.\footnote{Ajantha Subramanian, op.cit.}

The trawlers were attacked when they transgressed the 3 mile inshore
boundary, over exploited the resources and damaged the gears of artisanal fishermen.
A decade after the on set off the prawn rush and frequent classes between traditional
fishermen and this new class of fishermen, the Roman Catholic church of the district
(Diocese of Kottar) began to talk about the rights of the poor artisanal fishermen thus
ensuing that the “option for the poor” was manifested in a church project to motorise
artisanal crafts

3.5.2 The Initiatives

In 1963 Fr.James Tombeur, a Belgian catholic Priest served in the Roman
Catholic Diocese of Kottar of Kanya Kumari district and a Belgian technician who
was invited to help in the creation of a palm sugar plant at a village Parakkunnu
evisaged some action for development of fisheries by an intermediate technology:
Mechanisation of catamarans. The technician got an old out board engine and a rubber
boat from a private party at Pondichery and with a 10HP out board engine and gave
demonstration to the fishermen about the advantages of out board engines. This
attracted the attention of the fishermen and created the desire to motorize their crafts

\footnote{Ajantha Subramanian, op.cit.}
with out-board engines. In this background, an experimental projects was prepared and proposed through Kottar Social Service Society – a social development organization of the Roman Catholic Diocese of Kottar – for the supply of 100 outboard engines with the workshop facilities to be built at Muttom. The Caritas Austria sanctioned the proposed workshop. The Belgian technicians with ambitious plans contacted FAO and the newly begun ‘Freedom From Hunger Campaign’ in Belgium and Indian Government for a big program named ‘Indo-Belgium Fisheries Project (IBFP)’. The proposal got materialised and it was initiated as a collaborative venture of the Government of India and Belgium and patronized by the FAO\textsuperscript{198}. A project director, a master fishermen and an outboard engine technician were invited from aboard. The project commenced in the year 1969 in Muttom village\textsuperscript{199}.

Under the project 100 powerful 18HP Evinrude Petrol/Kerosene engines were imported from Belgium and distributed to the fishermen at concessional rate. The fishermen were expected to repay Rs.1200 towards the customs duty which was initialised advanced by IFFHC and the cost Rs.2400 was paid by BFFHC. The project included a workshop to extend training facilities and to undertake repairs and also an insulated van for marketing.

During the first year of operation the project was an economic success due to greater mobility of the crafts and increased catches of prawns. However, the outboard motor experiment was wound-up in 1973 due to fishermen’s wrong expectation that they would be provided at free of cost. Moreover, the lowest HP of motors was 18 which was far too high for the needs of the fishermen. The custom duty was also high,

\textsuperscript{198} John Kurien, op.cit., p. 6.
i.e. 60% of the value of engine. Further, after sometimes, due to some conflicts with regards to projects, it lost its push\textsuperscript{200}.

The transition from traditional crafts to plywood boats fitted with out-board engine began to trickle in 1982 and attained the proportion of a tide in 1994. The first prototype of the plywood boats was launched in 1982. It was an outcome of a decade old history of continuous inventive activity. The history started in 1972 when Fr. James Tombeur, Director of the Kottar Social Service Society (KSSS), a social service organisation of the Roman Catholic diocese of KanyaKumari district in Tamil Nadu.

The failure of out board motor project under the auspices of the Indo-Belgium Fisheries Project which he initiated, acted as a strong motivator for Fr.James Tombeur to find a solution to help the small scale fishermen of the region. He was searching for an engineer who could spend a few years with the fishermen of the district in order to build Fiber Reinforced Plastic (FRP) boats. He found Pierre Gillet, a Belgian Electro mechanical Engineer- cum- Priest. On Fr.James’ advice, Gillet took a short training in large FRP boat building factory in France and acquired some hand on experience in FRP boat repair and maintenance at a small yard. He got training in maintenance of diesel engines in England and arrived in India in the mid 1973. He started a training program for unemployed graduates in FRP molding in the new Boat Building Training Centre (BBTC) at Muttom under the auspices of the new KSSS Fisheries Development Project (KSSS – FDP) ,the successor of the IBFP which was formerly closed down at the end of 1973. Gillet realised that the training would be useful if it

\textsuperscript{200} James Tombeur, op.cit.
is combined with the practical task of building boats. He opted to construct 30 feet trawlers which were designed under INP and in great demand in that time. However, due to the infrastructural limitations of BBTC, this option was ruled out. Then it was opted to construct 21 feet keel hull commonly built in Cochin, which could be used for gillnetting when fitted with a 30 HP in board diesel engine. Five of these boats were built in by the trainees and named BIM series. As they were far outside the reach (Rs 120000 in 1974) of the average artisanal fisherman, they were given to fishermen sangams formed by the KSSS-FDP on a hire purchase basis. The boats were operated on cooperative basis. Though the fishing operations were successful, due to the poor repayment performance, the venture to fabricate more new boats thus aborted and the management of the fleet was taken over by the KSSS-FDP.

Then the BBTC took up the task of building a trawler of 7.5 tons installed with Leyland engines. The trawlers built under these specifications were known as KAM series and they attracted the attention for being the largest of their type in south India. However there were no takers for these series and therefore they were run by KSSS-FDP and several years later they were sold to merchants and financiers\(^{201}\).

Later, in order to focus on research and development, it was bifurcated from the manufacturing activity. The research and development unit was named Centre for Appropriate Technology (CAT) and boat building unit was renamed as Boat Building Centre (BBC). Fr.Gillet joined with Mr.F.M.T.Raj, an engineer form Kadiapattinam who had already worked on traditional crafts and experimented new models of crafts built by BBTC. They set an objective to build a prototype of new craft to replace the

\(^{201}\) John Kurien, op.cit., pp. 63-64.
catamarans. On account of an offer from a naval architect named Gifford and the Intermediate Technology Development Group (ITDG) set up by the famous economist Schumacher, they made attempts to build and test some prototypes of a new type of beach landing boat fabricated in marine plywood using a new technique called “Stitch And Glue”.

By the end of 1981, the first sand hoper prototype was constructed and some sea trials were also undertaken. The model was named ‘Muttomcat’. It brought prospects of order for boats from the Department of Fisheries, Tamil Nadu. As they were built with the condition of the sea in mind but used for reservoir fishing, they gained some adverse remarks. Therefore, Gillet and Raju revived their plan for the ideal crafts to replace catamarans. As a result, they designed an elongated Doris type craft of 24 feet long, 3 feet wide and 1\(\frac{1}{2}\) feet height. This model was accepted by Gifford and it was built and tested in Southampton harbor. A prototype, with the addition of two bow pieces to make it look exactly like a catamaran, was made in Boat Building Centre, Muttom and launched in Kadiapattinam. The new boat was named ‘Kottarkat’. It was tested and the test established the technical feasibility of the craft.

By June 1982, BBC Muttom received 3 orders from the fishermen of Vaniakudi and later, a few more orders from other fishermen and from an NGO in Quilon named Fishermen Community Development Programme (FCDP). By the end of 1982, BBC Muttom had a total outstanding order for 25 ‘Kottarkats’. In order to make these innovations commercially feasible, BBC Muttom, CAT and ITDG & Gifford negotiated with SIFFS and transferred the patent right to it. BBC Muttom was
granted the status of associate member of SIFFS. The SIFFS refers to South Indian Federation of Fishermen Sangams, a non-governmental apex federation of fishermen’s organizations from Quilon, Trivandrum and Kanyakumari Districts. It traces its origin to the Marianad Malsya Ulpadaka Cooperative Society and was involved in fish marketing and provision of credit. The SIFFS opened a small boat yard in the fishing village Anjengo in January 1983 and started producing the first ‘Kottarkat’ models. Then it specialized in plywood vallam meant for Quilon. By May 1984, a concerted effort by BBC Muttom and SIFFS had resulted in to a new set of specifications for plywood vallam production standardized for both yards. In the first 3 years of commercial production of the plywood boats (1983-85), BBC Muttom and SIFFS boat yard at Angengo got outstanding orders of 25-35 boats. Between 1982 and 1992, 2462 plywood boats were produced by SIFFS and related boat yards 202.

In the post- 1984 period, the spread of the complementary technology of out-board motors (OBM) was greatly enhanced due to the conscious support offered by the state ad financial institutions for providing OBM to traditional fishermen. Liberal bank credits and Government subsidies became available. The government also permitted more foreign private companies to enter the OBM market and expand their sales networks. Many Indian business houses also entered into the market and tried to explore foreign collaboration. The economic policy of Indian 1980 allowed more liberal import of technology resulted into the appearance of OBM in open market. The Japanese MNC Yamaha appointed dealers in south India who were given a special incentive to hand sell the OBM. The motorisation process was also facilitated by the pioneering efforts of the Kirloskar oil Engine LTD, Pune in the fifties for

202 John Kurien, op.cit., p. 86.
manufacturing marine diesel engines indigenously. Until 1966 marine diesel engines were imported. But, by 1977 there were 9 manufacturers in the country with the capacity to produce engines of even 10000 HP\textsuperscript{203}. Thus, in the post 1998 phase, the OBMs spread over to Kanyakumari District. The fishermen’s decisions to adapt an OBM were coupled with the decision to adapt a plywood boat\textsuperscript{204}

\textsuperscript{204} John Kurien, op.cit., p. 149.
Table 3.6

Trend of Mechanisation of Fishing Crafts in Kanyakumari District

<table>
<thead>
<tr>
<th>Year</th>
<th>Number of Mechanised crafts</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mechanised Boats</td>
<td>Motorised Crafts</td>
</tr>
<tr>
<td>1980*</td>
<td>510</td>
<td>-</td>
</tr>
<tr>
<td>1981**</td>
<td>-</td>
<td>80</td>
</tr>
<tr>
<td>1991@</td>
<td>624</td>
<td>210</td>
</tr>
<tr>
<td>2001@</td>
<td>1383</td>
<td>4116</td>
</tr>
<tr>
<td>2005-06#</td>
<td>2411</td>
<td>5199</td>
</tr>
<tr>
<td>2010$</td>
<td>1050</td>
<td>6672</td>
</tr>
</tbody>
</table>

Source: *An Appraisal of marine fisheries of TN & Pondicherry No 34, CMFRI 1987
** Marine Fisheries Information Service, T & Eseris, No 38, CMFRI, 1982
@Marine Fisheries Census 1991, 2001, CMFRI
#Directorate of Fisheries, Tamil Nadu, Chennai.
$Marine Fisheries Census 2010, CMFRI

Table 3.7

Marine Fish Landings by Mechanised Sector in Kanyakumari District

<table>
<thead>
<tr>
<th>Year</th>
<th>Total Landings (in tons)</th>
<th>Ladings in mechanised sector (in tons)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Mechanised Boats</td>
<td>Motorised crafts</td>
</tr>
<tr>
<td>1978-79 *</td>
<td>54672</td>
<td>54</td>
<td>-</td>
</tr>
<tr>
<td>1980 -81 **</td>
<td>28580</td>
<td>1816</td>
<td>-</td>
</tr>
<tr>
<td>1985-86</td>
<td>64434</td>
<td>6140</td>
<td>-</td>
</tr>
<tr>
<td>1990-91@</td>
<td>37282</td>
<td>3452</td>
<td>210</td>
</tr>
<tr>
<td>1995-96</td>
<td>32291</td>
<td>3744</td>
<td>684</td>
</tr>
<tr>
<td>2001-01</td>
<td>49716</td>
<td>9876</td>
<td>5340</td>
</tr>
<tr>
<td>2005-06</td>
<td>44697</td>
<td>245</td>
<td>10469</td>
</tr>
<tr>
<td>2010-11#</td>
<td>42716</td>
<td>26868</td>
<td>9436</td>
</tr>
</tbody>
</table>

Source: Fisheries Development 2011-12, www.tn.gov.in
*Marine Fisheries Information Service, CMFRI, Cochin, August 1981
** An Appraisal of Marine Fisheries of Tamil Nadu and Pondicherry ,No.34,CMFRI,1987.
@ Fisheries Census 1991, CMFRI, Cochin
# Directorate of Fisheries, Tamil Nadu, Chennai
3.5.3 Trend and Current Status

Even though mechanisation of fishing crafts in Kanyakumari District was introduced in 1950s itself, the level of mechanisation, ie the number of mechanised crafts in the district increased to a significant number (more than 500) only in 1980s. In the year 1980, the number of mechanised boats in the district was 510 which was increased to 624 in 1991 and got tripled in the year 2001-02. However the growth in number of adaption to mechanised boats was very slow as it involves heavy cost of investment. However, adaption to motorisation of traditional crafts and motorised FRP boats has registered an enormous growth in the district over a period of time. The number of motorised crafts in the district at the initial stage which was only 80 (in 1981) increased to 4116 within two decades (in 2001) which was 5140% of the initial number. Within another decade the number increased to 6672 (in 2010-11) which was 162 % of the number in the previous decade. The overall increase in the number of motorised crafts in Kanyakumari District within three decades was 8340% of the number of motorised crafts in the initial stage (Table 3.6).

The main impact of adaption to mechanisation and motorisation of fishing crafts in Kanyakumari district was on the size of marine fish landings. The increased number of mechanised crafts in Kanyakumari district over years has resulted into increased share in the total marine fish landings in the district. The marine fish landings by the mechanised fishing sector in the district in the earlier stage of mechanisation (1978-79) was only 54 tons which was 0.09% of the total marine fish landings in the district. In another two years (in 1981) the quantity of marine fish landings by mechanised sector increased to 1816 tones which was 6.35% of the total marine fish landings in the district. Within a decade (in 1990-91) it increased to 3662
tones which was 9.82% of the total marine fish landings of the year in the district. Similarly, the size of marine fish landings by the mechanised sector has registered a steady increase in the subsequent years also. It was 4428 tons in 1995-96, 15216 tons in 2000-01, 12944 tons in 2005-06 and 36304 tons in 2010-11 which represented 13.71%, 30.60%, 28.95% and 84.99% respectively of the total marine fish landing in the district (Table 3.7). The overall increase in marine fish landings by the mechanised sector in the district within three decades from the intensive introduction of mechanisation (1981-2011) was 67229 %, ie 672.29 times.

3.6 Summary

An overview of the historical development of mechanised of fishing industry in India in general and in Kanyakumari district in particular is presented in this chapter. Even though fishing industry has a long history which dates back to pre-history era, the history of mechanised fishing begins only in twentieth century. In India the history begins only in 1950s. Initiatives for introduction of mechanisation in fishing industry in India was taken by the government as a developmental activity to contribute towards the economic development of the country and to feed the growing population with nutritious food. Followed by introduction of mechanised boats in 1950’s, the motorisation era in which the traditional crafts and FRP boats were fitted with out-board engines started in 1980’s. In Kanyakumari district also the mechanisation and motorisation process started in the same phase. Adaption to mechanisation and motorisation has registered an enormous increase in the district in a few decades and it has impacted on the increase in number of mechanized crafts and fish landings.