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Identifying fisheries dependent communities in EU coastal areas

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ABSTRACT

The importance of local communities relying on fisheries is constantly emphasised in the European Union's Common Fishery Policy. Previous studies have analysed fishery employment for the entire EU based on statistical figures aggregated by administrative units at the regional or provincial level. This paper adopts a geographical approach to identify EU coastal communities relying on fisheries using accessibility analysis, principles at the basis of gravity models and disaggregated population and employment statistics. The dependency on fisheries is calculated comparing estimated employment from fisheries at each port with general employment in the areas of accessibility surrounding the port. By considering spatially disaggregated statistics the importance of fishing activities for specific local communities emerges more clearly in respect of previous studies. The map of fisheries dependent coastal communities identifies in 2010, 388 communities, out of 1697, with dependency ratios above 1%. Around 54% of total fishery employment is estimated in these areas. In terms of policy support, identifying and mapping these local fishing coastal communities is of key importance considering the strong priority assigned by the new European Union's Common Fishery Policy to fishery management at the regional level.

1. Introduction

The fishing and aquaculture sectors often play a crucial role in coastal areas of the European Union (EU) and many coastal communities rely on these activities for their income, having limited possibilities for economic diversification. The European Commission in the new Common Fishery Policy is committed to actively promote growth and improve employment opportunities in coastal fisheries and aquaculture-dependent communities [1]. This priority is in line with the more general target of the Europe 2020 strategy to reach an employment ratio of 75% in the 20–64 years old by 2020.

For a relatively small sector like fisheries, specific policy and fishery management measures in certain regions are required considering the social and economic importance that fishing fleets, especially small-scale, may play in these regions. This is of particular relevance in order to avoid potential negative impacts of policy measures on dependent communities.

The structural components of the CFP, which requires Member States to phase out overcapacity in their fleets by reducing the number of vessels, impact on fishery related employment. Furthermore, increased capital investments in the sector to improve efficiency and productivity often lead to the replacement of labour. While fish stocks are declining, high fuel prices, and increasing competitive pressures from other sectors further exacerbate many coastal fishing communities inherent socio-economic vulnerability. The current EU policy in fisheries dependent areas, laid out in Axis 4 of the European Fisheries Fund (EFF, 2007–2013) and in the future, more integrated, European Marine and Fisheries Fund (EMFF, 2014–2020), is to compensate for these negative effects and to provide support through investments in job creation and training programmes. For this, it is essential to identify areas whose local economies are most dependent on fisheries so that these efforts to reduce the negative impacts can be targeted effectively. Several studies have been aimed at measuring the contribution of fisheries to employment in coastal areas and identifying coastal communities relying on fisheries. A recent study estimated global marine fisheries employment at around 260 million, or 203 ± 34 million full-time equivalent jobs [2]. These estimates on fisheries generated employment (50 million people engaged in the catching sector and 210 million in the processing sector) are 1.75 times greater than estimates by the Food and Agriculture Organisation (35 million employed in the direct fisheries sector and 105 million in the indirect sector). The study of Teh and Sumaila [2] presents a more comprehensive estimate of global employment from all aspects of fisheries sectors,

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including small scale operations that are not well monitored and generally located in smaller, rural communities where it is difficult to account for unlicensed fishers. Nearly half (22 million) of the estimated 50 million direct fisheries jobs are small scale, a 40% increase from previous FAO estimates.

In the EU, the relevance of fisheries employment and the dependency on the sector has been assessed by comparing employment statistics on the fishery sector and on general employment at provincial and regional level [3–6].

According to Salz and Macfadyen [4], in 2005 the total employment in the fisheries sector, including aquaculture, processing and catching activities, amounted to about 407 thousand people representing 0.2% of total EU employment. Considering only the catching sector, employment was estimated at 187,200 jobs (0.09% of total EU employment).

Given the concentration of the fishing industry, the Edinburgh European Council of December 1992 officially recognised the existence of Areas Dependent on Fishing and the need to give them special attention. Based on 1997 data, around 34 areas with a sector dependency rate of 3–15% were identified at the regional level and around 30 areas with a rate between 20 and 60% at the local administrative unit level [6].

In Macfadyen et al. [5] the level of dependency on fishery in coastal areas has been estimated comparing fishery employment with general employment statistics at regional level. The results indicate a dependency rate at above 0.1% in twenty regions, most of them concentrated in Greece (8) and French overseas territories (4).

A report by MRAG [7] considers 24 case study locations to explore regional social and economic impacts of change in fisheries-dependent communities. The study points out how data collection across the diverse set of locations presented a number of challenges deriving from different levels of aggregation of data, different of boundaries, mismatches between the area of the case study location and administrative boundaries.

Fishery employment studies in the EU rely on economic data on the fishing sector collected and assembled through the Data Collection Framework (DCF) [8], while reference figures on general employment statistics are available from EUROSTAT at the regional level.

DCF fisheries economic data is collected by EU Member States through annual sampling programs. The data is then assembled for the entire EU by the European Commission Joint Research Centre. This data is aggregated by country and fleet segment and currently lacks detailed geographical segmentation by regional, provincial or local administrative units. In the case of the biological and transversal data, also collected under the DCF, the reference to fishing areas provides the possibility to perform spatially explicit bio-economic modelling and to relate fishing effort to fish stocks in specific sea areas. On the contrary on the "land side" the higher aggregation of economic data by country hinders at the moment the possibility of performing EU-wide socio-economic studies at regional or local level.

The need for spatially disaggregated statistics at a more finely defined geographical scale is in general considered important for regional analyses [9]. This need is particularly relevant when considering the socio-economic role of the relatively small EU fishing industry, which mostly affects local communities. When trying to evaluate a rate of dependency for the identification of coastal fishing communities this need applies not only to the specific fisheries sector but also to the reference figures on general employment or GVA against which to compare.

The objective of this paper is to provide a method to overcome the current limitations in data availability for regional socio economic studies for the fisheries sector with EU-wide coverage. In particular, focus is given to analysing fisheries employment at a more refined geographic scale and to identify and map coastal communities for which fishing activities are particularly relevant.

For this purpose several spatial analysis methods and individual vessel information from the Community Fleet Register were used.

First, fisheries employment national figures at each fishing port were spatially disaggregated using a linear model between fleet composition and national employment figures.

Secondly, accessibility analysis was performed to define areas of influence for fishing ports (hereafter referred to as Fisheries Service Areas or FSA). The idea stems from the approach of the gravity model, which considers the flow of goods and people between locations as being proportional to the relative offer and demand at the place of origin and destination and inversely proportional to distance. This model has been applied successfully in many areas of economic geography such as international trade, human migration and in defining areas of influence for commercial centres [10]. Recent contributions are providing stronger theoretical foundations to the model and increasing acceptance among economists [11]. In regards to labour market analysis, gravity models reflect the tendency of people to gravitate towards job opportunities closer to their place of living. While job opportunities generate an attracting force in respect of residential areas, high distance, low accessibility and long commuting time negatively influence the probability of a person being employed at a given location.

Accessibility analysis using geographical focal points of attraction has been applied to define areas of economic influence that mirror human behaviour in a geographical context rather than simply referring to aggregations by administrative units, such as provinces or regions. Following this line, EUROSTAT defined so called Maritime Service Areas considering areas of attractiveness and inland influence for focal points of attraction (ports and coastal settlements) along the EU coastline [12]. This approach is here extended considering fishing port as the main point of interest for job opportunities.

Thirdly, reference figures of general employment in the FSA were obtained from a method that combines land cover maps with information from a soil sealing layer to produce so-called dasymetric population densities maps [13]. The high resolution disaggregated population data provided by these maps is used as a proxy to disaggregate general employment from official statistics at the regional level.

The final step was to combine the estimated expected employment generated by fishing activities at each port and the general employment in the boundaries of the FSAs. The ratio between these two figures reflects the relevance of fishing activities in terms of employment opportunities in the surrounding areas and is applied as indicator of the dependency rate of coastal communities on fishing activities.

The result of the study is a map identifying fisheries dependent communities for the entire EU, by year and classes of vessels length. This result is important for targeting and assessing the impacts of the Common Fishery Policy that is calling for the adoption of specific measures for these communities. Further studies are foreseen for spatially disaggregating other socio-economic data on the fisheries sector, such as labour productivity and to further analyse "land based" impacts of management policies at a local and regional scale while maintaining a general EU coverage.

2. Methods

2.1. Disaggregation of fishery employment

Data on the EU fishing fleet and fishing ports were obtained from the Community Fleet Register [14]. The fleet register includes information on the length, main fishing gear, engine power and