

The economic impact of aquaculture expansion: An input-output approach



Eoin Grealis^{a,*}, Stephen Hynes^a, Cathal O'Donoghue^b, Amaya Vega^a, Suzanne Van Osch^a,
Cian Twomey^c

^a Socio Economic Marine Research Unit, National University of Ireland, Galway, Ireland

^b Rural Economy Development Programme, Teagasc, Ireland

^c J.E. Cairnes School of Business and Economics, NUI, Galway, Ireland

ARTICLE INFO

JEL codes:

C67

D57

Q22

Keywords:

Aquaculture

Input-output analysis

Macroeconomics

Natural resource economics

ABSTRACT

While the expansion of aquaculture production can confer positive economic impacts, under certain conditions, aquaculture can also have negative environmental impacts. Understanding the total economic impacts of aquaculture expansion is therefore necessary in order to make informed decisions when weighing economic considerations against environmental concerns. This paper considers the wider economic impacts, both direct and indirect of expansion in the Irish aquaculture industry. By disaggregating the aquaculture sector from Ireland's 2010 Input-Output table and calculating the resultant Leontief inverse matrix a number of economic multipliers for the aquaculture sector are estimated and used to calculate the potential indirect impacts of expansion. These multipliers are then used to estimate the economic impacts of reaching the targets set out in the recently published Irish national strategic plan for sustainable aquaculture, highlighting the potential for such an expansion to contribute to the rural economy.

1. Introduction

The rapidly rising demand for marine food products cannot be satisfied sustainably by wild fish stocks alone [1]. With the current world population of 7.3 billion expected to reach 8.5 billion by 2030 and 9.7 billion by 2050 [2], a substantial expansion in food production, including seafood, will be required to meet the needs of this expanded population. Coupled with this increase in population, is the rapid economic development that is taking place in Asia. It is expected that by 2020 over one half of the world's middle class will reside in the Asian Pacific region [3]. Given the higher rates of consumption of seafood in this area, the global demand for seafood is expected to increase dramatically [4]. There is already evidence of the growth in consumption of seafood in China, where in 1995 per capita consumption was just 7 kg. By 2020 it is anticipated to reach 36 kg per capita [5]. Also, according to the World Bank [3], global aquaculture production has already expanded rapidly to meet the demands of consumers. They observe that, over the period 1981–2011, aquaculture production has increased at an average annual rate of more than 8%, from 5.2 million tons in 1981 to 62.7 million tons in 2011.

To meet the expected increase in future global seafood demand, aquaculture is rapidly emerging as an alternative to commercial capture fishing [6]. Data from the Food and Agricultural Organisation (FAO) of

the United Nations' "Fishery Statistical Time Series" indicates almost continual annual increase in aquaculture output since the 1970s. Significantly, Fig. 1 shows that as wild capture fishery tonnage has remained relatively constant since the early 1990s, aquaculture has experienced almost constant annual growth. The share of global aquatic produce supplied by aquaculture surpassed 50%, overtaking capture fishery yields for the first time in 2013 and continued to rise in 2014 [7].¹ Scope for further growth in wild captures would appear to be limited with over 75% of global wild marine fish stocks fully or over exploited [8].

The European Union (EU) represents the largest fish market in the world. However, just 10% of the EU's consumed seafood came from EU aquaculture with 25% sourced from EU fisheries and the remaining 65% imported from the rest of the world [9]. The Common Fisheries Policy (CFP) highlights the importance of aquaculture in terms of food production potential and long term food security as well as its contribution to environmental, economic, and social sustainability [10]. Additionally as part of the European Union (EU)'s Blue growth Strategy to create sustainable growth and employment in the marine economy, aquaculture has been identified as a sector with high growth potential. However the European Commission notes that despite excellent growing conditions, the EU's aquaculture industry is lagging behind strong growth in other regions of the world [11]. The EU's

* Corresponding author.

E-mail address: eoin.grealis@outlook.com (E. Grealis).

¹ Reported tonnage figures for Aquaculture for the years 1954–1958 and 1998–2005 have been estimated by the FAO.

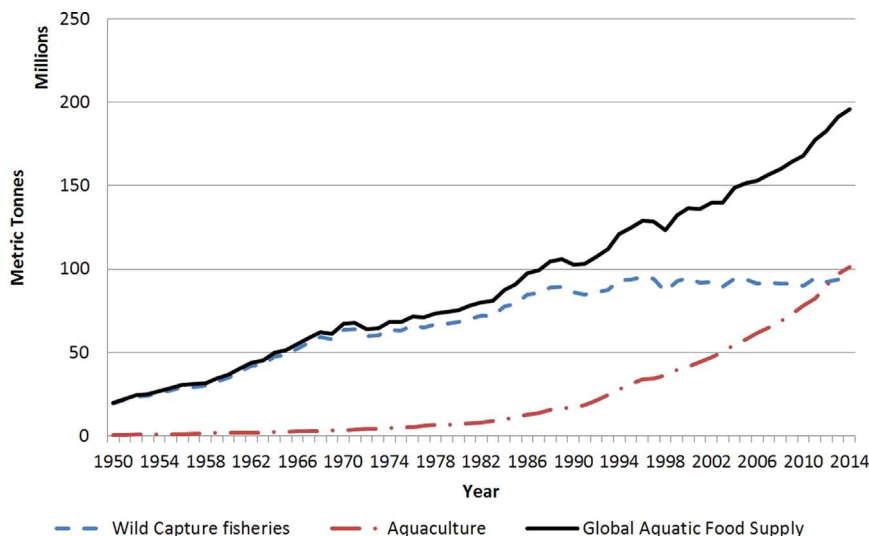


Fig. 1. Global Aquatic Food Supply Sources 1950–2014 (Created from FAO's Global Fishery and Aquaculture Statistics [7]).

strategic guidelines for sustainable aquaculture development identify a number of structural and institutional barriers which are suspected to be holding the industry back and outline a number of guidelines relating to the simplification of administrative procedures, coordinated spatial planning, supporting innovation, and encouraging member states to exploit competitive advantages. The incentive for national governments with limited resources to implement such measures is however somewhat dependent on the perceived wider benefits of expansion. In the context of wider EU policy objectives such as the prioritisation of extensive marine spatial planning, the full economic benefits of facilitating an expansion in aquaculture must be assessed. In addition to its potential to contribute to growth the aquaculture industry can also support rural development and sustain local communities [12,13] while providing employment in typically more rural coastal areas.

1.1. Irish aquaculture

Given its substantial natural resource and the geographical spread of existing aquaculture sites and associated activities around its coastline, Ireland is one such EU country which could benefit from significant expansion in the aquaculture sector. Ireland currently has circa. 380 licenced commercial marine aquaculture sites with approximately 85% of those licenced for shellfish (primarily mussels and giga oysters) and the remainder licenced for finfish farming which predominantly consists of salmon and trout farming [14].² The majority of these sites are clustered in a number of bays along the West coast. In addition, there are 70 inland aquaculture sites. A significant number of these sites are licenced for trout and other freshwater species. However, half of the inland sites are engaged in various stages of salmon production, producing ova, fry and smolts either for sale or for use within the enterprise at other coastal sites.

The nature of marine aquaculture is such that these sites are typically located in more peripheral rural areas along the North, West and South West coasts (Fig. 2) due to both geographical constraints (in terms of optimal siting, growing conditions and potential environmental impacts) and social constraints (in terms of foreshore licencing and local acceptance). It is believed the presence of aquaculture and associated seafood processing enterprises provide valuable centres of economic activity and employment to local communities [15]. Morris-

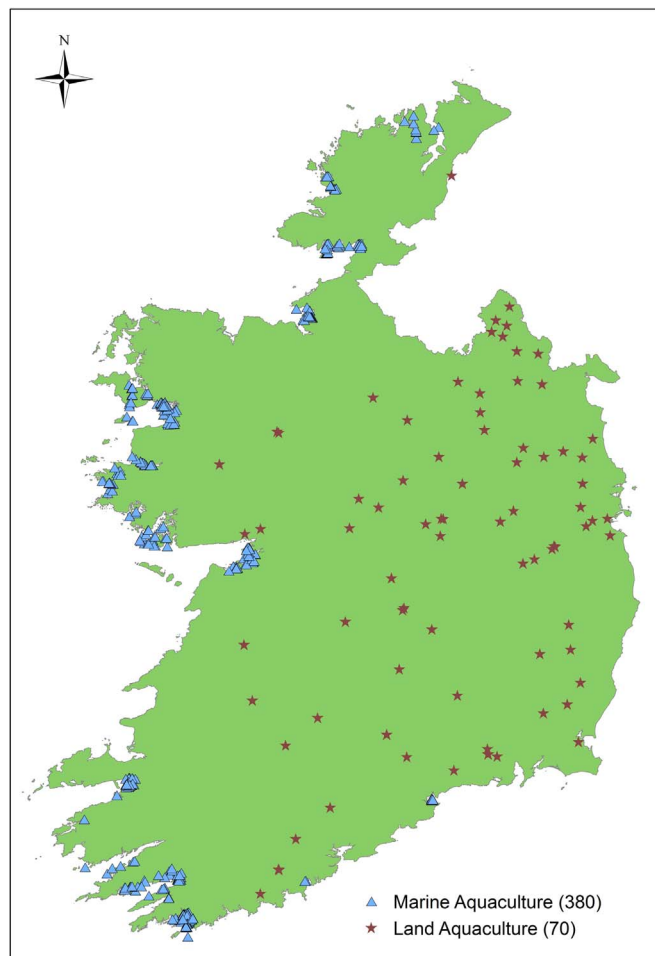


Fig. 2. Irish Aquaculture Sites 2016 (Compiled from the Department of Agriculture, Food and the Marine [14]).

sey and O'Donoghue [16] find that commercial sea fishing and aquaculture remain an important source of marine employment in peripheral regions of Ireland while Morrissey et al. [17] highlight that the aquaculture and seafood processing sectors offer higher than average incomes for employees in coastal regions.

The number of active enterprises engaged in marine aquaculture has remained relatively stable in recent years with approximately 300

² These figures represent granted licences as of 2016 and are used to illustrate the geographical location of licenced aquaculture activity only. Licenced sites may be periodically inactive.

Download English Version:

<https://daneshyari.com/en/article/5118009>

Download Persian Version:

<https://daneshyari.com/article/5118009>

[Daneshyari.com](https://daneshyari.com)