

Trash fish production and national fish feed requirement in Malaysia

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INTRODUCTION

The fisheries sector still plays an important role in providing fish as a source of food and protein. It contribute about 1.5 % to the GDP and provided direct employment to about 90,000 fishermen and 21,000 fish culturist. The Department of Fisheries is taking several measures to increase fish production in the country. Amongst these measures are to increase fish production from deep-sea fishing and the development of the aquaculture sector. An increase in the number of deep-sea fishing vessels together with sustainable management of the resource, it would give a positive contribution to the fisheries sector in the future. However, the real potential to increase fish production still remains within the aquaculture industry.

The fisheries sector in 2002, produced RM 5.41 billion consisting 1,463,921 tonnes of fish valued at RM 5.31 billion and 408 million of ornamental fish valued at RM 93 million.

MARINE FISHERIES

There are 35,458 licensed fishing vessels which are mostly operating in coastal waters, which have been exploited at an optimum level. Out of this number, 3,981 are trawlers, 879 are fish purse seiners, 164 are anchovies purse seiners. The remaining 30,434 vessels are operating traditional gears, with 31% of these using Gill/Drift nets.

Malaysia employs a zoning system for its marine capture fisheries. Malaysian fisheries waters are divided into fishing zones based on the distance from the coastline. In peninsular Malaysia Zone A is less than 5 nautical miles from shore, Zone B is 5 to 12 nautical miles, Zone C is 12 to 30 nautical miles and Zone C2 is more than 30 miles. Under this system fishing vessels using commercial gears, i.e. trawl nets and fish purse seines, are prohibited from fishing in Zone A, which is reserved exclusively for artisanal fishing gears. Anchovy purse seines are categorised as an artisanal gear. Trawlers and fish purse seines exceeding 40 GRT are prohibited from fishing in Zone B, while those exceeding 70 GRT are prohibited from fishing in Zone C.

In 2003, capture fisheries produced a total 1.28 million tonnes, or 86% of the national fish production, valued at RM4.01 billion. Coastal fisheries were the main contributor towards

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this total with about 1.1 million tonnes, or 85% of the overall capture fisheries production. The deep-sea fisheries industry is currently being developed to realise its full potential. Annual marine landings have stabilised at between 1.2 million and 1.3 million tonnes since 1998.

The marine capture fisheries landings comprised mainly of finfishes, although prawns and cephalopods (squids, cuttle fish and octopus) are also major components with 5.5% and 5.8% contributions, respectively. Prawns are landed mainly on the west coast of Peninsular Malaysia and Sarawak.

The major pelagic fish groups landed are Indian/short mackerels (*Rastrelliger* spp.), round scad (*Decapterus* spp.), neritic tunas, sardines (*Sardinella* spp. and *Dussumieria* spp.), hardtail scad (*Megalaspis cordyla*), ox-eye scad (*Selar boops*), anchovies and yellow-tail scad (*Alepes* spp.).

The major demersal fish groups landed are threadfin bream (*Nemipterus* spp.), jewfish/croaker (*Pennahia* spp., *Johnius* spp. and *Otolithes* spp.), rays, goatfish (*Upeneus* spp., *Parupeneus* spp.), lizard fish (*Saurida* spp., *Trachinocephalus* spp.) and marine catfish (*Arius* spp., *Osteiogenoisus* spp.).

One of the most important issues in fisheries all over the world is that of trash fish. Trash fish is a broad term, the meaning of which varies across countries and regions. In Malaysia the term trash fish applies to that part of the catch which is not fit for direct human consumption, including undersized fish of commercially important species. An increasing share of trash fish in overall landings is an indication of gross overfishing (Kusairi, Tai & Tengku, 1997). Excessive harvesting of juvenile fish will lead to growth overfishing.

In 2003 trash fish constituted 32% of the total marine capture fisheries landings in Malaysia (DOF 2005). There is concern regarding the trash fish component of capture fisheries due to increasing demand, particularly from aquaculture. Basically, there is no special fishery for catching trash fish in Malaysia. It is a by-catch that are mostly caught by trawlers. The major use of trash fish, however, is for coastal aquaculture, since almost 90% of cultured marine finfish involve direct feeding of trash fish. The composition of trash fish is varied depending on the type of fishing gear used although most of it is caught by trawlers. Trash fish comprises mainly demersal species, however, pelagic fish may be included when it was caught by the purse seiners. Spoiled higher value species may also be included as trash fish.

Trash fish landings in Malaysia are dominated by the west coast of peninsular Malaysia (Figure 1). Since 1987, when data are available for all three major areas, the west coast has always contributed more than 50% of the total trash fish landings. However, the percentage contribution of this area had declined from 84% in 1987 to 53% in 1991 and from then has stabilised between 50% and 60%. The east coast is the next highest contributor of trash fish. The share of the trash fish landings there had increased from 13% in 1987 to 40% in 1991 but subsequently declined gradually to 29% in 2003. The percentage contribution of East Malaysia, i.e. Sarawak, Sabah and Labuan, showed an increasing trend from 3% in 1987 to 14% in 1994 and had stabilised around this value until 2003.

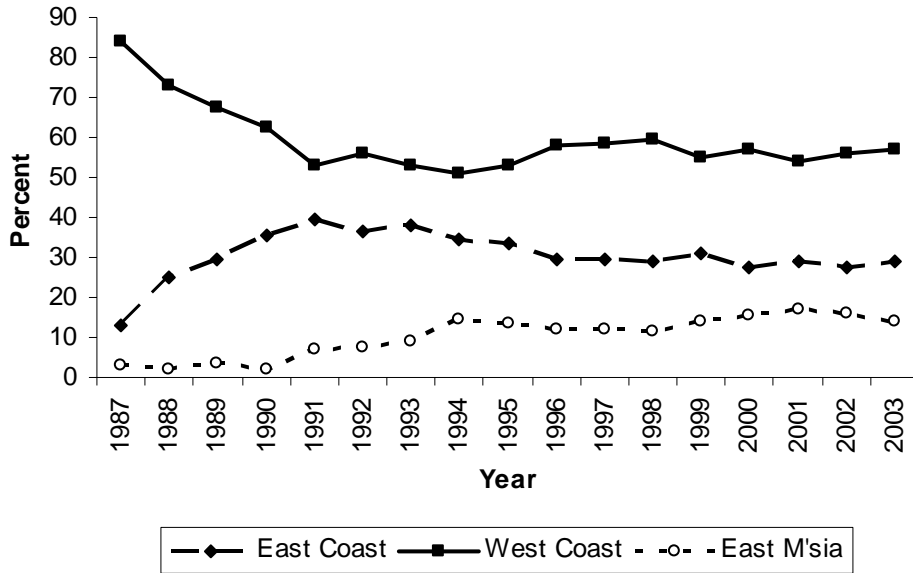


Figure 1: Percentage contribution to the total trash fish landings by area.

The trash fish landings in Peninsular Malaysia have shown an increasing trend since 1970 (Figure 2). There appeared to be two periods of sharp increases in the amount of trash fish landed; from 1970 to 1974 and from 1986 to 1990. The first period of increase catches appeared to be due to the trash fish landings on the west coast of peninsular Malaysia. The second period of increasing catches appeared to be influenced more by the landings on the east coast. During the period from 1970 to 2003, landings on the west coast have always been higher than those on the east coast.

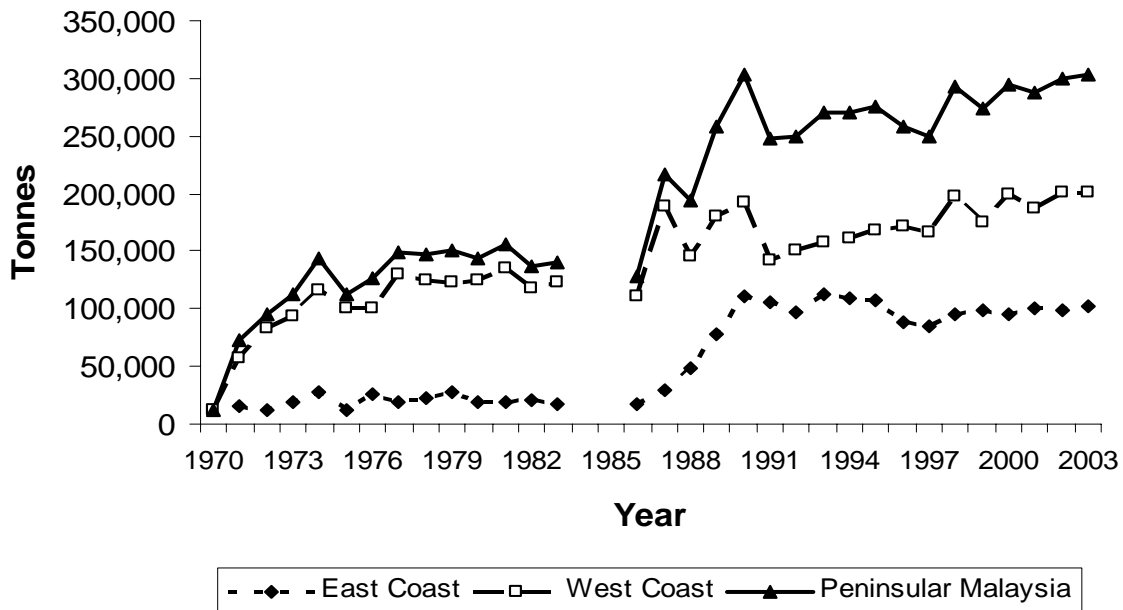


Figure 2: Annual landings of trash fish in peninsular Malaysia.

Trawlers is the most dominant fishing gear in terms of trash fish landings on both the west and east coasts of Peninsular Malaysia (figure 3 & figure 4). On the west coast, trawlers have always contributed more than 70% of the trash fish landings in that area since 1971, and more than 80% since 1975. Bag nets were a dominant gear in the 1970s when they contributed 10 to 20% of the annual trash landings until the mid-1970s. However, their contribution dropped sharply from the mid-1970s and since 1980 their share of the trash fish landings never exceeded 2.5%.

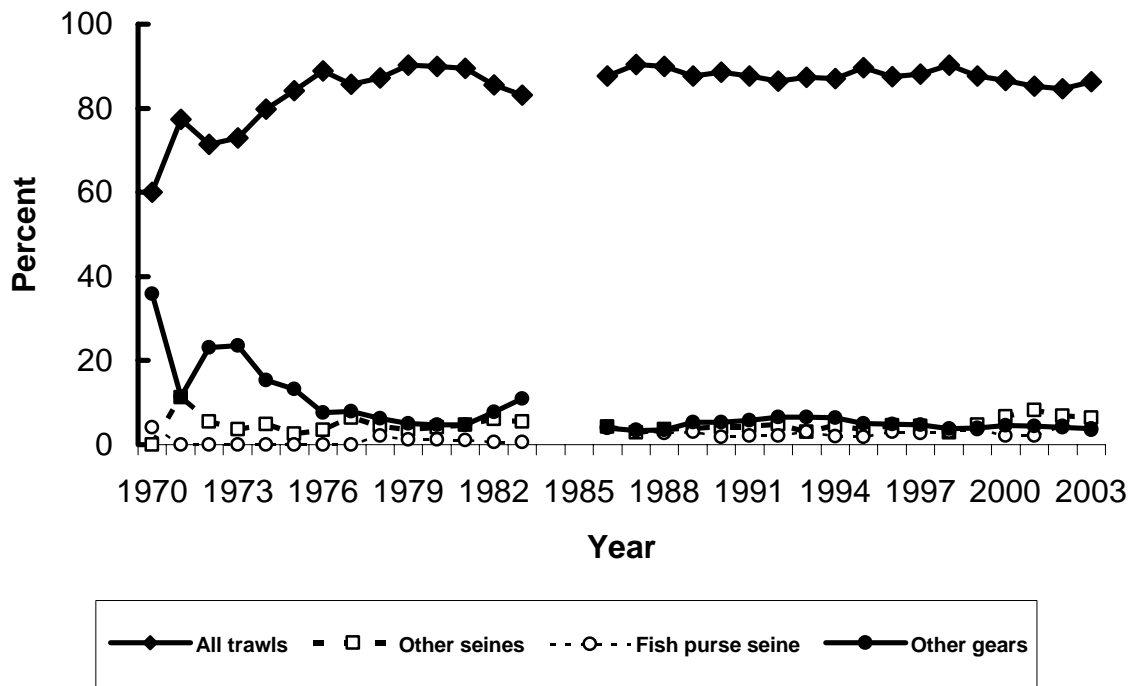


Figure 3. Percentage of trash fish landings by different fishing gears – west coast, peninsular Malaysia

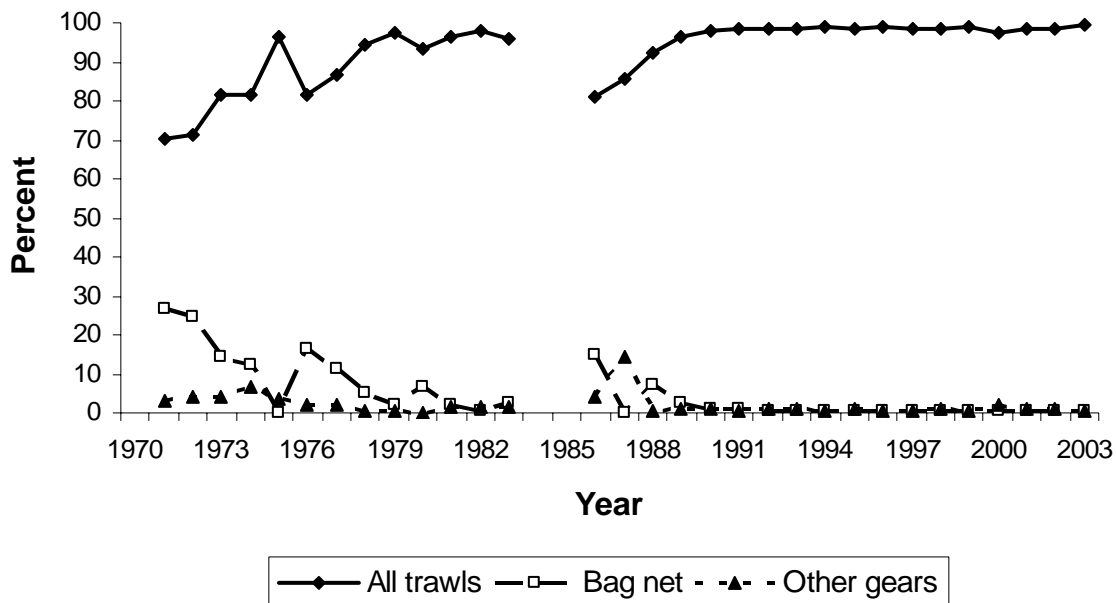


Figure 4. Percentage of trash fish landings by different fishing gears – east coast, peninsular Malaysia

AQUACULTURE

The aquaculture sub-sector of the fisheries sector has been growing annually in terms of production. This sub-sector is divided into marine aquaculture and freshwater aquaculture. Pond culture is the main system used in marine aquaculture, with cage culture being the other system used. For freshwater aquaculture, the most dominant system employed is pond culture followed by ex-mining pools, cage, cement tank and pen culture systems.

The annual productions from marine aquaculture increased from 5,000 tonnes in 1990 to 40,000 tonnes in 2003; of which 65% were prawns (tiger prawns and banana prawns) and 26% were carnivorous finfish (sea bass, snappers and groupers). Freshwater aquaculture productions increased from 10,000 tonnes in 1990 to 50,000 tonnes in 2003 and are currently dominated by red tilapia and marine catfish.

Under the Third National Agriculture Policy, aquaculture production in Malaysia is targeted to reach 600,000 tonnes annually by the year 2010, which include 200,000 tonnes freshwater fish, 120,000 tonnes marine fish, 150,000 tonnes marine shrimp and 130,000 cockles and mussels. This multifold increase in production from its current level will place a growing demand on the supplies of feed (formulated feed and trash fish), especially since of this aquaculture development is targeted at high value species such as grouper, snapper and penaeid prawn. These species require high inputs of fish protein in their feed. The intensification of aquaculture systems also requires greater feed inputs. The estimated formulated feed requirement by the year 2010 is 690,000 tonnes which include 300,000 tonnes for freshwater fish, 165,000 tonnes for marine fish and 225,000 tonnes for marine shrimp. Out of the total amount of feed required, only 100,000 tonnes will produce locally and the balance will be imported.

Production of freshwater fish mainly depend on formulated feed, waste from poultry industry and other agriculture by-product. Production of marine shrimp totally rely on dry formulated feed. In general, almost all of marine cage-cultured fish are fed with trash fish. However, there is no official data on the use of trash fish in the aquaculture industry in Malaysia although an estimate can be made based on the production of key species that are fed with trash fish. Production of major aquaculture species in 2003 which fed on trash fish are presented in the following table.

| Scientific Name | Common Name | Production,(tonnes) |
|-----------------------------|----------------------|---------------------|
| <i>Lates calcarifer</i> | Sea bass | 3,489 |
| <i>Lutjanus spp.</i> | Mangrove snapper | 2,173 |
| <i>Epinephelus spp.</i> | Grouper | 1,637 |
| <i>Lutjanus malabaricus</i> | Red snapper | 1,229 |
| <i>Lutjanus spp.</i> | Mangrove red snapper | 707 |
| <i>Scylla serrata</i> | Mud crab | 196 |
| <i>Total</i> | | 9,431 |

The food conversion ratio (F.C.R.) varies from 8 – 15:1, depending on the quality of trash fish. If the FCR is estimated around 10, then the amount of trash fish used is about 94,000 tonnes.

Farmers have quoted several reasons for the use of trash fish. The main reason is the cheap price of trash fish and that the supply is readily available. Usually, the supply chain for trash fish is well established in an area. The farmers believe that trash fish is the best feed based on his own observations on the feeding behavior of fish fed with trash fish versus those fed with dry pellets.

Although commercially produced extruded floating or sinking feeds have been available since the 1990s, the usage is low relative to marine fish production. The low usage of manufactured feeds to the well established chain supply of trash fish is mainly due to inadequate information on the use of pelleted feed and limited supply of weaned seed stock. The future challenges are to educate farmers on the best farming practices and management including the dry pellet feeding management, to demonstrate to the farmers the cost effectiveness of dry feeds and its long term benefits.

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