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## Impact of Subsidies on the Economic and Environmental Conditions of Small Scale Fisheries in Malaysia

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### Abstract

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This paper examines the economic and environmental impacts of fisheries subsidies on the small scale fisheries in Malaysia. The data for this study was obtained from interviews with 246 fishers from Kedah, Terengganu and Selangor states using a structured questionnaire. The study found that fishing effort and catch was significantly higher for commercial fishing boats operating in zone B and zone C compared to the artisanal fishing boats operating in zone A. The results suggest that fishing effort and catch was partly attributed to the fuel subsidy in fisheries. Furthermore, the larger engine boats (B and C) gained substantial fishing income that seems to reflect unequal distribution of benefits because larger vessels were able to gain maximum benefits compared to the smaller boats. However, the poor fishers (Boat A) were able to improve their livelihoods through various subsidies compared to the fishers with larger boats (B and C). The results suggest that current fisheries subsidies may not lead to sustainable fisheries and income of small scale fishers. Fisheries overexploitation cannot be reduced by elimination of subsidy, effective planning and designing of subsidy programmes may improve the wellbeing of fishers in Malaysia.

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**Keywords:** Fisheries subsidy; artisanal fisheries; income; fishing effort; livelihoods.

### 1. Introduction

Subsidy in fisheries can improve sustainable fisheries and contribute to the wellbeing of fishers if it leads to better management of fishing effort and harvesting methods. However, subsidies often result in the modernization of fishing vessels, increase in catches and fisheries depletion thus leading to



unsustainable fisheries (Milazzo, 1998; Pauly *et al.*, 2002; Khan *et al.*, 2006; OECD, 2006; Jacquet & Pauly, 2008; Lindebjerg, Peng & Yeboah, 2015). The important issue is that subsidies reduce the cost of operation or make the operation more efficient and generally motivate fishers to employ more fishing pressure and therefore difficult to attain sustainability and conservation goals in fisheries (Sumaila, 2011; WWSD, 2002). Fisheries subsidies can be categorized as beneficial, capacity enhancing or ambiguous. Beneficial subsidies include programmes that lead to enhanced natural capital such as fish stocks, capacity enhancing subsidies lead to overexploitation and make the fisheries unsustainable, while the impact of ambiguous subsidies are undetermined (Khan *et al.*, 2006).

Malaysia is a signatory to the RIO plus 20 Declaration and a member of Asia Pacific Economic Cooperation (APEC) and the World Trade Organisation (WTO) which seek to eventually eliminate subsidies as it can contribute to overcapacity and overfishing (Viswanathan *et al.*, 2013). Fisheries subsidies has important implications on the ecological sustainability and socioeconomic development (Munro & Sumaila, 2002; Sumaila *et al.*, 2010). The evidence from studies suggests that subsidies if effectively utilized can improve resource conditions and livelihood of those who depend on the resource (OECD, 2003). The problem of overcapacity and overfishing due to subsidy has been highlighted at the World Summit on Sustainable Development in Johannesburg (WWSD, 2002). Generally subsidies are provided directly to the fishers in the form of fuel and non-fuel items (Clark, Munro & Sumaila, 2005; Khan *et al.*, 2006). The effect of fuel and non-fuel fisheries subsidies on fisheries resources and wellbeing of fishers is difficult to measure (Schorr, 2006). In Malaysia, fisheries subsidies include fuel subsidy, monthly allowance, catch incentives, fishing equipment, and other investments in infrastructures for fisheries development (Viswanathan *et al.*, 2013). The positive contribution from subsidy towards resource conservation and livelihoods of fishers has important policy for livelihoods of coastal fishing communities in Malaysia. However studies on the impacts of subsidy on resources and fishers wellbeing in Malaysia have not been undertaken.

### *1.1. Fisheries Subsidy in Malaysia*

In Malaysia, the government introduced fisheries subsidy programmes in the early 1970s through a poverty eradication scheme for small-scale fishers. Under the programme, the government provided direct assistance to enhance livelihoods of small-scale fishers. The government introduced fuel subsidy in 2008, all licensed fishers were entitled to receive the fuel subsidy. In Malaysia, government spent about RM715 million on fisheries subsidies in 2012 (EPU, 2013). Fuel subsidy accounts for 67% (RM474 million) of total subsidy in 2012. Generally fuel subsidies are viewed as bad subsidies as this subsidy contributes to capacity enhancement in the fisheries. The major fuel subsidy recipients were the small scale fishers who comprise over 70 percent of the total fishers in zone A in Malaysia. Zone A is assigned to coastal fishers operating within 5 nautical mile and is reserved for traditional fishers, small vessels operating traditional gears. Zone B is assigned to vessels below 40 GRT operating 5-12 nautical miles from the shoreline and is reserved for trawlers and purse seiners. Zone C is for vessels below 70 GRT and operating within 12-30 nautical miles. Zone C2 is for offshore vessels greater than 70 GRT and operating beyond 30 nautical miles from the shore. Fishers are the poorest group in Malaysia, excess fishing capacity thus may cause deterioration of the resource and pose negative

impacts on the wellbeing of fishers (Islam et al., 2014). Fishers also have received living allowance which accounts for 24 percent of the subsidies (RM172.8 million).

The government has increased the living allowance for fishers operating in zone A from RM200 to RM300 per month in 2015. The fishers in zone B and C receive the living allowance of RM250. All licensed fishers are entitled to receive fish catch incentives: RM0.10 per kg for boat A and B and RM0.20 per kg of catch for zone C boats. Fisheries is complex in Malaysia as it has multispecies and multi gear characteristics. In Malaysia, fisheries policies have addressed poverty alleviation and livelihood of small scale fishers. The impact of subsidies should be examined to understand whether the poor fishers can improve their wellbeing through fuel and non-fuel subsidies. The limited studies on fisheries subsidies in Malaysia provides the backdrop for undertaking this study (Viswanathan et al., 2013). The objective of this study is to determine the socioeconomic and environmental impacts of fisheries subsidies in Malaysia. The study offer useful information to understand the relationship between fisheries subsidy and resource sustainability especially the contribution of subsidy towards livelihoods of fishers in Malaysia.

## **2. Methodology**

### *2.1. Study area, data source and questionnaire*

The study was conducted in the states of Kedah, Selangor and Terengganu in Peninsular Malaysia. These states are considered as the most important sites for the small scale fishers in Peninsular Malaysia. The fishery in these areas is mainly characterized by small scale artisanal fishers with very low catch relative to larger scale commercial fishers (boat B and boat C). Fishers rely mostly on fishing for their livelihood, with limited access to other employment. The data for this study were obtained from face-to-face interviews with fishers using a structured questionnaire. Prior to field data collection, focus group discussions (FGD) were conducted to improve the questionnaire and gather information on fishing practices, gear used, fisher's income and expenses. The questionnaire included household characteristics by type of fishing boat, fishing gear, subsidy indicators; catch and costs; household income from fishing and non-fishing sources; and respondents' perceptions about fisheries subsidies on their livelihoods. Respondents were selected from a list of fishing vessels, by district, provided by the Department of Fisheries office. Respondents were randomly selected from the list of boat A, boat B and boat C operators. Interviews were conducted by a group of trained enumerators. Each survey took around 30 minutes to complete. A total of 246 respondents were interviewed from April to August 2015. The average monthly fishing income was derived by deducting day-to-day operational costs of a fishing vessel which consist mainly of fuel, ice, food and bait. Fishing income was computed by catch per trip. The study used descriptive statistics to analyze impact of subsidies on the income of fishers by different category of fishing boats.

### 3. Results and discussions

#### 3.1. Sample characteristics

The sample respondents covered three category of fishing boats, boat A, boat B and boat C operating their gear in their respective fishing zone. Among the respondents, 74% were interviewed from zone A, 19% from boat B, the rest 7% interviewed from boat C. The mean engine horse power is 36.2, 238.7 and 364.6 for the respondents operating in zone A, zone B and zone C respectively (Table 1). The results show that the artisanal small scale fishers use significantly low powered engine, spent less fishing hour, and harvested very low amount of fish compared to the boat used by commercial fishers (Boat B and Boat C).

**Table 1.** Average engine capacity (horse power), fishing effort and catch by vessel type

Boat Type	Sample	Average HP	Fishing Hour/month	Catch KG/hour
Boat A	182 (74)	36.24	156.7	8.07
Boat B	47 (19)	238.70	247.3	96.75
Boat C	17 (7)	364.58	352.7	128.49
All	246 (100)	94.43	183.8	35.12

#### 3.2. Fishing effort

Fishing effort was calculated based on the number of hours spent per fishing trip per month by type of boats which shows that the fishers from zone A spent 157 hours per month for fishing, while the commercial fishing boats (boat B and boat C) spent relatively more fishing hours for fishing (Table 1). The results indicate that fishing effort of small scale fishers was substantially different from other commercial fishing boats. Average fish catch per hour of fishing effort show that boat zone B were able to catch 12 times higher catch compared to boat A (Table 1). Catch per hour for zone A boat was significantly different from commercial boats. The difference in fishing effort between boat zone A and other commercial boats was relatively less, 1.6 (boat B) to 2.2 (boat C) times, while the difference in fish catch was 12 times to 16 times higher compared to boat A. This indicates that the relatively low powered boats operating in zone A were less efficient compared to the larger engine powered boats.

#### 3.3. Operational expenses

The results show that the respondents spent more than 70% of total operational cost for fuel use (Table 2). Food at sea is the second highest cost spent by zone A fishers, while the larger vessels (boat C) spent relatively higher for ice. The results also show that the quantity of subsidized fuel was not adequate. Majority of the respondents from boat A obtained additional fuel with a monthly value of RM66 from open market, while half of the respondents from boat zone B obtained additional fuel with a value of RM1, 340 from outside (Table 2). The results indicate that some larger commercial boats (boat zone B and boat C) had to spend more for additional fuel from outside in order to operate fishing (Table 2).

**Table 2.** Average fishing effort, operational expenses and fuel use

Fishing operation	Boat A		Boat B		t-statistics
	Mean	Std. dev	Mean	Std. dev	
Operational expenses (RM/per month)	2,213.1	4832.9	14,955.3	21436.9	8.5***
Fishing effort (hours/month)	156.73	82.89	247.32	144.52	5.6***
Fuel obtained from open market (RM/month)	66.09	159.16	1,338.85	3026.57	5.7***

Note: \*\*\* significant at 1% level

<sup>1</sup> Ice cost for boat A, B and C accounts for 24%,41% and 35% respectively.

### 3.4. Income from fishing

Monthly average fishing income for small scale fishers was RM3,798, the income for group B was RM25,989 and RM16,125 for the boat C. The results show that income for the boats operating in zone A was relatively low compared to other boats. The results indicate that the larger boats were able to invest in fishing equipment that substantially increased catch and income. The evidence suggests that the larger powered boats (boat B) could capture major benefits from fisheries, it seems that there is inequitable distribution of benefits in fisheries. The small scale fishers have failed to increase substantial income from fisheries subsidies. The results supports other study finding in Malaysia, where it was found that the catch per unit of effort (CPUE) was significantly higher for purse seing gear (boat B and C) but the productivity was relatively low compared to other traditional gear and trawls (Islam, Noh & Yew, 2011).

### 3.5. Benefits from subsidies

Majority of the respondents from boat A obtained average RM416 per month from livelihood subsidies, cash aid (Bantuan Rakyat 1 Malaysia, BRIM) and catch incentives while the larger boat (boat B and C) respondents received average RM948 per month. The respondents were asked about their views on the impact of fisheries subsidies for their livelihoods. Majority of the small scale fisher respondents agreed that subsidy has contributed to increase their income. However, 54.9% of respondents (boat A) reported that their increased income was not adequate to meet their daily expenses (Table 3). The boat A fishers have also improved their household assets.

About 66% of respondents from boat A agreed that government subsidy has contributed to their wellbeing as fishing is the only livelihood option for almost all fishers in the coastal areas in Malaysia. Some alternative income generating programmes should be created to enhance livelihoods for the small scale fisher households. Creation of non-fishing economic activities are required. These activities could be in the tourism area or in the processing of artisanal products. This may reduce fishing effort and dependency on fishing activities. Diversification of livelihood options could improve fishers income and wellbeing as in other countries such as Bangladesh (Islam, Yew & Viswanathan, 2014). Their perceptions about fishing effort show that fishers of both zone A and B have been encouraged to go out to fish more days. The result supports the evidence that fuel subsidy has reduced fishing operational costs. The important results of this study suggests that subsidy has attracted fishers that lead to increase fishing effort. Fisheries subsidies are benefiting the artisanal fishers but excess fishing create pressure on the resource and the small scale fishers were not able to capture benefits from fishing. These

problems cannot be reduced by elimination of subsidy, effective planning and designing of subsidy programmes may improve the wellbeing of fishers in Malaysia.

**Table 3.** Respondents perception about benefits from subsidy

Contribution of Subsidy	Boat A	Boat B	Boat C	All
Income increased to support family expenditure				
Enough	45.1	63.0	70.6	50.2
Not enough	54.9	37.0	29.4	49.8
Contributed to increase income				
Enough	62.5	46.8	50.0	58.6
Not enough	37.5	53.2	50.0	41.4
Contributed to remain in fishing				
Yes	65.7	46.8	41.2	60.3
No	34.3	53.2	58.8	39.7
Contributed to increase access to household assets				
Enough	61.5	46.8	58.8	58.2
Not enough	38.5	53.2	41.2	41.8
Subsidy encouraged to go out to fish more days				
Yes	59.7	59.6	46.7	58.8
No	40.3	40.4	53.3	41.2

#### 4. Conclusions and policy recommendations

There is a growing recognition that sustainability of fisheries is critical for the economic benefit of the fishers. Subsidies create excess capacity due to reduction of fishing operational cost. In Malaysia, fisheries subsidy were introduced in 1970s in the form of direct livelihood support to the poor fishers. Fuel subsidies were introduced in 2008 and has become the major component of fisheries subsidy. The results of the study shows that majority of the fishers from boat A were able to derive benefits from fuel and non-fuel livelihood subsidies. However, the larger boats with boat B and C were able to capture maximum benefits from fishing while fuel subsidy was the main factor. The results suggest that current fuel subsidy programme may not be an effective strategy for enhancing income for the artisanal fishing communities in Malaysia.

The relatively larger boats (boat B and boat C) were able to derive substantial benefits from fishing, while the artisanal fishers failed to compete with the larger powered boats. There is a need to have a clear exploitation strategy to protect fisheries from overfishing due to fuel subsidy. Fisheries resources have been overexploited due to lack of effective implementation of fisheries rules. More enforcement and community education on fisheries regulations are needed to improve the fisheries. Given the current fisheries management, it would be difficult, both socially and politically, to remove subsidies from fisheries. The government should put priority to implement alternative employment activities that may improve fishers' welfare and enhance fisheries resources.

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