IMPACT OF THE INCREASING CATCHABILITY COEFFICIENT OF THE LARGE PURSE SEINER TO THE DEPLETION OF THE SMALL PELAGIC FISH BIOMASS IN THE JAVA SEA

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ABSTRACT

Understanding the dynamics of marine fish resources and its ecosystems requires long term historical data from a particular fisheries in a certain area. Technological development of small pelagic purse seine fishery in the Java Sea based on 1975-2007 landing data were collected and analyzed in this paper. The results demonstrate increasing fishing efforts, gradual changes of fishing tactic, and the strategy of the purse seine fleets are proportional to catchability coefficient. The analysis showed that the predicted catchability coefficient in 2007 was 5.8 greater than 1976. Catching ability reflects efficiency, fishing power, or probability of fish being caught in a particular fishery and it provide a quantitative magnitude expressed by "q". The dynamic of the coefficient is strongly correlated with the more advanced applied technology, skills and strategy of the fishermen in using fish aggregating devices and lights as well as increasing number of gears, boats, and engine sizes of purse seine fleets. Close studies towards increasing number of purse seiner during these periods also indicated that such fishery were not under well plan management, thus, it was not a surprise that such continuous improvement of catchability contributes to the declining of the small pelagic fish biomass.

KEYWORDS: **catchability coefficient, purse seiner, depletion, small pelagic fish, Java Sea**

INTRODUCTION

Fishing activities defined as human activities in order to catch wild aquatic animals with or without gears. The growth of fishing pressure as an impact of market driven and economical demands plays a significant role to the increasing of purse seine fleets in the Java Sea. A global concern dealing with rapid depletion of the world's fish stocks due to over exploitation is surging in several fisheries in the world. The number of collapsing fisheries in the world has been stable through time since 1950s pointing out that there are not any improvements in the overall fisheries management. For there is no mechanism to control the technological efficiency of existing effort, the expanding fishing intensity will exceed beyond maximum capacity of its recruitments.

Catchability reflects the efficiency, fishing power, and probability of fish being caught of a particular fishery. It is a quantitative magnitude expressed by the catchability coefficient (q). Several definitions on catchability found in publications. Larsen *et al.* (2003) defines the catchability (q) as the relationship between the catch rate (catch per unit of effort) and the true population size (B). The unit of catchability is fish caught per fish available per effort unit and per time unit. Hilborn & Walters (1992) states that catchability is also called gear efficiency or sometimes fishing power, and is strongly related to gear selectivity because it is species and size dependent. Catchability term in fisheries can be seen as the ease or difficulty experienced during the fishing operation, which is closely related to the concentration and density of fish in a particular fishing area. Fishermen have been aware of and been going in a direction to the fishing area that contains high concentration of fish based on season and size of fish.

Catchability coefficient (q) is a key parameter in the process of validation of a simulation model of fishing. These parameters are generally assumed to be constant. In practice, in which it is not always the case in accordance with the theory of fishing. Catchability coefficients vary according to season, year, technology, target species, gear, and the state (Roughgarden & Smith, 1996). An assumption in catchability coefficient (q) is still one of the most sensitive points of the surplus production model. In a multi species fisheries, imposing similar efforts to capture each species will face enormous difficulty (Hilborn & Walters, 1992).

In many cases the catchability of purse seine fleets increases from year to year, due to the development of their fishing technology. Dynamic fishing tactics and strategies improves as an adaptive response to the conditions of declining resource abundance, market demands, environmental, and regulatory

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