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Evaluating the sustainability and potential of the Blue Economy: A bioeconomic and input–output analysis of the fisheries sector in Cape Verde

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Highlights

- This study examines the potential of sustainable fisheries growth in Cape Verde's economy.
- The biological and economic sustainability of the fisheries sector in Cape Verde is analyzed.
- The Input–Output model is used to compute output and employment multipliers for the fisheries sector.
- Reductions in fishing effort and harvest are recommended to ensure sustainable growth.
- The study provides insights for policymakers on maximizing the output and employment multipliers.

Abstract

This study examines the biological and economic sustainability of the fisheries sector in Cape Verde, with a focus on its potential contribution to the Blue Economy. The estimated fish stocks in Cape Verde range from 32,000 to 41,000 tonnes, and fresh fish represents a significant source of animal protein for the Cape Verdean population. Using the standard bioeconomic models, we analyze fishing effort and harvest data from 1993 to 2021 to determine key reference points for equilibrium, such as Effort at Maximum Sustainable Yield (E_{MSY}), Maximum Sustainable Yield (MSY), Effort at Maximum Economic Yield (E_{MEY}), Maximum Economic Yield (MEY), Effort at Open Access Equilibrium (E_{OA}), and Open Access Equilibrium Yield (OAY). Additionally, we apply the Input–Output model to compute the output and employment multipliers for the fisheries sector, assuming it operates at Maximum Economic Yield. Our findings indicate that in 2021, the fishing effort and harvest levels exceed those necessary for maximum sustainable yield. To ensure the biological sustainability and growth of fisheries in Cape Verde, a reduction of 17 percent in fishing effort and 9 percent in harvest is recommended. Furthermore, the results of the Input–Output model reveal an output multiplier of 1.743 and an employment multiplier of 1.265 for the fishing sector. Based on our analysis, policymakers seeking to increase the output multiplier should focus on increasing the number of industrial vessels, while promoting artisanal vessels would be more effective in achieving a higher employment multiplier.

Introduction

The report by the Food and Agriculture Organization (FAO, 2020) highlights that global fish consumption has been increasing at an average annual rate of 3.1 percent from 1961 to 2017. This rate is nearly twice the annual world population growth rate of 1.6 percent during the same period and higher than the growth rate of other animal protein foods such as meat and dairy, which increased by 2.1 percent per year (FAO, 2020). The per capita fish consumption has also shown steady growth, rising from 9.0 kg in 1961 to 20.5 kg in 2018, an increase of approximately 1.5 percent per year (FAO, 2020). According to the United Nations (UN, 2022), around 40 percent of the global population resides near coastal areas, and over 3 billion people rely on the oceans for their livelihoods. Additionally, approximately 80 percent of world trade is facilitated through maritime routes (UN, 2022). The oceans, seas, and coastal areas play a crucial role in ensuring food security and alleviating poverty. The World Bank defines the blue economy as the sustainable use of ocean resources for economic growth, improved livelihoods and jobs, and ocean ecosystem health (WB, 2017). The European Commission (EU, 2022) reports that the European Union's Blue Economy sector employed approximately 4.5 million people in 2018 and generated a turnover of around €650 billion. This represents a