Introducing Fishing Quota Auction into Japanese Fishing Industry

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- I uploaded this slide on my github page:

  https://github.com/myuuuuun/fishing_quota

Introduction

- **Individual Fishing Quotas (IQs)** are the permanent rights to catch a specific kind/amount of fish in a specific region each year
- IQs system is used as a way to regulate fishings (prevent overfishings)
- Each year researchers estimate the amount of fish in the sea and set the Total Allowable Catch (TAC), which is the maximum total amount of fish that fishers can catch in a year
- The government allocates the total amounts to fishers, in proportion to IQs
- In some contries (NZ, AUS, USA, Iceland and so on), quota can be transferred to other fishers. Then it is called **Individual Transferable Quotas (ITQs)**

Situation in Japanese Fisheries

- Current situation of Japanese fisheries is disastrous...
- Total catch in Japan: about 4.8 million tons (2013), about 1/3 compared to 12.8 tons in the peak year (1984)
- Number of people engaged in fishing: 160 thousands, declining 7 thousands every year
- About 50% of people are age over 60, 3% are age under 24 (Norway: 10% are age over 60)
- Catch per person engaged in fishing is 27.6 tons (Island: 225.2, Norway: 214.5, Korea: 30.3, China: 5.4)

Situation in Japanese Fisheries

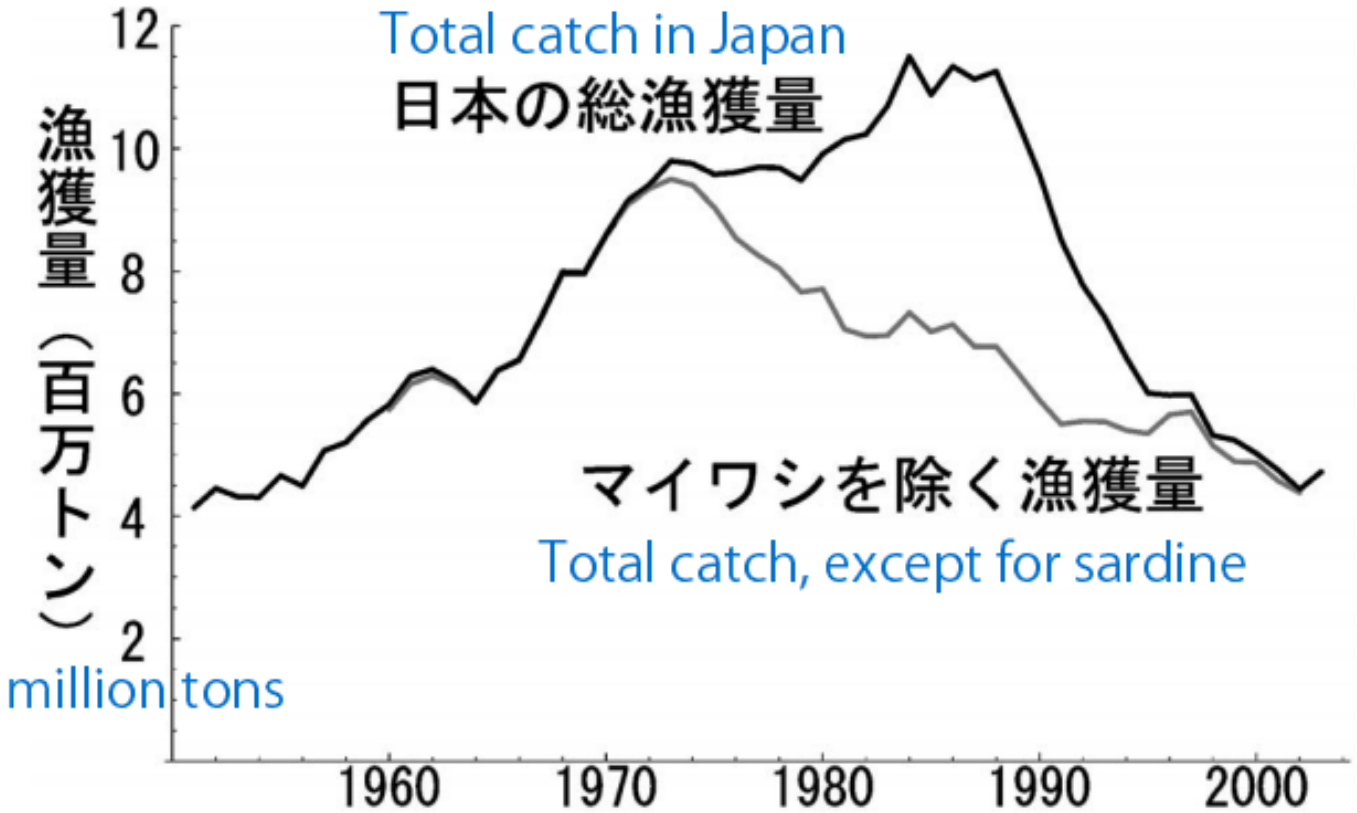


Figure: Transition of total amount of catch in Japan[2]. Total catch except for sardine is consistently decreasing since 1970.

[2] https://www.jstage.jst.go.jp/article/suisan/73/4/73_4_763/_pdf

Situation in Japanese Fisheries

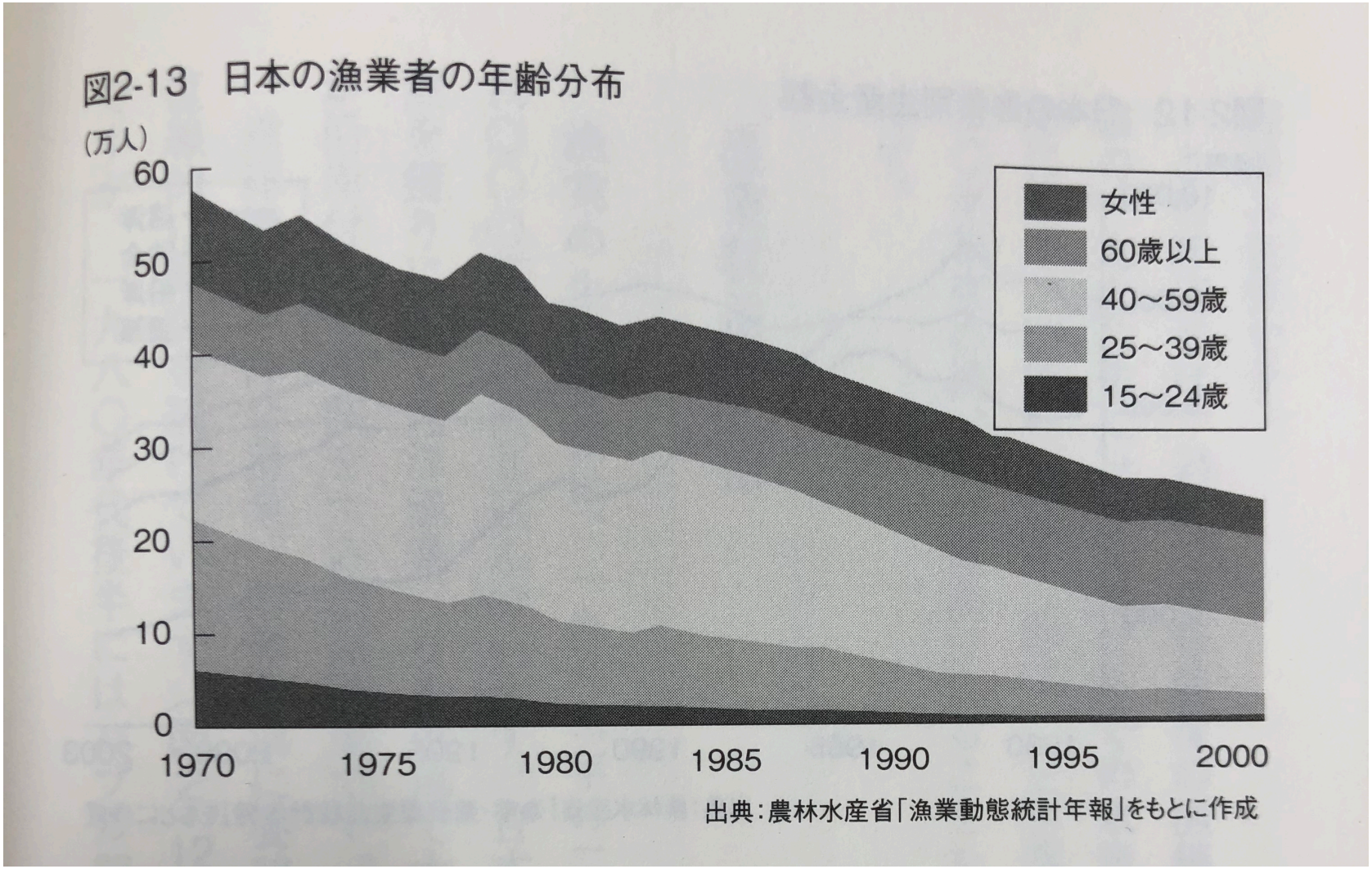


Figure: Transition of number of people engaged in fishing.

Situation in Japanese Fisheries

- Japan fails in controling overfishing
- Why? - Japan introduced TAC for 7 major kinds of fishes in 1990s, not working until 2009
- In 2002, TAC of sardine set by the government is two times as much as the (estimated) amount of that in the sea!

Situation in Japanese Fisheries

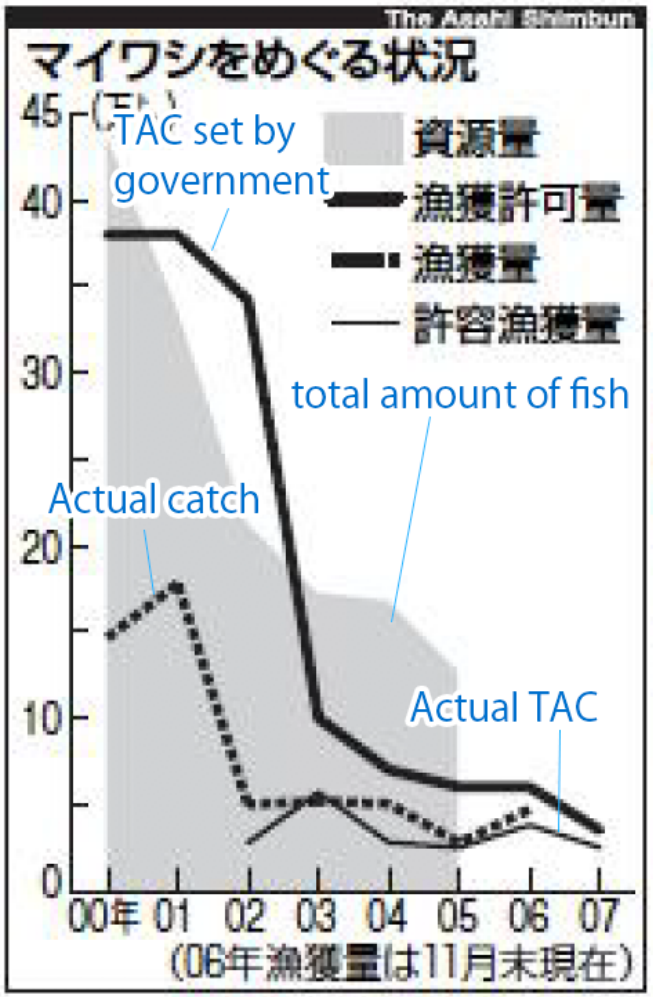


Figure: Total amount of sardine and TAC[3]

[3] Asahi Shimbun, Jan 18 2007

Situation in Japanese Fisheries

- Even after the improvement of TAC level, the problem is remaining - fishing competition!
- Japan does not adopt IQs system, rather uses “olympic system”
- The government sets TAC, and after the fishing season open all fishers start catching at once
- If total amount of catches exceeds TAC, then the fishing season finishes
- This system causes enormous inefficiency

Situation in Japanese Fisheries

Figure: Squid Fishery in Hokkaido[4]

[4] http://blog.goo.ne.jp/suisan-h/e/4cf33509d15eb708b4ead87e171dc717

Situation in Japanese Fisheries

Figure: Squid Fishery in Hokkaido[5]

[5] http://blog.goo.ne.jp/suisan-h/e/4cf33509d15eb708b4ead87e171dc717

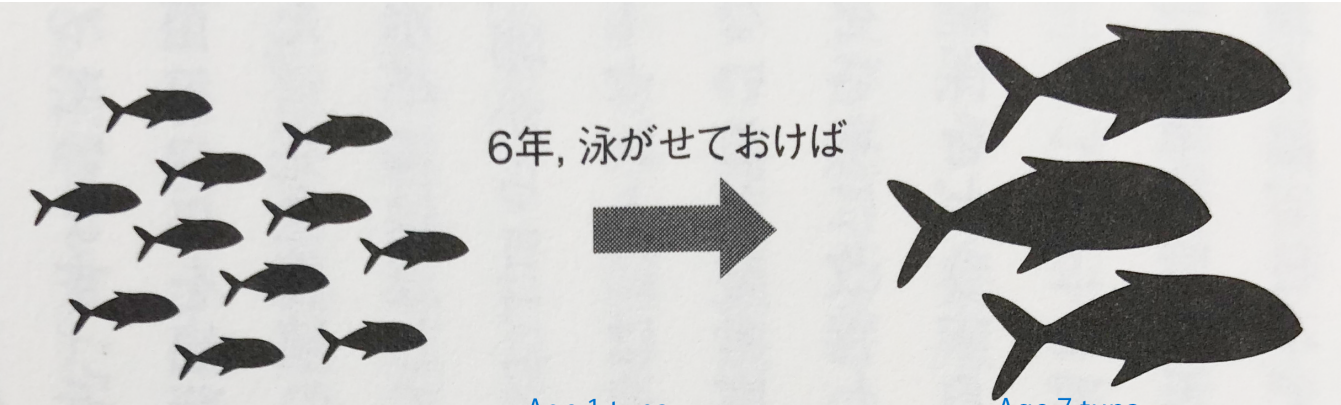
Situation in Japanese Fisheries

- Squid are nocturnal (active in the night) and gathering around the lights to eat plankton
- Fishers use a lot of bright lights to catch squid (180kW per vessel, 3600 times blighter than a 50W light bulb)
- Fuel cost for fishing lights is very expensive (1/3 of total fuel consumption)
- To catch squid in the dark night, much fewer lights are needed
- Overlighting is the result of comptetition between boats!

Situation in Japanese Fisheries

- Other problems of the olympic system:
- Consumers do not eat fish at once: when fishing season is open, the price collapses. After closing, the price becomes high - this is efficiency loss for both consumers and fishers
- Inducing fishers to catch young age (small) fish: since the season may finish tomorrow, they will catch all fish they find - this causes decrease of resources in the future

Situation in Japanese Fisheries



	ヨコワ(1歳)	マグロ(7歳)
漁獲数	162万尾	47万本
体重	3kg	97kg
漁獲量	4,856トン	4万5,590トン
単価	550円/kg	5,000円/kg
生産金額	27億円	2,280億円

Figure: Tuna at age 1 / at age 7. If we keep age 1 tuna living for 6 years, the price will be 100 times as high as at age 1

Fishing Quota Auction

- So Japan needs to introduce IQs!
- If IQs system is adopted, there is no need to join in competition - fishers can catch only large size fish without any obstruction, whenever they want (when the price in the market is high)
- At the same time, the auction system for IQs should be introduced

Fishing Quota Auction

- Fishing quota auction can separated into two types: Quota auction and Ace auction
- Quota auction needs for the people who want to quit a job and enter the fisheries / increase the capacity
- Ace is a temporary right to catch the fish in one year - which is distributed in proportion to IQs
- Ace auction is also important for efficiency - I'd like to model and evaluate this type of auction

Ace Auction

- Suppose a sudden rise of the oil price occurs, and some boats will make a loss if they operate
- In the past case in Japan: the government gave subsidies for fishers
- If ace auction is introduced, the inefficient fishers (boats) sell their ace permanently for efficient (large) boats
- Both buyers ans sellers can make a profit, and no need to pay subsidies!