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**POPULATION CHARACTERISTICS AND TRENDS OF FISHING COMMUNITIES IN
MALAYSIA AND THEIR RELATIONSHIP TO THE LEVEL OF EXPLOITATION OF
FISHERIES RESOURCES**

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1 INTRODUCTION

Based on the 1991 Census the population categorised in fishing households is estimated to be 63.6 thousand for Peninsular Malaysia, which is roughly 0.45 percent of the total 1991 population of 14.1 million. However, little is known about the demographic characteristics of the fishing population. Since this group is a small proportion of the general population the number of fishing households selected in past population studies have been very few to be considered as representative of fishing communities in general. To date we have not been able to locate any specific studies on the characteristics of the fishing population in Malaysia.

The Annual Fisheries Statistics reported that there are about 54 thousand fishers in the marine fisheries sector and 10 thousand aquaculturists in the aquaculture sector in Peninsular Malaysia in 1994. The total employed in the fisheries sector accounts for about 1.29 percent of the total labour force in Malaysia. It is generally accepted that the fisheries resources in Malaysia, especially in the inshore areas, are being overexploited and this is reflected in the policy of reducing the number of fishers in the country.

The aims of this paper are to describe the main characteristics and trends of the general population, since direct data on the fishing communities are not available, describe the main features of the fisheries sector, and to try to look at the relationship of these demographic variables to the level of exploitation of fisheries resources. The paper is divided into three major sections. The section following this introduction will highlight briefly the institutional background of the country. This is considered necessary as the fisheries sector is influenced to a certain extent by the rest of the economy. The section includes a brief discussion on the general economic policies which influence the general directions of both the population and fisheries policies. Section three will focus on the population characteristics of the country. Although there are no specific reference made to the fishing population the characteristics described for the rural population will in general be a good approximation. Section four will discuss the marine fisheries sector. This includes some inferences on the level of exploitation of the fisheries resource. A final summary section concludes the paper.

2 BRIEF INSTITUTIONAL BACKGROUND

Malaysia, formed in 1963, comprises the 11 states of Peninsular Malaysia (formerly the Federation of Malaya which gained independence from the British in 1957) and the Bornean territories of Sarawak and Sabah.¹ Malaysia is a constitutional monarchy with a rotational head of state (the Yang di Peruan Agong) elected for a term of 5 years among the Malay rulers of the Peninsular states.²

¹ Singapore was included in the formation of Malaysia in 1963 but left the new federation in 1965. Both Malaysia and Singapore are currently members of the Association of Southeast Asian Nations (ASEAN) which was formed in 1967. The other original members include Indonesia, Philippines and Thailand. Newer members include Brunei, Vietnam, and Cambodia

Administrative machinery

The government of Malaysia is a parliamentary democracy. The legislature consists of the Dewan Rakyat (elected members of Parliament) and the Senate (members appointed by the Yang di Pertuan Agong and State Legislative Assemblies). General elections are held about every five years.

The chief executive of the government is the Prime Minister. The Economic Planning Unit (EPU) which is responsible for economic planning is in the Prime Minister's Department. The Statistics Department which conducts the population censuses and the National Population and Family Development Board (NPFDB) which is responsible for population and family development programs are also in the Prime Minister's Department.

The fisheries sector is within the jurisdiction of the Ministry of Agriculture. There are two major institutions within the Ministry of Agriculture responsible for fisheries in Malaysia. The Department of Fisheries Malaysia (DOFM) is responsible for the management and conservation of fisheries resources. The Fisheries Development Authority of Malaysia (FDAM) is responsible for the socioeconomic development of the fisherfolk and the development of the fishing industry. The FDAM was formed in November 1971 by an Act of Parliament, Act 49 Fisheries Development Authority Act.

Development plans

Economic planning in Malaysia is considered to be one of the important contributors to the economic development of the country. Planning is undertaken by the EPU within the PM's Department. Planning is done within the context of five year plans which are reviewed and revised in the middle of the period. Both the public and private sectors are participants in the process of drawing up the public policies and programs. The First Malaysia Plan (1MP) covered the period 1966-1970. Malaysia is currently in the seventh plan period (7MP) covering the period 1996-2000.³

The central economic policy of Malaysia is based on the assumption of free enterprise, liberal trade, and foreign capital inflows. The country's heavy dependence on international trade necessitates such a policy. However, the specialisation on a few commodities (rubber and tin at the time of independence in 1957) and the structural imbalance within the sector, and economic inequality between the major ethnic groups require a growth oriented policy. Growth has to be achieved at such a rate to satisfy Bumiputera⁴ aspirations for progress towards parity with the other communities and non-Malay desires to protect and improve their economic position. The policy can be

² Except for Penang and Malacca the other nine Peninsular states each has a ruler (Sultan). Penang and Malacca each has a Governor while the East Malaysian states of Sarawak and Sabah have the Yang di Pertuan Negeri as the appointed heads of states.

³ Before the formation of Malaysia the Federation of Malaya had had two five year plans, the first and second (Malaya) five year plans.

⁴ Bumiputeras consist of the *orang asli* (aborigines), Malays, and non-Malay ethnic groups of Sarawak (Iban, Bidayuh, Melanau, Kenyah, Kayan and Bisayah) and Sabah (Kadazan, Murut, Kelabit, and Kedayan).

described as equitable distribution of growth rather than redistribution of income and wealth between the social classes.

The 1MP continues the objective of the first and second five-year Malaya plans of economic growth with an emphasis on development of the rural sector. The Federal Land Development Authority (FELDA) and the Ministry of National and Rural Development were created under the first five-year Malaya plan. The ethnic riots of May 1969, however, underscored the urgency of diffusing the economic inequality situation within the country. The policies espoused in the 2MP (1971-75) was to determine the development of the country in the decades to follow. The New Economic Policy (NEP) had the overriding objective of promoting national unity by reducing the economic imbalance between the various ethnic groups and regions within the country. There are two main strategies adopted: the eradication of poverty and restructuring of society so as to eliminate identification of ethnic group with economic function. The policy sets long term (20 years) targets for the achievement of the objectives. The end of the fifth Malaysia plan (5MP - 1986-90) marked the end of the NEP. The period 1971-90 also coincided with the first outline perspective plan (OPP1), a period spanning four development plans beginning with the 2MP.

The NEP was replaced by the New Development Policy as outlined in the Second Outline Perspective Plan (OPP2). The New Development Policy was subsequently renamed the National Development Plan (NDP). In 1991 the long term goal of Vision 2020 was launched. This sets the target of gaining industrial nation status for the country by the year 2020. Quite naturally the emphasis of this policy is on the industrialisation of the country, away from agricultural related commodities as emphasised up to the 5MP.

Poverty eradication

In 1970 the incidence of poverty was estimated to be 49.3 percent of the total number of households. As expected the incidence is higher in the rural areas (58.7 percent) compared to the urban areas (21.3 percent). The incidence was also highest for the Bumiputera group (65 percent) relative to the other ethnic groups, Indians (39 percent) and Chinese (26 percent). Bumiputeras formed 74 percent of the poor households in Peninsular Malaysia in 1970. The mean monthly household income of the bottom 40 percent was around RM76⁵ compared to the national mean of RM264. The Gini coefficient for the per capita distribution of income was computed to be 0.513. By the end of the OPP1 period (1990) the incidence of poverty had been reduced to 15 percent. Although the rural areas still had a larger incidence (19.3 percent) compared to the urban areas (7.3 percent), the disparity had been lessened. The national mean monthly household income was around RM1163. For comparison the mean monthly income for the bottom 40 percent was RM421 and the Gini coefficient had been reduced to 0.445 in 1990. The majority of the poor are still from the Malay community situated in the rural areas. The poverty levels in the predominantly rural and Malay states of Kedah, Perak, Kelantan and Terengganu are still above the national average.

⁵ The current exchange rate is RM2.48 to US\$1.

3 GENERAL PROFILE OF THE MALAYSIAN POPULATION

The main source of information on the Malaysian population is obviously the Population Census from the Department of Statistics, and various reports associated with the National Population and Family Development Board. This paper refers to the last three censuses, 1970, 1980, and 1991, for the information on population.

The estimated population in 1991 for Malaysia is 18.4 million with an annual growth rate that fluctuates around 2.5 percent between 1947-57, 2.3 percent between 1970-80 and 2.6 percent between 1980-1991 (Dept. of Statistics, 1995). The population is projected to reach 32 million in the year 2020 with an average growth rate of 1.7 percent (Mashitah, 1995). In 1994, Malaysia's estimated mid-year population stands at 19.6 million (Dept. of Statistics, 1996).

Population distribution

Approximately 50.7 percent of the Malaysian population in 1991 resided in the urban areas (Table 3.1). This percentage is high because of the new definition of urban areas utilized in the current (1991) census. Urban areas are defined as "gazetted areas with their adjoining built-up areas which had a combined population of 10,000 or more at the time of the census" and the built-up areas are "areas contiguous to the gazetted areas and had a population of at least 60 percent of the population aged 10 years or more employed in non agriculture activities and at least 30 percent of their housing units having modern toilet facilities" (Dept. of Statistics, 1995a; p xvii). In the previous two censuses (1970 and 1980), the definition of urban areas was based solely on the density of the population i.e. the gazetted areas with a population of 10,000 or more at the time of the census (Dept. of Statistics, 1983, p xv). Thus the rural-urban dichotomy for 1970 and 1980 are not comparable with the values for 1991.

The ethnic distribution of the population shows an increase in the percentage share of the population for Malays during the intercensal periods, while the Chinese and Indians showed reductions in their share of the population (Table 3.1). This pattern reflects the larger fertility rate among the Malays compared to Chinese and Indians. In 1991, the indigenous population of Sabah and Sarawak are categorized as "other indigenous groups " and together with Malays form the Bumiputera category.

Fertility and mortality rate

As noted in Table 3.1, the total fertility rate is following a downward trend. In 1970 the rate was 5.0 live births per 1000 women but in 1991 the rate has been reduced to 3.3. Further, the crude birth rate of Malaysia's population has also been declining. In 1970, the crude birth rate was 33.7 per 1000 population but declined to 30.9 in 1980 and to 28.1 in 1991.

Beside declining fertility and crude birth rates, the crude death rate has also declined dramatically. The crude death rate in 1970 was 12.4 per 1000 population and has been reduced to 7.0 in 1980 and 4.6 in 1991. Moreover, infant mortality has improved from 39.4 deaths per 1000 live births in 1970 to 12.5 deaths per 1000 live births. The development of lower fertility, and reduction in birth and death rates will

result in fewer younger population but with longer life expectancies. The consequences of these developments will increase the old age dependency.

The figures presented above indicated that Malaysia is undergoing a demographic transition with both fertility and mortality declining. The changes in fertility and mortality rates give rise to changes in the population age structure and family size.

Age structure

The age structure of Malaysia's population is still young where 37 percent of her population is below age 15 years in 1991 and a young dependency ratio of 62 percent (Table 3.1). The dependency ratio reflects the number in the economically unproductive age groups, those below 15 years and the elderly population above 65 years, in relation to the number in the economically productive age between 15-64 years. The total dependency ratio continues to decline from 92.4 percent in 1970 to 68.2 percent over the last 21 years. The age structure will change further with lower fertility and longer life expectancies.

Household size and type

Concomitantly, families will have fewer number of children and with greater chance of survival. This trend is reflected in the reduction of the average household size from 5.5 persons in 1970 to 4.8 in 1991 (Table 3.1). The reduction in household size is experienced both in rural and urban Malaysia.

In 1991, majority (60 percent) of the household types belong to the nuclear family household compared to only 55 percent in 1980 (Table 3.1). Only 26 percent of the household belongs to the extended household type in 1991 compared to 28 percent in 1980. The percentage of nuclear family household was larger (61 percent) than the national average in 1991. In contrast, the percentage of the extended family household in the rural areas was similar to the national average of 26 percent.

Generally, over the two censuses period of 1980-1991, the nuclear family household indicated an increasing trend, while the extended family household showed a decreasing trend.

Mean age at first marriage

Further, more and more Malaysians are delaying marriage which is reflected by the increasing mean age at first marriage. The mean age at first marriage has increased from 25 years in 1980 to 26.4 years in 1991. Population residing in the urban areas marries later than her counterpart living in the rural areas. The different timing of marriage among the urban and rural population was also reported in the Malaysian Population and Family Survey. The survey reported that the urban respondents mean age at first marriage was 21 compared to 19 years among the rural sample (unpublished data).

Median age

Fifty percent of Malaysian population in 1970 was under 17.4 years old. The median age (years) increased to 19.6 in 1980 and further increased to 21.9 in 1991 (Table 3.1) indicating an older population age structure and an impending ageing of

her population. Further, the median age of the urban population is older than the rural population signifying the greying of the urban population.

The improvements in the crude death rate, infant mortality and the longer life expectancies are indicative of the health status of Malaysians in general and also reflect the successful implementations of the primary health care programmes.

Economic activities

The economic activities of the population is shown in Table 3.2. Labour force participation rate for population aged 15-64 years for the total population in 1991 was 62.9 percent. The male participation rate was much higher at 83.8 percent compared to 41.9 percent for females. In addition, the unemployment rate showed a downward trend. The expanded employment created during the Sixth Malaysia Plan has resulted in the reduction in unemployment rate and in fact, the 2.8 percent unemployment in 1995 was the lowest ever recorded unemployment rate for Malaysia. The major provider of work was the service sector where more than 46 percent of the labour force was employed in 1990 onwards. The second highest provider of employment was the agriculture sector where 26 percent of the labour force was employed in 1991. The role of agriculture as the provider of work seem to be declining in importance, where in 1995 it accounts for only 18 per cent of total employment. On the other hand, manufacturing continues to provide employment for a fifth of the Malaysian labour force in 1995.

Looking at the distribution of employment by sex and industry (Table 3.3), four industries seem to employ more males than females in 1970. These industries were transportation (95.7 percent), construction (93.3 percent), electricity (94.7 percent) and mining and quarry (87.4 percent). Women were employed in agriculture (38 percent), community and social services (28.9 percent), and manufacturing industry (28.1 percent).

Generally, the participation of men in all industries are declining while that for the women the trend is increasing. In terms of occupation, more women are employed in the professional, technical and related workers, while more men are employed in the administrative and managerial occupation and sales and related workers. There was a large drop in women's employment in the agriculture sector from 1980 to 1991 (about 24 points, Table 3.4) and a large increase (about 19 points) in the production workers for the same period.

Educational status

The educational status of the population can be analyzed through the school attendance/ enrolment as well as the literacy rate. The population aged 6 years and above, ever attended school has increased from 77 percent in 1980 to 84 percent in 1991 (Dept. of Statistics, 1995a). The increase in school attendance was higher for females, from 71 percent to 80 percent compared to that for males, which increased from 84 to 88 percent during the same period. However, according to stratum, 89 percent of population 6 years and above ever attended school in 1991 compared to 79 percent for the rural population of the same age (Dept. of Statistics, p 110).

The literacy rate for population 10 years and above in Malaysia in 1991 was 86 percent. The urban population was more literate (91 percent) than the rural (81 percent) population. The rural percentage was even lower than the national average.

Household income

The mean gross monthly income for households in 1990 was RM 1167 and increased to RM 2007 in 1995 (Economic Planning Unit, 1996). The percentage of households earning between RM 1000 to RM 3000 per month has increased from 33 percent to 47 percent, while households earning less than RM 1000 per month has been reduced from 61 percent to 36 percent between 1990-1995.

In line with the general improvement in household income, rural households also reported better income distribution. In 1990 the rural household monthly income was RM 951 and increased to RM 1300 per month in 1995 with a 2.5 percent growth rate. On the other hand, urban households recorded higher improvement from RM 1617 in 1990 to RM 2596 in 1995, indicating a growth rate of 8.2 percent. The improvement in income distribution was attributed to the increase in national per capita income.

Health status

The health status of the population has improved tremendously as revealed in the demographic statistics. The improvement in the health status of the population can be attributed to the extensive health delivery systems. For example, in the Fourth Malaysia Plan (1981-1985), the focus of services were in the Maternal and Child Health services (MCH) to improve the health status of the rural population and the disadvantaged groups in the urban areas. Due to the services provided maternal mortality has been reduced to 0.2 in 1993 and infant mortality has been reduced (Table 3.1).

Another aspect of health that has not been studied much is the nutritional status of the population. National data is lacking in this regard. The nutritional status of the population can be analyzed through the birth weights of children, height per weight measure, wasting and stunting growth. A comprehensive study was undertaken by a group of nutritionists between 1992-1995 to gather information regarding the nutritional status of functional groups in Malaysia (i.e. fisherfolk, rubber growers, paddy planters, coconut growers, and the estate population). A total of 2338 households were surveyed and a total of 4779 children were sampled.

The preliminary analysis revealed that, in general, boys and girls in the fishing, paddy, and rubber villages recorded higher prevalence of underweight followed by the estate, and the coconut growers. The fishing, paddy and rubber villages have more than 30 percent incidence of underweight among the boys, while the estates have about 30 percent, followed by coconut villages with 22 percent. The girls in the fishing, paddy and rubber villages have more than 25-29 percent underweight, compared to 25 percent in the estates and in the coconut villages. In addition, the fishing, paddy and rubber villages have a higher prevalence of stunting and wasting than the estates and the coconut growers (Khor, 1996; personal communication).

Population policies

In the 1MP the objective of the population policy was to “lay the groundwork for less rapid population growth by instituting an effective programme of family planning” (p2). The view then was that a high population growth might exacerbate the unemployment problem and reduce the per capita income of the country. Particularly due to the fact that the poorer segments of the population are the ones with larger families this policy will also reduce the income disparity within the population. It was envisaged that at the end of the 20 year period First Perspective Plan (1985) the per capita income will be no more than RM1400 at the current 3 percent growth rate. If the rate can be gradually brought down to 2 percent the per capita income could be raised to RM1500 or more. The current (1965) per capita income was RM950 for the Federation of Malaya. The 1MP announced the proposed establishment of the National Family Planning Board. Family planning was also viewed as having desirable consequences on maternal and child health. Family planning in Malaysia has always been considered in conjunction with the extension of medical facilities and public health. A sum of RM2 million was allocated for family planning purposes. Family planning services will be made available to those who desire them. By the time of the midterm review of the 1MP (1969) the government had passed the National Family Planning Act 1966. The National Family Planning Board began its activities in May 1967. The review also made explicit the desire to reduce the population growth rate to 2 percent by 1985, the last year of the long term (20 year) Perspective Plan.

The 2MP noted the problem of imbalance in the availability of health and medical services (family planning included) and thus one of the objectives of the medical and health programmes of the 2MP was “to support and supplement the family planning programme, through functional integration with the rural health service” (p249). The extension of family planning services to the rural areas (including FELDA resettlements schemes and estates) as well as East Malaysia will help achieve the target birth rate of 32 per thousand population from the current level of 35 (p253). Family planning was considered as part of the total health package to be delivered to the rural population. Integration of rural health service was also a consideration of reducing the cost as well as the staffing problem.

The 3MP continued to report the problem of imbalance in the availability of health services between the states and regions, and the inadequacy of these services and personnel in the rural areas. Thus the objective with respect to family planning was to strengthen the family planning services in both urban and rural areas. The plan sought to reduce further the birth rate from 31 per thousand in 1975 to 28.2 in 1980 (p418).

The 4MP marks a significant shift in the attitude towards family planning. There was no separate section as before for the family planning programmes and neither was there specific targets for the birth rates as in the previous plans. It merely noted the success of the previous plans, reduction of population growth rate of 3 percent during the 1961-70 period to 2.8 percent during the 1971-80 period for the whole country (p373) and 2.6 percent for Peninsular Malaysia (p71). The population health programme mentioned the continuation of “the integrated approach of providing population health services through a package of health services including family

planning services, family health care, nutrition, maternal and child health services” (p379). The reason for the shift is not hard to reason out. The 4MP reported that towards the end of the 3MP there were indications of labour shortages in certain sectors and regions of the country. The sectors include agriculture (paddy cultivation, rubber and oil palm estates) and manufacturing industries employing a large percentage of female workers, and the construction industry (shortage of skilled workers). The unemployment rate for 1980 was reported to be 5.3 percent, down from 7.8 percent (1970) and 6.4 percent (1975) (p81). By the end of the plan period unemployment was expected to be 4.9 percent (p226). During the plan period (1981-85) employment was expected to grow at 3.2 percent while the labour force at 3.1 percent.⁶ This New Population Policy was first announced by the Prime Minister in September 1982 in which he stated that the country could support a population of 70 million (Hamid, 1988).⁷

The New Population Policy was officially stated in the mid term review of the 4MP in 1984. The document mentioned the relatively small size of Malaysia's population and the nation's capacity to generate wealth that can support a much larger population. It also noted that a larger population will enlarge the domestic market for the development of industries as well as providing economies of scale in the provision of infrastructure and other amenities. A larger population, it further reasoned, is not necessarily a liability if the skills and productivity of the population can be enhanced. An ad hoc committee of the Cabinet on population issues finally gave more specific details of the New Population Policy. The total fertility rate would be reduced by 0.1 every 5 years to the replacement level of 2.05 children by the year 2070. By 2100 the stable population of around 70 million will be achieved. An assumption made in the projection is that the life expectancy of Malaysians will steadily increase from 66 years in 1980 to 75 years by 2000 (Hamid, 1988). Some have called this policy pronatalist (Leete, 1996. p59) but it should be pointed out that although the rate of reduction has been reduced the goal of reducing the fertility rate has not been abandoned. In 1984 the National Family Planning Board was renamed the National Population and Family Development Board to reflect the more comprehensive programme with respect to population and family development. The promotion of the use of family planning must surely be deemphasised with the renewed emphasis on promoting family welfare and development.

4 THE FISHERIES SECTOR

The marine fisheries sector in Malaysia has undergone rapid changes during the past three decades from the late sixties to early nineties. The remarkable development

⁶ Leete (1996) noted that since the mid to late 70s there was widespread dissemination of the idea that the resource rich country with its relatively low population density was under populated. He further noted that the shift in policy can be detected as early as the mid term review of the 3MP which no longer mentioned population growth as being a major problem and showed that allocations made for family planning were underspent (p58-59).

⁷ Hamid (1988) noted that based on the current rates for 1961-1984 Malaysia's population would stabilize around 30-40 million.

of the sector during the mid-sixties and seventies has resulted in the increase in the number of fishing units, fisherfolk, motorized vessels and expansion in total fish landings. Many factors have contributed to this rapid development including geographical, economic, social and political factors. The long coastline, the rich fishing grounds off the waters surrounding Malaysia, the concentration of population along the coastal fringes, the need for cheap sources of protein food, high population growth, high demand for fish, rapid industrialization and urbanization, taste preferences, minimal protein requirement and the need for foreign exchange earnings have all contributed to the rapid expansion of the fishing industry during this period. Perhaps one important factor providing tremendous impetus to the fishery development during this period is the policy instituted to eradicate poverty by improving productivity. As a result, spectacular progress in technological innovation and modernization of fishing fleet have occurred during this period.

Rapid development and adoption of modern fishing technology in the sixties and seventies have given rise to the dualistic characteristics of the fishery sector in Peninsular Malaysia, where traditional fishery sector coexists with the commercial sector. The traditional fishery sector is typically small-scale, using small vessels of less than 40 Gross Registered Tonnage (GRT) and traditional fishing gears. The inshore vessels usually operate within the territorial waters, 12 nautical miles from the shore, and have low productivity. On the other hand, the commercial sector uses larger vessels, usually more than 40 GRT and typically operate commercial gears such as trawls and purse seines. The commercial fishing vessels operate further away from the shore and have higher productivity.

Rapid improvements in fishing technology and productivity in the sixties and seventies have severe negative impact on the fishery stocks in Peninsular Malaysia. By the eighties and early nineties, many fish stocks, in particular those found in the inshore areas on the West Coast of Peninsular Malaysia have been overexploited. As a result, fishery policies since the eighties, and continuing into the nineties, are oriented towards resource conservation and management of the fishery resources on a sustainable basis. During this period, inshore fishing fleets and the number of inshore fishers are being reduced and consolidated in order to achieve the optimal level consistent with the sustainable resource objective. The reduction in size of the inshore fishing fleet and inshore fishers has contributed towards increased productivity of the hitherto low productivity traditional fishing group.

The proclamation of the 200 nautical mile Exclusive Economic Zone (EEZ) since early eighties also has significant impact on the Malaysian marine fisheries sector. The EEZ has extended the fishery jurisdiction and has expanded the resource base for Malaysia. Due to this expanded sea areas and additional resources, the development of offshore fishing began to be given greater emphasis. Private entrepreneurs and inshore fishers are encouraged to invest in offshore fishing by the issuing of licenses. The development of offshore fishing has increased the production capacity and productivity of marine fishery in Peninsular Malaysia, particularly on the East Coast.

The purpose of this section is to discern the changes that have occurred in the marine fishery sector in Peninsular Malaysia during the last three decades spanning

from the late sixties to the early nineties. Wherever possible, these changes will also be explained.

Marine fish landings

The trend in marine fish landings in Peninsular Malaysia can be divided into three stages. In the first stage, the marine fish landings showed an increasing trend from 1969 to 1981. During this stage, landings increased by about 115 percent from 302,606 mt in 1969 to 649,313 mt in 1981 (Table 4.1). However, the landing trend was reversed in the second stage from 1981 to 1986 when marine fish landings decreased to about 446,000 mt in 1986. In the third stage from 1987 to 1993, the marine fish landings again showed an increasing trend from 740,565 mt in 1987 to 791,618 mt in 1993. Generally, the West Coast has contributed a larger proportion of the Peninsular Malaysia marine landings compared to the East Coast, but the gap between these two coasts has been narrowing in recent years (Table 4.1). Perak, Selangor and Kedah are the most important states in terms of marine landing contributions on the West Coast while the states of Trengganu and Pahang contribute the most to the East Coast marine landings.

Wholesale value of landings

The wholesale value of landings is presented in Table 4.2. In general, the wholesale value of marine landings in Peninsular Malaysia has increased over the years from 1969 to 1993. Similar trends are observed for both the West and East Coast. The increase in the wholesale value of marine landings in the sixties and seventies may probably be due to increase in landings while in the eighties and nineties it was probably caused by increasing demand due to increases in population, income and changing taste and preference of health-conscious consumers in favor of fisheries products.

Important species landed

Pelagic species, in particular the small pelagics are the most important species landed in Peninsular Malaysia since the sixties and seventies. This is shown in Table 4.3, where nine out of fifteen of the most important species landed in Peninsular Malaysia in 1970, 1980 and 1991 consisted of pelagic species. Small prawns and squids are becoming increasingly important species landed in the eighties and nineties.

Fishing fleets

An explanation of the marine fish landing trends described earlier is due to the variations in the number of fishing vessels used in catching fish. As shown in Table 4.4, the total number of licensed vessels in 1970 was 20,306. A large proportion of these vessels (62 percent) were small vessels of less than 40 Gross Registered Tonnage (GRT). A sizeable number of these vessels (5,277) was non motorized. On the other hand, the number of licensed inboard-powered vessels of more than 40 GRT was small in 1970.

In 1980, however, the total number of licensed vessels in Peninsular Malaysia increased to 30,518, an increase of 50 percent over the decade from 1970 to 1980 (Table 4.4). Except for the non-powered vessels, all the other categories of vessels

registered increases in 1980, with inboard-powered vessels of more than 40GRT registering the highest percentage increases (293 percent and 200 percent for 40-69 GRT and more than 70 GRT categories respectively). The increase in the number of licensed vessels in 1980 was due to the subsidies given by the government for vessels and gear upgrading. The aim of this policy was to increase the catching capacity and productivity of fishers, particularly the inshore fishers in order to alleviate poverty and to uplift their living standards. The increase in the number of licensed vessels, particularly in the higher tonnage categories, has resulted in increase in marine landings during the early eighties.

The number of licensed vessels in Peninsular Malaysia decreased in 1991 to 22,809 (Table 4.4). Much of the decrease was due to the reduction in number of non-powered vessels which were being upgraded to vessels with outboard engines. As a result, the number of outboard powered vessels increased in 1991 to 6,760. The number of inboard powered vessels decreased in 1991 compared to 1980. This was probably because with large increase in the number of vessels in this category during the eighties, the marine fishery resources in the inshore areas of Peninsular Malaysia have experienced overexploitation. Consequently, some fishers left the inshore fisheries and some have moved into deep sea fishery by upgrading their vessels to higher tonnage categories. This trend is shown in Table 4.4, where the number of vessels of more than 40 GRT showed large percentage increases. The percentage increase in the number of vessels of more than 70 GRT is particularly large. This can be attributed largely to the proclamation of the 200-mile Exclusive Economic Zone (EEZ) in the eighties which expanded the marine resource base for Malaysia. Policies were instituted to encourage fishers and entrepreneurs to invest in vessels of more than 70 GRT in order to venture into the exploitation of marine resources in the EEZ.

Fishing technologies

The fishing technologies in Peninsular Malaysia have undergone various changes. Most of these technological changes were started by fishers on the West Coast of Peninsular Malaysia which then spread and became widely adopted by fisherfolk in other regions in Peninsular Malaysia (Yap, 1977). Each change in the technology is accompanied by improvement in fishing productivity.

Fishers in Malaysia employ a wide variety of fishing gears, ranging from traditional gears such as drift nets, handlines, traps, lift nets, barrier nets, push nets and bag nets to more sophisticated commercial gears such as trawl nets and purse seines. Before the fifties, traditional small scale fishing gears dominate the fishery sector in Peninsular Malaysia. The handlines, bag nets, barrier nets, stationary stakes, push or scoop nets, traps and pots and the manual collection of shellfish are mainly used by artisanal fishers close to the shore and on small row boats to meet subsistence needs (Sivalingam, 1993). The lift nets and drift-gill nets were introduced in mid-fifties. These gears are more efficient than the traditional subsistence gears. However, they were more expensive and they did not displace the existing subsistence gears. Presently, the drift-gill net is the dominant gear in terms of number of units licensed and operated in Peninsular Malaysia. As shown in Table 4.5, the percentage of drift-gill net to total gear licensed in Peninsular Malaysia was 44 percent in 1970, 49 percent in 1980 and 57 percent in 1991, while the percentage of drift net to total

gear operated in Peninsular Malaysia was 28, 39 and 45 percent in 1970, 1980 and 1991 respectively. Similarly, the percentage of drift-gill net to total gear licensed and operated on the West Coast showed increasing trend from 1970 to 1991. However, for the East Coast, the percentage of drift-gill net to total gear licensed and operated increased from 1970 to 1980, but the percentage has decreased slightly from 1980 to 1991 (Table 4.5).

Even though drift-gill net is the dominant gear in terms of number, the percentage contribution of drift-gill net to total landings in Peninsular Malaysia, East and West Coast in 1970, 1980 and 1991 were less than 12 percent (Table 4.6). The percentage contribution of other traditional gears in the East Coast and Peninsular Malaysia in 1970 were quite high (Table 4.6). Similarly, the high percentage landings on the West Coast and Peninsular Malaysia were high in 1980, due to the increase landings of cockles, especially in the states of Perak and Selangor, during this period. Thus, it can be seen that the traditional gear in general and the drift-gill net in particular are not that productive. The productivity can be reflected by the catch per unit of gear used as shown in Table 4.7. It can be seen that the productivity of drift-gill net is the lowest among all gear types in 1970, 1980 and 1991. The low productivity of the traditional gears, including the drift-gill net was due to the relative immobility of these gears compared to the commercial gears such as trawl and seine.

The purse seine was introduced to fishers on the West Coast in the late fifties and on the East Coast in early sixties (Sivalingam, 1993). Compared to the drift-gill net, the purse seine requires a much larger capital investment. The successful operation of the purse seine requires not only a high initial investment outlay but also high maintenance, operating and capital depreciation costs. Due to the large capital outlay, the number of units of purse seine licensed and operated in Peninsular Malaysia, East and West Coast in 1970, 1980 and 1991 is the smallest compared to trawl nets and drift-gill nets (Table 4.5). However, the percentage contributions to total marine landings by purse seines are much higher than those by drift-gill nets from 1970 to 1991 despite the fact that the former is much smaller in number (Table 4.6). In terms of productivity measured by landing per unit of gear used, purse seines ranked the highest in Peninsular Malaysia, East and West Coast in 1970, 1980 and 1991 (Table 4.7). The productivity of a purse seine unit is even higher than the trawl net in these regions during the last two decades. Although the productivity of purse seine is high, it may not be as profitable compared to the trawl net due to its high investment, maintenance and operating costs.

Trawl gear was initially introduced to fishers in Penang and Kedah from Thailand in 1963 and it then spread rapidly to other parts of Peninsular Malaysia due to its high efficiency (Jahara and Yamamoto, 1988). Since then, the trawl gear has emerged as an important and significant fishing gear in terms of total number of fishing units, total fishers employed and total marine landings in Peninsular Malaysia.

Table 4.5 shows the number of units of trawl gear licensed and operated in the last two decades for Peninsular Malaysia, East and West Coast. In terms of number, trawl gear ranked second after drift-gill net for Peninsular Malaysia in 1980 and 1991. While the number of trawl gear licensed for Peninsular Malaysia in 1970 was smaller

than drift-gill and seine nets, the number in operation during this period, however, was higher than the seine nets. The discrepancy between the number of trawl net licensed and in operation was probably due to some gears licensed as other than trawl were being converted to and operating trawl nets illegally. For both regions, licensed and operated trawl gears ranked second highest in terms of number in 1970, 1980 and 1991.

The contribution of trawl gear to marine fish landings in Peninsular Malaysia in 1970 was quite modest, with percentage contribution to total landings ranked second highest after seine landings on the West Coast, and ranked second highest after the landings of other traditional gears on the East Coast (Table 4.6). However, trawl net led all other gears in terms of percentage landings for all regions in 1980. This was due to the rapid expansion of the trawl fleet during this period. The percentage contribution of trawl net increased further for Peninsular Malaysia due to increases in the number of units of trawl gear and also the proclamation of 200 mile EEZ in late eighties which further increased the resource base and fishing grounds for the trawl gears, particularly on the East Coast of Peninsular Malaysia.

As a result of increased landings by trawl gear, the productivity increased from 1970 to 1980 for all regions (Table 4.7). Similarly, productivity increased for East Coast, West Coast and Peninsular Malaysia as a whole from 1980 to 1991. The cause of this decline in productivity, as mentioned earlier, was probably due to the overexploitation of the fishery resources in this state. It is also noted from Table 4.7 that the productivity per unit of trawl is lower than that for seine. However, as seen from Table 4.5, the number of trawl gear operated in all regions were much higher than the number of units of seines. This may be due to higher profitability of trawl gear as compared to the seine net since the former requires relatively much lower investment and operating costs.

Number of fisherfolk

The fishing industry provided direct employment to about 80,000 fisherfolk in Peninsular Malaysia in 1993⁸ (Table 4.8). This represent 1.3 percent of total employment of active labour force in Peninsular Malaysia. From 1969 to 1980, the general trend in the number of fishers was definitely increasing, in tandem with the rapid expansion of the fishing industry. However, the trend for the number of fishers reversed from 1981 to 1990. This declining trend was probably due to the overexploited state of the resource or perhaps as a result of the fishery policy objective to conserve marine resources by reducing the number of licensed fishing vessels during this period. In 1993 the number of fishers was 53887. Of this total 60.1 percent (32,382) were on the West Coast of Peninsular Malaysia.

Marine resource potential

The marine fisheries landings are determined not only by the amount of fishing effort (which comprises vessels, gear labour and fishing days or time) but also the

⁸ This figure includes only fishers working in licensed vessels and disregard those in unlicensed vessels, those working part-time and those employed indirectly by the fishing industry such as in fish marketing, boat building, ice making, fish processing etc. Thus, the figure could be underestimated.

potential availability of the fish stocks. In general, the amount of available fisheries resources is determined by the biological and environmental factors. The former include the strength of recruitment, the rate of growth of individual fish and the rate of decay or mortality due to aging and predation. Recruitment and rate of individual growth will add to the stock while mortality rate will reduce the stock size. Among the environmental factors having important impacts on the fish stocks include water temperature, salinity, availability of food, and the level of pollution. Except for the pollution levels, all the biological and environmental factors are not directly controlled by men. In addition, fish in the ocean cannot be counted directly. In order to estimate the potential marine resources, indirect approaches through modelling and resource assessment need to be used. Current, information pertaining to the potentials of fisheries resources are primary obtained from two principal sources, namely:

- (a) Resource surveys conducted by the Department of Fisheries, Malaysia (DOF) and the Fisheries Research Institute (FRIM), and
- (b) FAO reports on fisheries resources in the South China Sea region.

These reports, however, contained only some general indication of stock abundance but did not have sufficient information to indicate conclusively the maximum resource potentials for each species. Detailed studies of the fishery resource potentials in Malaysia are hindered by the multispecies characteristics of the Malaysian fisheries which have rendered studies on fish population dynamics difficult and tedious.

As can be seen from Table 4.9, there appears to be considerable variations in the resource potential estimates among various studies. With such high variability, therefore, these estimates can only be used to indicate the gross potential available yields. In assessing the potential yields of marine resources in the Malaysian water, it is useful to discuss separately the inshore and offshore waters as well as the East and West Coast of Peninsular Malaysia owing to several dissimilarities between these regions.

Inshore resources (0 - 30 miles)

According to studies conducted by DOF, the potential demersal resource yield in the inshore waters of the West Coast was estimated at about 62,000 mt (Shaari, 1976). If semi-demersal resources are included, the total potential yields in the inshore waters of the West Coast amounted to about 90,000 to 94,000 mt (Pathansali, 1976). Tiew (1966) estimated the total potential demersal resource yield at 80,000 mt, while the FAO Workshop on fishery resources off the Straits of Malacca estimated the potential demersal stock to be 100,000 mt (FAO, 1977). The highest yield was estimated by FRIM for the inshore demersal resources of the West Coast of about 110,000 mt (FRIM, 1980).

The above shows that considerable variations (with a wide range of 80,000 to 110,000 mt) exist between various estimates of the potential inshore demersal fisheries resources in the West Coast. Nevertheless, the demersal resources in this region are biologically overfished as evidence from several gross symptoms such as declining trend in the catch per unit effort, extinction of certain commercially valuable species, notably *Lacterius lacterius*, and increased proportion of trash fish in the

landings (Jahara and Yamamoto, 1988). Under these circumstances, increase in fishing effort would not contribute to increase in catch as evident in the landing trend shown in Table 4.1. In other words, the prospect of expanding demersal fisheries in the West Coast inshore waters appear to be bleak. It would appear more appropriate to decrease fishing effort for this fishery in order to allow the stock to rebuild.

The estimation of the potential yields for pelagic resources is difficult because of its migratory characteristics, wide variations in spawning, etc. Estimates of potential pelagic yields at best could only be based on catch trends. Pathansali (1976), Shaari (1976), Chong (1977) and FRIM (1980) estimated the potential yields for the potential pelagic resources on the West Coast to be between 81,000 to 91,000 mt, while a total potential yields of 50,000 to 100,000 mt was estimated by Tiews (1966). It can be seen that the range of variations in the potential pelagic yield estimates is much wider between the various studies. The pelagic resources in the inshore water of the West Coast have also been overexploited (Jahara and Yamamoto, 1988). This implies again that increasing effort is not likely to cause increased catch for the present fishing areas.

The potential demersal and semi-demersal yields in the inshore waters of the East Coast was estimated to be in the range of 95,000 to 200,000 mt (Pathansali, 1976; Shaari, 1976; FRIM, 1980). The FAO Workshop on the demersal resources including prawn resources off the Sunda Shelf estimated that the potential yield was 200,000 mt. Similar to the West Coast, the inshore demersal resources on the East Coast have been exploited to the full potentials, if not overexploited. Thus, it appears that reducing present effort level in the inshore waters is the most sensible step in view of the dwindling demersal resources.

For the inshore pelagic resources on the East Coast, FRIM (1980) provided an estimated potential yield of about 76,000 mt. Pathansali (1976) and Shaari (1976) estimated the pelagic resources in the region to be between 56,000 to 75,000 mt while the estimates by FAO (1977) was 88,000 mt. Compare it with the present catch level, the pelagic resources on the East Coast have been exploited closed to the potential yields.

Offshore resources (beyond 30 miles)

Information on the offshore demersal and pelagic resources on the East and West Coasts of Peninsular Malaysia is scarce. From the estimates by FAO (1977) and FRIM (1980), the potential offshore demersal resources on the East Coast amount to 74,000 mt, about one-third of the estimated potential in the inshore area. For the offshore demersal resource potential on the West Coast, the estimate by FRIM (1980) was 57,000 mt, about half of the potential yield estimated for the inshore fisheries in this region. The estimated potential yield for the offshore pelagic resources in Peninsular Malaysia is virtually nonexistent. The only estimate provided by FRIM (1980) was 57,000 mt. With such scatchy information, it is difficult to ascertain the state of exploitation of the offshore fisheries resources in Peninsular Malaysia. However, from the evidence that foreign vessels from neighbouring countries such as Thailand, Taiwan and Korea have been exploiting the offshore resources in the South

China Sea for a long time but until recently, this indicates that the potential fisheries resources in this region have already been surpassed.

Role of mangroves in fishery production

Mangrove areas generally enhance the availability of food in the nearshore areas and because of the availability of food and their ability to provide shelter or protection from predators they function as important nursery or spawning grounds for many fish species. Sasekumar and Chong (1987) showed a positive linear relationship between offshore prawn catches and area of mangrove forests in Peninsular Malaysia (quoted in Chong, 1996, p18). Singh et al. (1994) found a positive correlation between mangrove dependent fin fish species production and area of mangroves for West Coast Peninsular Malaysia (Chong, 1996, p18). Estimates on the contribution of mangroves to total production ranged from 32 percent of the total capture fishery (Jothy, 1984) to 50 percent for mangrove dependent finfishes (Sasekumar et al. 1994) and 98 percent for prawns (Chong et al. 1994).

Table 4.10 shows the change in the area of mangrove reserves in Malaysia between 1980 and 1990. Overall the area of mangrove forests declined by 11.8 percent within the decade. Except for the state of Malacca, which experienced an increase in hectareage, all the states showed declines in the mangrove area. The decline was greater for the East compared to the West Coast for Peninsular Malaysia, 45.5 percent and 15.4 percent respectively. The percentage for Sarawak was above the national average while that for Sabah was lower than the national average. Figures for the period 1955-1980 showed that the main reason for the conversion of mangrove forests to non-forestry use was agriculture (85 percent). Aquaculture accounted for only 4 percent of the conversions (Razani 1982, quoted in Chong, 1996, Table 3).

State of fisheries resource exploitation

The state of the exploitation of the fisheries resources in Peninsular Malaysia may be shown by several indicators such as the catch per unit of vessel and the quantity of trash fish landings, or more specifically the percentage of trash to total landings. These indicators are presented in Table 4.11.

The landings of trash fish have increased from 1970 to 1991 for the West Coast, East Coast and Peninsular Malaysia as a whole. In percentage terms trash fish are accounting for a bigger proportion of total landings. This increase is more pronounced between 1980 and 1991. For the period 1970 to 1980 the percentage increase of trash to total landings for the Peninsular was mainly due to the West Coast. For the West Coast the percentage increased from 18.8 to slightly more than 25 percent while the increase for the East Coast was marginal. In the second period, however, there were marked increases for both regions, 25 to 35 percent for the West Coast and 19 to 34 percent for the East Coast. Increasing landings of trash fish which include small size, commercially valuable species, is an indication of growth overfishing of the fisheries resources in Peninsular Malaysia.

Catch per vessel of commercially valued species, as shown in Table 4.11, decreased from 1970 to 1980 for the West Coast. However, catch per vessel increased from 1980 to 1991 for the West Coast. For the East Coast catch per vessel increased

throughout the whole period. As a result of the overwhelming increase in catch per vessel for the East Coast, the catch per vessel for Peninsular Malaysia as a whole increased from 1970 to 1991. The earlier decrease in catch per vessel on the West Coast indicates that fisheries resources in this region were being overexploited. On the other hand, the increased catch per vessel on the West Coast indicates that the government policy of controlling fishing effort in the late eighties and early nineties may be effective to contain the problem of overexploitation of fisheries resources. The increasing catch per vessel occurring in the East Coast from 1970 to 1991 may be attributed to the government fishing effort control policy as well as increased in fisheries resources in the region owing to the proclamation of the 200 miles Exclusive Economic Zone and the subsequent expansion of the deep-sea fleet. However, there are signs that this expansion in catch is slowing down (Kusairi and Tai, 1996).

Based on these gross indicators, it can be summarized that the fisheries resources in Peninsular Malaysia experienced growth overfishing from 1970 to 1991. The fisheries resources on the West Coast have been overexploited or at least close to overexploitation, while it is still possible to increase exploitation of the fisheries resources on the East Coast of Peninsular Malaysia.

Fisheries policies

General agricultural policies and programmes in Malaysia are guided by the New National Agricultural Policy (NNAP) which was formulated in 1992. This comprehensive plan was a revision of the earlier National Agricultural Policy (NAP) announced in 1984.

When the NAP was formulated in the mid 80s the agricultural sector was still the single largest and most important sector in the economy. However, its share had been declining over the years and its growth had been slow compared to the fast expanding manufacturing sector. Furthermore current policies have been commodity oriented and independent of one another. The NAP sought to provide a more coordinated approach towards solving the problems in the agricultural sector. The objective of the NAP was "to maximise income from agriculture through efficient utilisation of resources and the revitalisation of the sector's contribution to the overall economic development of the country". Several strategies were formulated and these include: (i) new land development (ii) in situ development to rectify the problems of uneconomic farm size, unremunerative crops and low productivity (iii) agricultural support services such as research, extension, marketing and agricultural taxes and incentives (iv) social and institutional development.

The NAP was reviewed in 1991 and in 1992 the New NAP (NNAP) was announced. The preamble to the new policy stated the need to integrate the NAP and the objectives of the OPP2 and Vision 2020. It also highlighted the emerging problems of labour shortage, limited supply of agricultural land, and human resource issues of lack of managerial and technical skills, innovativeness, and general decline of Malaysia's competitiveness in the world agricultural trade. The basic thrust of the new policy was to accelerate the transformation of the agriculture sector to a modern commercial and sustainable sector. The strategies adopted include: (i) optimum use of

resources (ii) accelerating the development of agriculture based industries (iii) research and development (iv) the role of the private sector (v) reformulating marketing (vi) development of a more dynamic food industry.

As can be expected policies pertaining to the fisheries sector in Malaysia are generally couched within the broad framework of the national economic policy goals.

Fisheries policies under the NEP period (2MP-5MP) essentially translate the national economic policy goals into more specific goals for the sector. Among the important fisheries policy goals include:

- (1) To conserve fisheries resources particularly in the inshore areas.
- (2) To achieve optimal production of fish to fulfill the demand of the nation.
- (3) To increase productivity, income and also the socioeconomic status of fisherfolk.
- (4) To eliminate conflicts between fishers using different gears, particularly between artisanal and trawler fishers in the inshore waters.

Fisheries policies in the seventies are more attuned to objectives (3) and (4), consistent with the NEP goals. During this period, there was rapid development occurring in the fisheries sector, as a result of the modernization and upgrading of artisanal fishing fleets and improved fishing technology of trawlers. Consequently, yields, fishing income, number of fishers and fishing investments have increased in the fisheries sector (Yap 1973; Gibbons 1976; Jahara 1977). In addition, fishing infrastructures such as landing complexes, jetties, roads, transportation and supporting industries such as fish marketing and processing, net making, boat construction, ice factories and cold-room facilities were also developed rapidly (Jahara and Nik Mustapha 1993). As a result of these rapid development, fisheries resources, particularly in the inshore areas have been overexploited. With dwindling resources and increasing number of vessels and fishers, competition to exploit the limited fisheries resources has occurred, resulting in conflicts between artisanal and trawler fishers.

As mentioned above the National Agricultural Policy (NAP) was launched in 1984. As far as fisheries policies are concerned the NAP referred to fish as an important source of protein and mentioned that the country's requirements will be met through the use of modern methods. Off-shore fishing will be promoted with the help of local and foreign expertise. Aquaculture will also be promoted and it was singled out as a potential export revenue earner.

In order to achieve the objectives of NAP, the National Fisheries Development Plan (NFDP) was formulated in 1985. The NFDP outlines the development programmes, strategies and policies for the fishery sector until the year 2000 (Malaysia 1985). The plan is divided into five sections, namely, (1) inshore fisheries; (2) offshore fisheries; (3) aquaculture; (4) support services for development; (5) social and institutional development. Specific strategies are formulated for each of the above components and these are summarized below.

Inshore fisheries

The policies and strategies for this sub-sector are aimed at conserving, rehabilitating and managing the fisheries resources as well as to improve the living standards of inshore traditional fishers. Among the programmes implemented include reduction in the number of fishers from 89000 in 1980 to 30000 in 2000. Vessel licensing programme is also implemented to limit fishing effort. Fishers excluded from the sector will be given training so that they can find job opportunities and be assimilated into other sectors such as aquaculture, food processing, small businesses, offshore fisheries and agriculture. Other programmes implemented to improve the productivity of this traditional fisheries sub-sector include vessel buy-back scheme for those fishers not given licenses, improving biological productivity through biological resources research, establishment of marine parks, construction of artificial reefs and enforcement (Mohd. Ibrahim 1992; Ishak et al. 1993).

Offshore fisheries

Development of the offshore fisheries coincides with the objectives of NAP and is directed towards commercial operations of offshore fishing. The planned programmes for this sub-sector include intensifying research to determine the location of fisheries resources within the EEZ; modernizing fishing fleets by issuing 646 licenses for vessels of size 70 GRT and above; providing credit facilities such as Fisheries Special Loan Scheme (Skim Pinjaman Khas Perikanan, SPKP) managed by the Bank Pertanian Malaysia; developing ports for offshore fisheries; and outlining steps to enforce regulations and to provide security at sea.

Aquaculture

Development of aquaculture is targetted to produce about 160000 mt of fish per year. Among the strategies planned to achieve this target include identifying areas suitable for aquaculture; intensifying research on seeds production, nutrition and fish diseases; providing extension and training services, in particular on culture and management technique to fish farmers; and providing incentives and low interest loans for aquacultural investments.

Development support

Support provided by the Government for the fishery sector as a whole is in the form of research, development, training and infrastructure.

Social and institutional development

In order to improve the social and economic conditions of fishing communities, fisher community development areas are established and the development of fisher's cooperatives will be intensified.

The NNAP was announced in 1992. However, as far as the fisheries sector is concerned there was no significant difference between this and the older policy. It merely acknowledged the need to maintain sustainability of the resource base which can be taken to refer to the need to control fishing effort in the overfished inshore areas as well as the need for proper management of the off shore fishery. The NNAP also mentioned the promotion of deep-sea fishing in the off shore areas and of

aquaculture. Downstream manufacturing activities based on the fish resources will be promoted.

5 SUMMARY AND CONCLUSIONS

The population of Malaysia currently stands at 18.4 million with a growth rate of about 2.6 percent between 1980 and 1991. This growth rate is a reversal of the declining growth rate of around 2.5 percent for the period between 1947 and 1957, and 2.3 percent between 1970 and 1980. This has been attributed to the new population policy which was formulated in the mid 80s. Although total population is growing, the government is still committed to the reduction of the total fertility rate, although the rate of reduction is somewhat slowed. It is expected that the total fertility rate will be equal to the replacement level of 2.05 by the year 2070. The new population policy has targetted a stable population of around 70 million by 2100.

The bulk of Malaysia's population reside in Peninsular Malaysia. Of the total 18.4 million in 1991, 14.1 million (76.6 percent) are in Peninsular Malaysia. The fishing community is estimated to be around 63.6 thousand, or 0.45 percent of the total population in Peninsular Malaysia. This figure is down slightly compared to 67 thousand estimated by the 1980 census, but is higher than the 1970 census estimate of 61.5 thousand.

This fishing population is expected to continue its downward trend due to the outmigration of the fisherfolk community to the rapidly growing industrial sectors of the economy. In view of excessive level of effort in the fishing industry, the government is also discouraging entry into the artisanal subsector of the fishery, where the bulk of the fishers are.

Although the fishing industry is a relatively small sector of the overall Malaysian economy the total value of its output in 1994 was worth RM2.99 billion. This is approximately 1.6 percent of total GDP in 1994. Even though the percentage contribution to GDP has been declining, the ringgit amount has been increasing over the years. (The percentage contribution to GDP was 2.3 percent in 1970, 3.4 percent in 1980 and 2.6 percent in 1990.) Total value of fishery exports was RM865.9 million in 1994. This is about 0.4 percent of total export earnings for the year. (The percentages for 1970, 1980, and 1990 were 2.0, 2.2, and 1.9 percent, respectively.) As with total value of output, even though the percentage contribution of the fishery sector as a foreign exchange earner is declining the absolute values are increasing over the years. In terms of employment generated, the fisheries sector contributed about 1.29 percent to total employment in 1994. (This is down from 2.4 percent in 1970, 2.3 percent in 1980 and 1.7 percent in 1990.)

The number of fishers was reported to be 80 thousand in 1994. About 65.4 percent of these fishers are located in Peninsular Malaysia. The number of fishers was increasing from 1969 (69.6 thousand) to 1980 (89 thousand). From 1980 it decreased to about 60.4 thousand in 1992. In 1993 it began to increase again to 80.3 thousand. This reversal is probably due to the emphasis on the deep sea subsector which began

with the New Agricultural Policy in the mid 80s. The average number of deep sea boats increased from 87 for the 1986-8 period to 269 for the 1990-93 period, an increase of more than 200 percent.

In 1994 there were 41,114 boats licensed in Malaysia. Peninsular Malaysia accounted for 46.4 percent (19,088) of these vessels. Seventy percent of Peninsular Malaysia boats are in the West Coast.

Most of the vessels are motorised though a large majority are small, less than 40 GRT. Between 1970 and 1980 the number of vessels has increased. Since 1980 the number has been decreasing to the present level. The number of large boats (greater than 70 GRT), however, has been increasing since the emphasis given to the exploitation of the EEZ fish resources within the ambit of the NAP. In the late 80s large vessels constitute about 2 percent of the total trawl fleet and 9 percent of the seine fleet. For the early 90s (1990-1993) the corresponding figures are 5 percent for trawls and 22 percent for seines. In 1994 there are 582 large vessels licensed with 429 (73.7 percent) in the Peninsular Malaysia. Of these 39 percent (168) are in the West Coast. Since seine vessels generally employ a larger number of fishers (23 compared to 6.6 for trawls in Peninsular Malaysia) the impact on the number of fishers is obvious.

In 1994 total marine landings in Peninsular Malaysia was 785,079 mt. The West Coast accounted for 58.6 percent of these landings. Trawls (59 percent) and seines (20.6 percent) account for the bulk of this landings. Traditional gears account for only 8.5 percent of total landings.

The pattern for fish landings show the same trend as that of number of fishers and number of vessels. Overall landings show an increasing trend for the 69-81 period. Landings was 303 thousand mt in 1969 and 649 thousand mt in 1981. Since 1981 landings has been decreasing till the late 80's when it showed an upward turn.

From the evidence of trash fish landings and catch per vessel, the fish stocks are showing signs of overexploitation, especially in the inshore areas and in the West Coast. It is generally agreed that coastal mangroves contribute to the productivity of the fisheries sector. The evidence presented indicated that mangroves areas have been declining.

Several general implications can be inferred from the above. As the population increases, becomes more urbanised, and becomes more affluent, the demand for fishery products is likely to increase. Also as the general awareness for health issues increases, the positive aspects of fish consumption will also favour increased consumption. On the supply side, although labour into fishing has to compete with the more preferred employment in the other sectors, the decline in labour employed can be more than compensated by the adoption of more productive, and potentially more destructive, technology. Furthermore, fish stocks have been affected adversely from influences on the environment, exemplified by dwindling mangrove areas. All these translate to increased pressure on fish stocks.

Fortunately, the above does not necessarily mean the eventual destruction of all fish stocks. It merely points to the need for better management. Although pressure on overexploited inshore stocks, due in part to the ease of entry into the fishery and difficulty of detection, must be relieved by the reduction of effort. More importantly, new stocks must be found and incentives provided for them to be exploited. This is especially true with respect to the labour input. Inherent in management is the necessity for accurate and timely information. Identification of new stocks and monitoring their health require substantial investment in research capabilities. The policy of effort reduction requires adequate investment in surveillance and enforcement activities.

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Table 3.1. Malaysia: Selected Demographic Indicators and Family Structural Variables, 1970, 1980, 1991

INDICATORS	1970	1980	1991
Total population (million)	10.3	13.1	18.4
Urban population (%)	26.4	34.2	50.7
Female life expectancy at birth (yrs)	66.5	70.5	73.7
Male life expectancy at birth (yrs)	62.2	66.4	69.0
Population age structure in age groups (%)			
0-14 yrs	44.9	39.6	36.5
15-64 yrs	52.0	56.8	59.8
65+ yrs	3.1	3.6	3.7
Ethnic Composition			
Malay	52.7	55.3	58.3
Chinese	35.8	33.8	28.7
Indians	10.7	10.2	9.4
Others	0.8	0.7	2.9
Other indigenous group	-	-	0.9
Median age	17.4	19.6	21.9
Rural	16.7	18.7	20.2
Urban	18.9	21.3	23.5
Crude death rate	12.4	7.0	4.6
Infant mortality rate	39.4	23.9	12.5
Crude birth rate	33.7	30.9	28.1
Total fertility rate	5.0	3.9	3.3
Maternal mortality	1.40	0.60	0.19
Total dependency ratio (/100)	92.4	76.0	68.2
Rural	98.0	84.0	79.0
Urban	77.0	63.0	58.0
Young dependency ratio (/100)	86.5	69.6	62.0
Rural	92.0	77.0	71.0
Urban	71.0	57.0	53.0
Old dependency ratio (/100)	6.0	6.0	6.0
Rural	6.0	7.0	7.0
Urban	6.0	6.0	5.0
Mean age at first marriage	-	25.0	26.4
Urban	-	26.1	26.9
Rural	-	24.2	25.8

Table 3.1. (Continued)

INDICATORS	1970	1980	1991
Household type			
One person	-	9	8
Nuclear	-	55	60
Extended	-	28	26
Related person	-	6	3
Unrelated person	-	2	3
Average household size	5.5	5.2	4.8
Rural	5.4	5.2	4.8
Urban	5.7	5.1	4.8

(After: Department of Statistics, 1983, 1995, 1996).

Table 3.2. Malaysia: Labour Force Participation Rate and Employment, 1990-95

Labour Force/ Employment	1990	1991	1992	1993	1995
Labour Force ('000)	7042	7241	7441	7646	8140
Participation rate (%)					
Total	65.9	66.6	66.7	66.8	66.9
Male	86.3	85.7	85.7	85.8	86.8
Female	45.8	47.5	47.6	47.3	47.1
Unemployment rate (%)*	5.1	4.3	3.9	3.0	2.8
Employment ('000)	6686	6926	7148	7371	7915.4
Agriculture, Forestry, Livestock & Fishing ⁺	26.0	24.3	22.8	21.4	18.0
Mining & Quarry ⁺	0.6	0.5	0.0	0.5	0.6
Manufacturing ⁺	19.9	21.7	22.8	24.4	19.9
Construction ⁺	6.3	6.7	7.1	7.5	6.3
Services ⁺	47.2	46.8	46.7	46.6	47.2

* Percentage of total labour force.

⁺ Percentage of total employed.

(After: Masitah, 1996; Anon., 1996)

Table 3.3 Malaysia: Percentage Distribution of Employment by Industry and Sex, 1970-93

Industry	1970		1980		1990		1993	
	Male	Female	Male	Female	Male	Female	Male	Female
Agriculture, Forestry, Livestock Fishing	62.0	38.0	61.0	39.0	65.6	34.4	69.1	30.9
Mining & Quarrying	87.4	12.6	89.7	10.3	87.1	12.9	90.6	9.4
Manufacturing	71.9	28.1	59.9	40.1	53.6	46.4	55.6	44.4
Electricity, Gas, Water	94.7	5.3	92.5	7.5	93.1	6.9	90.5	9.5
Construction	93.3	6.7	92.7	7.1	95.7	4.3	94.3	5.7
Wholesale and Retail Trade, Hotel and Restaurants	81.8	18.2	70.7	29.3	61.4	38.6	60.9	39.1
Transport, Storage and Communications	95.7	4.3	93.7	6.3	88.9	11.1	90.0	10.0
Finance, Insurance Real Estate and Business Services	NA	NA	70.5	29.5	65.8	34.2	63.1	36.9
Community, Social and Personal Services	7.1	28.9	70.6	29.4	62.1	37.9	61.2	38.8
Average Percentage Distribution	69.0	31.0	67	32.7	65.0	35.0	65.7	34.3

Table 3.4. Malaysia: Employment Distribution by Occupation, Sex, 1970-1993

Occupation	1970		1980		1990		1993	
	Male	Female	Male	Female	Male	Female	Male	Female
Professional, Technical & Related Workers	4.6	5.3	6.4	8.5	6.4	9.4	7.3	11.2
Administrative & Managerial Workers	1.0	0.1	1.4	0.3	2.8	0.6	4.0	1.0
Clerical & Related Workers	5.4	4.1	6.8	11.1	7.0	14.1	7.5	16.7
Sales & Related Workers	9.8	4.9	10.3	7.2	11.4	11.4	10.3	10.7
Service Workers	8.1	8.4	9.0	9.0	9.9	14.1	10.7	14.4
Agricultural, Animal Husbandry, Forestry Workers, Fishermen and Hunters	47.6	66.8	35.9	46.3	29.4	28.1	22.6	18.9
Production and related workers	23.5	10.4	30.2	17.6	33.1	22.3	37.6	27.3

(After: Department of Statistics, 1995)

Table 4.1 Total Marine Fish Landings, West Coast, East Coast and Peninsular Malaysia, 1969 - 93 (mt)

Year	W. Coast	E. Coast	P. Mal.
1969	247518	55088	302606
1970	234228	64777	299005
1971	253134	69928	323061
1972	230487	80622	311109
1973	280654	90576	371230
1974	317814	121761	439576
1975	270664	104570	375234
1976	294579	116389	410968
1977	377866	120086	497951
1978	410774	153757	564531
1979	432347	138558	570905
1980	493446	129484	622930
1981	433369	215944	649313
1982	434190	133337	567527
1983	441573	166913	608486
1984	347744	133897	481640
1985	327124	135737	462861
1986	324047	122329	446376
1987	499862	240703	740565
1988	430188	264261	694449
1989	489334	257550	746884
1990	510471	309432	819903
1991	401900	307687	709587
1992	473995	293537	767532
1993	446515	345103	791618

Source : Annual Fisheries Statistics, various years.

Table 4.2 Total Wholesale Value of Marine Landings (RM million), West Coast, East Coast, Peninsular Malaysia, 1969-93

Year	W.Coast	E.Coast	P. Mal.
1969	127.27	36.73	164
1970	126.83	44.1	170.93
1971	137.47	44.73	182.2
1972	228.24	70.28	298.52
1973	347.27	86.7	433.97
1974	404.6	138.82	543.42
1975	386.66	145	531.66
1976	493.07	149.17	642.24
1977	649.32	179.17	828.49
1978	966.03	327.38	1293.41
1979	810.02	177.56	987.58
1980	779.32	198.69	978.01
1981	808.02	406.68	1214.7
1982	975.83	258.41	1234.24
1983	974.3	328.78	1303.08
1984	805.19	253.94	1059.13
1985	793.08	258.04	1051.12
1986	752.87	264.91	1017.78
1987	644.30	340.78	985.08
1988	592.60	385.94	978.54
1989	807.24	426.6	1233.84
1990	882.73	468.23	1350.96
1991	847.57	526.74	1374.31
1992	1119.95	578.91	2379.96
1993	1058.69	662.58	1721.27

Source : Annual Fisheries Statistics, various years.

Table 4.3 Major Species Landed in Peninsular Malaysia

Rank	1970	1980	1991
1	Udang (C)	Kerang (M)	Kembong (P)
2	Kembong (P)	Kembong (P)	Selayang (P)
3	Kerang (M)	Udang kecil (C)	Sotong biasa (M)
4	Bilis (P)	Bilis (P)	Udang (C)
5	Tamban (P)	Selayang (P)	Kerisi (D)
6	Cincaru (P)	Udang Sedang (C)	Selar Kuning (P)
7	Tenggiri (P)	Tamban (P)	Bilis (P)
8	Merah (D)	Aya (P)	Udang Minyak (C)
9	Selayang (P)	Selar Kuning (P)	Aya (P)
10	S. Kuning (P)	Udang Baring (C)	Udang Baring (C)
11	Duri (D)	Cencaru (P)	Tamban (P)
12	Udang Baring (C)	Pelata/Selar (P)	Pelata/Selar (P)
13	Aya/Tongkol (P)	Tenggiri (P)	Gelama (D)
14	Parang (P)	Kerisi (D)	Pari (P)
15	Gelama (D)	Sotong Biasa (M)	Tenggiri (P)

Source : Annual Fisheries Statistics, 1970, 1980 and 1991.

Note : (P) denotes pelagic fish, (D) denotes demersal fish, (C) denotes crustacean and (M) denotes molluscs.

Table 4.4 Number of licensed vessels by tonnage class, West Coast, East Coast and Peninsular Malaysia, 1970-1991

	West Coast	East Coast	Pen. Malaysia
<u>1970:</u>	<u>13,908</u>	<u>6,398</u>	<u>20,306</u>
Non-powered	3,179	2,098	5,277
Outboard powered	1,751	413	2,164
Inboard powered:			
Less than 44 tons	8,791	3,879	12,670
45 to 59 tons	180	7	187
60 tons and more	7	1	8
<u>1980:</u>	<u>22,082</u>	<u>8,438</u>	<u>30,520</u>
Non-powered	3,820	1,682	5,502
Outboard powered	5,709	876	6,585
Inboard powered:			
Less than 40 GRT	11,995	5,678	17,673
40 to 69 GRT	548	186	734
70 GRT and more	10	16	26
<u>1991:</u>	<u>16,659</u>	<u>6,150</u>	<u>22,809</u>
Non-powered	626	92	718
Outboard powered	5,838	922	6,760
inboard powered:			
Less than 40 GRT	9,415	4,513	13,928
40 to 69 GRT	595	343	938
70 GRT and more	185	280	465

Source : Annual Fisheries Statistics (various issues).

Table 4.5 Number of fishing gear licensed and in operation, West Coast, East Coast and Peninsular Malaysia, 1970-1991

	West Coast		East Coast		Pen. Malaysia	
	Licensed	Operated	Licensed	Operated	Licensed	Operated
<u>1970:</u>						
Trawl	599 (5.0)	2,483 (20.4)	750 (20.2)	1,065 (19.3)	1,349 (8.6)	3,548 (20.0)
Purse seine	1,754 (14.7)	1,597 (13.1)	261 (7.0)	272 (4.9)	2,015 (12.9)	1,869 (10.6)
Drift / Gill net	5,551 (46.7)	3,792 (31.1)	1,299 (34.9)	1,234 (22.4)	6,850 (43.9)	5,026 (28.4)
Hook & line	454 (3.8)	1,372 (11.3)	273 (7.2)	1,389 (25.2)	727 (4.7)	2,761 (15.6)
Other traditional gears	3,538 (29.7)	2,936 (24.1)	1,134 (30.5)	1,558 (28.2)	4,672 (29.9)	4,494 (25.4)
<u>1980:</u>						
Trawl	3,347 (12.7)	5,265 (26.7)	1,240 (19.3)	819 (14.9)	4,587 (14.0)	6,084 (24.1)
Purse seine	2,028 (7.7)	1,951 (9.9)	664 (10.3)	429 (7.8)	2,692 (8.2)	2,380 (9.4)
Drift / Gill net	13,260 (50.3)	8,453 (42.8)	2,630 (40.9)	1,487 (27.0)	15,890 (48.5)	9,940 (39.3)
Hook & line	1,185 (4.5)	1,323 (6.7)	944 (14.7)	1,791 (32.5)	2,129 (6.5)	3,114 (12.3)
Other traditional gears	6,550 (24.8)	2,764 (14.0)	946 (14.7)	981 (17.8)	7,496 (22.9)	3,745 (14.8)
<u>1991:</u>						
Trawl	3,224 (19.4)	4,599 (26.4)	1,059 (17.5)	1,548 (32.8)	4,283 (18.9)	6,147 (27.8)
Purse seine	1,196 (7.2)	1,020 (5.9)	530 (8.8)	368 (7.8)	1,726 (7.6)	1,388 (6.3)
Drift / Gill net	10,465 (62.8)	9,095 (52.3)	2,415 (39.9)	902 (19.1)	12,880 (56.7)	9,997 (45.2)
Hook & line	517 (3.1)	722 (4.1)	1,607 (26.5)	1,276 (27.0)	2,124 (9.4)	1,998 (9.0)
Other traditional gears	1,257 (7.5)	1,969 (11.3)	443 (7.3)	630 (13.3)	1,700 (7.5)	2,599 (11.7)

Note : Figures in parentheses denote percent of a particular gear group to total gear.

Source : Annual Fisheries Statistics, 1970, 1980 and 1991.

Table 4.6 Landings of Marine Fish by Gear Group, Peninsular Malaysia, 1970-1991

	Gear Group				
	Trawl	Seine	Drift net	Handlines	Other traditional
<u>1970:</u>					
W. Coast	68,728 (29.3)	79,529 (33.9)	15,657 (6.7)	8,804 (3.3)	61,687 (26.3)
E. Coast	17,388 (26.8)	12,838 (19.8)	6,456 (10.0)	5,930 (9.2)	22,187 (34.2)
Pen. Mal.	86,116 (28.8)	92,367 (30.9)	22,113 (7.4)	14,734 (4.9)	83,874 (28.0)
<u>1980:</u>					
W. Coast	193,974 (39.3)	117,393 (23.8)	25,714 (5.2)	6,203 (1.3)	150,191 (30.4)
E. Coast	33,306 (25.5)	51,333 (39.4)	14,059 (10.8)	14,440 (11.1)	17,265 (13.2)
Pen. Mal.	227,280 (36.4)	168,726 (27.0)	39,773 (6.4)	20,643 (3.3)	167,456 (26.8)
<u>1991:</u>					
W.Coast	259,276 (64.5)	66,847 (16.6)	45,659 (11.4)	2,691 (0.7)	27,427 (6.8)
E. Coast	184,552 (60.0)	86,774 (28.2)	5,990 (1.9)	15,956 (5.2)	14,415 (4.7)
Pen. Mal.	443,828 (62.5)	153,621 (21.6)	51,649 (7.3)	18,647 (2.6)	41,842 (5.9)

Note : Figures in parentheses represent percent of landings of a particular gear to total landings.

Source : Annual Fisheries Statistics, 1970, 1980 and 1991.

Table 4.7 Landings of Marine Fish per Unit of Gear Operated, West Coast, East Coast, Peninsular Malaysia, 1970, 1980 and 1991

	Trawl	Seine net	Drift net	Hook & Lines	Other Traditional
<u>1970:</u>					
W. Coast	28.19	49.80	4.13	6.42	20.35
E. Coast	16.33	47.20	5.23	4.27	15.20
P. Mal.	24.27	49.42	4.40	5.34	18.65
<u>1980:</u>					
W. Coast	36.84	60.17	3.04	4.69	54.34
E. Coast	40.67	119.66	9.45	8.06	17.60
P. Mal.	37.36	70.89	4.00	6.63	25.13
<u>1991:</u>					
W. Coast	56.38	65.54	5.02	3.73	13.93
E. Coast	119.22	235.80	6.64	12.50	22.88
P. Mal.	72.20	110.68	5.17	9.33	16.10

Source : Computed from Tables 4.5 and 4.6.

Table 4.8 Number of Fishermen Working on Licensed Fishing Vessels, West Coast and Peninsular Malaysia, 1969-1993*

Year	West Coast	Pen. Malaysia
1969	40,588	69,614
1970	43,955	68,154
1971	43,397	67,961
1972	44,251	69,252
1973	49,303	75,965
1974	45,547	70,805
1975	48,379	73,304
1976	47,757	73,536
1977	48,690	76,645
1978	54,091	83,694
1979	55,029	82,926
1980	59,729	88,972
1981	56,997	86,925
1982	51,189	80,237
1983	47,028	75,590
1984	47,339	76,368
1985	43,778	69,530
1986	38,815	59,452
1987	38,792	60,569
1988	37,487	68,963
1989	41,782	62,580
1990	39,054	59,801
1991	38,213	61,309
1992	37,403	60,410
1993	32,382	53,887

Source : Annual Fisheries statistics.

* The figures include only fishermen working on licensed vessels only and hence could be underestimated by disregarding those in unlicensed vessels and those employed indirectly by the fishing industry. However, compiling statistics for fishing employment is difficult and tedious due to nature of the fishing industry such as the existence of several categories of fishing labour namely, pure wage-earners, owner operators and unpaid family workers; and also the perplexing problem of defining full-time and part-time fishermen.

Table 4.9 Estimates of Marine Fisheries Resource Potentials in Malaysia ('000 metric tons)

Source	Region	Demersal		Pelagic	
		Inshore	Offshore	Inshore	Offshore
A (1966)	West Coast East Coast	80		50 - 100	
B (1976)	West Coast East Coast	90 - 94 95 - 130		81 56 - 75	
C (1976)	West Coast East Coast	62 184			
D (1976, 77)	West Coast ¹ East Coast ²	213 200	74	88	
E (1976)	West Coast East Coast			81 - 91 60	
F (1980)	West Coast East Coast	110 200	57 74	88	76 57
G (1981)	Pen. Mal.		154		300
H (1987)	Malaysia				502
I (1987)	Malaysia		493		484

- Sources: A - Tiews, K., "On the Possibilities for the Further Development of the Southeast Asian Frontiers Until the Year 2000", IPFC/C4b/Tech.2, IPFC 12th Session, Hawaii : 1966.
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- I - Sulaiman b. Abu Bakar, "Pelan Tindakan Perikanan Laut Dalam (Deep Sea Fisheries Action Plan)", Paper presented at the Seminar on Deep Sea Fishing, Kota Bahru, Kelantan, 28 - 30 November, 1987.

Table 4.10 Malaysia: Mangrove areas, 1980-90 (ha)

State	1980	1990	%change
Kedah	9037	8034	-0.11
Penang	406	406	0
Perak	40869	40869	0
Selangor	28243	21983	-0.22
N. Sembilan	1352	1061	-0.22
Malacca	77	314	3.08
Johor	25619	16697	-0.35
<i>West Coast</i>	105603	89364	-0.15
Pahang	2496	2032	-0.19
Terengganu	2982	954	-0.68
<i>East Coast</i>	5478	2986	-0.45
Sarawak	44491	36992	-0.17
Sabah	349772	316460	-0.10
<i>Malaysia</i>	505344	445802	-0.12

Source: Chong (1996) Table 3.



Table 4.11: Indicators of Exploitation of Fisheries Resources in West Coast, East Coast and Peninsular Malaysia 1970, 1980 and 1991

	1970	1980	1991
Trash fish landings:			
West Coast	43,989 (18.77) ^a	124,103 (25.15)	141,794 (35.28)
East Coast	12,536 (19.34)	19,009 (14.58)	105,892 (34.42)
Pen. Malaysia	56,524 (18.84)	143,112 (22.94)	247,686 (34.91)
Catch per vessel: ^b			
West Coast	12.97	12.45	14.88
East Coast	9.47	20.23	42.72
Pen. Malaysia	11.88	14.15	20.82

^a Figures in parentheses refer to percent of trash to total landings.

^b Computed by dividing total catch by the number of operating vessels. Total catch include commercially valued species by excluding trash fish and shell fish such as cockles, clams and snails. The number of operating vessels is from Table 4.5.

