

Estimating the Technical Efficiency of Small-Scale Inland Fisheries: A Case from Vavunikulam Tank

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The fisheries sector comprises coastal, offshore, and inland fisheries. Inland fisheries specifically involve the exploitation of fishery resources from inland water environments. Vavunikulam is one of the largest tanks in the Mullaitivu District, Northern Province, Sri Lanka, and holds immense potential for inland fishing. This study aims to determine the level of technical efficiency and identify factors affecting the technical efficiency of small-scale fishing households. This study also focuses on the role of the National Aquaculture Development Authority of Sri Lanka (NAQDA) and the fishing society in this context. Out of the 60 fishing households using the Vavunikulam tank, 50 fishermen were selected using a convenient sampling method. Data were collected with thoughtfully designed questionnaires. A Cobb-Douglas stochastic frontier approach with an inefficiency model was used to estimate the technical efficiency and identify the determinants of the efficiency of fishermen. The maximum likelihood parameter estimates showed that fishing output was significantly and positively correlated with the number of fishing gear used and the duration of fishing. This indicates that optimizing input usage can lead to increased fish output levels. The study found that 69.80% of the deviation of observed fishing output from frontier output was due to technical inefficiency. The estimated mean of technical efficiency of the sample fishermen was about 86%, suggesting that by efficiently utilizing existing resources, the technical efficiency could be enhanced by 14%. Further results showed that education level, experience, and income from other sources were found to have a negative and significant effect on technical inefficiency, and age was found to have a positive and significant effect on technical inefficiency of fishing output. Therefore, government and policymakers should take necessary actions and foster policies to improve the technical efficiency of fishermen through providing formal as well as informal education, training programs, and credit facilities.

Keywords: Technical efficiency, Inland fisheries, Catch-rate, Stochastic frontier analysis, Inefficiency model