TOWARDS THE IMPLEMENTATION OF EUROPEAN UNION'S NEW INTEGRATED MARITIME POLICY IN GREECE: BLUE GROWTH THROUGH MARINE AQUACULTURE FOR THE SUSTAINABLE DEVELOPMENT OF THE ISLANDS

MICHAEL CHATZIEFSTATHIOU[1], IOANNIS SPILANIS[2]
[1]*Minister's Advisor on Fisheries, Ministry of Shipping & Aegean, Piraeus, Greece, e-mail: mhatzi@env.aegean.gr*
[2] *General Secretary for Aegean & Island Policy, Ministry of Shipping & Aegean, Mytilene, Lesvos island, Greece*

PREMA IMPLEMENTACIJI NOVOG INTEGRISANOG MARINSKOG ZAKONODAVSTVA EVROPSKE UNIJE U GRČKOJ: SPROVOĐENJE STRATEGIJE 'BLUE GROWTH' VEZANE ZA GAJENJE MORSKIH RIBA U CILJU ODRŽIVOG RAZVOJA OSTRVA

Apstrakt

Trenutna ekonomska situacija traži od Evropske Unije da brzo i efikasno nađe način da oporavi svoju privredu oslanjajući se na mudar, održiv i inkluzivni razvoj. Razvoj integrisanog pristupa primorskim pitanjima doprinosi jačanju Evropskog kapaciteta za povećanjem odrzivog korišćenja morske privrede. Ovaj pristup istovremeno garantuje bezbednost ljudi i zdravlje morskih ekosistema, s obzirom da je njihova zaštita važna za odrzivi razvoj i prosperitet. Nova strategija Grčkih ostrva – pod nazivom Integrisan Zakonodavstvo Ostrva - u potpunosti uključuje principe Integrisanog maritimnog zakonodavstva Evropske Unije, naročito njegovu 'Blue Growth' strategija koja se bavi razvojem kroz seriju marinskih aktivnosti i oslanja se na tri ideje: 'Kvalitetna' ostrva, 'Zelena' ostrva i ostrva gde svi imaju 'Jednake mogućnosti'.

Da bismo sproveli ovaj zakon moraju se razviti praktično primenljivi modeli, smernice i analitički okvir koji će pomoći donosiocima odluka i administrativnom osoblju da razlikuju postojeće aktivnosti, naročito na ostrvima. Oni ce takođe pomoći da se ograničeni finansijski resursi na pravi način usmere ka projektima ili regionima od kojih se očekuje najveća dobit. Metod opisan u ovom radu dozvoljava da izvršimo procenu nivoa održivosti u regionu ostrva i uticaj vodećih aktivnosti u ovoj oblasti, naročito kada je reč o gajenju morskih riba. Jedan deo ovog istraživanja koristi Delfi

Metod da bi naveo faktore koji utiču na gajenje morskih riba, i pokazatelje za merenje tih faktora.

Za potrebe razvijenog metoda (koji je baziran na zahtevu za zaštitu podataka programa za životnu sredinu UN-a) evaluacija aktivnosti zasnovana je na dva koraka: i) **učinkovitost po jedinici proizvodnje**, koja je vezana za dodatnu vrednost, radna mesta stvorena u toj oblasti, korisćenje vode, korisćenje energije, stvaranje otpada, i, ii) **raspon ispitivanih ljudskih aktivnosti u poređenju sa nosivim kapacitetom odredjene oblasti.** U ovom metodu održivi razvoj se tumači kao kontinuirani process koji istovremeno vodi do poboljšanja ekonomskih i društvenih uslova, kao i zaštite životne sredine koje su lokalna društva usvojila. Ocenjivanjem doprinosa svake ljudske aktivnosti, mozemo da predložimo odgovarajuće mere za određenu oblast i ispitamo mogućnost stvaranja novih farmi, ili širenje postojećih. Ovaj metod takođe može da se iskoristi da bi se utvrdile lokacije koje nisu odgovarajuće za projekte za razvoj akvakulture.

Ključne reči: održivi razvoj, ostrva, "blue growth", morska akvakultura
Keywords: sustainable development, islands, blue growth, marine aquaculture

INTRODUCTION

The present economic context calls for the European Union to find a fast and effective road to recovery based on smart, sustainable and inclusive growth. The development of an integrated approach to maritime affairs since 2007, consistent with other sectoral policies, contributes to the enhancement of Europe's capacity to maximise the sustainable use of the oceans, seas and coasts, while at the same time ensuring safety of people and the health of oceans and seas. Marine ecosystem goods and services and the protection of the marine environment are an important element for sustainable development and prosperity. This was reassured by the European Ministers with the "Limassol Declaration" (European Council, 2012). The new strategy for the Greek island regions - called Integrated Island Policy - is fully incorporating the principles of EU's Integrated Maritime Policy, especially its Blue Growth initiative, and relies on three (3) concepts: "Qualitative" Islands, "Green" Islands, and, Islands of "Equal Opportunities". Blue Growth is the contribution of the EU's Integrated Maritime Policy to achieving the goals of the Europe 2020 strategy for smart, sustainable and inclusive growth, and has identified five (5) specific areas with a particular potential for growth where targeted action could provide an additional stimulus: maritime, coastal and cruise tourism, blue energy, marine mineral resources, aquaculture**,** and, blue biotechnology.

Resource constraints introduce a requirement for priority setting, which can be defined as the task of selecting a subset of issues, policies or projects towards which limited resources will be directed. The priority-setting task always involves trade-offs due to political, social, cultural, financial, legal & technological constraints. In multi-stakeholder and multi-objective settings the decision-making process is complex. The task is often made harder by incomplete or inaccurate datasets. Decision makers will aim to adopt a procedure that is analytically robust, auditable, transparent and understandable (Hajkowicz, 2002). This method, developed by the Laboratory for Local & Insular Development of the Department for Environment of Aegean University, allows the estimation of sustainability level in an island region and the footprint of the activities (driving forces) in this area. The method has been properly adapted to measure the contribution

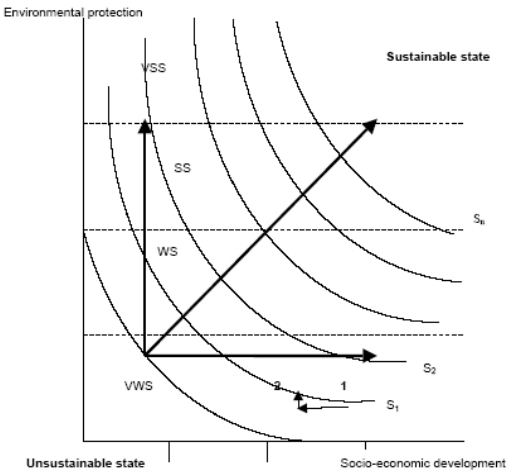
of marine fish farming to the sustainable development of island regions, letting us to proceed to faster implementation of "Blue Growth" initiative in Greece.

The sustainability analysis calls for the consensual setting of a "band of equilibrium" for a list of indicators making possible to evaluate the sustainability of the present situation in the target region and to determine what is desirable and what is unacceptable. The projection of these indicators also makes it possible to evaluate the region's sustainable development levels and thus its future sustainability (Spilanis et al., 2005). It is common practice to develop a single indicator of sustainable development, but this logic has not been adopted here. To have a better picture of the progress in each one of the three SD's dimensions separately, and to help policy makers to make clear suggestions, the overall number of factors (on economy, environment and society) is taken into consideration, without these factors appointed the same weight factor.

The purpose of the research is not to consider the prospect of sustainability of the industry (that is usually the research aim), but the development of a methodology and the proposal of an exclusive set of indicators to assess the contribution of marine aquaculture to sustainable development of the islands where they are installed, through the implementation of two different kinds of measurements, a) the performance and impact of marine fish farming, and, b) the factors that affect the performance and impact.

MATERIALS AND METHODS

For the purposes of the method developed (based on UNEP's DPSR), the evaluation of activities is based on two steps: i) **the performance per production unit**, that relates to the added value, the employment created at the area, water use, energy use, waste production, and ii) **the scale of the examined human activity compared to the carrying capacity of the host area**. In this method, the sustainable development (SD) considered a continuous process that leads simultaneously to the improvement of the economic, social and environmental goals adopted by each local society (this approach is shown in Figure 1, below).



To measure the performance, and to locate and record the factors and parameters that affect performance (economic, social, environmental) of the marine fish farms that

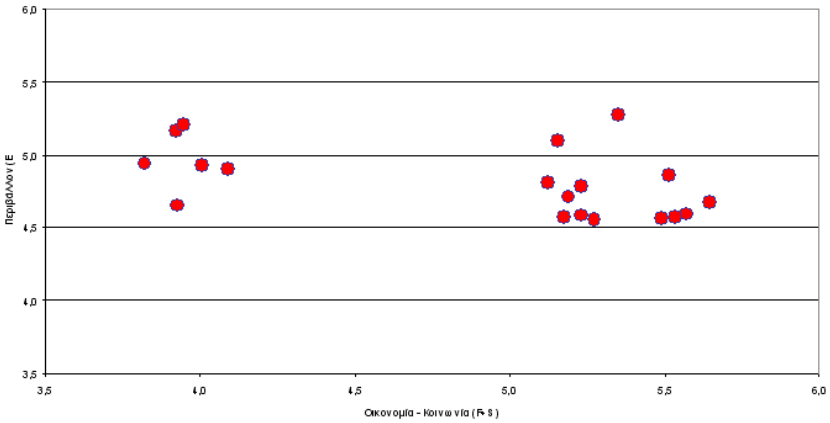
operate on islands, and the role of each one of these to their sustainability, **research has been made with structured questionnaires at the total number of fish farms of Aegean sea that use floating cages.** The questionnaire had a set of questions about the value of the proposed indicators and also on the factors that affect the performance and the sustainability of **each installation separately** - and not the company or group of companies in total - so, if the company had more fish farms in the study area (islands of Aegean sea) they had to complete one questionnaire for each one site. Totally, **31** questionnaires were sent by fax and e-mail to farms and finally **20** from them were answered. These 20 questionnaires relate to **80% of the fish farms** at Northern and Southern Aegean Sea that today are under operation, and they cover more than **90% of the production**.

Performance measured for all 3 dimensions of sustainable development: **Economic**, where the annual turnover per tonne of product (or per fry) is the critical index, **Social**, which takes into account the employment created (quantitative, number of employees, duration, wages) and qualitative characteristics (education level, gender, ethnicity), **Environmental**, where the per tonne (or per fry) resource consumption and waste generation, and the permanent change (deterioration) of the environment caused by infrastructure and facilities, are the parameters to be considered. The measurement uses in total **33 indicators** for the three (3) dimensions of sustainable development, spilt to **6** indicators for the **economic (F1 - F6),** to **9** indicators for the **social (S1 - S9)** and to **18** indicators for the **environmental (E1 - E18)** dimension of sustainability.

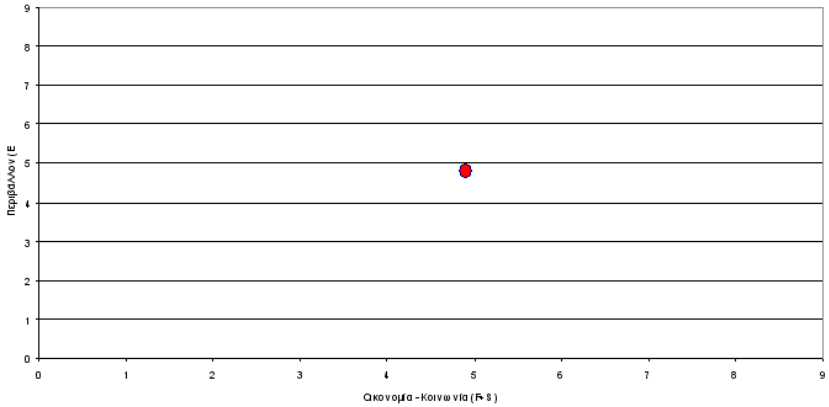
RESULTS

The quantitative and qualitative analysis of the answers gave us meaningful results, which are briefly presented here by these two (2) graphs, showing that we have two different group of farms, the one with relatively worst socio-economic status, but their total performance considered satisfactory. Having these data as a starting point we can now repeat the survey after a period of time and estimate if their development drives them to a more sustainable status.

Graph of the Performance of Each Assessed Aegean Fish Farm



Graph of the Total Performance of the Aegean Fish Farms



Next step was to locate the parameters that affect their performance, something that will give us the opportunity to actively involve and improve them. From our research we ended up with **14 parameters** and **77 indicators**. These parameters, with the number of their indicators in brackets, are: Quality Assurance (3), Product Differentiation (3), Environmental Protection (12), Fingerlings Production (2), Animal Welfare & Health (5), Biodiversity (4), Materials Supply (6), Site Selection (8), Employees (8), Public Image (7), Group of Companies (3), Standardization Level (9), Trading (3), Promotion (4).

We must notice that until today are not determined commonly accepted parameters that affect the performance of marine fish farming, and the indicators for their measurement. For that reason the parameters and their indicators, which occur from the research and analysis, it is possible to include a significant percentage of subjective opinion. To minimize that problem, the Delphi Method was used. To increase their possible acceptance, to classify their share separately at the three components of the sustainable development, and appoint their weight, a comprehensive matrix with the 14 parameters and the 77 indicators sent initially to **80 special scientists** working on research, production, and to administration, for examination, evaluation and completion. To the 2nd face of this exercise the panel of experts increased to **95 scientists**, and the parameters and their indicators finalised.

From original research determined that also **14 factors** should be measured when the Status (**State**) of an island region is estimated. These factors measured with different indicators, from which **9** indicators give the state of economy, **11** indicators the state of society, and **19** indicators the state of environment. These initial indicators were **supplemented** with more specialised indicators for use to productive aquatic ecosystems.

According to the applied theory, the **evaluation** of any human activity (actually, the **Pressure**) can be based on two criteria: 1) **The performance per unit of production,** which is linked to economic performance (value added), employment generated per unit, and the environmental burden (e.g. consumption of water, of energy, waste generation per unit, etc), and, 2) **The scale of the activity compared with the carrying capacity of the area**, for all the various human activities that take place in it.

The research proceeds to selection of proper indicators for the better measurement of the impact of marine fish farms, and to the **supplement** and **adjustment** of the existing ETNA's methodology. The **2 additional** environmental indicators cover the case

in which at the study area, the islands, **there is activities that are taking place in the marine environment**:

- **П20 - Recording appearance of alien species, cultivation or farming of alien species.** Helps to estimate the pressure on marine ecosystems (e.g. from lessepsian immigrants), and the threat that consists human activities for the biodiversity, by type of ecosystem, and for the different ecosystems of the island.
- **П21 - Quality of marine waters (marine environment).** Helps to estimate the quality of marine waters, which is particularly important in the case of marine fish farming, since it is the environment in which the production takes place, and is highly influenced by them, while at the same time the farms influence them back.

DISCUSSION

The specific characteristics of the islands (the "island phenomenon"), a combination of factors, affect always their economic development, and their sustainability level will be higher if their development is not dependent on a single activity: the economic risk then is lower and the stress on some of the natural resources is less important (Spilanis et al., 2005).

The new strategy for the Greek islands developed by the General Secretariat for Aegean & Island Policy (part of the Ministry of Shipping & Aegean) covers the whole island regions of the country and is called **Integrated Island Policy** because incorporates different sectoral policies targeting at the sustainable development of the islands through different activities, sushi as Marine Aquaculture, Tourism and Marine Tourism, Traditional Agriculture, etc. Its three (3) main pillars are:

1. **"Qualitative" Islands:** islands offering products & services of high quality. This can be done by developing action plans to utilise public and communal resources (e.g. public or municipal property etc.), incorporating the technical know-how and skilled work, as well as intangible assets for tourists with specialized interests.
2. **"Green" Islands:** islands that implement policies to reduce the use of the already limited water and energy resources. This includes better management of their natural resources (e.g. marine protected areas and forest biomass management), and the reuse of materials that are products of local recycling processes.
3. **Islands of "Equal Opportunities":** islands providing all the General Economic Interest Services. Offering "Equal Job Opportunities" to their inhabitants, "Equal Opportunities" to potential investors, and, will encourage and support innovative actions by providing proper motives (e.g. social services, IT technical know-how, scientific consultancy etc.).

An aquaculture development plan for an island region must have as an objective to provide a sound basis for development, while at the same time to conserve the unique environment of the islands for the present and future generations. The establishment of fish farms on islands is based on a comparative advantage: the farms, mainly in floating cages, use two recourses that are in a great abundance at the islands, (clean) sea and easy access from the (remote) beaches (Klaoudatos et al., 1996).

Therefore, even if today there are some difficulties, the investors will continue to show an interest in establishing fish farms at the island regions. There is, however, a

question about **whether** and **how** this human activity can contribute to the islands sustainable development. Some aspects regarding the fast aquaculture development require further attention. Concerns relate to environment (Karakassis et al., 2005), health and animal welfare issues, and potential conflicts with fisheries and recreational activities.

Marine aquaculture (or Mariculture) is a new competitor for the same limited resources and this antagonism should be judged on the basis of the efficiency of resource utilize as well as the environmental compatibility. Mariculture has today an important role to play in rural development and in reversing decline in fishing communities (Burbridge et al., 2001). Common criteria should be used for evaluating all economic activities, and to include socio-economic and environmental costs & benefits is a good way to achieve it.

With this research a simple system is proposed that can monitor the 'progress' of each local society by calculating a number of indicators that can measure the state (S) and its change over time as pressure (P) comes from mariculture (DF). This approach reflects the fact that SD has a different content for different societies and comparisons can be misleading (Katranidis et al., 2003). Advantage of this approach is that compares similar states of sustainability for the same society and yields meaningful results (Chatziefstathiou et al., 2006).

CONCLUSIONS

The system of measurement is relatively simple, relying mainly on published or easily accessible data, and the selection and weighting of indicators made using the Delphi method (Caffey et al, 1998). The developed method could be used as tool capable in determining also the inappropriate sites for projects in areas that initially had been considered suitable for aquaculture development. Monitoring practices will ensure that the established activities will not lead in dew time to the deviation from the sustainability's targets, and at the end of the policy period evaluation practices will determine whether the overall state of the SD of the island had been improved.

To diversify the activities we can proper assess the contribution of each activity and select the most desirables. In the case that this is aquaculture, we can propose the policy on which we must continue to examine the possibility of establishing new farms, or expanding the existing, with a way which will support the sustainable development of the islands through productive activities of the primary sector, while preserving the unique identity of each island (their 'insularity').

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