FORWARD

FRAMEWORK FOR RIA FORMOSA WATER QUALITY, AQUACULTURE, AND RESOURCE DEVELOPMENT

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Project – Challenges

> The multidisciplinary character of the project and its high social impact poses challenges on:

- > Ecosystem approach to aquaculture production with the integration between high detailed integrated models and system-wide screening models.
- > The coordination of research in diverse fields of knowledge such as hydrodynamics, ecology and economy with a common goal of delivering a useful management aid.
- > The management of a prolific relationship with the stakeholders in social, economical and environmental sensitive topics, whilst creating added value both to the research developed as in the management tools produced.

> This project complements previous European (OAERRE, ECASA) and national projects (MONAE, TICOR, NEEA) on aquaculture sustainability.

Introduction

Rationale

> Aquaculture worldwide is growing exponentially and contributes together with competing activities to the pressure affecting habitat complexity and biodiversity of the costal ecosystems.

> In the Ria Formosa (Portugal), aquaculture of clams is an important activity but in the past decade aquaculture productivity has decreased and seems to be related to environmental factors (reduction of oxygen, food supply...).

Objectives

> Definition of the carrying capacity for activity types in certain zones of the Ria.

> Planning and regulation of existing economic activities (shellfisheries, bivalve aquaculture, pisciculture, salt culture, tourism).

> Identification of potential reconversion and modernization of certain economical activities.

> Identification of training assets necessities for good environmental practices

> Indications for fisheries and recreational collecting planning in the lagoon area.

Methods

Water quality and ecology
- Database
- GIS
- Field work (small scale)
- Laboratory work (bivalve physiology)

Processes study
- **Individual scale** (clam, oyster, fish)
- **Local scale** (farm, plots)
- **System scale** (Hydrodynamics, Pressures)

Models: implementation, calibration, validation
- **Integrated models** (Boxes, growth - hydrodynamic - watershed - pollution
- **Screening models** (ASSETS, …)

Outputs
- Bivalve **carrying capacity**
- Scenario **optimization**
- Support for **planning and regulation** of economical activities
- Identification of necessities for good **environmental practices**

Stakeholders | Stakeholders | Stakeholders | Stakeholders

Clam culture (5 000t y^{-1})

Fish culture (Seabream-seabass 700t y^{-1})

First results

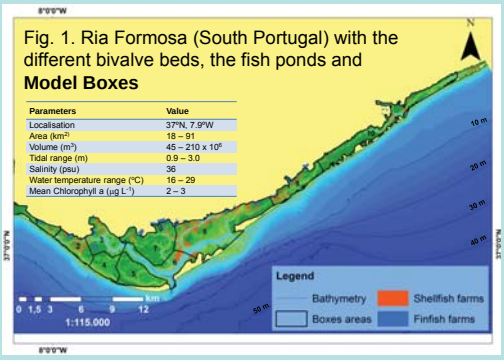
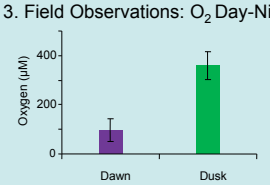


Fig. 1. Ria Formosa (South Portugal) with the different bivalve beds, the fish ponds and **Model Boxes**

Fig. 2. System scale – EcoWin2000 model

	Clam production
Reported statistics	5 000t y^{-1}
Estimated by E2K (From ECASA)	4 000t y^{-1}

Fig. 3. Field Observations: O_2 Day-Night Fluctuations



O_2 is consumed during the night (neap tide: smaller exchanges of lagoon water with the sea)

Fig. 4. Farm scale – FARM layout

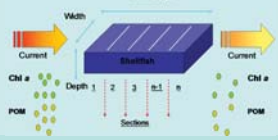
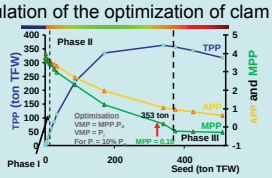


Fig. 5. Simulation of the optimization of clam farm



TPP: Total Physical Product, APP: Average Physical Product, MPP Marginal Physical Product, VMP Value of Marginal Product

Project key information

> Multidisciplinary team including IMAR, IPIMAR, ARH-Algarve, ICNB[5] and local municipalities.

> Funded by the Polis Litoral Ria Formosa, Plano 6: Plan of upgrading and sustainable management of activities related to the resources of the Ria Formosa - Contract n.º 101/10/CN003.

> Duration: 24 months, started January 2010.

> Website: http://www.polislitoralriaformosa.pt/forward/index.php

Key references

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