

TOOLBOX AQUACULTURE

Aquaculture site selection

Site selection

Many of the issues associated with the aquaculture sector are a result of poor spatial planning. The suitability of a location for aquaculture is determined by many factors including biological,

environmental, social and regulatory issues. Furthermore, other activities will be competing for space and resources so not all areas are available for aquaculture.

Site selection is the identification of the most appropriate location to establish an aquaculture system. Once the site has been selected, the aquaculture producer will then perform more detailed assessments as part of the licensing process. Based on the information provided in the application, the relevant decision makers will determine if a license should be granted or not. Therefore, it is important to remember that site selection is the start of the licensing process and does not guarantee that aquaculture will be permitted in that specific area.

Site selection considerations

Many factors should be considered when identifying and selecting a site for aquaculture. Generally, they can be summarised in three broad categories: 1) regulation and policy, 2) availability of an area, and 3) suitability of an area. First and foremost, regulation and policy will play a key role in outlining the type of aquaculture that can take place within a jurisdiction, as this will ultimately define what can take place. Regulations may be set and overseen at a national level, but could also be at a more local level depending on the legal system within the country. Assuming regulation permits a specific type of aquaculture, it is then necessary to assess availability and suitability. Not all available locations are suitable for aquaculture, while the opposite is also true; not all suitable locations are available for aquaculture. Depending on data, availability and suitability of a location may be assessed sequentially or in parallel. However, it is important to note that data collection and analysis may be time consuming and require a considerable amount of resources depending on the level of detail required.

Regulation and policy

There may be restrictions or moratoriums in place that prevent aquaculture from being established, or regulations may prohibit or specify types of aquaculture, which can influence species and technologies that will be used. Consequently, the first step in assessing site suitability and the potential for aquaculture development should be to consult national and regional regulations to ensure such systems can be established. There are different considerations depending on the type of aquaculture.

For multi-user areas or locations where the environment may be particularly sensitive, there may be a need for more co-ordinated planning. The use of designated zones for aquaculture development can be useful. These are usually identified and established by government and regulatory authorities, and then the aquaculture producers will select sites within these areas. Some countries have management areas, where farms will work together on farm strategies and disease control within an area and coordinate activities such as treatment or fallowing.

When selecting a site for aquaculture development, aquaculture producers must consider the regulations and policies of that area and adhere to any conditions that must be met in order to establish a farm. Likewise, for site selection, it is important to be aware of existing management agreements within areas of interest, which may affect the establishment of a

farm, but also the operation of a farm once developed. Discussion with the regulatory authorities, and perhaps even local stakeholders may be useful at this stage.

Availability and suitability of a location

It is important to assess the availability of locations for aquaculture. There may be permanent or temporary restrictions that make an area unavailable for use, and will therefore affect the potential use for aquaculture, regardless of the suitability of that location. Such limitations that prevent aquaculture from being established are often referred to as constraints. For all types of culture, other activities and potential conflict between resource users can affect the availability of a location for aquaculture. If an area is already occupied, then it is unlikely it is available for development. For land-based culture, ownership of the land or water-rights can also restrict potential areas for development.

Furthermore, the physical conditions of the environment may render a location unavailable, for example, a coastal location may be too shallow for a cage system to be established, or there may be an inadequate water supply for a pond system.

A suitable site must meet the biological requirements of the farmed species, provide the economic benefits for the producer and minimise impacts on the environment and other resource users and activities.

Site selection

Following analysis of the regulatory feasibility, availability, and suitability of the area, potential sites can be selected. This may be one site or a number of sites that show potential and should therefore be assessed in more detail. These sites should be the most appropriate location that is available and also suitable for development. To obtain a licence to farm at these sites, more detailed and site-specific analysis will be required as part of the planning and licensing process.

Framework for site selection and regulation

There are many different steps within the site selection process. As discussed previously, it is difficult to establish a detailed common framework as there are specific needs and requirements depending on the species, system, and area that are under assessment. However, there are common elements that each site selection assessment should consider, and we have developed a broad framework, which is outlined in Figure 1. This is relevant for coastal, marine, freshwater, and land-based production, and can be used for fish, shellfish, and seaweed.

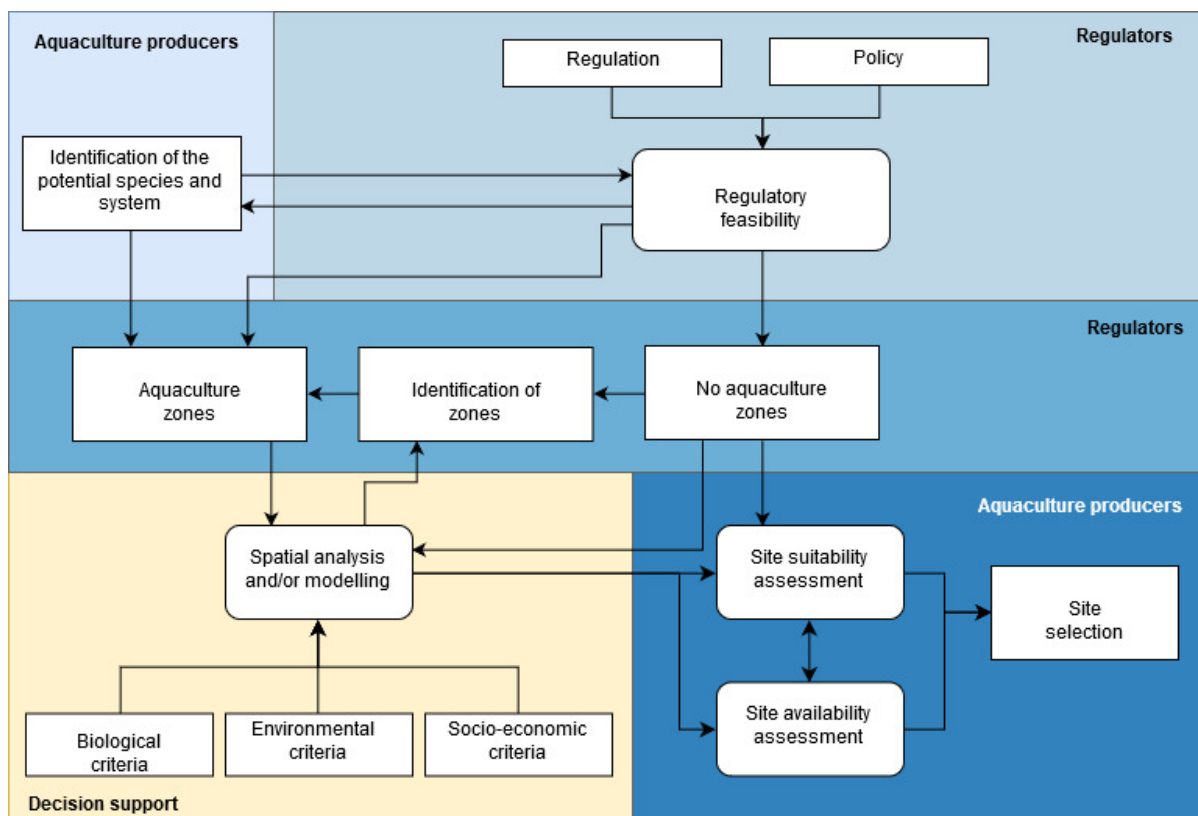


Figure 1: Overview of the broad spatial framework for site selection and regulation .

The first step in the site selection process involves the prospective aquaculture producer deciding which species to farm and the system to use. In many cases, this will be a simple decision based on existing aquaculture practices within the country and experience of the producer. For commonly farmed species within a country there is usually an established planning and regulatory framework. However, for a new species or system, there may be a need for regulatory authorities to evaluate the existing regulatory regime, to ascertain whether a new species or system should be allowed, and, if so, whether the licensing and regulatory approach should be revised and updated. In Norway, research and development licences have been introduced to encourage innovation in the sector and are a good example of how a more flexible approach to licensing can be used to support development as technology improves and more information is available on farming practices, health and welfare, and environmental impacts.

Once the species and system has been established, the producer can then begin the spatial assessment. Zones are established by planning and regulatory authorities, and, if they exist, aquaculture producers should focus their assessment in such areas. However, if there are no zones, the site selection process is less restrictive, but may first require broad-scale analysis to identify an area or region of interest using coarser-scale data with a spatial resolution of several kilometres before identifying a potential area for more detailed site availability and suitability assessment.

Spatial analysis and modelling has a key role in decision support, facilitating the site selection process by providing information that would otherwise be difficult to obtain. Biological,

environmental, and socio-economic data can be evaluated and assessed to identify the locations that are most appropriate for aquaculture development. Trade-offs between different factors can be considered, and a range of different scenarios can be explored. This then allows the identification of areas that are available for aquaculture development and areas that are suitable for aquaculture development. The results should be combined to indicate those areas that are both available and suitable for development, and the most appropriate site can then be selected.

Further reading

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