Optimum tax on foreign fishing in Africa protects stocks and domestic fishing

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This is a small-scale fishing fleet. Credit: Kofi Vondolia

People living in coastal areas in Africa can rarely utilise their entire fishing zones as their simple boats only allow them to fish near the coast. Research carried out by economist Kofi Vondolia at the University of Gothenburg, Sweden, shows that the migration of fish stocks is significant to fish management.

The United Nations Conference on the Law of the Sea allows foreign fishing fleets to utilise the zones further out at sea, justifying this position by stating that there is a surplus of fish in these areas. A tax which takes into account ecological and socio-economic factors has the potential to regulate fishing, preserve stocks at sustainable levels and steer more of the income towards the country in possession of the

fishing waters.

"Allowing technically advanced fishing fleets to fish offshore within Ghana's economic zone means that inshore fish stocks, which are accessible to the country's own, small-scale fishing fleets, are also dwindling," says Kofi Vondolia, whose study forms part of a doctoral thesis at the University of Gothenburg.

Economic fishing zones for different countries are regulated in the United Nations Convention on the Law of the Sea, dated 1982. According to the convention, so called surplus fish in economic zones of coastal states may be utilised by other states. However, in the opinion of Kofi Vondolia, the word "surplus" is misleading. He uses empirical data from Ghana to demonstrate that fish management should take into account the fact that fish stocks out at sea migrate towards the coast. A series of other scientific studies have also shown that many fish stocks migrate. However, this knowledge has not yet made a breakthrough in the practical management of the global fish stocks.

This is why Kofi Vondolia has developed a bioeconomic model in order to calculate an optimum tax on fishing at sea, or offshore fishing. This tax can be used as a tool for political control by countries that use simple fishing techniques and are unable to utilise their entire economic fishing zones.

"If the government in a coastal developing country holds reliable data on the factors relevant to fishing taxation, they can use our bioeconomic model to set an optimum taxation level for foreign ships undertaking offshore fishing within the economic zone of that country," says Kofi Vondolia.

The tax being proposed by researchers is regarded optimal since it will maximise net profits for the country which owns the fishing waters;

Ghana, in this example. Alternatively, the tax can be set at a level just high enough to deter offshore fishing and bring maximum benefits to small-scale domestic coastal fishing. The latter will most likely not lead to maximum net profits for the country, but it may be preferable from a distribution point of view, since poor fishermen will benefit.

This tax reflects a number of factors, not least the biological link between offshore and inshore stocks, and how significant the levels of fish migration between these are. It also takes into account the reproduction rate of the fish species, the price of the fish, the cost of harvesting and the social discounting rate. This involves comparing current costs with costs arising in the future as well as comparing the income that is currently generated with future income.

"The fees foreign trawlers pay for offshore fishing at present are very low in comparison to our calculations. It is unlikely that the current level of charges lead to the highest possible welfare for the countries with fishing zones in which foreign vessels are fishing," says Kofi Vondolia.

More information: The thesis has received a positive reception by scientific journal *Environment and Development Economics*, which is currently reviewing a revised version.

Provided by University of Gothenburg