



## **Fueling Overfishing: The Economic and Environmental Costs of Fuel Subsidies**

Leaders of the G-20 countries recently pledged to phase out subsidies for fossil fuels<sup>1</sup> – subsidies that encourage overconsumption of the fuels that directly contribute to climate change. The Organization for Economic Cooperation and Development (OECD) and the International Energy Agency found that eliminating fossil fuel subsidies by 2020 would reduce global greenhouse gas emissions in 2050 by ten percent.<sup>2</sup>

International trade agreements have long addressed the harmful effects of subsidies on commerce. But now, as part of the Doha trade round, the World Trade Organization (WTO) is engaged in negotiations that would also address the effects of subsidies on a natural resource. The WTO is currently negotiating new trade rules on fisheries subsidies, including those for fuel.

Fuel subsidies encourage the wasteful use of fuel. They also maintain uneconomic and environmentally destructive fishing practices, such as deep sea trawling. To the extent that fishing capacity remains in use because of these fuel subsidies, the necessary restructuring of the sector through capacity reductions is prevented. In turn, the chronic excess capacity that exists in most countries creates powerful interests in support of ongoing subsidies and continued high fishing quotas, leading to persistent overfishing.

As the World Bank stated in its recent report on fisheries reform, subsidies (most significantly fuel subsidies) create perverse incentives for continued fishing in the face of declining catches. The result is greater investment and fishing effort in over-stressed fisheries, reinforcing the fishing sector's poverty trap and preventing the creation of an economic surplus that can be invested in alternatives with greater social returns.<sup>3</sup>

---

<sup>1</sup> Leaders' Statement, The Pittsburg Summit, September 24-25, 2009. . . . Energy Security and Climate Change, para. 29.

<sup>2</sup> Ibid.

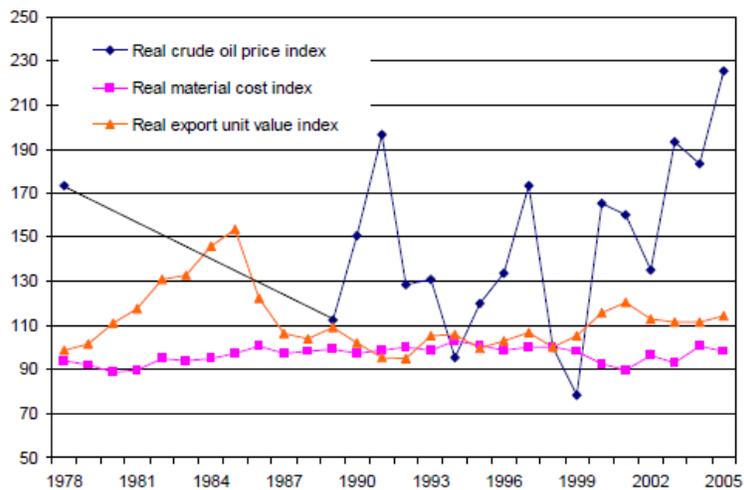
<sup>3</sup> The Sunken Billions: The Economic Justification for Fisheries Reform. Agriculture and Rural Development Department. . . . The World Bank. (2008). Conference Edition, pp. 4 and 23.

## Fuel consumption in marine capture fisheries

Fisheries account for about 1.2 percent of global oil consumption, an amount equivalent to that burned by the Netherlands.<sup>4</sup> Fishing is a fuel-intensive activity with global fleets consuming on average 620 liters (or half a ton) of fuel for every ton of catch landed.<sup>5</sup> Fisheries targeting high value species like shrimp, tuna or swordfish frequently consume in excess of 2,000 liters per ton of landings.<sup>6</sup> Deep sea trawling on average consumes more than 1,000 liters per ton of catch.<sup>7</sup>

The energy performance of fishing fleets often has declined over time as stocks are depleted and more effort is expended to catch the same amount of fish. These changes can be dramatic. The ratio of fuel used to the edible fish protein caught by the commercial fishery in New Bedford, Massachusetts increased six-fold from 1968 to 1988, largely as a result of declining stocks and subsidies that encouraged increased effort.<sup>8</sup> In the Gulf of Thailand, catch of the same surveillance ship using the same gear declined from 250 kilograms to about 18 kilograms per hour between 1961 and 1999.<sup>9</sup>

**Fig. 1: Cost Trends (Indices: 1998=100)**



Source: *The Sunken Billions*, World Bank. p.15

<sup>4</sup> Peter H. Tyedmers, Reg Watson and Daniel Pauly, Fueling Global Fishing Fleets, Royal Swedish Academy of Sciences, *Ambio* Vol. 34 No. 8 (December 2005). pp. 636-637.

<sup>5</sup> Ibid.

<sup>6</sup> Ibid. p. 635.

<sup>7</sup> Sumaila, U.R., Ahmed Khan, Louise Teh, Reg Watson, Peter Tyedmers, Daniel Pauly. 2006. Subsidies to high seas bottom trawl fleets, in Sumaila, U.R., Pauly D. (eds.), *Catching more bait: a bottom-up re-estimation of global fisheries subsidies* (2<sup>nd</sup> version, 2007). Fisheries Center Research Reports 14 (6), Fisheries Center, the University of British Columbia, Vancouver, Canada. p. 51.

<sup>8</sup> Mitchell, C., Cleveland, J., Resource scarcity, energy use and environmental impact: A case study of the New Bedford Massachusetts USA Fisheries. May 1993, *Environmental Management* Vol. 17:3.

<sup>9</sup> *Saving Fish and Fishers*. The World Bank. . . . Agriculture and Rural Development Department. May 2004. p. x.

Fuel constitutes a significant component of fishing costs, reaching up to 60 percent in some fisheries, such as the commercial fisheries of Hong Kong.<sup>10</sup> On average, the cost of fuel consumed by the global fish-catching sector amounted to 20 to 30 percent of total revenues in 2004 and 2005.<sup>11</sup> More recent increases in fuel costs through the summer of 2008 made many fleets uneconomic. However, fuel costs are heavily subsidized. Even before the sharp increase in fuel prices, global fuel subsidies were estimated to be about \$4.2 to \$8.5 billion per year, or around eight percent of the annual commercial fish catch of about US \$80 billion.<sup>12</sup> Most large fishing nations provide fuel subsidies, with the largest fuel subsidies provided by China, Japan and Russia.<sup>13</sup>

The dramatic increase in global oil prices from 2003 through the summer of 2008<sup>14</sup> led to wide calls for greater fuel subsidies for fishing fleets. This occurred even in countries that did not previously subsidize. The recent dramatic declines in oil prices appear to have reduced these demands, but are likely to re-emerge with global economic recovery.

### *Effects of fuel subsidies on fisheries and fishing communities*

Fuel subsidies have a direct impact on the level of fishing effort.<sup>15</sup> At a minimum, fuel subsidies permit boats to continue to fish when it is not economic to do so. Where overcapacity already exists, as it does in most fisheries, maintaining fishing effort supports ongoing depletion of fish stocks. Even in countries with well-developed management plans, persistent fleet overcapacity has led to overfishing as a result of the political pressure for high fishing quotas created by excess capacity.<sup>16</sup>

Higher fuel costs for fishing fleets should temper overexploitation of fish stocks, particularly if the value of the catch does not increase to capture the higher input costs. More often, the easier political solution to higher fuel prices is to subsidize the users of fuel. This approach neglects the

---

<sup>10</sup> Sumaila, U.R., L. Teh, Watson, R., P. Tyedmers, D. Pauly, Fuel price increase, subsidies, overcapacity and resource sustainability. ICES Journal of Marine Science Advance Access, April 30, 2008. p. 1.

<sup>11</sup> FAO, The State of World Fisheries and Aquaculture 2006, pp. 131-132 (2005 data). . . . The Sunken Billions: The Economic Justification for Fisheries Reform. Agriculture and Rural Development Department. . . . The World Bank. (2008). Conference Edition, p. 16 (2004 data).

<sup>12</sup> Sumaila, U.R., L. Teh, Watson, R., P. Tyedmers, D. Pauly. 2006. Fuel subsidies to fisheries globally: Magnitude and impacts on resource sustainability. . . . In Sumaila, U.R., Pauly D. (eds.), Catching more bait: a bottom-up re-estimation of global fisheries subsidies (2<sup>nd</sup> version, 2007). Fisheries Center Research Reports 14 (6). pp. 38-48.

<sup>13</sup> Ibid. pp. 45-46. . . . China (\$1.8 billion), Japan (\$1.1 billion), Russia. (\$491 million), South Korea (\$331 million), Thailand (\$241 million), India (\$233 million), USA (\$184 million), Mexico (\$175 billion), Indonesia (\$171 million), Taiwan (\$120 million), Spain (\$122 million), Norway (\$116 billion), Argentina (\$115 billion) and France (\$94 million). Estimated as of 2000. U.S. data includes federal subsidies only.

<sup>14</sup> Crude oil prices adjusted for inflation rose nearly five-fold, from US\$ 30 a barrel in 2003 to US\$ 147 a barrel in June 2008.

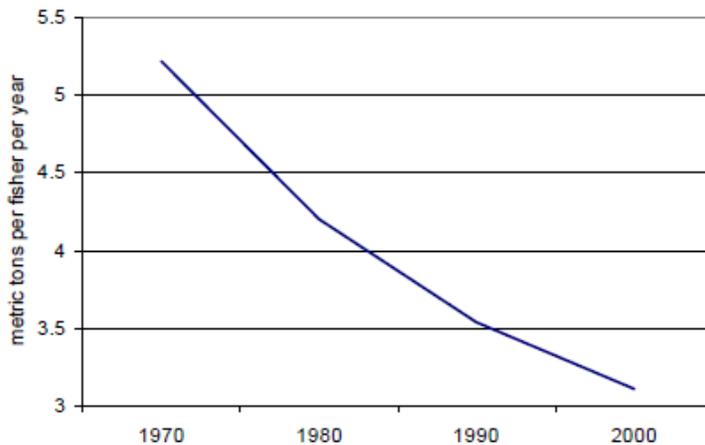
<sup>15</sup> Sumaila, U.R., L. Teh, Watson, R., P. Tyedmers, D. Pauly. 2006. Fuel subsidies to fisheries globally: Magnitude and impacts on resource sustainability. . . . In Sumaila, U.R., Pauly D. (eds.), Catching more bait: a bottom-up re-estimation of global fisheries subsidies (2<sup>nd</sup> version, 2007). Fisheries Center Research Reports 14 (6). p. 38.

<sup>16</sup> This overcapacity is variously estimated as two to three times that required to generate present catches. . . . Pauly, D., The Overexploitation of Marine Ecosystems: Facing the Consequences of Duplicity and Ignorance. Ram Margalef lecture, October 6, 2008, Barcelona.

underlying problem of chronic overcapacity and prevents the reduction in capacity that should result from higher input costs.

Fuel subsidies prevent the necessary adjustment to higher resource costs and create vested interests in support of ongoing subsidies. Fuel subsidies keep people employed in an activity with decreasing productivity as a result of overfishing. Failing fisheries in turn often prompt additional government subsidies, leading to a cascading loss of both resources and employment. From an economic perspective, the effects of subsidies are “that you will be artificially keeping people in a business that is no longer viable.”<sup>17</sup>

**Fig. 2: Annual Catch (Marine and Inland) per Capture Fisher**



Source: *The Sunken Billions*, World Bank. p.19

In many developed countries, such as the European Union, subsidies continue to be used in the face of ongoing loss of employment in the fishing sector. As the European Commissioner for Fisheries and Maritime Affairs stated (before the European Commission passed emergency measures to support the European fishing industry): “If we were to allow subsidies to be given then we’re saying that we are going to subsidize this industry permanently. And that is certainly not the way forward.”<sup>18</sup>

### Fuel subsidies damage the oceans

Subsidized fuel prices do not reflect the economic cost of fuel. Instead, fuel becomes wastefully used, increasing both fishing intensity and the negative impact on the environment from pollution, accidental catch of other species and habitat destruction. In addition, fuel subsidies promote active rather than passive fishing methods and can lock in use of existing technologies to the exclusion of other more promising or cleaner technologies.<sup>19</sup>

<sup>17</sup> Michael Akester, Danish government advisor to Vietnam for coastal management, quoted in “Overfished Vietnam to subsidize new fishing boats.” May 5, 2008.

[http://www.monstersandcritics.com/news/business/news/article\\_1403434.php/ eca049\\_Overfished\\_Vietnam\\_to\\_subsidize\\_new\\_fishing\\_boats](http://www.monstersandcritics.com/news/business/news/article_1403434.php/ eca049_Overfished_Vietnam_to_subsidize_new_fishing_boats)

<sup>18</sup> Joe Borg, quoted in “UK fishermen struggling in face of rising fuel prices.” Fishupdate.com. May 5, 2008.

<sup>19</sup> Reforming Energy Subsidies, UNEP, (2008). p. 13.

Subsidies that encourage the production and use of fossil fuels inevitably have some harmful consequences for the environment.<sup>20</sup> In addition to the release of greenhouse gases, the burning of fossil fuels represents an increasing source of pollutant emissions into the atmosphere and the sea.<sup>21</sup> The elimination of fuel subsidies and the re-introduction of market signals into the operational and investment decisions of vessel owners are key to creating a more fuel-efficient fishing industry and reducing its carbon footprint.

Subsidies also enable the use of fuel-intensive techniques such as high-seas bottom trawling that are particularly destructive. Deep sea demersal species are particularly vulnerable to exploitation because of their low growth rates and long life spans, making it more profitable for fishermen to effectively mine the species rather than sustainably exploit them. Bottom trawling on the high seas is also very damaging to seafloor and seamount habitats and produces a high level of accidental catches and discards. Trawls can permanently modify the seabed and alter the ecosystem for creatures living in the water column above. This fishing practice is so destructive that the United Nations has called for it to be severely restricted.<sup>22</sup>

Subsidies amounting to 25 percent of total landed value of the high seas bottom trawl fleet exceed the average profits, indicating that without subsidies the bulk of the world's bottom trawl fleet would be operating at a loss. More than half of government incentives given to the high seas bottom trawl fleet are in the form of fuel subsidies.<sup>23</sup> In subsidizing fuel costs, taxpayers are keeping in operation one of the most environmentally damaging industries in the world.

### *Fuel subsidies have high economic costs*

Subsidies reduce incentives to use energy efficiently, act as a drain on government finances and hold back economic development.<sup>24</sup> Subsidies protect consumers from higher market prices but, by preventing a drop in consumption, serve to maintain prices. British Petroleum reports that most of the increased demand for oil in 2007 was in countries that subsidize fuel costs.<sup>25</sup>

Fuel subsidies are very inefficient, creating significant economic losses.<sup>26</sup> In a world of increasing fuel subsidies, the real cost of catching fish may exceed the landed value.<sup>27</sup> An individual fisherman may do no more than break even financially, even with subsidized input costs. However, the subsidy amount could have been used for other purposes such as health and

---

<sup>20</sup> Ibid. p. 15.

<sup>21</sup> USEPA (1991). Nonroad Engine and Vehicle Emission Study-Report, EPA 460/3-91-02, Ann Arbor, MI, USA. . . The US Environmental Protection Agency has calculated that for every ton of fuel used by a fishing trawler while it is in port, 35 kg of VOC, 27 kg of NO<sub>x</sub>, 23 kg of SO<sub>2</sub> and 3 kg of lead are produced.

<sup>22</sup> G.A. Res. 59/25 ¶66, U.N. Doc A/RES/59/25 (Jan. 17, 2005).

<sup>23</sup> Sumaila, U.R., Ahmed Khan, Louise Teh, Reg Watson, Peter Tyedmers, Daniel Pauly. 2006. Subsidies to high seas bottom trawl fleets, in Sumaila, U.R., Pauly D. (eds.), *Catching more bait: a bottom-up re-estimation of global fisheries subsidies* (2<sup>nd</sup> version, 2007). Fisheries Center Research Reports 14 (6), Fisheries Center, the University of British Columbia, Vancouver, Canada. p. 51.

<sup>24</sup> *Reforming Energy Subsidies*, UNEP, (2008). p. 12.

<sup>25</sup> *Fuel Subsidies Overseas Take a Toll on U.S.*, New York Times, July 28, 2008. p. 1.

<sup>26</sup> Robert Frank, *How Fuel Subsidies Drag Down a Nation*, New York Times, August 17, 2008

<sup>27</sup> *The Sunken Billions: The Economic Justification for Fisheries Reform*. Agriculture and Rural Development Department. . . . The World Bank. (2008). Conference Edition, p. 1.

education and for other government expenditures such as infrastructure that have a higher social return. This is of particular concern for developing countries. As UNEP recently reported, social policy goals “can be achieved more effectively through alternative mechanisms involving direct welfare payments or investment in social services, since the economic efficiency losses and environmental effects are less marked” [than through energy subsidies].<sup>28</sup>

In September 2009, G-20 leaders recognized the importance of mitigating any adverse effects on the poorest households from the loss of fuel subsidies by providing them with targeted cash transfers and forms of support other than subsidized fuel. In Indonesia, a cash transfer system enabled the government to direct cash payments to over 19 million households while reducing fuel subsidies. This action improved the national balance sheet and enhanced the economic condition of the poorest population.<sup>29</sup>

Subsidies for fuel also have technology effects, supplanting labor on vessels with more capital intensive fishing methods, with implications for employment in fishing communities. Subsidies provide an incentive for vessel owners to use more powerful and fuel-consuming engines. They also induce more use of refrigeration on vessels. Both effects give vessel owners greater incentives to extend fishing trips and increase catch.<sup>30</sup> Most significantly, fuel subsidies distort the competition between fuel-intensive fishing fleets and fleets using passive gear or other low-energy fishing techniques that may have less unintended catch and cause less harm to ocean habitats.

While often conceived as a short-term intervention, subsidies tend to become entrenched at high cost to society and frequently confer more benefits on the wealthy (*i.e.*, vessel owners) rather than the targeted poor (vessel crews). By creating perverse incentives to increase fishing effort, “input subsidies tend to reinforce the sector’s poverty trap.”<sup>31</sup> In sum, as the World Bank notes, the economic benefits from fishing subsidies are less than the costs and “the negative environmental externalities generated by input subsidies are considerable.”<sup>32</sup>

## Conclusions

The economic and environmental rewards from eliminating fishing subsidies make it one of the most significant actions that can be taken to protect the world’s marine resources. As the World Bank reports, if fish populations can be rebuilt and fishing effort is maintained at economically maximizing levels, the economic gains that can be generated from commercial fisheries resources are enormous. At the same time, there are considerable additional benefits not only from a reduction in fossil fuel consumption, pollution, habitat destruction and accidental catch, but also from the contribution of larger fish stocks in supporting a wide range of marine species and ecosystems.

---

<sup>28</sup> Reforming Energy Subsidies, UNEP (2008). p. 24.

<sup>29</sup> The Pittsburg Summit 2009: Acting on our Global Energy and Climate Change Challenges, p. 1.

<sup>30</sup> Fueling the threat for Sustainable Fisheries in Europe, a study commissioned by WWF. July 2007.

<sup>31</sup> The Sunken Billions: The Economic Justification for Fisheries Reform. Agriculture and Rural Development Department. . . . The World Bank. (2008). Conference Edition, p. 45.

<sup>32</sup> Ibid.

## **About Oceana:**

Oceana is an international conservation organization dedicated to protecting the restoring the world's oceans. Oceana's multidisciplinary teams of scientists, economists, legal and technical specialists, and communications professionals win specific and concrete policy changes to protect the irreversible collapse of marine ecosystems.

This paper is authored by Leslie Delagran, economist, Oceana. For further information, please visit [www.cutthebait.org](http://www.cutthebait.org) or contact Oceana, 1350 Connecticut Avenue, NW, 5<sup>th</sup> Floor, Washington, DC 20036, United States, +1 202 833 3900.