

Fisheries research for ocean governance: A topic model analysis of fisheries science from 1990 to 2016

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Abstract

Fisheries science is continuously becoming more integrative and multidisciplinary. At the same time, the need to include the human dimension more tightly into fisheries scientific endeavor has been widely recognized among scientists from various disciplines, while fisheries are increasingly referred to as socio-ecological complex adaptive systems (SECAS) and in connection with marine ecosystem services. The purpose of this study is to assess whether fisheries science output is reflecting the conceptual diversity of fisheries as SECASs, and to what extent. Is science diversifying fisheries research topics, in an attempt to capture the complexity of the fisheries system and their role in marine ecosystem services, or is it multiplying research on similar topics, trying to achieve in-depth, but possibly marginal, understanding of a few selected components of this system? By utilizing Latent Dirichlet Allocation, a generative probabilistic topic model, we analyze a unique dataset consisting of almost 30,000 full-text articles published in the period 1990-2016 in 18 top-tier scientific journals specialized in fisheries. After identifying the hidden topics of fisheries science, we analyze the extent to which they cover the complexity of the fisheries domain, and to what extent they are reflecting ocean governance objectives. Moreover, we examine topic prevalence, and topical trends and patterns over the 26 years. This research is relevant across fields (from marine resource management to policy-making), as it deals with the core problematic of the intersection of these domains, i.e. future research focus in the fisheries field for achieving good environmental status of marine waters.

Keywords: fisheries research focus, machine learning, marine ecosystem services, topic models, latent dirichlet allocation

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