



# SUSTAINABLE EXTENSIVE AND SEMI-INTENSIVE COASTAL AQUACULTURE IN SOUTHERN EUROPE

## PUBLISHABLE EXECUTIVE SUMMARY

### PROJECT OBJECTIVES

SEACASE – “Sustainable extensive and semi-intensive coastal aquaculture in Southern Europe” is a specific targeted research project, supported by the European Commission within the Sixth Framework programme under contract no. 044483.

The main goal of SEACASE is to develop effective tools for the maintenance of competitiveness, productivity and profitability of extensive and semi-intensive Aquaculture production in Southern Europe. Minimization of environmental impacts and improvement on the quality and public image of its products, were identified as key sustainability factors.

The project is based on case studies covering a wide variety of production systems and geographical locations (Portugal, Spain, France, Italy and Greece). Traditional extensive and semi-intensive coastal Aquaculture systems in Southern Europe are facing difficulties, especially due to the increased competition for coastal areas by other candidate users and market competition, due to decreasing prices of intensive aquaculture products. By promoting this type of Aquaculture, the project aims to contribute to a better management of coastal areas of particular ecological interest, support sustainable production and create employment opportunities/security in rural zones.



**Figure 1:** Vale Bonello – Valliculture (Italy)

## INTENTIONS FOR USE

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The SEACASE project aims to contribute to:

- I. develop/understand technological improvements for the better use by the industry of the extensive and semi-intensive aquaculture systems
- II. generate a better knowledge on the status and economic viability of these systems.

These outputs should provide support to national and European authorities in defining their policies.

Environmentally friendly farming protocols in a range of case studies will be analyzed and developed in the course of the project, and moreover some basic technological improvements will also be studied. The SEACASE project intends to establish quality markers to allow the differentiation of aquaculture products from extensive and semi-intensive systems from the ones produced in intensive systems. Some of these markers may also facilitate product traceability. Codes of Conduct in European extensive and semi-intensive Aquaculture in coastal areas, including product safety, animal welfare and environmental issues will be proposed.

Considering the public authorities' interest a report will be produced about the current status of extensive and semi-intensive aquaculture in Southern Europe, including coastal maps by GIS system. Finally, a socio-economic evaluation of selected production systems in different countries will be performed. Where possible this analysis will be completed by an assessment of potential non-market benefits and costs, including social and patrimonial aspects.

## IMPACT

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The SEACASE project can provide the basic information for development of strategic plans on extensive and semi-intensive aquaculture practices and resources conservation, and for evaluating the feasibility of associating an economic viable activity with the conservation of sensitive coastal areas and wetlands. The promotion of traditional aquaculture activities may play an important role in rural areas, leading both to the development of the local economy and to preservation of the social and cultural heritage.

The fulfilment of SEACASE objectives will reinforce the **competitiveness** of these aquaculture systems, through development of protocols aimed to increase productivity while maintaining high quality standards and minimal environmental impact. Moreover, SEACASE will contribute to increase the availability of healthy, safe and high quality aquaculture products, to the diversification of farm market products, and also to improve the image of aquaculture industry.

SEACASE research work will allow extensive and semi-intensive aquaculture to benefit from **technical innovation**, namely: the formulation of innovative eco-friendly fish diets; the use of molecular tools to assist selection of *Sparus aurata* strains tolerant to low temperature; the synthesis of existing pond management techniques; and the development of a new integrated approach to support traditional eel fisheries.

A strong European dimension of the SEACASE project will contribute to the strengthening of cooperation between several Atlantic and Mediterranean countries (France, Greece, Italy, Portugal, and Spain) in these farming systems. By carrying out the proposal at European level, an added value is also expected by the direct application and comparison of the same protocols in different production systems influenced by geographic peculiarities. The wide knowledge is essential to develop a common approach of European countries to improve the image of extensive and semi-intensive aquaculture as an environmentally sound economic activity producing high quality products.

## WORK PERFORMED

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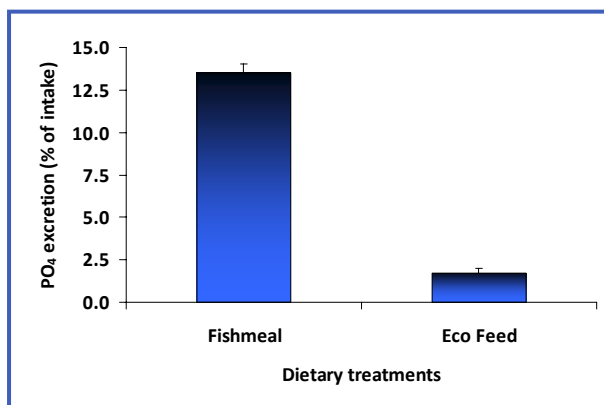
During the period covered, the project progressed in all Workpackage (WP) areas:

- The National reports on the revision of the current state of extensive and semi-intensive coastal aquaculture (WP1) were concluded. Some inputs were added to the original reporting grid; several coastal maps with the identified production areas were created, and following future work will be part of a GIS database;
- Major progress occurred in all three tasks of the workpackage on technical bases for production and management improvements (WP2). The trial of eco-friendly diets formulations for sustainable fish farming in ponds is finished, and results are being disseminated. A questionnaire to farmers regarding slaughtering methodologies was performed in the five countries involved in the project, and the manual on optimization of slaughtering procedures is under final revision. The trial on stress response to low temperature is underway; an experiment to assess the genetic variability of the sea bream groups was performed, as well as the cold challenge experiment. The laboratory analyses are being done.
- The six selected case studies (WP3) are progressing in each country. First results were obtained, some already disseminated and second year experiments are underway as planned.
- In the final product quality task (WP4) protocols were defined at the beginning of the project. First data of fish from intensive production are under process. Partner working in the case-studies are contributing with samplings for the juvenile's quality task (WP4), measurements and analysis are underway.
- Reviews of national certification procedures, by country, were completed. Codes of conduct for each case-study are being developed (WP5).
- The most representative extensive and semi-intensive farming systems for socio-economic assessment (WP6) were identified by country. The collection of socio-economic information either next to farmers, or as group surveys format, is underway.
- Dissemination activities (WP7) were undertaken since the beginning of the project, with the creation of a webpage and videos, participation in congresses, press releases, television interviews, and the production of a biannual newsletter, among other activities.

## RESULTS ACHIEVED SO FAR

The work performed during the first 18 months of the project, resulted in the following main achievements:

- An environmentally-friendly diet formulation was produced within the scope of task 2.1 and will be used in the polyculture case-study (task 3.2). This eco-friendly diet was designed with reduced contents of fish oil and fish meal. Its utilization also allowed lower losses of soluble phosphorus into the environment. Phosphorus excretion is much lower than those found in fish fed a practical fish meal diet. Phosphorus wastes are a major concern for many aquaculture operations since it is a triggering factor for algae blooms and can play a significant role on the eutrophication of the aquatic environment.



**Figure 2:** Levels of soluble phosphorus excreted by seabream fed the eco feed diet.

- The genetic variability trial showed that the two seabream groups exposed to the cold temperature experiments, presented levels of genetic variability which fitted in the range of the natural population data.
- The utilization of artificial substrates in mesocosms cages did not enhance the appropriated food availability for sea bream. Aquaculture based on periphyton could be more effective for omnivorous species than carnivorous species.
- The presence of Aquamats<sup>®</sup> in earth ponds increased primary and secondary production in the earthen ponds as show by the higher pH, dissolved oxygen and zooplankton abundance.
- The method used in eels tagging (task 3.5) was considered efficient after two fishing seasons where more than 2000 eels were captured and marked, in three different rivers.
- The analyses of seabream samples from intensive origin showed significant differences regarding body composition, within July and October fish groups. Season had an important effect on heavy metals deposition, but both mercury and cadmium levels were considerable lower than documented values for wild sea bream. Results confirm the high lipid content in reared fish and suggest that the difference observed between wild and intensively reared fish could allow the products from extensive or semi-intensive aquaculture to be identified by the consumer as similar to its wild counterpart.
- A well defined pattern of skeletal anomalies could be assigned to each rearing system, since the results of statistical analysis indicate that the juveniles reared in semi-intensive conditions have a more wild-like phenotype than the batches from intensive farming.

## EXPECTED END RESULTS

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At the end of the project the partnership intends to achieve a better and wider knowledge on extensive and semi-intensive practices in Southern Europe, from the technological, environmental and social perspectives.

With the results obtained, it is expected to produce technical reports and scientific publications, with clear results and conclusions that can be easily consulted and used. Some of these reports and publications will be especially devoted to farmers, namely dealing with technological improvements; farming methodologies; slaughtering procedures and scientific bases for certification processes. It is expected that the identified quality markers will help the sector to improve the consumer's image of aquaculture in general, and extensive and semi-intensive products in particular.

A clearer understanding of these systems, new inputs and a possible trend may be suggested for this sector, which may be of use for a wide range of stakeholders.

Overall, it is expected that the SEACASE project will contribute to the sustainability of extensive and semi-intensive aquaculture systems in Southern Europe, through reduced environmental impacts and increased productivity and competitiveness.

## DISSEMINATION OF KNOWLEDGE

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Several actions were undertaken to promote and disseminate the project thematics, activities and results.

A **Webpage** was created, and written in six languages. Several items explaining the aims, background and project organization can be found. Each participant team is introduced, as well as the project advisory board (farmers associations). A web-library, with documents in different languages, was created and is monthly updated. Project reports may also be downloaded from the webpage.



[www.seacase.org](http://www.seacase.org)

**Newsletter:** three newsletters were produced since the beginning of the project. The newsletters include a general project presentation; the progress and work performed on the different work packages and two technical notes written by project researchers. The newsletter will continue to be produced, twice a year, until the end of the project.





During the first 18 months of SEACASE project, six oral **communications** and six **posters** were presented in several conferences, meetings and exhibitions at National and International level.

## CONTRACTORS INVOLVED

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Participant name	Participant short name	Country
Centro de Ciências do Mar do Algarve	CCMAR	Portugal
Instituto Nacional de Investigação Agrária e das Pescas	INIAP-IPIMAR	Portugal
Consejo Superior de Investigaciones Científicas	CSIC	Spain
Institut Français de Recherche pour l'Exploitation de la Mer	IFREMER	France
Centre Régional d'Expérimentation et d'Application Aquacole	CREAA	France
Syndicat mixte "Forum des Marais Atlantiques"	FMA	France
Université de Bretagne Occidentale	UBO	France
Istituto Centrale per la Ricerca Scientifica e Tecnologica applicata al Mare	ICRAM	Italy
Università degli Studi di Roma 'Tor Vergata'	UTV	Italy
Department of Public Health, Comparative Pathology, and Veterinary Hygiene, University of Padova	UNIPD	Italy
Hellenic Center for Marine Research	HCMR	Greece
University of Crete	UoC	Greece

## CO-ORDINATOR CONTACT DETAILS

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