Fisheries Policies Impacts Consideration towards the Development of Rural Coastal Areas

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Abstract

The current study aims to examine the effectiveness of fisheries policies and specifically of the Greek Operational Programme for Fisheries, 2007-13. In specific, aims to examine and assess possible impacts generated, in the regional economy of Voreio and Notio Aigaio from its four axis, with particularity to the forth one. For this a regional Input-Output model was built in order to capture direct and indirect impacts in terms of output, employment and income. Results indicate that the dynamics of the fisheries sector in the regional economy are very weak and along with the continuous shrinking of the sector, leads to the necessity of supporting alternative vocational activities for the development of coastal rural areas. Though, results indicate that the funds attributed to such policies are very small, resulting in very weak generated impacts in the regional economy. And thus it is not expected current policies to seriously affect the development of such regions through the promotion of alternative to fishing activities.

Keywords: Rural Coastal Areas, Operational Fisheries Programme, Impact Analysis, Regional Analysis. (JEL: R11, R15, R58, Q22)

Introduction

The bulk of the Greek coastal areas belong to rural Greece, embodying all the characteristics and problems of rural regions, facing significant development problems. The developing situation in the majority of coastal areas, compared to inland rural areas, is far more arduous bearing in mind the insular character of most coastal areas. Additional to the common problems of rural areas, coastal areas are facing problems such as severe isolation; it is very difficult to communicate with hinterland and are solely dependant from sea transportations. Moreover, the seasonality of their major activities, such as tourism and its related activities (hotels, restaurants, retail trade, etc) it is also a severe problem; the touristic period lasts just two to three months during the summer. The seasonality characteristic of touristic activities and the lack of alternative vocational prospects induce inhabitants of these areas to migrate permanently or temporarily during the winter and autumn period, abandoning their areas with all the sequential consequences.

The major activity in all those coastal areas, historically, has always been fishery. The fisheries sector supported in various dimensions the viability of the coastal areas. The sector beyond its economic role (income generation) supports the social character of the areas by sustaining local activities such as employment creation in the fisheries sector and to all its related industries. Various activities and customs are related to fishery and moreover it covers nutritional needs with high quality and value products. Despite its small share in the country's total GDP (about 0.3%) and employment (0.31%) fishery is regarded as an important sector in Greece as it provides income to several important coastal areas and it is characterized by significant upstream and downstream economic linkages. Moreover, the GDP and employment shares in the coastal areas are much higher than the national ones proving its importance along with its sustainable role for those marginal coastal areas.

Despite the importance of fisheries sector its presence the last years is diminishing drastically. The employees of the previous decades reduced substantially, the fish production has also declined due to the retrieval of a significant number of fishing vessels (induced by the measures of the Common Fisheries Policy) and the stricter conservation policies for

maintaining stocks. The current situation of the sector is related to problems such as the old age of the fleet, the shortages in vocational training, the high cost of fishing equipment and energy, the lack of a coherent institutional framework and difficulties in locating fishing fields caused from excess fishing.

The need to confront some of the various problems of the fishing sector stimulated specific related policies; the *Operational Programme for Fisheries* (OPF) for the period 2007-13 is the major tool in use today. According to the Programme budget 274 million euro is expected to be allocated for the development of the sector through 5 axes. The 2007-13 OPF aims to continue the policy of the previous 2000-06 programme and to consolidate the preconditions for a viable fisheries and aquaculture sector that respects nature and meets the demands of consumers and the food industry. The aims of the programme are seek through its five axes; all axes promote various actions for the development of the fisheries sector and the coastal and insular areas.

Considering the axes and measures of the OPF the primary objective of the present analysis is to examine the performance of the whole programme, its ability to promote social and economic development in the eligible areas. That is, the skill of the programme, as is formed, to promote employment, output and income. Moreover, to examine the dynamics of the fisheries sector for the economy compared to all other sectors. Knowing the structure and problems (limited vocational alternatives to fishery and tourism) of the coastal areas the next aim of the analysis is to examine the aptitude of the OPF in promoting alternative activities in the coastal areas, specifically axis 4. It is believed that this should be one of the main objectives of policies such as the OPF.

Taking into consideration the relatively small contribution of the fisheries sector in the country's economy, in terms of income and employment contribution, the analysis will be focused at regional level (NUTS 2). The two insular regions of Voreio and Notio Aigaio were selected, as among the most remote and those with the highest shares in total employment.

The study initially presents the situation of the fisheries sector in the coastal areas and the Common Fisheries Policy (CFP) focusing on the last programme (OPF 2007-13). Next the selected methodology and the data used are described. In the following section the results of the analysis indicate the effectiveness of the Greek 2007-13 OPF in the under examination region. In the last part some concluding remarks are discussed.

Coastal Regions and Fisheries sector

Europe in comparison with its extent and other continents has relatively long coastline that reaches almost 89.000 Km, while 120 millions of its residents live at its coastal urban centers (EEA 2006). Greece is also characterized from its coastal areas because of the long length of its coastline (13.780 km) and its large number of islands. Great urban centers of the country are set in the coastal areas and almost 90% of the total population is concentrated in those areas while, during the summer season, additional visiting crowds create an abnormally large number of population because of tourism. Almost 3.500 islands, islets and skerries belong to Greece which represent approximately the 50% of its total coastline, the 20% of its total extent, while from these islands, 112 are inhabited with a population that represents 13% of the total population of the country. Most of these Greek islands are mountainous and a large number of them belong to less favored areas (MRDF 2009).

The coastal areas of Europe, during the last two decades, received substantial pressures because of the tourism increase, the urbanization and other human activities that are developing rapidly in them (EEA 2006). The consequences to the overland and marine ecosystems of the coastal zone, the quality of life of the residents, in accordance with the effects that the climate change is estimated to bring to those areas, impose the implementation of an integrated policy to these regions. The Strategy for the Integrated

Coastal Zone Management (ICZM) and the European recommendation for the ICZM that followed (EC 2000/547 and 2002/413), is moving towards this direction. The breakdown of those policies (sectoral, national, community and more) remains a problem for the state members that are called to implement national strategies for the ICZM.

In Greece, the fisheries sector is a traditional and important activity for the coastal areas. This sector includes the sea fishery, the aquaculture and alteration-trading of fishery products. The development of tourism during the last decades led fishery and tourism to be complementary to each other initially and to be competitive in terms of human capacity and employment thereafter. Despite this fact and the small share in the country's total GDP (less than 0.4%), fishery as a sector of primary industry, remains important for the national economy. It contributes mainly by sustaining social and economic coherence of coastal and insular areas, by covering animal proteins with high biological value (about 30% of the country's total animal protein production) and by utilizing domestic wealth-producing resources.

Greece, with reference to employment in the fishery sector, is in the fifth position among the 25 countries of the EU following Spain, France, Italy and Great Britain. About 40.000 people are employed in the sector in which 38.000 of them are permanently employed, while 75% of those are working in the sea fishery. The employees in the sea fishery in the previous decade reduced substantially, due to a series of social, financial and political factors. Specifically, the employment in the sea fishery is connected with hard work and security conditions in the fishing vessels, seasonality, lack of steady working schedule and also living in remote and isolated areas. In parallel, the substantial decrease of the fish-reserves led to political measures that have as a result the continuous decrease of the fishing fleet, fact that is connected with the reduction of the job positions in the sector. Finally, beside its seasonality, tourism is often the one-way option for employment for young people of the coastal and insular areas and for fishermen who quit their profession because tourism secures better working conditions and better social acceptance (European Parliament 2008).

The fishing fleet was 18.269 vessels (2005), with a total capacity of 93.387 GT and an average age of 26 years. The biggest percentage of the fishing fleet is consisted from small coastal fishing vessels with an overall length of under 12m; those vessels are found in areas which are depended on fishery. The annual fishery production during the last decade is relatively steady, while fishery production of all kind reached 224.000 tones in 2005, forming a negative national balance for fishery products for the country (shortfall 116.066 tones). Imports are mainly connected with third counties' originated products, while exports are connected with fresh fishery production and products of aquaculture towards EU countries.

The major problems of the Greek fishery is the lack of infrastructure, the age of the vessels, the difficult working conditions specifically in the small vessels of the coastal fishery, the lack of vocational training, the small business options, the big age average of the fishermen and, generally, the unwillingness of the existed manpower to work at the sea fishery sector which is the reason of employment of alien sea-workers.

Common Fisheries Policy

In accordance to the European Union's frame, the first common measures for the fishery industry are dated back to 1970 and cover mainly the equivalent access of all fishermen to the sea-water of the member states, the management of fishing resources, the support of professional fishermen income and the common set up of the market. All those measures became more essential in 1976 when the member states determine that the European Community could better manage and support the fishery activities and interests to national negotiations. After many years of negotiations, the Common Fisheries Policy was established in 1983 – CFP (Regulation EEC 170/83 of the Council). From 1992, the CFP adopted the

Multiannual Guidance Programs (MGP) fishery fleet aiming to reduce the fishery effort, in order to preserve the balance between the available resources and the fishery activities (Regulation EEC 3760/92). As the 1992 measures proved ineffective, further rapid decrease of many species fish-reserves led to the reformation of 2002 and to the new CFP, with primary the objective to safeguard the sustainable development of the fishery activities from environmental, economic and social perspectives. In this frame precautionary measures were instituted for the protection and conservation of living water fowl resources, as well as the minimization of the effects from the fishery activities to the marine ecosystems (Regulations E.U. 2369, 2370 and 2371/2002).

The Common Fisheries Policy become in effect through the operational fisheries programmes for every programming period and with funds mainly from the Financial Instrument for Fisheries Guidance (FIFG) and the new European Fisheries Fund (EFF) from 2006 (CEU 1999, 2006). In the Operational Fisheries Programs of all the programming periods, there are axes and measures that refer to the fishery activity accommodation, to the renewal and modernization of the fishery fleet, to aquaculture, to fishery production alteration and trading, to fishery infrastructures etc.

Aside from the Operational Fisheries Programme up to the second programming period (1994-1999), the Community Initiative PESCA carried out which intended to assure the complementarity of the resources of the structural funds, to develop new productive economic activities, to apply innovative measures and also to empower co-operations and know-how development.

In the frame of the PESCA 1994-1999, actions and movements of both private and public sector were anticipated in connection to the fishery sector exclusively and, at the same time, to the rejuvenation of specific areas which were depended on fishery and to the creation of new working positions. Among the twelve measures of the Community Initiative PESCA 1994-1999, there was a special interest to those that have to do with differentiation and conversion of this sector's enterprises towards sea tourism, adjustment of the fishery ports in order to develop new activities, improvement of the professional skills of those they are employed in the sector and reinforcements for the installation of small industries.

During the second programming period 1994-1999, 2nd Community Support Framework (2nd CSF), for the Operational Programme for Fishery and Community Initiative PESCA, 219.034.012 euros from public resources were invested totally in Greece (MRDF 2008). A total number of 2.632 business plans were carried out, from which the greater percentage (21.2%) went to the Region of Kentriki Ellada, the Region of Kentriki Makedonia (12.9%) and the Region of Attica (12.4%) followed, while, in respect of the number of the business plans, the first place went to the Region of Notio Aigaio (13.4%), the Region of Kentriki Makedonia (12.9%) and Notio Aigaio (9.9%) followed.

During the third programming period 2000-2006 (3rd CSF) the community initiative PESCA discontinued, while for the Operational Fisheries Programme a total amount of public resources reaching 330.234.159 euros were invested in Greece. The greater share went to the Region of Attica (15.2%) and, the Region of Kentriki Makedonia (14%) and Notio Aigaio (12.6%) followed. In the OPF 2000-2006, the measures that marked a great success were those that have to do with vessels dissolution, with aquaculture and alteration and trading, while the absence of the PESCA was covered mainly with socioeconomic measures (axis 4 – other measures) that their goal was to face the negative results from the implementation of all measures of the CFP. These measures were the early retirement, the application of integrated common plans aimed to improvement of the fishery activities, the support of the redirection and differentiation of fishery profession, the support of the fishermen in case of recess of fishery for different reasons and, finally, the support of the new fishermen. All of these measures were never applied and had no results (MRDF 2009).

For the forth programming period 2007-2013, regarding the European Union and the Common Fisheries Policy, 3.8 billion euros were invested from the European Fisheries Fund. The National Strategic Development Plan for Fisheries for the period of 2007-2013 has been set up in Greece in accordance with the articles 8 and 15 of the Regulation (EC) 1198/2006 of the Council and, from the year 2007, the Operational Programme "Fisheries 2007-2013" is in action.

In the OFP 2007-2013 a total amount of 274.105.143 euros from public resources are available and it is applied to the eleven NUTS 2 regions of the convergence objective and the two Regions which are out of the convergence objective. In those two regional sections belong also and the distanced Greek islands which are part of a third category, which is formed with islands that have geographical disadvantages because of their position (Appendix II and Article 53, Regulation 1198/2006); these islands belong in the regions of the convergence objective. The OPF 2007-2013 is consisted from five axis. The first axis includes measures for the adaptation of the fishing fleet and the second, measures for aquaculture, inland fishing, processing and marketing. The third axis is referred to measures of common interest, the fourth to sustainable development of fisheries and the last axis is referred to technical support of the program (Table 1).

Table 1. Greek Operational Program "Fisheries 2007-13".

	Priority Axis	Value (€)	%
Axis 1	Measures on fishing fleet adaptation	97.767.605	35,7
Axis 2	Aquaculture, inland fishing, processing and marketing of fishery and aquaculture products	80.661.538	29,4
Axis 3	Measures of common interest	43.676.000	15,9
Axis 4	Sustainable development of fisheries areas	45.000.000	16,4
Axis 5	Technical support	7.000.000	2,6
	Total	**274.105.143**	**100**

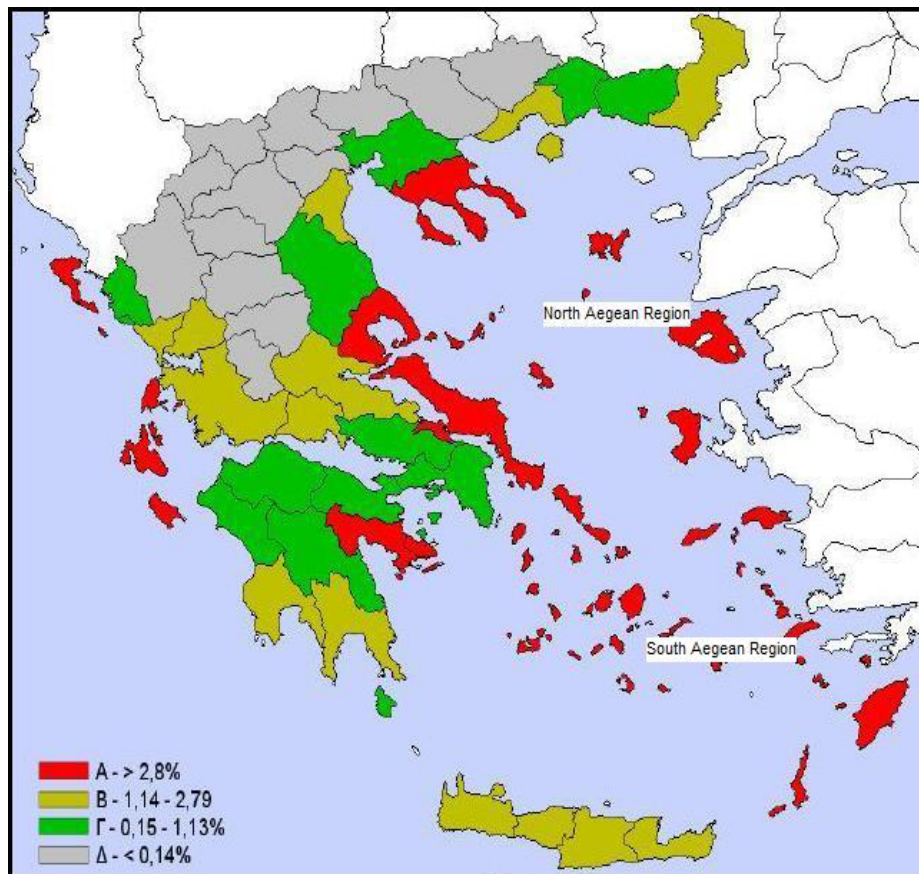Source: Ministry of Rural Development and Foods 2009

Coastal Rural Areas Development and Axis 4 of the OPF 2007-13

The common fisheries policy in its initial steps belonged to the Common Agriculture Policy (CAP) and shared with it the same legal basis and the same goals that had to do with the increase of productivity, the stabilization of the markets, the secure product availability and reasonable prices for the consumers. Gradually the CFP developed a distinguished identity as the Community was progressing and it had to face special problems that were connected with fishery, like access in common resources, the stock conservation, the structural measures for the fleets and the foreign affairs. Their path though had been almost parallel as both CAP and CFP, during the same year (1992) recognized beyond the others the need to take measures for the environment protection. The second reform of 1999 establishes the position of the rural development as the second axis of the CAP and, since then steadily supports it. The multidimensional local and integrated development of the rural areas along with the coastal – fishing areas, even though up to that stage it was enhanced as a pilot program from the LEADER and, indirectly, from PESCA, the forth programming period adopt it as a basic axis for both the CAP and the CFP. Many of the coastal and insular areas are mountainous and disadvantage at the same time, and it is considered as a fact that they are part of the rural areas. This fact, in the Greek reality, led many of these areas, from 1991 until nowadays, to assert and succeed their accession in both LEADER and Integrated Programs for Rural Development (IPRD) while, in some cases, the clustering objectives of the local operational programs and important parts of their projects were relative to the fishery activity.

That became a result from the multisectoral orientation of the fishery policy, the limited resources that the operational programs had and also the "weak development base" that both the PESCA initiative initially and the rest of the measures that followed, had. Being in the forth programming period, the CPF adopts except of the other measures, the area - based approach and the abandonment of the pure sector- based approach, applying the axis 4.

The approach that the forth programming period brought and refers to the sustainable development of the coastal areas that are based on fishery is a result from the dependence that these areas have on fishery in terms of employment and from the decline of the fishery activity, mainly the sea one.

In Greece, despite the considerable decreasing trends on fishery in terms of fishery fleet and employment reduction, the sector remains powerful in the coastal areas and mainly in the island areas. The pure non developed island regions maintain 45% of the total employment of the fishery sector in Greece and if isolated islands or islands are added, represent around 60% of the total employment. Based on the dependency of the employment from the fishery sector, the most important regions become the Voreio Aigaio (8.846%), the Notio Aigaio (5.287%), and the Ionia Nisia (3.989%) while Kentriki Ellada (2,175%) and Anatoliki Makedonia and Thraki (1.635%). On the map 1, Greece is presented in four zones based on the dependence of fishery employment.

Resource: Ministry of Rural Development and Foods 2009

Map 1. Dependence zones from sea fishery

The axis 4 from OPF 2007-2013 is aiming to support the coastal and insular areas for a sustainable development; areas that are dependent from fishery and are usually connected with problems such as demographic, infrastructural etc and, at the same time, they have

natural advantages that can be used as inputs for tourism activities. The 4th axis provides resources of 45.000.000 euros totally, accounting the 16% of the programme's total funds. It is also believed that it is very important to support the competition of coastal areas by reorganizing and redirecting the production basis and by creating working positions out of the fishery sector. Furthermore, it intends to strengthen the attractiveness of the coastal areas by improving the basic infrastructures and by protecting the natural and human environment.

The axis 4 for sustainable development of fisheries areas, in a matter of principals, measures and applications, copies almost entirely the preexisted Community Initiative LEADER as it adopts: the integrated approach, the area-based priority, the recognition of local differences, the multisectoral approach of development, the creation of extra incomes and multi-activity, the activation of local endogenous human resources, the participation of local private and public organizations, the encouragement for women's participation, the decentralized direct management, the "bottom up" approach, the interregional cooperation, and, at the end, the complementary action with other interventions that take place to these areas.

The specific objectives of the program aim the increase of added value of the fishery products, the promotion of ecotourism, the job retention and new working positions creation, the promotion of the quality of the coastal environment, the protection and upgrade of natural and architecture heritage and also the improvement of both basic technical infrastructures and services of the coastal areas.

The local programs that axis 4 supports, mainly concern the coastal areas with a small fishery community, with a decreasing fishery activity and with low population density. The local programs for the sustainable development of coastal areas, are designed, are submitted and, since they are approved, are carried out from the Local Action Groups - Fisheries (LAG-F) like the models of LEADER's Local Action Groups. The local programs are approved for support on a competitive basis, after the call for expressions of interests is announced from the administrative department of the operational program and after the evaluation of the submissions based on criteria that have to do with the aim of the submitted program and the reliability of the perspective LAG-F.

The implementation of the axis for the sustainable development of the coastal areas in Greece has followed the course of the call expression of interests, proposals for local programs have submitted. The axis 4 has been already activated in other countries of the E.U like France ((Pays basque, Pays Pyrénées-Méditerranée, etc) and Spain (Ria de Vigo – A Guarda, Galicia), where the local programs of the coastal and fishery areas has been chosen and their implementation has been started (FARNET 2010).

Applied Methodology and Data

Realizing the importance of the fisheries sector for the rural coastal areas and its current problematic situation along with the developing difficulties of the coastal areas, becomes obvious the great significance of the OPF, and especially axis 4. For this a sound methodology is needed to evaluate performance issues of the Greek OPF. In order the social (in terms of employment) and economic (in terms of output and household income) performance of the OPF and the fishing sector significance for the under examination region to be examined Input-Output (I-O) analysis was employed. I-O analysis consist a tool of general equilibrium analysis that can identify the key sectors of an economy and assess the impacts of different policies to all sectors of the economy. The basic advantage of I-O analysis is its ability to examine a regional or national economy as a whole. Simultaneously can assess the impacts from changes in one sector on all other sectors of the economy; both the direct and indirect impacts. I-O can capture the indirect effects and the impacts due to

general structural changes. Therefore this approach will provide evidence on the size of the effect upon the total employment, income and gross output, by employing a final demand base approach.

For this, I-O Hirschmanian multipliers are estimated initially to identify the importance of the fishing and all other sectors of the regional economy. Next, utilizing the estimated linkage coefficients, impact analysis is performed to assess potential impacts of the OPF by axis. Special attention is given to the 4th axis that promotes the sustainable development of the coastal areas through the support of alternative, to fishery, vocational activities. Additionally, hypothetical scenarios are built, in the case where the impacts of the 4th axis are weak, to show the performance of axis 4.

The 2005 national symmetric I-O table, latest available, was used for the empirical analysis, which is consisted by 60 sectors, compiled according to the European System of Accounts (ESA). For the needs of the regional analysis, the initial scheme of 60 sectors of the national table ended to a 38 sectors scheme; after eliminating non-existent sectors in the region and aggregating small and unimportant one. Moreover, regional sectoral employment was used, for the regionalization procedure. Since a regional table is not available the practice is such case is to construct one, employing a regionalization technique (see Miller and Blair, 2009).

The GRIT technique was employed for the regionalization of the national table. The GRIT technique was initially proposed by Jensen et al., (1979). It is a hybrid method which is based on non-survey techniques of location quotients giving, however, simultaneously the possibility to the user to insert external data from surveys or other secondary sources that are considered superior; mainly for important sectors in the region or important cells of the regional transactions matrix. Most studies, in the literature, applying the GRIT technique, estimate the regional interindustry flows by using an employment-based *Simple Location Quotient* (SLQ) or a *Cross Industry Location Quotient* (CILQ) to the corresponding elements of the national direct requirement matrix.[1]

As Flegg *et al.* (1995) refer in their study, the two above mentioned LQs provide an alternative way of estimating the relevant trading coefficients. Those trading coefficients depend on three variables: the relative size of the supplying sector; the relative size of the purchasing sector and the relative size of the region. SLQ takes into account only the first and the third while CILQ takes into account only the first two, hence both have certain deficiencies. In order to overcome the above shortcoming, in the present study is used, an adjustment of the traditional *CILQ* suggested by Flegg *et al.*, (1995) and modified after a discussion in the literature by Flegg and Webber (2000)[2], for the regionalization of a national I-O table. Specifically, regional technical coefficients were estimated by the following formulae:

$$FLQ_{ij} = CILQ_{ij} \cdot \lambda \tag{1}$$

where, $CILQ_{ij} = \dfrac{E_i^R / E_i^N}{E_j^R / E_j^N}$ and $\lambda = \log_2 \left[1 + \left(\sum_{i=1}^{n} E_i^R \middle/ \sum_{i=1}^{n} E_i^N \right) \right]^{\delta}$; R, N stand for the region

and the nation, respectively, $i,j=1,…,n$ are the economic sectors, E is the sectoral employment, and $0 \le \delta < 1$ is the coefficient of adjustment, the magnitude of which depends on the relative

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[1] Detailed discussion and application of GRIT technique can be found in Jensen *et. al* (1979), Mattas et. al (2006) and Mattas et. al (2009).

[2] The original proposal of FLQ by Flegg *et al.* was introduced at 1995, since then a dialogue was opened in the literature (Flegg and Webber 1996a, 1996b, 1997, 2000) and McCann and Dewahurst (1998)) and the original version was improved and modified to the version appeared in the literature by Flegg and Webber 2000.

size of each region. When $FLQ_{ij} \geq 1$ then the corresponding regional technical coefficient (a_{ij}) is the same with the national-one $\left(\alpha_{tij}^R = \alpha_{ij}^N\right)$, whereas when $FLQ_{ij}<1$ it is adjusted accordingly $\left(\alpha_{tij}^R = FLQ_{ij} \cdot \alpha_{ij}^N\right)$. The rest of the national technical coefficients $\left(\alpha_{ij}^N - FLQ_{ij} \cdot \alpha_{ij}^N\right)$ is included in the imports row as the sector i in the region cannot satisfy the demand from sector j, which in turn comes from imports.

Following the steps of GRIT (Mattas *et. al,* 2006), the regional I-O table can be constructed and the regional linkage coefficients can be estimated, for the identification of the regional key sectors. Following the reasoning of Sharma et al. (1999) a final demand based approach was adopted to estimate the linkage coefficients and assess possible impacts of the Greek OPF. Specifically, the well known I-O multipliers[3] were estimated, in terms of output, income and employment that indicate each sector's direct and indirect linkages in the regional economy.

Empirical Analysis Results

Linkage Analysis Results

The calculated multipliers indicate the ability of each sector to enhance the whole economy's output, income, and employment due to an exogenous increase in its final demand. Such exogenous changes in the current analysis are the fund inflows of the OPF. In table 2 below are shown the sectors with the highest multipliers[4] of the regional economy of Voreio and Notio Aigaio as well as those of the fisheries sector.

Table 2. Output, income and employment multipliers for Voreio and Notio Aigaio region

Sectors	OM	Rank[*]	Type I IM	Rank	Type I EM	Rank
Metals and machinery	1.451	1	2.478	3	1.682	8
Insurance and pension funding	1.447	2	1.690	5	1.731	7
Wearing apparel and leather	1.418	3	4.635	2	1.926	5
Electrical machinery	1.393	4	1.885	4	1.755	6
Furniture	1.380	5	1.640	6	1.412	11
Fish and aquaculture	1.022	38	1.027	35	1.0206	37

* Sectors are ranked according to their multiplier magnitude; OM=Output Multipliers, EM=Employment Multipliers, IM=Income Multipliers.

As it can be seen from the results, fisheries is the sector with the lowest multiplier in terms of output, and almost rank last in terms of income and employment. This indicates that fishery is among the sectors with limited capacities to induce indirectly the regional economy's development. On the other hand Metal and machinery sector has the highest output multiplier and among the highest in terms of income and employment. The same situation is for Insurance and pension and wearing apparel and leather sectors. Financing those sectors -with high multipliers- the whole regional economy will gain much higher returns, coming from the same sectors (direct impacts) and mainly from many other sectors of the economy (indirect impacts).

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[3]See, among others, Miller and Blair (2009) for a detailed presentation of the computational procedure and Mattas et. al (2005) for a discussion on multipliers.
[4] In table A1 in the appendix are shown the multipliers of all sectors.

Impact Analysis Results

The estimated possible impacts 5 in terms of output, income and employment on the regional economy of Voreio and Notio Aigaio from the application of the Greek OPF 2007-13 are shown next in the current section. In order to assess impacts, apart from the estimated linkage coefficients the funds flows in the region were also necessary, per axis. The share of each axis shown in table 1 is at national level. In order to estimate the share per axis for the region of Voreio and Notio Aigaio, the shares of the previous OPF (2000-06) were used; that is, 19%. The next critical step in the analysis was to allocate the fund inflows per axis to the sectors of the regional I-O table; for this the opinion of the experts in the administration of the Greek OPF was taken[6].

The estimated impacts are shown in table 3 below. The first column of the table indicates the expenditure in the regional economy per axis (in mn euro), the total amount is 50.750 mn euro. As it can be seen Axis 1 is that with the highest expenditures (18.576 mn euro), on the other hand Axis 4 which attracts the interest of the study has the lowest amount with Axis 3. For the sustainable development of the region under examination, that is, the tool for promoting alternative to fishing vocational activities in the region, invests only 8.298 mn euros. It is obvious that despite the small economy of the region, the amount cannot support seriously the aims of the axis 4. In specific, only 216 new jobs are generated in the region, that is, the regional employment is increased by 0.11%. The same impacts more or less were assessed for the regional output and the household income.

Table 3. Total change in the Employment, Output and Income of the region from the OPF

FOP Expenditures (mn Euro)	Employment persons	(%)*	Output mn Euro	(%)	Income mn Euro	(%)
Axis 1: Measures on fishing fleet adaptation						
18.576	494	0.25%	21.455	0.14%	1.677	0.07%
Axis 2: Aquaculture, inland fishing, processing and marketing of fishery and aquaculture products						
15.326	345	0.18%	18.035	0.12%	1.616	0.07%
Axis 3: Measures of common interest						
8.298	156	0.08%	11.318	0.08%	1.099	0.04%
Axis 4: Sustainable development of fisheries areas						
8.550	216	0.11%	11.181	0.07%	1.173	0.05%
TOTAL **50.750**	**1212**	**0.62%**	**61.990**	**0.42%**	**5.564**	**0.23%**

* The shares represent change in the total regional Employment, Output and Household income

The highest impacts in the region are generated by Axis 1 and 2, as they absorb the majority of the funds. The impacts of Axis 3 are weaker than that of Axis 4, despite the fact that both invest the same amount in the region. Totally, the regional OPF it seems to generate 1212 new jobs in the local economy (increases the regional employment by 0.62%), generates 61.990 mn euro output and 5,564 mn euro household income.

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[5] For a presentation of the manner of calculating the impacts can be found, among others, in Kulisic et. al (2007) and Miller and Blair (2009).

[6] This point is highly important for the analysis since it affects significantly the estimated impacts; an allocation to different sectors will give different results.

Having estimated the possible impacts of the OPF for the region and specifically for axis 4, it is obvious that the applied policy is ineffective with very weak impacts. It lacks ability to support the development of those coastal rural areas, by promoting alternative to fishing activities. For this, a hypothetical scenario was built assuming the increase of the financing of axis 4, to 200 mn euro. The impacts of this scenario are shown in table 4.

Table 4. Total change in the Employment, Output and Income of the region from axis 4 (funds 200 mn euro).

FOP Expenditures (mn Euro)	Total change in:					
	Employment		Output		Income	
	persons	(%)*	mn Euro	(%)	mn Euro	(%)
Axis 4: Sustainable development of fisheries areas						
200.000	5050	2.60%	261.555	1.75%	27.430	1.12%

* The shares represent change in the total regional Employment, Output and Household income

As it can be seen with by increasing the expenditure of axis 4 to 200 mn euro, the impacts become much higher. The regional employment is increased by 2.6%, that is, 5050 new jobs. The regional output as well as the household income are increased, 1.75% and 1,12% respectively.

Conclusions

The fisheries policy is obviously one of those policies that took into consideration the coastal areas since the decade of 70's. Furthermore, it is an important policy as it is formed in programmes and axis that can promote the development and management of the coastal zones. Bearing in mind the importance of the fisheries policies and specifically of the current OPF, the present study aimed to evaluate the programme's ability to generate regional impacts and hence to promote the regions development.

As it can be seen from the results the dynamics of the fisheries sector in the regional economy are weak and along with the pessimistic perspectives of the sector lead to the necessity of supporting alternative vocational activities for the development of coastal rural areas. The only axis (4th) of the OPF that promotes such activities is proved very ineffective; the generated impacts in the regional economy are not expected to confront any developing problems or redirect significant number of people engaged in fishing to other alternative activities.

The specific authorities that are involved in the formation of the fisheries policies should take into account the peculiarities of the sector and the coastal regions, while forming the axis and their attributed funds. Alternative or related to fishing activities are necessary to be supported and promoting.

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Appendix

Table A1. Output, income and employment multipliers for Voreio and Notio Aigaio region

SIC code	Sectors	OM	Rank*	Type I IM	Rank	Type I EM	Rank
01	Agriculture	1.181	17	1.494	10	1.103	26
02	Forestry	1.163	20	1.146	21	1.074	28
05	Fish and aquaculture	1.022	38	1.027	35	1.021	37
10--14	Mining	1.230	14	1.581	7	2.085	2
15	Food products and beverages	1.319	8	1.532	9	2.034	4
18+19	Wearing apparel and leather	1.418	3	4.635	2	1.926	5
20	Wood products	1.204	15	1.246	18	1.201	19
22	Printed matter	1.309	10	1.442	11	1.223	18
24+25	Chemicals and Plastic	1.317	9	4.831	1	2.621	1
26	Non-metallic mineral products	1.324	7	1.397	12	1.363	12
27+28+29	Metals and machinery	1.451	1	2.478	3	1.682	8
31+33+35	Electrical machinery	1.393	4	1.885	4	1.755	6
36	Furniture	1.380	5	1.640	6	1.412	11
40	Electrical energy, gas	1.148	24	1.113	24	1.168	20
41	Collected and purified water	1.076	31	1.040	34	1.071	29
45	Construction work	1.130	25	1.120	23	1.124	23
50	Trade and repair of motor vehicles	1.103	26	1.083	27	1.054	31
51	Wholesale trade	1.175	18	1.273	14	1.292	15
52	Retail trade	1.095	29	1.052	32	1.024	36
55	Hotel and restaurant	1.063	34	1.067	29	1.057	30
60	Land transport	1.188	16	1.090	26	1.103	25
61	Water transport	1.102	28	1.347	13	1.348	14
62	Air transport	1.262	12	1.541	8	2.079	3
63	Transport services	1.231	13	1.260	15	1.357	13
64	Post and telecommunication	1.169	19	1.121	22	1.234	17
65	Financial intermediation	1.151	22	1.169	20	1.251	16
66	Insurance and pension funding	1.447	2	1.690	5	1.731	7
67	Financial intermediation services	1.154	21	1.077	28	1.075	27
70	Real estate	1.040	36	1.251	16	1.522	9
71	Renting services	1.066	32	1.060	31	1.103	24
74	Other business services	1.295	11	1.217	19	1.151	21
75	Public administration	1.065	33	1.017	36	1.042	34
80	Education	1.028	37	1.011	38	1.020	38
85	Health and social work	1.083	30	1.043	33	1.052	32
90	Sewage	1.053	35	1.016	37	1.033	35
91	Membership organisation	1.344	6	1.249	17	1.423	10
92	Recreational services	1.150	23	1.112	25	1.139	22
93+95	Other services	1.102	27	1.063	30	1.052	33

* Sectors are ranked according to their multiplier magnitude.
OM=Output Multipliers, EM=Employment Multipliers, IM=Income Multipliers. SIC=Standard Industrial Classification