CHAPTER – II

REVIEW OF PREVIOUS STUDIES ON MECHANISED FISHING

This chapter is intended to present a review report of the earlier attempts made by scholars and researchers on various aspects of the mechanised fishery sector. The previous studies pertaining to the mechanised fishing mainly concentrated on the impact of mechanisation on the socio-economic conditions of fishermen, fishery output, marine fishery resources, and the overall structure of the marine fishing industry. But only a few studies emphasised the general and specific problems encountered by the boat operators particularly in the mechanised fisheries sector. The available literature on the performance of mechanised fisheries sector is briefly discussed under the following headings.

1. Mechanisation and socio-economic conditions of fishermen.
2. Mechanisation and marine fishery resources.
5. Mechanisation and related other aspects of marine fishing industry.
6. Problems of mechanised fishing.

2.1. Mechanisation and Socio-economic Conditions of Fishermen

Sathiadhas R and Venkataraman G (1981)\(^1\) have studied the impact of mechanisation of fishing on the socio-economic conditions of fishermen of Sakthikulangara and Neendakara coastal villages of Kerala. The study established that the mechanisation had brought out marked improvement in production, employment, infrastructure, export as well as in the social parameters like housing.
and education. It is pointed out that there is a rise in the level of indebtedness of the fishermen investors and it was mainly due to acquiring the new fishing assets. The study further indicated that lack of fishing harbour is the major constraint affecting the socio-economic development of the area.

Ibrahim P (1992)\(^2\) examined the socio-economic impact of the introduction of modern techniques of production into a traditional labour intensive sector which employs indigenous and conservative technology. The study found that the sudden introduction of mechanised boats have brought out more negative effects. In order to minimise the possible adverse effects, the government sought to bring the mechanised fishing under the co-operative sector. The study pointed out a decline in the fishermen employment during the post mechanisation period. The ratio of active fishermen to total fishermen population declined in almost all the districts in which the degree of mechanisation was high. The per capita income of the traditional fishermen declined in absolute and relative terms.

Panikkar K.K.P and Sathiadhas R (1993)\(^3\) have made a study on the structural change in Karnataka marine fishery and its socio-economic implications. The study found that the socio-economic scenario of Karnataka fishery has undergone a structural change in the mid seventies. The change is mainly due to the introduction of new technology in the form of mechanised crafts and gears. Mechanisation has paved the way for the growth of many ancillary industries such as ice factories, processing units, boat building yards and net making factories which have created more employment opportunities and in turn benefitted those
who are in and around the urban centres, rather than the unemployed fishermen in the coastal villages.

Sathiadhas R et.al. (1994)\(^4\) studied the technological change and its impact on traditional fishermen in Tamil Nadu. According to them motorisation of country crafts and improvement in fishing methods have considerably reduced the stress and strain of traditional marine fishing and to a certain extent improved the living conditions of fishermen.

Mahesh V. Joshi (1996)\(^5\) studied the factors affecting the mechanisation of fishing crafts and its impact on marine fish production, household income and the standard of living of fishermen households. The study brought out that there is direct relationship between mechanisation of fishing crafts and employment levels. The average earnings of crew members in mechanised crafts were substantially higher than those of crews in non-mechanised crafts.

The co-operative sector has failed in providing adequate credit to the fishermen. The variable cost per trip of a trawler is higher than the out board motorised boat. The fuel cost is the main item of variable cost in the case of trawlers. The fishermen unanimously recorded their strong opposition against the government policy on deep sea fishing by foreign vessels. The study further highlighted the short run and long run issues of mechanised fishing. The fish stock would be exhausted which has negative effect on employment income and standard of living of traditional fishermen.
Selvasmily C (2007)\textsuperscript{6} attempted to compare the welfare conditions of the fishermen of catamaram sector and mechanised sector in Kanyakumari district. The analysis revealed that the fisher folk in Kanyakumari district deprived of power to enjoy their basic rights. They happened to be in the lowest rung of the ladder and ignorant of various welfare programmes implemented to uplift their socio-economic status. The study further indicated that fuel cost and maintenance cost on craft and gears were the major occupational expenditure in the mechanised sector. A gradual increase in trend was found in the fish catch under mechanised sector.

High tide was considered as a major natural factor limiting the fishing operations. Communal conflicts and group clashes were the main social obstacles to the peaceful co-existence in the fishing villages which has resulted in a decline in the number of fishing trips and fish production.

2.2. Mechanisation and Marine Fishery Resources

Banerji S.K (1973)\textsuperscript{7} ascertained that till the beginning of the seventies the mechanised fishing did not show any significant effect on seasonal fluctuations in output. For a long period as prawns were abundantly available for fishing, the mechanised boats were operated during prawn season only and kept their equipments idle for the rest of the year. The exclusive preoccupation of the mechanised boat with prawn fishing resulted in the concentration of their operations in the inshore a region which was already under excessive exploitation.
A rate of exploitation in excess of their regenerative capacity would lead to depletion.

Kurian J (1978)\textsuperscript{8} analysed the genesis and nature of crisis in Kerala fisheries and the conflicts between modern and traditional fishery sector. The trawler boom caused by unlimited possibilities of prawn export led to polarisation between modern sector and traditional sector. The traditional artisan fishermen feared that an indiscriminate application of over efficient harvesting technology would lead to over fishing and a deleterious impact upon fishery resources.

Sankaranarayanan K.C and Karunakaran V (1985)\textsuperscript{9} attempted to study the major problems faced by the fishing industry in Kerala. The study concluded that the total marine fish catch (mechanised and non-mechanised vessels) have shown a declining trend and it is mainly due to over fishing along the Kerala coast. Further the study suggested a total ban on trawling in the inshore areas, within a distance of about 7 kilometers from shore is required to save the marine resources along Kerala coast.

Kurian J (1985)\textsuperscript{10} has come out with a distinguishing view on the transformation of the fishery economy of Kerala into an open playing field of international capitalism. Kerala fishery remained for a long, the domain of poor and illiterate fishermen who eked out a livelihood by applying their knowledge of fishery environment. The author criticised that the Indo-Norwegian Project (INP) paved the way for the entry of alien capital and big businesses in the Kerala fishery economy by introducing trawler technology, refrigerated transportation of
fish and also by promoting shrimp exports to USA. These developments had their pressure on the fishery resources of Kerala.

**INP:** Indo-Norwegian Project (1953) was launched as a community development programme in the two coastal villages of Kerala - Sakthikulangara and Neendakara, situated on either side of the inlet of the Asthamudi Lake. Fitting suitable engine to fishing boats, provision of repair facilities, introducing new type of fishing gears, improvement in processing and curing methods etc., are the multifaceted action programmes of the INP.

Jacob Mani (1995)\(^{11}\) studied the problems of marginalisation among traditional fishermen in Kerala. The study concluded that the economic and political marginalisation of fishermen started in Kerala in the 1950’s with the commissioning of INP. He claimed that the INP is the main cause for the depletion of fishery resources and the common resources are being encroached upon mainly by affluent industrial classes.

Sanjeeva Gosh (2004)\(^{12}\) in his article discussed the environmental degradation due to indiscriminate bottom trawling which causes severe depletion of the regenerating and renewable aquatic resources. He warned that fishing by mechanised trawler is the most dangerous environmental intervention to the marine aquatic system.
2.3. Mechanisation and Marine Fishery Output

Planning Commission of India (1971)\textsuperscript{13} has made an evaluation on the programme of mechanisation of fishing in all the eight maritime states of India. Samples of 382 mechanised boats and 67 country boats operating in 27 fishing centres were drawn. The report confirmed that the gross catch of the mechanised boat was higher than that of the country boats by 70 per cent and the value of catch was almost three fold. However, it was found that the gross catch per unit investment in country boats was four times higher than that in mechanised boats.

Kurian J. and Ibrahim P (1978)\textsuperscript{14} analysed the economic issues of fisheries sector in relation to mechanisation. The study was based on secondary data and mainly concerned with the trends in production and distribution of fish output during the post mechanisation period. The post mechanisation experience offered objective lessons for the formulation and implementation of development strategy with social justice. The mechanisation process was mainly planned for increasing the income and employment level of traditional fishermen. But it was not fulfilled. It was noted that the fish production during the post mechanisation phase did not show any significant increase and it is claimed that the rise in the value of output is due to price rise. The researchers held the view that employment opportunities, per capita income etc., were also on a downward move and economic conflicts had began to emerge in fishery sector.

Kurian J and Wilman R (1982)\textsuperscript{15} made a comparative study on the costs and earnings of the traditional and mechanised fishing crafts in Kerala. The study...
revealed that the productivity, profitability and contribution to the national economy by artisan fishery units were better than the mechanised vessels. The latter were found to be incurring losses in their operation. However, the earnings of the individual fishermen in the mechanised crafts were found to be the highest. A trawler worker has earned almost double than those in the kattumaram hook and line combination.

Shrivastava, et.al (1986)\(^{16}\) highlighted the impact of mechanisation on small fishermen in Gujarat and Karnataka. According to them fishing is regarded as a powerful income and employment generator as it stimulates the growth of a number of subsidiary industries. Mechanisation has contributed a substantial growth of fish production in Gujarat but a marginal growth in fish production is recorded in Karnataka.

The study identified some economic factors which contributed the rapid increase in the number of mechanised boats. The factors include institutional credit in liberal terms, higher returns of investment on mechanised crafts, wage payment for crew members in terms of predetermined share in the total catch and the faster rise in the fish prices.

Kamalkumar Datta, et.al (1989)\(^ {17}\) studied the productivity, profitability and income distribution in capture fishing of Orissa coast. The analysis confirmed that the non-mechanised fishing units earned low net returns compared to mechanised units. But the net returns of non-mechanised units were higher than that of mechanised units in relation to the capital investment and the operating cost.
Sathiadhas R. and Benjamin R.E. (1990)\(^{18}\) studied the economics of trawler and gillnet units operated in selected centres of Tamil Nadu coast. The main aim of the study was to highlight the comparative economic efficiency of mechanised fishing units operating in different fishing centres of Tamil Nadu. The results revealed that the over dependence on prawn catch for the sustenance of trawlers is slowly being reduced in this region. It is ideal to diversify the fishing techniques to reduce the fishing pressure on prawns and aim more towards catching other varieties of quality fishes. Introduction of bigger boats with longer operational range will further help to avoid the conflict between the mechanised and traditional fishermen.

Sathiadhas R, et.al (1992)\(^ {19}\) undertook a study to evaluate the comparative economic efficiency of craft gear combination in Nagapattinam coast of Tamil Nadu. An overview of production trend showed that the contribution of mechanised boats in the total marine fish landings of Tamil Nadu steadily increased from 28 per cent in 1976 to 62 per cent in 1990. The contribution of trawler units is more than 90 per cent of the mechanised landings and nearly 50 per cent of the total landings of the state. The pair trawling provided a new technique to fishermen to harvest the underexploited marine resources.

Sekar, et.al (1993)\(^{20}\) conducted a study with the objective of analysing the region wise, craft wise, gear wise and period wise marine fish production in Tamil Nadu. The craft wise analysis showed that mechanised crafts alone contributing nearly 59 per cent of the total fish catch. Among the gears, the gillnets accounted
for 39 per cent, followed by trawl net constituted 31 per cent of the total marine fish catch. Moreover, it is found that the fishing activities got its momentum for three month period i.e. between July and September. Region wise production statistics showed that Palk-Bay recorded the highest annual growth rate in fish production whereas the lowest growth rate is recorded in west coast.

Chennubhotla, et.al (1999)\(^{21}\) have conducted a study on the different kinds of mechanised and non-mechanised crafts and gears employed along the Andhrapradesh coast. The study pointed out that until the middle of 1960s, fishing along Andhrapradesh coast used to be carried out by indigenous non-mechanised crafts. Subsequently, trawlers and later mechanised vessels operating with gillnets increased the fish production in Andhrapradesh.

Narayanakumar R, et.al (2000)\(^{22}\) pointed out that the marine fishery sector of Tamil Nadu has experienced tremendous growth and transformed from a subsistence level to the status of an industry mainly through the introduction of modern technology. The overall landings have been increased but a low catch per unit effort and the increased cost of fishing have left some units to run on loss. The study claimed that the mechanised crafts were more efficient despite higher investment and large maintenance cost.

Mini K.G. and Srinath M (2003)\(^{23}\) attempted to analyse the performance of trawling and the fish production and catch composition of Tamil Nadu marine fishery sector. It has been estimated that the annual average fish production in Tamil Nadu was 3.51 lakh tonnes during 1985 – 2000, which represented 15.8 per
cent of the total landings of the country. The production data showed an absolute increase between 1985 and 1992, thereafter, a fluctuating trend was noticed. The upward trend was mainly associated with the increase in the number of trawlers and extension of fishing ground, but the downward movement was accompanied with overexploitation of the fishing ground.

Aswathy N.A, et.al (2011)\textsuperscript{24} analysed the viability of various mechanised fishing units in the Kerala state using different economic and financial indicators. The study revealed that the multiday trawlers of more than six days operation having the highest capital productivity with lowest operating cost. The average cost and return statistics envisaged that the costs and returns are high in the case of trawlers with multiday operations whereas, for gillnetters with multiday operation, the average cost and returns are low. The study suggested that mechanised trawlers, purse seiners and single day gillnetters in Kerala are economically viable and generate sufficient revenue to cover the cost of operation and generate sufficient funds for reinvestment.

\textbf{2.4. Mechanisation and Traditional Fisheries Sector}

Srinivasan (1981)\textsuperscript{25} drew attention on the problems faced by traditional fishermen due to the increasing competition from mechanised boatmen following the prawn boom in Tamil Nadu. He cautioned that if the tempo of trawling continues unabated, the Tamil Nadu coast might experience the diminishing returns which have already set in on the west coast. The author stressed the
importance of diversified techniques in maximising production and improving the productivity of artisanal fishermen.

Ranga Rao V (1987)\textsuperscript{26} has analysed the performance of fishery sector in India. The author examined some of the pressing problems faced by fisheries industry and the possible ways to tackle such problems. Lack of infrastructure development coupled with inadequate marketing facilities seriously affected the growth of fisheries output. Marketing facilities were existed in some areas but inadequate and were unorganised. The entry of deep sea fishing trawlers in the inshore areas is a serious threat to the small fishermen. The author suggested that cooperative organisation is the most suitable form of institution for fisheries development.

Sathiadhas R. and Panikkar K.K.P (1989)\textsuperscript{27} have made a study on socio-economic status of marine fishermen along Madras coast. The study concluded that the traditional fishermen have now become wage earners in the mechanised sector. The study admitted that the rise in income of fishermen is due to higher prices for their catch rather than volume of catch.

Thippaiah P (1989)\textsuperscript{28} investigated the effects of mechanisation on marine fisheries in Karnataka. The study reported that mechanisation has brought out occupational changes in the marine fishing industry of Karnataka. Most of traditional fishermen who were self employed earlier became labourers in the mechanised units for a meagre income.
Sam Bennet P. and Arumugam G (1993) have analysed the impact of motorisation on the traditional fishing in Tuticorin. The study identified that motorisation of fishing crafts brought out significant changes in the lives of traditional fishermen. The figures on fish landing showed a fluctuating trend until 1989 and thereafter it steadily decreased. The study further pointed out that the intensive fishing carried out by motorised units in the inshore areas where traditionally fished by non-motorised units was the main reason for decrease in the fish catch.

Kurian J (1994) analysed the causes of the diffusion of motorised plywood boats along the lower south–west coast of India. The author held the view that the modern sector is poised for a perpetual growth at the cost of the traditional sector in the fisheries industry. But the benefits of technological advancements are misappropriated by a few non-fishermen by marginalising and depriving the majority of the traditional fishermen.

Ambrose Pinto, et.al (1995) analysed the impact of deep sea fishing policy of Government of India. They cited that the introduction of mechanised boats brought forth a number of socio-economic problems. The situation of traditional craft operators is worse due to over fishing by mechanised crafts. In spite of the adverse effects of mechanised crafts on the economy of the traditional craft operators, the government of India has now opened Indian water to foreign fishing vessels, which will have a disastrous impact on the social wellbeing of fisher folk.
Muktha Shet M (1995)\textsuperscript{32} conducted an investigation on the socio-economic conditions of fishermen of Dhakshina Kannada. The investigation report envisaged that the traditional fishermen and small boat owners have been facing threat and challenges from the large mechanised boat owners. Since the marketing practices are under direct control of large boat owners, the smaller ones with a less catch and low unit price find it difficult to get a fair return for their toil. But low unit price was not a problem to the large boat owners, for them, low unit price was compensated by the larger catch per unit effort.

Antony George and Placid G (2000)\textsuperscript{33} recorded the fishermen struggle against mechanised fishing in Kerala. The report revealed that the government’s policy on allowing mechanised fishing in the inshore waters of Kerala resulted in a reduction in the level of income of traditional fishermen. The rapid mechanisation ensures that resourceful entrepreneurs take over the resources that had traditionally belonged to the artisanal fisher folk.

Sathiadhas R, Venkateswaran K (2000)\textsuperscript{34} made a study entitled equity and economic implications of mechanised fishing on traditional fishery in Tamil Nadu. The study concluded that the introduction of mechanised crafts helped to increase the fish production but it adversely affected the livelihood of traditional fishermen. The catch per trip was maximum when the traditional crafts operated alone but the mechanised boats have created more employment opportunities. This may lead to a situation where in the traditional craft owners might leave their occupation and turn to work as labourers in mechanised sector.
Rajasenan O (2001)\textsuperscript{35} attempted to analyse the effects of new technology on the occupational pattern and living conditions of the traditional fishermen. The study expressed the view that the modernising process in fishing industry through the introduction of new technology changed the occupational structure by converting the immediate producers into ultimate wage earners. The traditional fishermen become a deprived and marginalised section in their community.

Henry (2003)\textsuperscript{36} conducted a sample study on mechanised boat owners in Sakthikulangara and Neendakara fishing villages of Kerala found a direct correlation between the economic status of the owner and the technical features of the boats. The poor owners possessed second hand boats which were mostly older boats and with inferior technical features and are less competitive.

The consideration of profit forced the fishermen to introduce over efficient harvesting vessels to enable them access to the remotest regions of the sea which led them to adopt heavily destructive harvesting techniques like stay-over fishing. The large and over efficient vessels render the existence of the smaller and weaker ones very difficult.

2.5. Mechanisation and Related Other Aspects of Fisheries Industry

Achari T.R.T and Devadhas Menon (1959)\textsuperscript{37} using census method, prepared a report on the impact of the Indo Norwegian Project (INP) in Sakthikulangara and Neendakara villages of Kerala. The study takes into account, the owners of mechanised boats, canoes and the labour households working in these vessels. The study established that the fishermen households of
Sakthikulangara responded far more positively to the new technology introduced in fishing. It was found that in Sathikulangara, there was a marked increase in the number of mechanised boats, correspondingly an increase in the assets and liabilities of boat owner households. But in Neendakara village there was an increase in dependence on the traditional technology.

Sandvan P (1959)\textsuperscript{38} gave a detailed account of the origin, aims, location, structural arrangement and functioning of INP in Kerala. The project was initiated at Sakthikulangara – Neendakara in Kollam district, and was, later extended to Cochin and other areas as well. The author narrated the evolution of mechanisation of fishing crafts, starting with 22 ft. clinker beach boat to those of greater size and horse power, culminating in the medium boats, using trawl and purse seine nets. The study highlighted the information on the pioneering endeavours of the Indo Norwegian Project on scientific processing, preservation and marketing of fish, fishery infrastructure and fisheries research.

Platteau J.P, et.al (1985)\textsuperscript{39} have analysed the linkages between credit, labour and marketing in three coastal villages in south Kerala, where the traditional, intermediate and modern fishing technologies operating simultaneously. The study primarily aimed to find out how the variations in the level of technology bring change in the characteristics and functioning of the credit system and magnitude of indebtedness. It was observed that credit, labour and marketing relations are so interlinked as to restrict the freedom of the debtors and to reinforce the impact of imperfections in each market under traditional
fishing. However, in the mechanised sector, where the growth is rapid and credit is abundant the incidence of interlinked contracts based on credit declines.

Nishad Y.P (1987)\textsuperscript{40} in his article socio-economic aspects of motorisation of traditional crafts, analysed the need and factors affecting mechanisation of fishing crafts in Gujarat, Kerala and Tamil Nadu. The study found that the institutional credit and subsidy are the major factors responsible for the mechanisation of fishing crafts.

Korakandy R (1994)\textsuperscript{41} argued that development in the marine fishing industry in India was a direct function of technological change. Kerala enjoyed the primacy for a very long time in production, processing and export of marine products among the maritime states in India. It was due to the direct result of introducing advanced technology in the various domain of fishery industry. He has further argued that the development achieved by the industry was curtailed by the limited growth strategy followed by the state government.

Mukul (1994)\textsuperscript{42} described the conflict between the traditional fisher folk and the mechanised trawler owners on the fishing rights, in several parts of Tamil Nadu and Kerala. He criticised that, it is the failure on the part of government machinery to restrict the conflict.

Varambally K.V.M (1998)\textsuperscript{43} has made a study on marine fisheries in coastal Karnataka suggested the need for appropriate fishery management system. The analysis revealed that the mechanisation programme has brought more than
80 per cent of the fishermen population within its fold. However the mechanised fishery sector is faced with several constraints and new issues.

The economic efficiency of mechanised boats started decreasing. It is pointed out that Karnataka coast has been overcrowded with mechanised boats. In addition to this, the absence of clear cut demarcation of potential fishing area for traditional fishing crafts and mechanised crafts created disputes and clashes between fishermen groups. The mechanised fishing has become uneconomical due to decrease in catch per unit effort and increase in cost of fishing operation.

Krishnan C.K (2003) has examined the recent trends in mechanisation of Malabar fishery sector. The article examined the operating cost of trawlers fitted with inboard engines with ring seiners using kerosene. The study concluded that the active fishermen were more attracted towards the inboard engine boats due to the lower operating cost compared to outboard engines. The average cost of operation per day for a ring-seiner unit using outboard engine was between Rs.5000 and Rs.6000 and for dieselised inboard engine was only Rs.2000.

2.6. Problems of Mechanised Fishing

Mathur P.R.G (1977) has made an investigation in Tanur fishing village of northern Kerala and Annie Felix (1980) conducted an enquiry on fishing in the Vypeen island of central Kerala. The authors pointed out that mechanisation brought out certain structural and organisational changes in the fisheries sector of Kerala. According to them a group of absentee fishermen was emerging and a section of whom came from non-fishing sector.
Abdul Hakkim (1980)\textsuperscript{46} has made a case study by taking into account of few fisheries cooperatives in Quilon district which accounted for the major part of mechanised fishing in Kerala. The study found that the lion’s share of benefits of mechanised fishing in the state was garnered by persons or groups not actually engaged in the fish production sector but the persons who set up the fishery cooperatives.

Sehara D.B.S and Karbahari J.P (1991)\textsuperscript{47} have conducted a study entitled socio-economics of trawler fishing in Saurastra. The study revealed that the trawler owners were availed credit from National Development Corporation under group financing scheme as well as from nationalised banks for adopting the new technology in fishing. The fishermen cooperative society mainly involved in supplying fuel and fishing gears. Marketing of fish is still a major problem to majority of the trawler owners. The economic parameters which were tested by the study proved that the trawler fishing was profitable and economically efficient.

Giriappa S (1997)\textsuperscript{48} has made a study on performance of mechanised and non-mechanised boats. The author stated that the mechanised boats account for bulk of the total catch and the value of catch per boat has increased significantly, whereas, the catch value has come down in non-mechanised boats owing to less catch and their catch mainly consists of less competitive marine species. The study admitted that the new deep sea fishing policy would be a threat to the survival of local mechanised fishery sector. The study suggested that the
mechanised sector need to go for product diversification and long distancing which would help them to stay on fishing.

2.7. Research Gap

The review of previous studies on mechanised fishing revealed that greater attention has been provided on the impact of mechanisation on the socio-economic conditions of fishermen, fishery output and employment, traditional non-mechanised sector, motorised crafts and on marine fishery resources. A few studies outlined the problems encountered by mechanised boat operators especially, on marketing, finance and fishery infrastructure.

Studies on various aspects of marine fisheries economics in Kanyakumari district was conducted by scholars and researchers at various times. Stephen (1993), Maria John (1994), Pazhani (1998), Antony Raj (2002), Amirthaian (2002), Selva smily (2007), Stella Bai (2008) and Krishnan (2010) were mainly concerned with the socio-economic conditions of fishermen, fisheries finance, fish marketing, fishermen and fisherwomen cooperatives and fishermen migration.

Till date, no comprehensive and systematic efforts have been made to probe the economic viability of operating mechanised fishing units and the specific problems that pose threat to the prospects of mechanised fishing in Kanyakumari district. The present study is an attempt to fill this research gap.
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