Tools for Assessment and Planning of Aquaculture Sustainability (2016/2020)

H2020 Project No: 678396
Project Partners

- University of Stirling (UK) (coordinator)
- NIVA (Norway)
- DHI (Denmark)
- Water Insight BV (Netherlands)
- Alterra-Wageningen UR (Netherlands)
- Plymouth Marine Laboratory (UK)
- Universidad de Murcia (Spain)
- Université de Nantes (France)
- Hellenic Centre for Marine Research (Greece)
- Szent Istvan University (Hungary)
- AquaBioTech Group Ltd (Malta)
- Marine Institute (Ireland)
- NACEE – Eastern European (Hungary)
- Aquaculture Stewardship Council (UK)
- Fundacion Imdea Aqua (Spain)
What are the challenges TAPAS is addressing?

• **Fragmented approaches to licensing and regulation**, together with limited availability of suitable areas for aquaculture, are a major barrier to future development and expansion of the aquaculture sector.

• There is a **need to support member states to establish more efficient regulatory frameworks** and to reduce cost and time of licensing aquaculture farms.

• There is a **need to ensure there are appropriate tools, models and approaches** available to predict and monitor environmental impacts and also quantity ecosystem services provided by aquaculture.

• There is a **need to strengthen environmental sustainability of aquaculture and enhance its image**.
Aims and objectives to address these ....

• Identify sustainability requirements and licensing approaches, and identify bottlenecks hampering cost-efficient licensing and regulatory practices.

• Identify the gap between the availability of and needs for models, modelling and decision frameworks, and critically analyse and refine existing tools and technologies, developing new approaches if needed.

• Assess the environmental services provided by European aquaculture.

• Strengthen management practices and develop an Aquaculture Sustainability Toolkit for timely and cost-efficient environmental assessment and regulation.
What will the project offer?

• Improved regulatory frameworks for adoption by Member states
• Improved tools for quantification of environmental services
• Improved spatial planning linked to carrying capacity and sustainability indicators
• Improved, more efficient tools for licensing and aquaculture development
• Improved, more efficient tools for monitoring and prediction of environmental impacts
• Improved conditions for investment in the sector through provision of state of the art tools and integrated, holistic, decision support
• Significantly enhanced real time in-situ monitoring linked to early warning and sustainability
What will TAPAS deliver?

• Environmental models, tools, management approaches, decision frameworks (Aquaculture Sustainability Toolbox) and policy recommendations to support EU Member States towards establishing a coherent and efficient regulatory framework

• Examples:
  - Use of earth observation data
  - In-situ and real-time monitoring systems
  - DSS (TAPAS-Smart?) and toolbox
  - Tools (e.g. environmental assessment)
  - Ecosystem services and societal models
  - Site selection, growth potential and carrying capacity models
  - Use of regional scale models
  - Provide information for policy, licensing and regulations
  - Assess risk of potentially toxic substances

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How?

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Case studies

Include production systems throughout Europe:

• Coastal shellfish (France, UK)
• Marine cages (Ireland, Norway, Malta, Greece, Spain)
• Freshwater cages (UK)
• Freshwater ponds (Hungary)
• Recirculating systems (Denmark)
• Integrated multi-trophic aquaculture (IMTA) (Ireland, Malta)

Feed into the WPs for data provision and validation
Workpackages

- **WP1** – Project management (UOS)
- **WP2** - Requirements Analysis and Stakeholder Integration (MI)
- **WP3** - Environmental Risk Assessment of potentially toxic substances (ALT)
- **WP4** - Ecosystem Services and Societal models (NIVA)
- **WP5** - Near Field Models for regulation and site selection (UOS)
- **WP6** - Far Field Models (PML)
- **WP7** - Monitoring and Validation (WI)
- **WP8** - Aquaculture Sustainability Toolbox (DHI)
- **WP9** - Dissemination, Outreach and Exploitation (ABT)

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Work Package 2: Requirements Analysis and Stakeholder Integration

Objectives

1. Evaluate existing regulatory and licensing frameworks across the EU
2. Design new, flexible approaches to licensing working to common standards
3. Ensure the acceptability and utility of the approach by close engagement and collaboration with industry, regulators and certifiers
4. Take account of the range of production environments and sub-sectors and the need to integrate with other sectors
5. Develop timely and cost efficient tools that incentivise investment in sustainable aquaculture

Provide information for policy, licensing and regulations
Work Package 2: Requirements Analysis and Stakeholder Integration

Consultation/questionnaires:

- The issues and bottlenecks outlined in consultation - highlighted areas where a tool was needed.
- The tools asked for directly by consultees.
- Tools suggested by partners from workshop.
- Collated and formed report.
Work Package 2: Requirements Analysis and Stakeholder Integration

Draft consultation report:

- Overview of issues, bottlenecks to regulation of aquaculture in the EU.
- Recommendations to improve these issues and highlighting the potential positive impact of each.
- 11 summary recommendations to tackle issues and bottlenecks.
- Appendix - Exploring case studies and potential new approaches.
Work Package 2: Requirements Analysis and Stakeholder Integration

- Develop a modern **electronic licensing system**
- Provide **clear guidance** for quantifying impact and balancing risk
- Develop and improve **tools and environmental models**; site identification, site optimisation and carrying capacity.
- Carry out **real time**, inexpensive, **risk focused monitoring**
- **Level the playing field** for costs of applying for licences
- **Streamline aquaculture legislation**; flexibility, assess license term, use trial licence models.
- **Harmonise implementation** of EU regulations; reducing the variation, harmonising of EIA procedures.
- Encourage implementation of National Plans and amended EIA Directive across jurisdictions to **help simplify processes and administration**.
- Designate **strategic national aquaculture zones** where risk assessments, capacity and impact studies are carried out on an ‘area’ basis.
- Develop local scale, **producer lead, communication platforms** to facilitate dispute resolution and enhance cooperation.
- Develop **public communication platforms** to make monitoring information publicly available.
Work Package 3: Environmental Risk Assessment (ERA) of potentially toxic substances

Objectives

1. To evaluate and improve existing farm-scale modelling tools for the evaluation of the ecotoxicological risks generated by antifouling agents, veterinary medicines and potentially toxic compounds.

2. To compile, develop, and test environmental thresholds for potentially toxic substances used in EU aquaculture.

3. To develop rapid assessment tools for the prospective ERA of potentially toxic substances that can be used by farm applicants and regulators (WP8).
Work Package 3: Environmental Risk Assessment (ERA) of potentially toxic substances
Work Package 4: Ecosystems services and Societal models

Objectives

1. To build an analytical framework for the assessment of ecosystems services (ES) and benefits provided from European aquaculture based on the general concept of Ecosystems services cascades.

2. To identify what trade-offs and possible synergies that exists between aquaculture provisioning services and other ecosystem services and to be able to quantify these.

3. To assess how negative trade-offs can be minimized and sustainability improved through management and planning approaches (e.g. selection of adequate sites, species diversification and IMTA) and through adaptations in the farm operating practices.

4. To analyse how the knowledge gained from assessment of ES and ES trade-offs can be incorporated into current planning and licensing.
Work Package 5: Near-field models for regulation and site selection

Objectives

1. Evaluate capabilities of near-field models for the purposes of aquaculture development and regulation in the EU in different environments and for different culture organisms.

2. Using data from WP7, test existing or potential, simple or complex near-field models as management tools for estimating environmental fate of wastes from fish and shellfish culture within fresh-water and coastal marine environments throughout the EU.

3. Develop integrated site selection models using GIS – through integration of models into a “water-body scale” spatial systems which will be incorporated into WP8.
Work Package 5: Near-field models for regulation and site selection

Example of simulation of individual Pacific oyster growth at the scale of a coastal area (UN)

AIM (HCMR)
Work Package 5: Near-field models for regulation and site selection

Simulations with ShellSIM feeding FVCOM-ERSEM results (PML)
Work Package 6: Far-field models

Objectives

1. Improve existing approaches to combine Earth Observation and modelling
2. Develop additional indicators for operational use
3. Provide relevant far field models and EO data to the other WPs

Modelled summer (June-Sept) concentration of phytoplankton carbon in surface waters (0-10m) in 1992 in the Baltic Sea.
Work Package 7: Monitoring and Validation

Objectives

1. Evaluate available and contribute to the development of new *in situ observation technologies* of physical, ecological and chemical water quality including novel biosensors and optical sensors as well as monitoring the integrity of the cage material

2. Establish methods for *quality control of the large data streams* produced by the automated measurement stations

3. Develop methods to detect *emerging problems with water quality*

4. Develop methods for using the upcoming *Copernicus Sentinel-2 MSI*

5. Inventory of available *in-situ datasets* collected in decades of regulatory monitoring of fish farms, and field campaigns
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Work Package 8: Aquaculture Sustainability Toolbox

Objectives

1. Collating, refining and developing methods, guidelines and integrated tools to support best practice for aquaculture impact assessments in Europe.

2. Case-based examples of best practise using the sustainability tool selecting, analysing and weighting assessment results.

3. Incorporating feedback from decision-makers into the prototype tool design process to ensure the final tools are as useful as possible.
Work Package 8: Aquaculture Sustainability Toolbox

From WP2 outcomes:

- E-licensing
- One-stop-shop
- Tools for Guidance
- Communication Platforms
  - Guidance
  - Pre-application process
- Public Information Platform

- The Aquaculture Licence
  - Term, Flexibility, Trial licences, Alternative approaches
- Environmental monitoring databases
- Quantifying impact and balancing risk
Work Package 8: Aquaculture Sustainability Toolbox

Outputs
Still under construction and consultation with stakeholders
- WAS/EAS Montpellier 2018
- EAS Berlin 2019
Work Package 9: Dissemination, Outreach and Exploitation

Objectives

1. **Communication strategy** to provide information about the project for all relevant stakeholder groups.

2. Coordinate and encourage the exploitation of the project results.

3. Enhance the use of project results by EU decision making bodies, national and regional authorities.

4. Ensure the involvement of the European aquaculture industry in the project (links to WP2).

5. Enhance the image of EU aquaculture through communication of TAPAS results to the public.

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Links with other EU projects

Related projects?

• TAPAS
• AquaSpace
• ClimeFish
• CERES
• SUCCESS
• PrimeFish
• PerformFish
• MedAid
• Others ???
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