Revenue Based Fishing Capacity Estimation of Trawl Fishery - An Economic Approach

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The problem of overcapacity in fisheries is common and rebalancing the fishing pressure on available fish stocks is the challenging task at the global level. FAO (1998) highlighted that effective fishing capacity management is a major concern both at national and international levels. It has also been specified clearly that every country should develop a national level fisheries management plan including assessment of domestic fishing capacity and introduce measures to prevent or eliminate excess fishing capacity. Accordingly, initiatives were taken to assess the fishing capacity in the countries such as USA, Europe, China etc. and India has started the same in the slow pace.

In physical terms, capacity is defined as "the maximum output that can be produced per unit of time from existing plant and equipment and unrestricted availability of variable inputs". In economic means, capacity is "the maximum revenue attainable for the given fixed inputs using relevant outputs and output prices". The common methods used to estimate fishing capacity are Peak-To-Peak Analysis (PTPA), Stochastic Frontier Analysis (SFA) and Data Envelopment Analysis (DEA).Of which, Peak-To-Peak Analysis and Data Envelopment Analysis are the two methods that are recommended by the FAO Technical Working Group on the Management of Fishing Capacity as the practical methods of measuring fishing capacity. Among this, DEA is a popular tool used extensively for the estimation of fishing capacity.

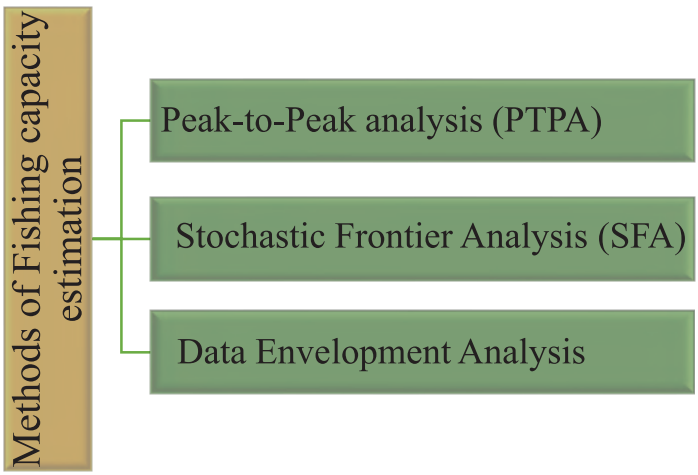


Fig.1 *Various methods of fishing capacity estimation*

Estimation of fishing capacity is mainly confined to industrial fisheries where there is likelihood of imposing control on fishing capacity. But, in semi-industrial fisheries it is very complex due to lot of uncertainties. This study aims the revenue-based fishing capacity with the help of both physical and economic indicators using data envelopment analysis.

Generally, fishing capacity estimation is limited to physical indicators viz., Gross Tonnage or Horse power towards estimating the fishing effort and the earlier studies on these aspects are on physical indicators rather on economic indicators. Generally, the number of fishing vessels, size of fishing vessel, technical efficiency of vessel operation and potential fishing time of each vessel at a specified period of time are the four components of fishing capacity which is also stated as fleet capacity. In practice, due to scarcity of data, economic capacity analysis is seriously considered in fisheries context (Herrero and Pascoe, 2003).

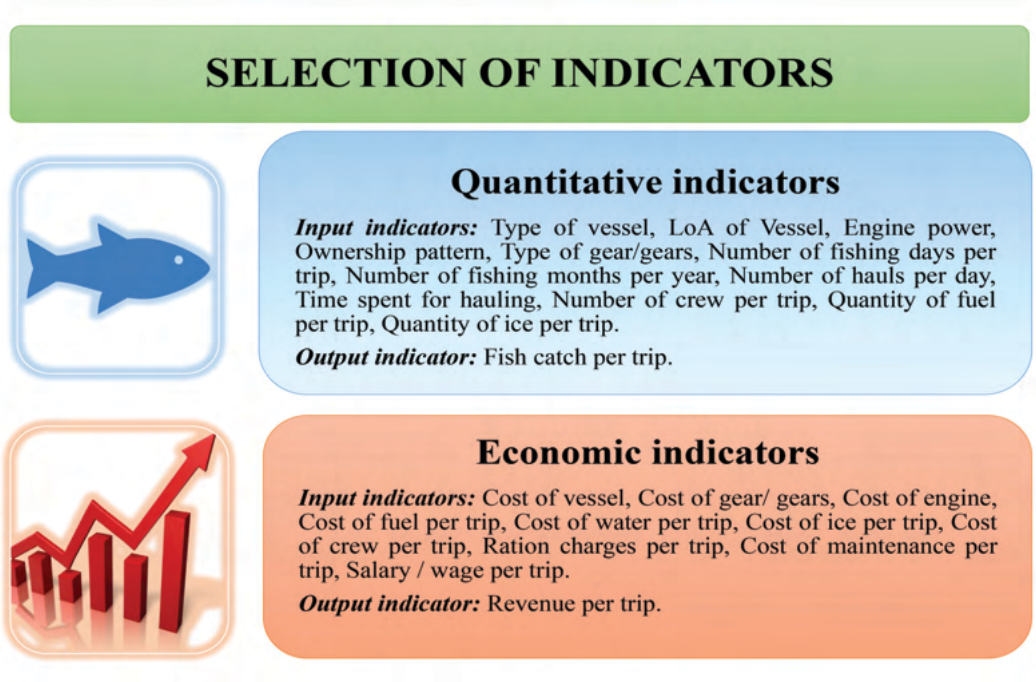
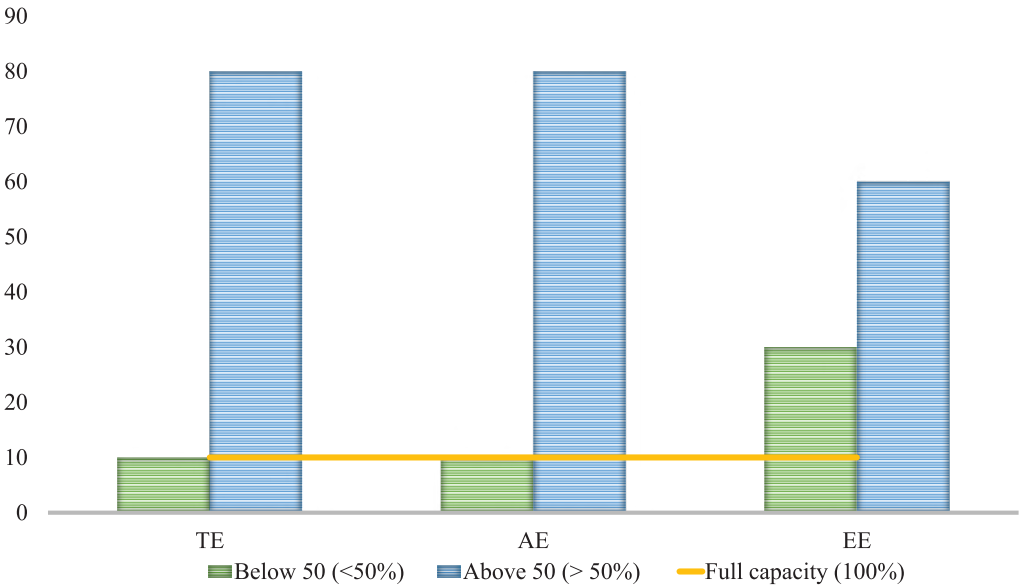


Fig.2 *Quantitative and economic indicators of DEA*

The trawl fishery with LoA ranged between 15 to 25 metre and were categorized into small, medium and large trawlers for the purpose of the study. The study reveals that the mean capacity utilized by the trawlers (16.5-22.5m) was 0.72 and 0.53 by using physical (quantitative) and economic indicators respectively. This showed that there are scope for increasing the technical efficiency of the trawlers by 28 percent. The Economic efficiency of trawlers was 0.53 implied that certain vessels which are operating at high technical efficiency are showing low economic efficiency.



TE – Technical Efficiency; AE – Allocative Efficiency; EE – Economic Efficiency

Fig.3 *Revenue-based capacity of trawl fishery*

The comparison of Technical Efficiency (TE) and Economic efficiency (EE) revealed that there were 80 per cent of fishing vessels operated with more than 50% efficiency levels. While the same under economic efficiency was only 60%. Besides, it was revealed that 21.15 and 24.58 per cent of trawlers operating with full efficiency were not proportionate with the economic efficiency levels.

Increase in fishing capacity is the resultant of combination of factors viz., increases in number of vessels, improvement in efficiency and expansion of effort. As fish resources are finite and limited in size, indiscriminate exploitation resulted in biological, social and economic consequences. Several measures/ initiatives had been taken by various countries towards addressing the capacity issues. In India, the policy intervention based on the revenue-based fishing capacity of various fleets is necessary towards enhancing the fisheries sustainability both at biological and economical measures.

References:

FAO (1998) Report of the Technical Working Group on the management of Fishing Capacity, La Jolla, United States of America, 15 – 18 April, 1998. FAO Fisheries Report. No. 586. Rome, 57p.

Herrero, I.and Pascoe, S. (2003) Value "versus" Volume in the Catch of the Spanish South-Atlantic Trawl Fishery, Journal of Agricultural Economics, 54. 325-341.