

RECOMMENDATION DOCUMENT FOR COMMON AND SHARED PRACTICES FOR AQUACULTURE

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Report	RECOMMENDATION DOCUMENT FOR COMMON AND SHARED PRACTICES FOR AQUACOLTURE
Description	This document reports all the information collected during the ARGOS project regarding common actions for aquaculture. It summarizes them and makes them available to the SC
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Author	Agriteco - PP1 Veneto Region

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1. Introduction

The ARGOS (ShARed GOVERNance of Sustainable fisheries and aquaculture activities as leverage to protect marine resources in the Adriatic Sea) project matured within the ITALY-CROATIA development program and saw the formation of a group of specialists from different Italian and Croatian regions under the scientific supervision of CNR IRBIM in Ancona and the IOR institute in Split with the aim of trying to establish a common framework for the governance of fisheries and aquaculture activities in the entire Adriatic basin. All of these experts were brought together in the Adriatic Advisory Council (AAC) technical table in which aspects of maritime spatial planning, marine resource management and habitat protection in the Adriatic were discussed.

The results that emerged from the various deliverables produced by the partners together with the discussions held during the course of the meetings allowed for the formulation of recommendations that are being passed to the SC as a final summary. The main themes include:

- Environmental sustainability
- Biological sustainability
- Socio-economic sustainability

The European Union (Reg (EU) 1380/13) defines aquaculture as:

the rearing or cultivation of aquatic organisms using techniques designed to increase the production of the organisms in question beyond the natural capacity of the environment, where the organisms remain the property of a natural or legal person throughout the rearing and culture stage, up to and including harvesting

In this case in the definition itself is inherent a concept that also emerged during the ARGOS project activities i.e. that an area devoted to aquaculture goes beyond the natural capacity of the environment so it can no longer be considered a natural but a man-made area where activities are carried out that may have influence on the surrounding environment.

Moreover, the establishment of AZAs (areas allocated for aquaculture) is part of the broader process of maritime spatial planning (MSP) for the sustainable development and growth of maritime areas in Europe, as defined by Directive 2014/89/EU, transposed in Italy by Legislative Decree 201/2016. The Directive promotes the sustainable development of the seas and oceans and the growth of maritime economies with a coordinated, integrated, and transboundary approach and requires Member States to develop Management Plans for jurisdictional waters by mapping existing human activities with a focus on certain key economic sectors for Blue Growth such as aquaculture.

The activities that developed during the ARGOS project precisely tried to express the concept of "coordinated, integrated, and cross-border approach" as much as possible so that the need to have a unified Adriatic entity that can support this new integrated concept emerged very strongly. It is requested that the SC advocate for the stabilization of the AAC technical table, which becomes an environment in which to discuss at the Adriatic level the prospects for aquaculture. Therefore, it becomes basic for having an Adriatic approach to be able to enlarge the participation in this permanent AAC also of those states that are currently not part of it (Slovenia, Montenegro and Albania).

The ARGOS approach to aquaculture issues has always been a bottom-up approach trying to go and intercept the needs and problems of those who are currently farmers but also analyzing the criteria for potential developments.

The IMO/FAO/UNESCO-IOC/WMO/WHO/IAEA/UN/UNEP Joint Group of Experts on the Scientific Aspects of Marine Environmental Protection (GESAMP, 2001) defined "zoning" (or spatial analysis for aquaculture) as follows:

Zoning may be used either as a source of information for potential developers (for example by identifying those areas most suited to a particular activity); or as a planning and regulating tool, in which different zones are identified and characterized as meeting certain objectives. Zoning of land (and water) for certain types of aquaculture developments may help in controlling environmental deterioration at the farm level, and in avoiding adverse social and environmental interactions. Conflict between different resource use activities can be avoided. By creating exclusive zones, a sense of ownership and heightened responsibility for environmental management may be created in the user community.

Zoning has also been defined by FAO, as the action of “dividing an area in zones or sections with different characteristics, or reserved for different purposes or uses, or conditions of use such as no take zones or reserves (see marine protected areas [MPAs]), biodiversity corridors, non-trawling areas and areas for exclusive use by small-scale fisheries or aquaculture”

In this process of defining the uses of maritime space, it becomes basic to define AZAs as best as possible so as not to go and take away areas from other uses but also with a focus on selecting areas for aquaculture that we are actually suited for this purpose.

2. Definition of AZAs and activities needed

Identifying an area for aquaculture is not a simple cartographic exercise of dividing the maritime space, nor is it a response to particular demands of the productive world or a stopgap with respect to other anthropogenic activities, but rather a careful identification of the maritime space with the aim of making the most of that space, which as pointed out becomes an anthropized area.

First of all, all those physical constraints that are already present in the marine environment such as MPAs, main sea routes, urban sewage pipelines, etc., for which there are already minimum distances to be respected, must be identified. The International Union for Conservation of Nature (IUCN) has analyzed the compatibility between different aquaculture activities (intensive or extensive, for fish or shellfish) with respect to 7 different classes of marine protected areas and defining for each area what is the degree of compatibility according to three different classifications: not compatible, compatible with caution or totally compatible; the following table shows the different degrees of compatibility.

Categories	Ia	Ib	II	III	IV	V	VI
High density fish cage culture	N	N	N	N	*	*	*
High density on-land close system fish culture	N	N	N	N	*	*	Y
Medium density on-land circulating system fish pond culture	N	N	N	N	*	Y	Y
High density shell fish culture (table, long-lines)	N	N	N	N	*	*	Y
Low density pond /lagoon fish culture	N	N	N	N	*	Y	Y
High density seaweed culture	N	N	N	N	*	*	Y
Low density shellfish culture	N	N	N	N	*	Y	Y
Medium density invertebrate (e.g. sea cucumber) culture	N	N	N	N	*	Y	Y
Integrated Multi-trophic culture	N	N	N	N	*	Y	Y
Restoration purpose aquaculture *	*	*	*	*	*	Y	Y

Potential interference between aquaculture and protected areas

Having determined which areas are free of physical constraints, parameters must be evaluated to identify their suitability or otherwise:

- the natural or anthropogenic abiotic parameters
- the biotic parameters

Natural abiotic parameters are defined as all those chemical-physical, morphological or forcing characteristics that are intrinsic to an environment; the main ones to be considered are temperature, salinity, dissolved oxygen, current, bottom depth, etc. Abiotic parameters of anthropogenic origin, on the other hand, concern, for example, the influence on waters reaching the sea as a result of runoff from agricultural fields with nutrient or herbicide transports, urban discharges, etc.

Biotic parameters refer to all those components concerning living organisms that are present in the environment and from the relationships between them and there may be predators, fouling, variation in plankton availability, die-offs, biotoxins, etc.

All this information should be interpolated spatially to create a map of suitable areas for uses by distinguishing different types of farming (shellfish or fish farming) and also giving a degree of suitability.

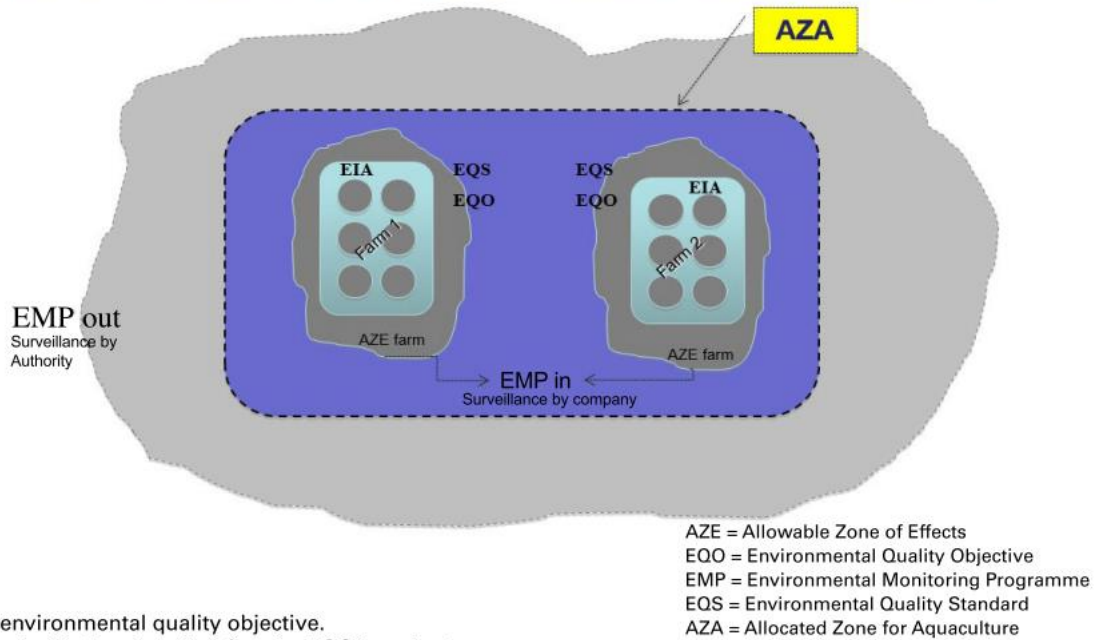
The one for Zadar County is given as an example.

- Zone Z1 - areas designated for mariculture
- Zone Z2 - areas where mariculture has a high priority, but other activities are allowed
- Zone Z3 - areas where limited forms of mariculture are allowed under certain conditions and where it serves as a supplement to other dominant activities
- Zone Z4 - areas not suitable for mariculture.

An area designated for mariculture does not lose its connotation as a natural area with the establishment but only subsequently as aquaculture activities are allowed within it. In this case, it cannot be considered a closed environment but a potential source of risk to the surrounding ecosystem that therefore requires an environmental monitoring plan. The management of aquaculture areas and sites is therefore aimed at ensuring the maintenance of environmental quality, reducing potential impacts related to production activities, resolving any conflicts of use, and ensuring ecosystem services and expected socio-economic benefits.

The monitoring plan is shared with the monitoring agencies and implemented periodically to monitor the state of the ecosystem and assess any impacts, using an adaptive approach, which takes into account the monitoring results to redefine and readjust it as aquaculture activities and environmental conditions at the marine site change. If the measured parameters show a degradation of environmental quality beyond the limits deemed acceptable by the environment, corrective measures must be taken.

Example of environmental monitoring areas within and outside the allowable zone of effect



EQO: environmental quality objective.

The legislation should define the EQO in order to preserve ecosystem services

EQS: environmental quality standard.

The EQS is a value which specifies the maximum permissible concentration of a chemical in the water column and in the sediment

Among the main risks that mariculture activities may pose are:

- The potential loss of microplastics through rubbing or detachment of mussel socks.
- Being a "man-made" area produces waste that could end up in the sea
- In fish farms there may be leakage of antibiotics or organic material (food or faecal material) into the environment with the risk of oxygen depletion
- Changes in behavior of wild animals attracted to these areas by dispersed food or for reproductive stimuli

3. Ground logistical services

Marine space planning for aquaculture activities is also greatly affected by the distance between the facility and onshore logistics. An area potentially suitable for mariculture may never be used because the distances to a hypothetical onshore area make it not economically viable; therefore, it becomes critical to be able to have an exchange of information between the MPS and local land use planning. Among the main requirements that a site must have to be functional for an offshore facility are:

- Adequate docking areas for vessels servicing the facilities
- Storage space for materials necessary for the proper functionality and maintenance of the facilities
- Suitable space for product processing, packaging and shipping