



# ECASA NEWSLETTER

Issue 2

Summer 2006

**ECASA** - An Ecosystem Approach for Sustainable Aquaculture – is an EU funded Framework 6 RTD project, with 16 research partners from 13 member states. It is the successor to several 4th and 5th Framework Programme projects which have helped to push forward our understanding of the effects of aquaculture on the environment especially in the Mediterranean.

In 2002 the EU published a strategy for the sustainable development of European aquaculture. One of the main objectives of the strategy is to ensure an environmentally sound industry. One of the actions proposed to aid this strategy is to develop specific criteria and guidelines for aquaculture focused Environmental Impact Assessments.

The EU is a contracting party to the UN Convention on Biological Diversity and adheres to the FAO Code of Conduct for Responsible Fisheries and so any strategy for the integrated management of land, water and living resources must promote the conservation and sustainable use of marine resources in an equitable way.

An ecosystem approach to aquaculture management is not about managing or manipulating ecosystems but is concerned with ensuring aquaculture management decisions do not adversely affect ecosystem function and productivity and so marine resource use is sustainable in the long term.



Marine salmon farm, West Coast, Scotland

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European aquaculture is highly diverse and consists of a broad range of species, systems and practices. Marine aquaculture has been expanding rapidly in the last decade and the current value of annual aquaculture production is €2,500 million, consisting of 17% of the volume and 27% of the value of the total fishery production of the union. Usually based in rural coastal areas where traditional employment is in decline, aquaculture developments have helped stabilise rural populations by providing year round employment. In Brittany alone, 3,000 people are employed on oyster farms.

To maintain current production levels, and enable further development of the industry, a holistic ecosystem based approach to the application of farming technologies and governance, the consideration of socio-economics and natural resource use, should be adopted so that all these factors can be integrated and sustainability may be achieved.

## The three objectives of the ECASA project are:

**Identify** and assess quantitative and qualitative indicators of the effects of aquaculture on the environment and vice-versa.

**Assess** and develop operational tools (models), to establish and describe the relationship between environmental conditions and aquaculture activities over a range of ecosystem conditions and aquaculture production systems.

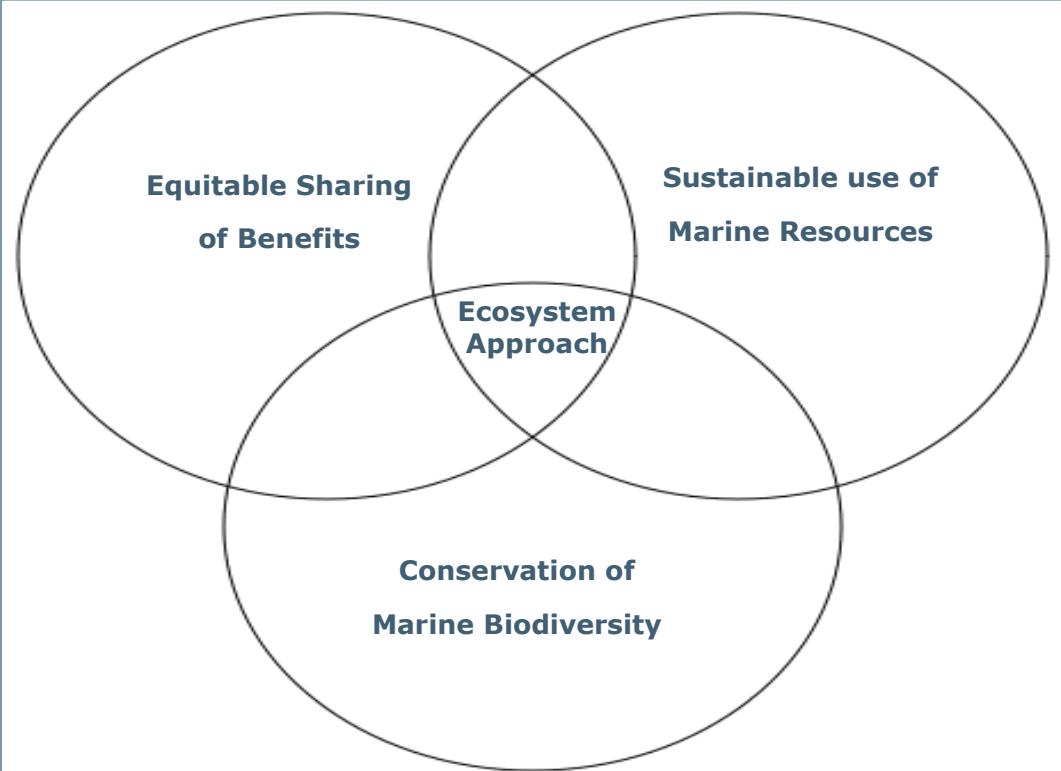
**Develop** effective environmental impact assessment and site selection.

Through these objectives ECASA aims to support the aquaculture industry in providing guidance and tested tools to minimise environmental impacts whilst maximising sustainable productivity. These tools shall inform industry of effective site selection and provide a coherent and fair approach to Environmental Impact Assessment

The Convention on Biological Diversity established three main goals; the conservation of biological diversity, the sustainable use of its components and the fair and equitable sharing of benefits from the use of genetic resources. There is direct correlation between these three goals and the three pillars of sustainable development, with the ecosystem approach as the fundamental delivery mechanism. Effective progress towards sustainability through the adoption of the ecosystem approach requires all sectors involved in aquaculture to become engaged.

# Sustainable Development

Primary goals of the CBD		Three pillars of sustainable development
Conservation of biological diversity	→→→	Environmental sustainability
Sustainable use of its components	→→→	Economic sustainability
Fair and equitable sharing of benefits	→→→	Social sustainability

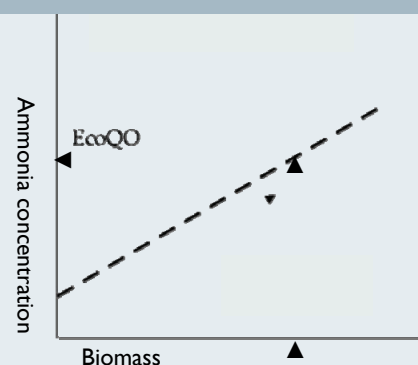


## Tools for Sustainable Aquaculture

The first 12 months of the ECASA project was spent considering which environmental indicators to include in the ECASA 'Tool-Box', that would best measure the range of conditions and practices found within European aquaculture. Fifty three indicators have been proposed for testing in the 2006 field campaign, capable of measuring various environmental impacts which can occur for example in sediments under the farms, in the benthic fauna, in water quality and also the socio-economic aspects of aquaculture. The main criteria for these indicators are that they should be scientifically robust, easy to measure and interpret and be cost efficient. Their applicability shall be tested throughout Europe at 14 different study sites. Another set of operational tools being developed by ECASA are a selection of environmental models. These models shall be tested for their practical utility, (they are easy to set up, run and interpret), and their scientific robustness.

The relationship between models and indicators can be summarised in Figure 1 opposite. Here the concept of the model is simplified to a linear relationship between two variables, ie an environmental variable (or indicator) on the y axis—e.g. ammonia concentration and a production variable on the x axis—e.g. salmonid biomass. Once validated this relationship can be used to assess the assimilative capacity for a given site that is set by the level of production at which the y axis response approaches an Ecological Quality Objective. Although models are typically more complicated than this, their purpose is essentially the same, a tool to predict, or estimate a y axis value from a given x axis value.

Figure 1. Illustrating a model linking production and environmental indicators



# The ECASA Field Campaign 2006

Study sites, in ten European countries, have been proposed for the ECASA field campaign representing an array of environmental conditions and cultivated species: from a Norwegian site north of the Arctic Circle, ranging south to an eastern Mediterranean site located off the Isle of Crete. Both fin-fish and shellfish production systems are included in the study. The field campaign will run from March to September 2006. The table below lists the locations, species and cultivation process at the study sites.

Site Location	Species Cultivated	Cultivation Type
Norway	Salmon	Net pen
UK - Scotland	Salmon	Net pen
UK - Shetland	Cod	Net pen
France - Brittany	Oysters	Trestle and pole
France - Normandy	Clams, Oysters	Intertidal culture: bottom and trestles
France - South coast	Oysters, Mussels	Suspended culture on tables
Spain	Sea Bass, Sea Bream, Tuna	Net pens
Portugal	Clams, Oysters	Intertidal culture: bottom and trestles
Italy - Gulf of Venice	Mussels	Long line
Italy - Bisceglie	Sea Bass, Sea Bream, Pandora	Net pens
Italy - Porto Ercole	Sea Bass, Sea Bream, Shi Drum	Net pens
Croatia	Sea Bass, Sea Bream	Net pens
	Oysters, Mussels	Long lines
Slovenia	Sea Bass, Sea bream	Net pens
	Mussels	Long line
Greece	Sea Bass, Sea Bream	Net pens

Proposed study sites



At the end of the field campaign the farmer at each study site will be given a site report synthesising the results of the sampling activity, documenting all the measurements taken, monitoring procedures and protocols followed. This report shall be in the form of a mini EIA, and should provide improved advice on carrying out the field aspects of EIA in relation to aquaculture developments.

ECASA site, Slovenia



Various sampling techniques shall be deployed at the field sites. Niskin bottles will be used to collect water samples for nutrient analysis and chlorophyll a, Van Veen grabs will collect sediment samples from beneath net pens which shall be analysed for Total Organic carbon, Total Nitrogen and the species composition of the resident Benthic faunal community.

The sites proposed include offshore, coastal and estuarine locations in the Mediterranean and North Atlantic. The water conditions at these sites range from calm and sheltered fjords and bays to rough conditions in exposed locations in the North Atlantic. Fifty three indicators and variables covering water quality, sediment geochemistry and benthos, have been screened for their suitability. A selection of these shall be investigated during the summer campaign for their applicability, (are they cost-effective, robust and practical), to aid the development of models to establish the functional relationship between the environment and aquaculture activities.

Field work on a Scottish fjord aboard SAMS vessel RV Calanus.



# Introducing the ECASA 'Tool-Box'

The ECASA 'Tool-Box' will contain a suite of environmental indicators and predictive models whose focus will be to assess of marine sites for aquaculture activities and subsequently provide a consistent framework for the application of Environmental Impact Assessments, resulting in coherent and relevant Environmental Statements.



The 'Tool-Box' will also contain a series of procedures advising on suitable combinations of these components and their particular applicability in the marine environment. This 'Tool-Box' will report on the merits of the chosen indicator set including best methodologies for collection, analysis and interpretation, and on the recommended set of models. Guidance will be given on specific spatial scale and farm size, and on the use of models to estimate site and water body assimilative capacity, sustainable production, and on the reliability of model predictions.

The 'Tool-Box' will include a manual that will present the knowledge gained in the project, and guide industry and regulators to the most useful tools appropriate for evaluating site suitability across varying environmental conditions. Details of all the indicators, models and procedures screened and analysed by the ECASA project can be found at the website—<http://www.ecasa.org.uk>



SCOTTISH  
ASSOCIATION  
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SCIENCE

The Coordination Team are based at the Scottish Association for Marine Science (SAMS) one of the oldest marine research institutions in the world and a centre of excellence for the study, education and promotion of marine science.



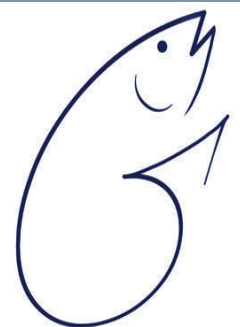
The EU's Research Framework Programme 6 contributes to the creation of a true "European Research Area" (ERA), which is a vision for the future of research in Europe, an internal market for science and technology. Fostering scientific excellence, competitiveness and innovation through the promotion of better co-operation and coordination between all levels. Economic growth increasingly depends on research, and the FP is the financial instrument that will help make the European Research Area a reality.

## Working Towards Sustainability

Towards the end of the ECASA Project, a Workshop will be held to inform industry and regulators of the Projects achievements and outputs and launch the 'Tool-Box'. This meeting will be held towards the end of 2007 in a central location within Europe. The aim of this Workshop will be to link research with industry, which is fundamental to any endeavour where public policy, environmental conservation and natural resource use are equal players. To register for the mailing list for this Workshop please contact [ecasa@sams.ac.uk](mailto:ecasa@sams.ac.uk). Further details will be available from the website—<http://www.ecasa.org.uk>

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