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A methodology for analyzing the impact of the artisanal fishing fleets on regional economies: An application for the case of Asturias (Spain)



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ABSTRACT

Artisanal fleets represent one of the most sustainable fishing segments. Under the current Common Fisheries Policy (CFP), a key issue consists of quantifying their contribution to employment and value added generation in local economies, but methodological tools have not been specifically developed to analyze this question and few empirical quantifications have been carried out due to lack of information (output, intermediate consumptions, primary inputs, etc.). This paper presents a methodology to measure the importance of artisanal fleets in an economy, on the basis of input-output (IO) analysis and by applying a disaggregation procedure that allows for distinguishing their activity when this information is aggregated into one of the sectors observable on an IO table. An empirical exercise has been conducted for the case of the artisanal fishing fleet of Asturias (region in Northwest Spain) by drawing together many different sources of data concerning its activity and by splitting the whole “Fisheries and aquaculture” sector in the symmetric IO table. The new IO table has allowed to estimate the impact of the artisanal fishing fleet’s activity, showing that it exerted in 2010 higher multiplier effects on regional employment and income than the whole economy and the rest of the fisheries sector (basically, the industrial fleet). Findings also revealed that the potential of the artisanal fleet to generate gross value added is particularly important. Our results also suggest that sectoral disaggregation of IO tables is a highly versatile, useful and replicable methodology for socioeconomic studies of artisanal fisheries.

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1. Introduction

Artisanal fisheries constitute an important source of employment, income and food to millions of people from coastal communities worldwide, as well as a fundamental cultural and traditional identity factor at a regional level [1]. Although the concept of *artisanal fisheries* depends on the geographical context and there is not a universally accepted definition, terms as “artisanal”, “small-scale” or “traditional” are usually applied indistinctly to differentiate them from the industrial and semi-industrial fisheries and to refer to coastal/inshore traditional extensive fishing. In Europe, the existing differences in management and regulatory frameworks as well as the high heterogeneity of these activities across countries and regions, have prevented so far a common definition of artisanal fisheries [2,3], and “small-scale coastal

fishing” (SSF) is the most usual term¹ to define the “(...) fishing carried on by fishing vessels of an overall length of less than 12 m and not using towed gear² (...)”.

In practice, in most of cases SSF are closely related to artisanal fishing, basically characterized by being small-scale marine businesses developing by small-sized fishing vessels, usually owned directly by fishermen that develop their activity in coastal areas within a few hours from the ports where vessels are based. They use a vast array of fishing gears targeting a great variety of high-valued marine species, with frequent changes in the gears and fishing techniques used during the year in order to maximize profitability in each period. In fact, many vessels operate as polyvalent/multi-species boats with low levels of capital investments,

¹ Derived from European legal framework, as the *Proposal for a Council Regulation European Fisheries Fund, (COM (2004) 497 final)*. <http://ec.europa.eu/transparency/regdoc/rep/1/2004/EN/1-2004-497-EN-F1-1.pdf>.

² Towed gears as defined in the Table 2, Annex I of the Commission Regulation (EC) No 26/2004 of 30th of December 2003.

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family-based work and a high importance of traditional knowledge.

In many South-European regions artisanal vessels represent around 75–80% of the fishing fleets [2,4–6]. According to the European Scientific Technical and Economic Committee for Fisheries (STECF), the EU small-scale fleet consisted of around 51,000 vessels, which accounts for the 74% of the active fleet in 2012 [7]. Most of artisanal fisheries present a number of important strengths and potentials: high level of environmental sustainability [8], relative high labor demands, good fitting into the principles of development, maritime and environmental European policies, specialization on high-valued sea products with recognized quality, and flexible and adaptive production patterns (multi-gear polyvalent vessels) that provide non-seasonal income and employment for many coastal communities [9]. Additionally, artisanal fisheries represent an activity with key social impacts on coastal communities and economic linkages on the economies of European maritime regions, so they are expected to play a key role in the *blue growth* in the future. Although fishing sector usually has a low weight in terms of total contribution to aggregate GDP and Gross Value Added generation, its impact is highly concentrated in certain coastal areas. Additionally, artisanal fisheries are a fundamental cultural and traditional identity factor for coastal communities. As the European Commission recognizes [10], EU policies support³ and the assessment of their effectiveness needs a deep understanding of the context that surrounds local decisions about fisheries, so socio-economic indicators must be used to assess the performance and impacts of sectoral policies.

Artisanal fleets have distinctive features with regard to industrial fishing and the rest of the catching sector, which requires implementing specific planning and management measures⁴ [9,11], designed on the basis of a proper knowledge of their situation, their contribution to the generation of income and employment in coastal regions, and the role played in the integrated development of coastal areas taking into account the complex interactions between the human and the natural dimension within these fisheries [12]. Nevertheless, European artisanal fisheries represent an area of marine and fishery science that has been largely ignored. In spite of their dimension and socioeconomic importance, there is only limited information available about artisanal fleets and, generally, little attention has been paid to their social, economic and cultural characteristics and relevance. This issue has traditionally hampered the application of fitted, based-on-knowledge sustainable and integrated management measures to these fleets, reducing the chance of developing effective and integrated management measures to enhance their situation [9]. Unfortunately, there is little empirical quantification of the socio-economic impacts of artisanal fleet's activity in Europe and their entire contribution to coastal regions and communities' growth and development.

Due to lack of information about artisanal fisheries in Europe, many recent characterization studies have been focused on outlining the differences between artisanal and non-artisanal fishing fleets [9,13–16]. Other studies have focused on profitability analysis of the catching sector [7] or have been mainly focused on employment [17–19]. The conclusions of these studies indicate that this activity represents a relevant percentage of the total fishing and aquaculture sector contribution to the generation of employment and income, and this impact is expected to be higher at a local scale because the activity is concentrated on certain

coastal areas highly dependent on it.

Input-Output (IO) modeling can be considered as a useful framework in policy analysis to identify strategic sectors and quantify their whole contribution to the economy (see Miller and Blair [20] for an exhaustive recent description of IO methodology). There is recent literature on marine and fisheries economics that bases on IO analysis to evaluate the economic importance of fishing industries in a national economy, as in Kwak et al. [21] for Korea, or Morrissey and O'Donoghue [22] for the case of Ireland. For the specific case of Spain, two previous studies applied an IO-based methodology focusing on the region of Galicia (Northwest Spain), which is one of the most fishing-dependent regions in Europe. In the first one, Fernández Macho et al. [23] constructed Social Accounting Matrices (SAM) to quantify the importance of the fishing sector within the regional economy in 1999.⁵ In the second one, Surís-Regueiro et al. [24] based on the IO table of Galicia in 2005 to quantify the importance and socio-economic impacts of fisheries and aquaculture activities, although the results of this study circumscribe to the urban area of the Ria de Vigo (the most populated city in Galicia).

Although applying this methodology is feasible when the analyzed sectors are clearly delimited in the sectoral division of IO tables (as, for example, the whole fishing industry), its application for the particular case of artisanal fisheries is not straightforward, since this activity is not specifically distinguished from the vast array of marine industries in national or regional accounts. The main aim of this paper is to apply a methodology to isolate the importance of artisanal fisheries sector in an economy. This methodology is based on IO analysis and applies a disaggregation procedure that allows for distinguishing the activity of artisanal fleets when this information has been previously aggregated into one of the sectors observable on an IO table. The application of this methodology is illustrated by means of an example for the case of Asturias (Spain). The paper is structured as follows: section two depicts the characteristics of the methodology to be applied. In section three a description of the main features of our case of study is presented. Section four describes the sources looked up and the data used for the empirical exercise, as well as the process to link and integrate them according to the analytic requirements of IO table structure. Section five shows the results, quantifying the impact of the artisanal fleet's activity on the regional economy in terms of estimates of multipliers for output, value added and employment. Section six contains a discussion about the relevance of this study and the methodological approach for the future of artisanal fishing fleets under the new CFP, emphasizing the advantages and challenges of the method proposed. Finally, Section 7 provides the concluding remarks.

2. Methodology: input-output modeling

In this section we will present the IO methodology, which allows for estimating individualized economic results on specific sectors and considering the inter-relationships between them. Furthermore, this technique enables to quantify the importance of a sector in an economy basing on its response to impacts on exogenous variables.

2.1. The basic input-output model

The main objective of an IO model, as originally developed by Leontief [26], is to study the interdependence among the different

³ Mainly the Common Fisheries Policy (CFP), but also the cross-sectoral Integrated Maritime Policy (IMP), environmental and regional policies.

⁴ Concerning issues as subsidies, supports to investments and training, definition of spatial fishing rights, criteria for allocation of fishing capabilities, promotion of diversification activities, etc.

⁵ See Pyatt and Round [25] for an extensive description of the methodology for constructing and analyzing Social Accounting Matrices.

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