

Session 2: Seafood Security and Marine Ecosystem Sustainability

Can We Get More Fish?

Degradation and Recovery of Fisheries Resources

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There are many warnings in marine ecosystems. The mean trophic level of the world fisheries landings (MTL) has decreased from ca. 3.5 in 1950 to ca. 3.3 in 1990. This implies overfishing because the fish being harvested are increasingly coming from the less valuable lower trophic levels as populations of higher trophic level species are depleted. Convention on Biological Diversity chooses MTL as an indicator of marine ecosystem integrity and ecosystem goods and services in Global Biodiversity Outlook. This decline of MTL is called “fishing down”. The theory of “fishing down” is based on the assumption that the major target species is high price and higher trophic level fish. The proportion of low value fish of the total fish consumption differs between developing countries and developed countries.

There is a mismatch between demand and supply of fisheries resources from the food security viewpoints. In the case of Japanese fisheries, the total allowable catch (TAC) exceeded the allowable biological catch (ABC) in some fish including sardine and the actual catch exceeded ABC in some years. In contrast, the actual catch is much smaller than the ABC in some species, including Pacific saury and anchovy. It should be noted that the total ABCs of these species is larger than 2 million tons. However, economic demand of these species is short in Japan, while economic demand of overfished species including tunas and chub mackerel is still large.

In conclusion, we made the following recommendations that could both increase the food resources and reduce the chances of overexploitation: (1) Do not eat high value fish too much; (2) Catch more fish at lower trophic levels; (3) Do not use too much fish as fish meal; (4) Reduce discards before and after landings; (5) Establish food markets for temporally fluctuating fishes at lower trophic levels; (6) Improve the food-processing technology used on small pelagic fishes; (7) Switch the target fish to correspond to the temporally dominant species; (8) Conserve immature fish especially when the species is at a low stock level; (9) Conserve both fish and fishers; (10) Say goodbye to traditional MSY theory; and (11) Monitor not only the target stock level but also any other indicator of the “entire” ecosystem.



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Academic Degrees

1985 DSc, Graduate School of Science, Kyoto University, Japan
1982 MSc, Graduate School of Science, Kyoto University, Japan
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Field of Study

Mathematical Ecology, Fisheries Science, Environmental Risk Science