

Measurement of Productivity Changes in Traditional Fishery Sector at Red Sea, Saudi Arabia: The Malmquist Productivity Index Approach

By

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Abstract

The Saudi traditional fishery yield, at Red Sea, is continuously losing its relative importance in total fish production. Sustainable development policies for this sector need to be supported by technical and economic studies. Data Envelopment Analysis (DEA) has generally been adopted as the most appropriate methodology for the estimation of fishing productivity or capacity through estimating the Malmquist productivity index with its two components of efficiency and technical changes.

Study results showed that mean average productivity change over five years, 1999-2003, were negative for fishing methods at fishing areas, because of negative technical changes exceeds positive efficiency change. Training of fishermen and improving technology of traditional boat and fishing methods, using fish finder, would improve efficiency and technological productivity changes. Average yearly productivity changes showed that harvesting at Tabouq & Madinna reach its capacity or MSY level, while there was over harvesting at Makka. Policies of saving natural stock of fish would be different based on the last results, it should take into consideration the differences among fishing grounds.

The impacts of weather, environment, and fish reproduction seasons on productivity of fish are shown by the estimation of average monthly productivity change, i.e. positive or negative productivity changes for each month of the year. Based on study results, controlling monthly number of fishing efforts for each boat is the first necessary step to avoid natural stock depletion.