

EE475: Natural Resources Economics

Some public policies toward Fisheries

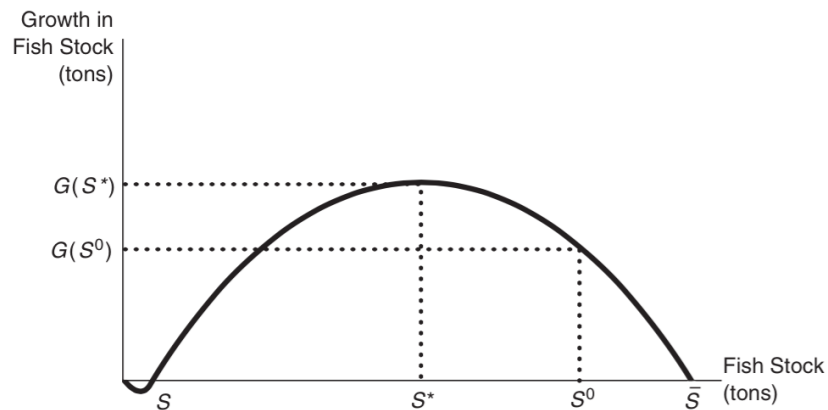
13th March 2015
by
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Outline

- Review contents from last time
- Aquaculture
- Raising the real cost of fishing
- Taxes
- Individual Transferable Quotas (ITQs)

Review

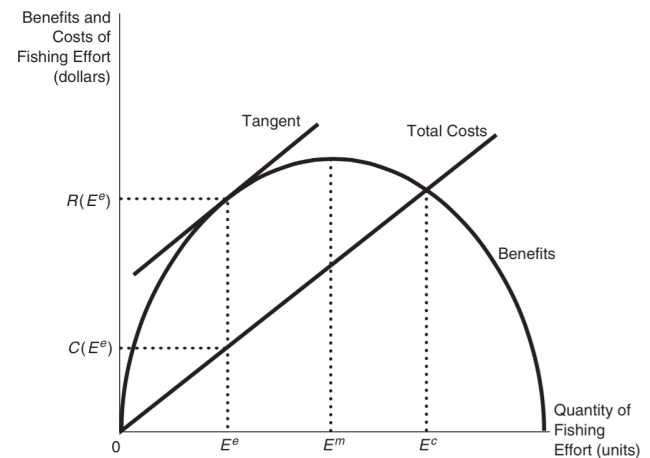
FIGURE 13.1 Relationship between the Fish Population (Stock) and Growth



Source: Tietenberg & Lewis (2012) p.322

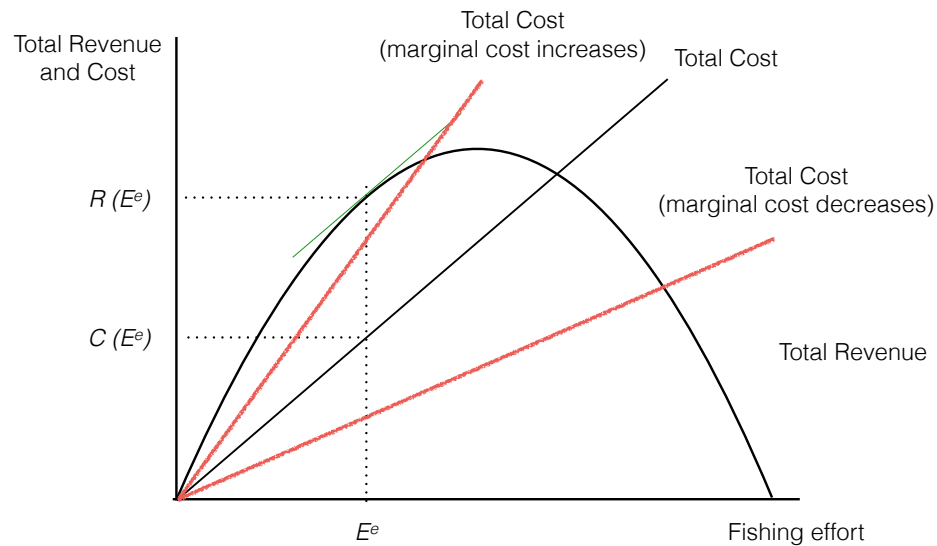
Review

FIGURE 13.2 Efficient Sustainable Yield for a Fishery



Source: Tietenberg & Lewis (2012) p.324

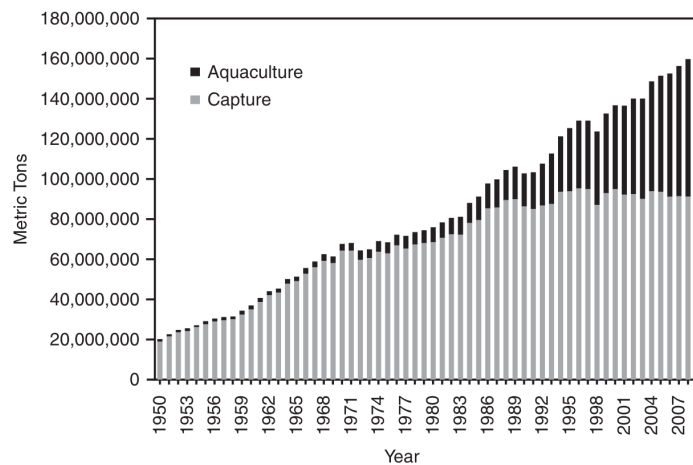
Review



Aquaculture

- One main problem of fishery resource: The resource is under open-access property regime.
- Solution? : Make it private
- Aquaculture: Controlled raising and harvesting of fish
 - Not very mobile
 - Can be confined by artificial barrier
 - Instinctively return to their place of birth to spawn (lay eggs).

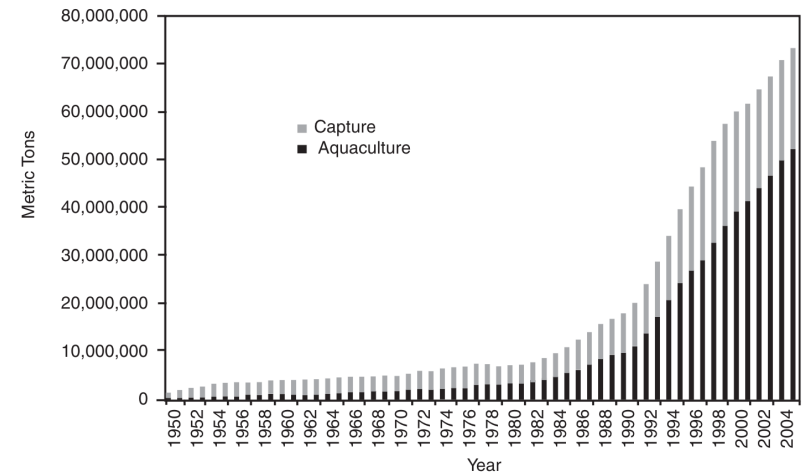
FIGURE 13.4 Global Capture and Aquaculture Production



Source: "Global Capture and Aquaculture Production" from FISHSTAT PLUS Universal Software for Fishery Statistical Time Series, Version 2.3 (2000). Copyright © by Food and Agriculture Organization of the United Nations. Statistics and Information Services of the Fisheries and Aquaculture Department. Available at: <http://www.fao.org/fishery/statistics/software/fishstat> Reprinted with permission.

Source: Tietenberg & Lewis (2012) p.333

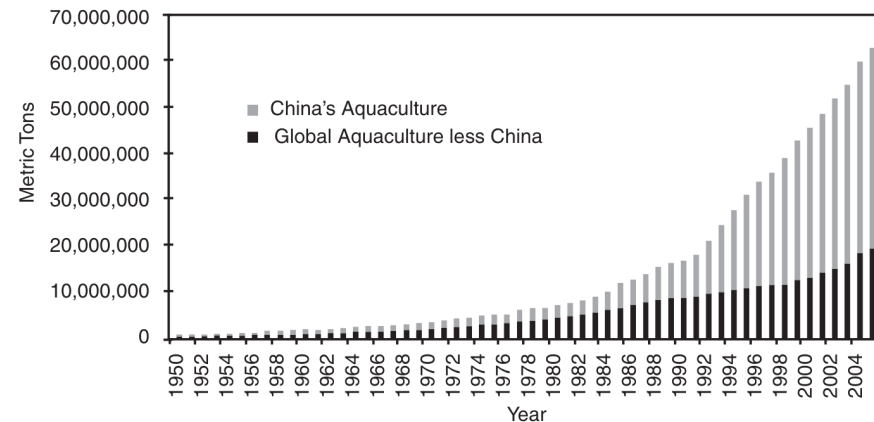
FIGURE 13.5 Chinese Capture and Aquaculture Production



Source: "Chinese Capture and Aquaculture Production" from FISHSTAT PLUS Universal Software for Fishery Statistical Time Series, Version 2.3 (2000). Copyright © by Food and Agriculture Organization of the United Nations. Statistics and Information Services of the Fisheries and Aquaculture Department. Available at: <http://www.fao.org/fishery/statistics/software/fishstat> Reprinted with permission.

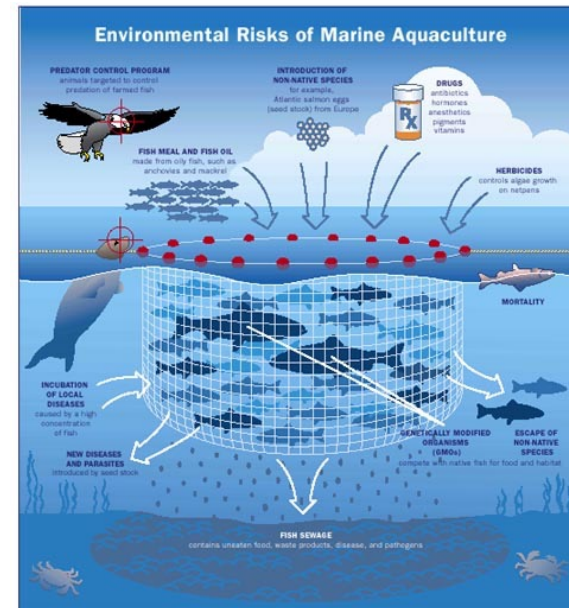
Source: Tietenberg & Lewis (2012) p.334

FIGURE 13.6 China's Rising Share of Global Aquaculture



Source: "China's Rising Share of Global Aquaculture" from FISHSTAT PLUS Universal Software for Fishery Statistical Time Series, Version 2.3 (2000). Copyright © by Food and Agriculture Organization of the United Nations. Statistics and Information Services of the Fisheries and Aquaculture Department. Available at: <http://www.fao.org/fishery/statistics/software/fishstat> Reprinted with permission.

Source: Tietenberg & Lewis (2012) p.334



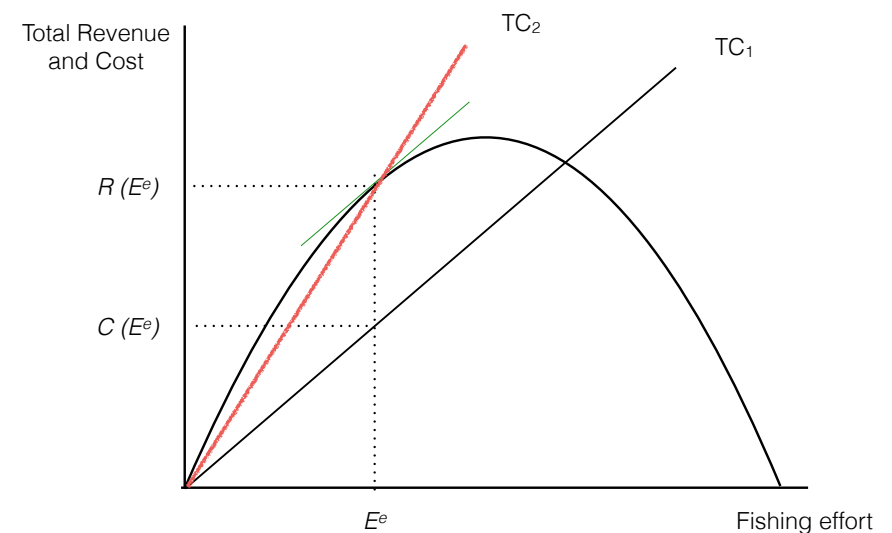
Some Environmental Risks from aquaculture

- Drugs (antibiotics)
- Diseases and illness spread to native species
- Fish sewage
- Increase sediments
- Escape of non-native species
- Predator control program

Raising the Real Cost of Fishing

- IF you were the government, how (with what measures) would you raise the cost of fishing?
- How would the policy affect the Total Cost curve?
- To which level of fishing harvest would be your objective?

Raising the Real Cost of Fishing

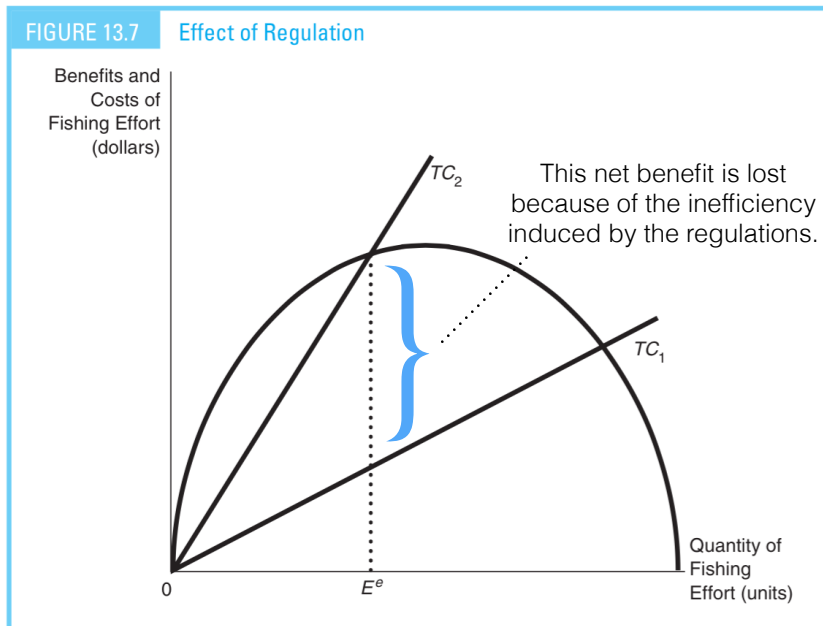


Raising the Real Cost of Fishing

- Were the policies efficient?
 - No! Even when they had resulted in the efficient fishing effort!
- Why?
 - “Efficiency implies not only that the catch must be at the efficient level, but also it must be extracted at the lowest possible cost.” (Tietenberg and Lewis 2012, pp.336).

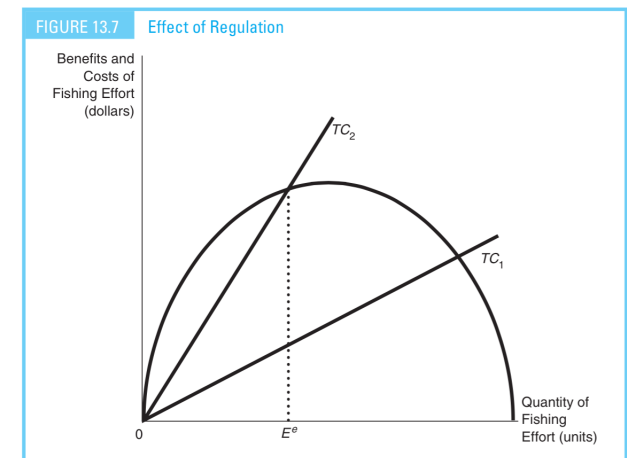
Raising the Real Cost of Fishing

- If you were the fishermen, what would you do to maintain your catch level if these regulations were applied?
 - Prohibition of destructive tools (*probably the most efficient from the fishermen's perspective*)
 - Limitations on fishing time



Taxes

- Taxes on effort would create the same effect to the TC curve.
- What is the difference between Taxes and the Regulations?



Taxes

- Distinguish between *transfer costs* and *real-resource costs*
 - Real-resource costs: Costs which involve utilisation of resources
 - Transfer costs: Costs to that part of society (in this case fishermen) bearing them, but are exactly offset by the gain received by the recipients
- The 'net benefit' of the fishermen from taxes are not wasted, but transferred to other parts of society through government.

Individual Transferable Quotas (ITQ)

- Established in New Zealand in 1986
- 18 countries adopting it
- Species-based

Country	Number of Species Covered
Argentina	1
Australia	26
Canada	52
Chile	9
Denmark	1
Estonia	2
Falkland Islands	4
Greenland	1
Iceland	25
Italy	1
Morocco	1*
Mozambique	4
Namibia	10
The Netherlands	7
New Zealand	97
Portugal	1*
South Africa	1*
United States	6

*Complete species list unavailable

Source: Adapted from Cindy Chu, "Thirty Years Later: The Global Growth of ITQs and their Influence on Stock Status in Marine Fisheries," *Fish and Fisheries* Vol. 10 (2009): 217–230.

Source: Tietenberg & Lewis (2012) p.341

Individual Transferable Quotas (ITQ)

- 3 Characteristics of an efficient quota system
 - (1) The quotas entitle the holder to catch a specified share of the total authorised catch of a specified type of fish.
 - (2) The catch authorised by the quotas held by all fishermen should be equal to the efficient catch for the fishery.
 - (3) The quota should be freely transferable among fishermen and market should send appropriate price signals about the value of the fishery.

Individual Transferable Quotas (ITQ)

- Considering transferability of the ITQ
 - The entitlement to fish flows to those gaining the most benefit from it because their costs are lower.
 - Encouraging technological progress

Individual Transferable Quotas (ITQ)

- The distribution of the rent : Possibilities and Outcomes
 - Auction : The outcome would be very similar to the tax system. why?
 - Give quotas to the fishermen in proportion to their historical catch. Then, let them trade through market.
 - New entrants have to purchase quotas from existing fishermen.
 - Competition among the potential purchasers would drive up the price of the quotas until it reflected the market (present) value of future rents

Note

- **Rent**
 - Unearned revenue
 - any payment made, or benefit received
 - for 'non-produced input', e.g. land
 - for assets formed by creating official privilege over natural opportunities
 - by beneficiaries of other deliberately created exclusivity, e.g. labor guild, corruption
- Fishermen do not produce the fish, they catch them. Value of the fish is not a result of production of the fishermen.