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THE ESTIMATION STRATEGY OF ABC AND THE MANAGEMENT RULE OF TAC FOR JAPANESE COASTAL FISHERY

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The estimation strategy of ABC and the management rule of TAC for Japanese water.

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In United Nations Convention on the Law of the Sea (UNCLOS), it was enshrined that "*States shall take measures which are designed, on the best scientific evidence available to the States concerned, to maintain or restore populations of harvested species at levels which can produce the maximum sustainable yield* (MSY)".   However considering the current status of scientific knowledge for the fishery target species in Japan, it is practical that MSY can be defined as the optimal yield under the proper fishery stock management (Japanese Fishery Agency 2012).   In Japan, the allowable biological catch (ABC) is estimated for important coastal fishery stocks including the target species for TAC.   The threshold level of stock (Blimit: the minimum stock biomass to ensure an appropriate amount of recruitment) is defined and in when the biomass is above that level, sustainable use is carried out based on the strategy depending on each biological and fishery characteristics.   If the biomass is less than the threshold level, tighter ABC is set to recover the stock.   If the stock biomass is extremely low (below Bban: threshold level of stock to do fishing moratorium), fishing moratorium or similar measure will be recommended.

There are 7 fishes, i.e. Japanese sardine, Japanese jack mackerel, chub and blue mackerel, Pacific saury, Alaska pollock, snow crab and Japanese flying squid, as target species for TAC and 20 populations are separated to estimate ABC.   For 14 of these 20 populations, Blimits are defined.   Among those, populations except for 4 populations, i.e. Japanese jack mackerel in Tsushima warm current, Chub mackerel in Tsushima warm current and 2 Japanese flying squid populations which have rather clear relationships between spawning stock biomass and recruitment (S-R relationships), historical minimum spawning stock biomasses (Bloss) are defined as threshold level to ensure an appropriate amount of recruitment.   It is because there are little clear S-R relationship, and the effects of regime shift and the frequency of dominant year classes decide the variance of stock biomass for these populations.   For these populations, the stock managements based on S-R relationships are impossible.   Thus, it is practical and effective that the threshold levels are defined based on the historical minimum stock biomasses to maintain the enough recruitment for fish species with non-clear S-R relationships.

Having ratified the UNCLOS in 1996, Japan has introduced a TAC system and TAC

has been generally kept below ABC. TACs are set with the understanding of the fishermen, which works as an upper limit of catches. This also shows that MSY, defined in Japan as "the optimal yield under the proper fishery stock management" based on historical stock biomass, works reasonably well as the practical threshold level. Fishermen know well from their experience that the stock biomass had fluctuated and this make the Japanese threshold easy to gain understanding of fishermen.

This situation is not only in Japan. For instance, in New Zealand, initially it was tried to use Bmsy for the Blimit of Rock lobster but the estimated Bmsys by several assumptions varied so that they could not be used as Blimit. On the other hand, fishermen had understood that the stock biomass in the past was rich. Therefore, it is managed by targeting the level of CPUE level at that time when the biomass was rich (Hilborn & Stokes 2010). This is consistent with the current management state of many fish species in Japan.

In first place, Blimit should be a limit to prevent recruitment overfishing. On the one hand, for fish with high steepness, there is broad fishing intensity to keep Alec MacCall's (National Marine Fisheries Service, Santa Cruz, California) concept "Pretty Good Yield" (PGY: within 80% of MSY), even if Fcurrent is higher than Fmsy, Bcurrent will not be smaller than Bmsy immediately (Hillborn 2010). Considering on the hardness to estimate MSY, for the stocks in North Pacific Ocean which had experienced various fishing intensity and had fluctuation of biomass, Bloss would have similar performance with Bmsy.

Thus considering on understandable for fishermen and similar performance with Bmsy, for new target species of stock management, it is one practical option to learn from these strategies of stock management for Japanese coastal fishery.

A series of documents submitted by Japan to the WCPFC Management Objective Workshop have no intention of reopening the discussion regarding to the reference point for the WCPFC stocks at WCPFC-SC meetings. The discussion of the WCPFC-SC meetings is recognized as valuable. These documents is believed to be valuable and to provide good contribution presenting additional ideas of some other candidates of the RP to be used for the Northern stocks of the WCPFC, which are not discussed so far at the SC meetings.

Refferences

Japanese Fishery Agency, 2012, The basic rule to estimate ABC in 2012.

Hilborn, R. and K. Stokes, 2010, Defining overfished stocks: Have we lost the plot?, Fisheries 35: 113-120