

# Indonesian shrimp resource accounting for sustainable stock management

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Manuscript received: 18 April 2015. Revision accepted: 28 December 2016.

**Abstract.** Anna Z. 2017. *Indonesian shrimp resource accounting for sustainable stock management*. *Biodiversitas* 18: 248-256. Shrimp fisheries is a resource of important economic value, and is one of the high-demand commodities. Although regarded as a resource that has the ability to grow relatively quick and allows for a year-round production, these resources could experience declining production, or even extinction, if not managed properly. Planning the management of shrimp fishery stock requires basic information on the stock dynamics, both in terms of its natural production and utilization, through resource accounting, mandated by the Agenda 21 of United Nation Conference on Environment and Development (UNCED), formulated in the System of Integrated Environmental and Economic Accounting (SEEA). This study measures the accounting of the shrimp resources, both physical and monetary. In addition, the study also aims to measure the shrimp resource that can be utilized (fishable biomass), from the balance of resources. The approach used in this study is a standard bioeconomic model, with Fox model to estimate biological parameters, and methods of System of National Accounts of FAO (2004), named recursive model, adapted to the existing data. The results of the analysis, includes the calculation of standing stocks (physical asset account), fishable biomass, depletion, as well as monetary accounts. Result shows that the overall condition of the stock still in surplus, where the standing stocks from 1988 to 2014, are in the range of 200,000 to 900,000 tons yearly, with the monetary value between IDR 500 billion to 2 trillion. The intrinsic growth of shrimp tend to be positive in average, with values in the range of -258,000 tons to 263,890 tons. The trend estimation for the next five years (2015-2020), showed a decrease in the stock, and the stock closed as many as 350,000 tons in 2020. This paper also suggests the policy recommendations for the development and management of shrimp resources, in Indonesia.

**Keywords:** Bio-economic modelling, fishery accounting, fishery stock management plan, monetary account, physical account, shrimp

## INTRODUCTION

Fisheries resources in general and shrimp resources in particular are among the natural resources biodiversity found in Indonesia, capable of contributing to state income and improving the welfare of its citizen. Indeed, sustainable management of the biodiversity is an inevitable requisite in attaining such aims. Management of renewable fisheries resources is in essence a given, since the resource's limited growth and carrying capacity. Thus, managing the extraction of the resource with the afore mentioned considerations, is key and provides positive feedback in sustainable utilization and the stock biodiversity of shrimp. The biodiversity of shrimp in Indonesia consist of some species, such as: *Metapenaeus affinis*, *Metapenaeus brevicornis*, *Metapenaeus ensis*, *Metapenaeus barbata*, *Penaeus monodon*, *Parapenaeopsis hardwickii*, *Parapenaeopsis sculptilis*, and many more (Marine and Fisheries Statistic Data System 2014).

Fisheries resources management, which is economically and environmentally sustainable is a necessity. It is imperative to establish the link between the flow of fish stock and economic aspects of capture fisheries. The link may be established by means of economic accounts of fisheries resources. National resource accounting, a measure of both aggregate and sectoral sustainable development processes, provides an overview and direction

on how the degree of extraction of fisheries resources relates with the financial flow it provides (monetary account) in the past, present, and future (Theys 1989; Neumayer 2000; Hediger 2004), notes that natural resource accounting (also known as patrimony account), alongside national accounts and satellite accounts can be used to define alternative scenarios of sustainable development under various evaluation criteria.

The conventional nature of national accounting system does not take into consideration volume changes of various natural resources, e.g. stock of capture fisheries (Danielsson 2001). Natural resources make important contributions to long-term economic performance and should be considered economic assets (Sukhdev 2010). Considering the thesis of a large literature, that net national product (which is a flow) is that index in closed economies, is shown in some interpretations to be simply false and in others to suffer from deep estimation problems (Dasgupta 2009). Natural resource accounting, such as on fisheries, generates new nuances in the calculation of regional and national economic performance. In general, both performances only account for production, production value, or Gross Domestic Product (GDP) or Gross Regional Domestic Product (GRDP), without counting for resource extraction (WCED 1987). Fisheries resource accounting can provide a detailed picture of upstream to downstream resource flow (FAO 2004). It should be noted