Co-financed by Greece and the European Union

Project presentation

IMTA-Effect: **I**ntegrated **M**ulti **T**rophic **A**quaculture for **EFF**iciency and **E**nvironmental **C**onserva**T**ion, is funded by EU ERANET COFASP (www.cofasp.eu) and lasts 2016-2020. It associates 9 partners from public research and private companies, in 6 countries.

The project aims to develop IMTA strategies for fish farmers to develop new production systems being efficient, economically attractive, robust, and environmentally friendly. For this purpose, the project aims to provide scientific references on the nutrient and energy efficiency gains generated by associating different aquatic species of different levels in the food web. Depending on targeted species, aquatic environment (marine or freshwater), and production system (ponds, open sea, close containment, recirculating systems), the basic concepts are the same but the efficiency and implementation of IMTA strategies may be different. Therefore, there is a need for a better understanding of the interaction of species of different trophic levels in IMTA, and for provision of reliable practical references for system implementation

A special attention will be paid on the primary production, as it can be considered as:

- the major trophic level in the capture of dissolved nutrient ;
- the major functional component in the conversion of the CO_2 into O_2;
- a source of food for the reared species, in a perspective of closed system approach (total recycling);
- a source of income, by cultivating algal species for industrial purpose, in a perspective of industrial ecology (complementarity of human activities in terms of material and energy flows in a territory).

One important aspect of IMTA is connected to the ecosystem services that the implementation of these systems will provide, mainly in environmental susceptible area where nutrient cycling is an issue. IMTA may provide environmental sustainability, economic stability and societal acceptability.

For the development of new production systems, the understanding of stakeholders' expectations is crucial. The perception of the ecosystem services (and disservices) associated to IMTA implementation will be a key factor of the integration of IMTA in territories. It will be explored together with a dissemination of the IMTA results of the project in each of the study area.

IMTA-EFFECT is conceived on the cross-fertilization of case studies and scientific competences.

The project is conceived as an ecosystem integrative approach based on coordinated steps:

- Experimental approach aiming:

    - The assessment of the efficiency of different IMTA systems;
    - Nutrient and energy flows analyses for a better assessment of the role of the different species of the IMTA food web and the evaluation of the recycling efficiency of IMTA (WP1 & WP2).
- Modelling: as an analytical step necessary to adapt and create specific tools for system running prediction connected with environmental analysis (WP3).
- Economic and social evaluation: to understand the perception of the IMTA by stakeholders through the ecological services framework (WP4).

Two basic production systems with various forms will be studied: multitrophic marine systems and freshwater polyculture systems. These systems are divided into two modalities: 1 - species reared separately in different structures permitting a precise measurement of each species activities and role in nutrient and energy cycling, 2- Species reared all together in the same structure, showing an overall result of species interactions. These two modalities will be used to develop and calibrate bio-energetic and bio-physic models. These different case studies will permit to understand the functioning and the efficiency of each compartment of the systems, and their interactions in the different contexts.