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Scientifically-Supported Economic Incentive Approaches

for the long term sustainability of Atlantic Bluefin Tuna fisheries

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In a nutshell

- *Atlantic Bluefin Tuna is an important fishery in the Mediterranean Sea;*
- *The effectiveness of the current management of Atlantic Tuna is questioned;*
- *The stock status, economic benefits, and the amount of jobs generated by the bluefin tuna fishery can be increased markedly with improved management;*
- *Solution: implement economic incentive management approaches that are back strongly by science.*

Atlantic Bluefin Tuna is currently at risk of being overfished to depletion (Sumaila and Huang, 2012). The widely-accepted primary reason for the current state of this stock is the fact that it is shared and exploited by many countries, which motivates countries to 'race for the tuna' resulting in overfishing (Sumaila, 2013). This phenomenon is known as the 'tragedy of the commons' (Hardin, 1968).

To deal with the shared stock nature of tuna in the Atlantic Ocean and adjacent areas, the International Commission for the Conservation of Atlantic Tunas (ICCAT) was established in 1969. One of ICCAT's major responsibilities is to set and allocate the amount of tuna that can be safely harvested annually based on science. However, ICCAT has consistently set this amount much higher than the levels recommended by its scientists since 1995 (Sumaila and Huang, 2012). Thus, the organization has been criticized for its failure to manage bluefin sustainably. Consequently, some more drastic and immediate actions have been called for, including a complete shut-down of the fishery; listing bluefin tuna on the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES); and cutting the current annual catch quota by more than half.

The Atlantic Bluefin tuna can be divided into two groups: west and east Atlantic tuna, which are different in terms of their life histories. Both groups of bluefin tuna are highly migratory and have a long life span

of up to 30 years. The east Atlantic bluefin tuna supports the fisheries of the eastern Atlantic Ocean area and the Mediterranean Sea.

The bluefin tuna fishery in the Mediterranean Sea started in the 7th Millennium BC (Sumaila and Huang, 2012). The popularity of Japanese sushi and sashimi, worldwide, during the 1980s made the bluefin tuna much more economically attractive than before. For example, a single Bluefin tuna was auctioned in the Tokyo market for USD 396,700 in 2011, motivating an increase in vessel capacity, vessel power and new storage innovations for bluefin tuna in the 1980s and 1990s. This increase imposed severe pressure on the bluefin tuna stock.

Total catches of bluefin tuna were stable at around 5,000 to 8,000 t per year from the 1950s to the early 1970s. After this period, large changes were observed with catches peaking in the mid-1970s, followed by an unusually large drop in catches by the early 1980s. From then on to the mid-1990s, catches increased steadily from 9,000 to 40,000 t per year. After that, there was a substantial decrease in catch to 24,000 t per year in the most recent decade. This drop was attributed to under-reporting catches by fishers and not due to official catch reductions, which, combined with overfishing, led to rapid declines in tuna populations over the years.

Illegal and unreported fishing are widely recognized as one of the biggest problems facing bluefin tuna management in the Mediterranean Sea. It has been estimated by ICCAT that the total catches were more like 43,000 t in the Mediterranean Sea in the early 2000s. The estimated total catch in 2007 was 47,800 t for the Mediterranean Sea and 13,200 t for the Eastern Atlantic Ocean, resulting in a total catch of 61,000 t - much more than the official catch for that year.

The total gross revenue generated by fisheries exploiting the Mediterranean bluefin tuna is estimated at 226.8 million USD a year. This generated profit of about 29.2 million USD in 2006 (Sumaila and Huang, 2012). The jobs supported by the bluefin tuna fisheries are estimated to be about 3,500 full-time equivalent jobs in 2006. Finally, this fishery has an annual multiplier effect on national economies of both MENA and non-Mena countries that fish the stock of about 635 million USD (Sumaila and Huang, 2012). These numbers underscore the economic importance of these fisheries and the need to design economic policies and management strategies for their sustainable use through time.

ICCAT was created to manage over 30 tuna species in the Atlantic Ocean and adjacent seas, including the Mediterranean bluefin tuna. The Commission, composed of 48 Contracting Parties (countries/political entities), is a Regional Fisheries Management Organization responsible for combining a wide array of scientific and socioeconomic information to set the total amount of Atlantic bluefin tuna that can safely be harvested annually. This amount is then split among member countries who are individually responsible to manage their fleet in accordance with the limit set. ICCAT is also responsible for collecting and analyzing statistical information and making recommendations.

As ICCAT has consistently shown its inability to effectively manage Bluefin tuna as demonstrated by the approval of non-science based quotas in many years, conservationists have appealed to other alternative authorities, especially CITES, which is an international body with an objective to "ensure that international trade in specimens of wild animals and plants does not threaten their survival". So far, the listing of bluefin tuna in CITES has been proposed twice, in 1992 by Sweden and in 2010 by Monaco. However, Sweden withdrew the proposal in 1992 and the proposal in 2010 got denied due to feverish rejection by some ICCAT member countries, in particular, Japan. Thus, listing in CITES Appendix I is a difficult path and seems infeasible in the near future. Other more feasible management tools, such as the implementation of economic policies based on economic principles that are supported by solid science of the ecosystem are needed to ensure economically sustainable management of these valu-

able marine resources. ICCAT may want to follow some of approaches used by the Commission on the Conservation of Antarctic Marine Living Resources (CCAMLR), a commission that has been praised for being a relatively good example of a science-based management organization (Miller and Slicer, 2014) and (Cassandra et al. 2016).

Two key problems with current tuna management and potential solutions

At the international level, a key criticism of ICCAT is that it ignores scientifically determined annual allowable quotas (TACs). Fixing this shortcoming will increase ICCAT's effectiveness significantly as it would help it meet a key goal for which it was created, that is, to protect tuna stocks from being depleted through over-exploitation.

At the national level, a key goal, in addition to ensuring that national fishing vessels do not exceed their ICCAT determined quota, is to ensure no economic waste of their valuable fishing quotas. To achieve this goal, economic approaches that internalize externalities that arise due to the shared nature of Atlantic Bluefin tuna stocks. Appropriate incentive schemes need to be designed to make it in the self-interest of fishers not to overcapitalize and overfish. In the case of fisheries, the use of individual transferable quotas (ITQs) or catch shares is the instrument of choice by many economists. These fishing quotas involve allocating catch shares to individuals or firms, who as 'owners' can freely trade their quota shares in the market. The key reason why many economists advocate for the use of this tool it that it gives fishers quasi-property rights and therefore a stake in the long term sustainability of the fishery. It is clear that transferable quotas have their merits: if they are underpinned by the setting of science-based total allowable catches, they can constrain the catch and enhance profitability. Currently, ICCAT modifies scientifically determined quotas using political, economic and social criteria. It is clear that transferable quotas have their merits: if they are underpinned by the setting of science-based total allowable catches, they can constrain the catch and enhance profitability. Currently, ICCAT modifies scientifically determined quotas using political, economic and social criteria.

Individual transferable quotas (ITQs) are no panaceas for solving fisheries management problems. A key shortcoming of ITQs is that it does not confer on its owners full property rights, which can lead to practices such high grading and discarding of fish, ultimately resulting in the unsustainable use of the fish resource. Social scientists have also raised social concerns that may arise from the use of ITQs. Hence, the use of this instrument needs to be part of a broad management system that will ensure that their shortcomings are addressed while their merits are reinforced. In other words, measures are needed to ensure that this instrument works to improve economic efficiency while ensuring the sustainable and equitable use of the fishery resources and the ecosystems that support them. Below are suggested strategies for a balanced individual transferable quota management system that would help with the achievement of economically, ecologically and socially desirable outcomes (Sumaila, 2010):

- At the country level, individual transferable quota systems must be supported by arms-length stock assessment units and backed with strong arms-length monitoring, control and surveillance to deal with the lack of full property rights and thereby stop the tendency to overfish.
- Some restrictions on the ownership of catch shares to people who actually fish the stocks may be needed to mitigate against diluting performance when quota owners are different from those who fish, which weakens the incentive to preserve the fish stocks for the long term;
- Measures to ensure resource sustainability by taking an ecosystem-based management ap-

proach including paying special attention to the management of essential habitat, use of safe minimum biomass levels, applying input controls, etc.; Networks of reasonably large marine protected areas need to accompany the implementation of transferable quotas to deal broadly with the ecosystem effects of overfishing, to allow for recovery, and to recognize the effects of uncertainty on the performance of individual quota systems.

- Imposing limits to quota that can be held by each quota owner, to mitigate the social problem of concentration of fishing power. It is worth noting that this is already a feature of many existing transferable quota systems;
- In some fisheries, equity concerns may be alleviated by allocating quotas to 'communities' or to residents of a territorial area in the form of community transferable quotas and territorial user rights in fisheries, respectively. With such schemes in place, the economic efficiency benefits of individual transferable quotas may be captured while minimizing their negative social impacts; and
- Auctioning of quotas could be used in some fisheries to deal with the problem of initial allocation of quota and its equity implications.

In conclusion, for ICCAT to achieve its objectives, it is suggested that it should aim to implement a balanced transferable quota system that is fully backed by science. Also, ICCAT needs to strengthen its approaches by developing effective cooperative mechanisms; introducing enforceable penalty regimes for stopping IUU fishing; and strengthening its reporting/monitoring systems. These suggested approaches to improving the performance of ICCAT have, by and large, been used successfully by the Commission on the Conservation of Antarctic Marine Living Resources (CCAMLR) in the management of the Southern Ocean (Miller, 2011).

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