



# AQUACULTURE



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A work coordinated by **Michèle Mesmain**  
with the **Slow Fish network** in 2016

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# AQUACULTURE BRIEF

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Aquaculture has been around for thousands of years, providing a healthy and sustainable source of protein in numerous contexts and regions, often mimicking nature or with a high integration with other food production.

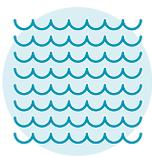
The rapid expansion and corporate consolidation of aquaculture over the past decades has given rise to many important issues and controversy.

This brief tries to examine the issue to provide guidance and lead to understanding, on a case by case basis, what is Good, Clean and Fair farmed seafood within a sustainable food system. Therefore, we have defined a conceptual framework articulated around primary assumptions (general and specific), and we examine the most salient critical elements of aquaculture, which are the core of any aquaculture assessment and understanding.

This brief is a working document, to be used as a backbone for Slow Food members working on the issue, to constitute a collective library of examples of aquaculture that will render these criteria tangible.

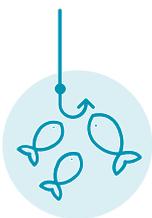
## PRIMARY ASSUMPTIONS

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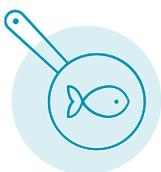
### Healthy oceans

**A healthy and resilient ocean is essential** to provide healthy protein for human consumption, and continue to play an invaluable role in oxygen production, carbon dioxide uptake, regulation of a warming global climate, and probably many other roles we are ignorant about, since we know less today about the oceans than we do about the moon.



### Priority to sustainable wild fishery

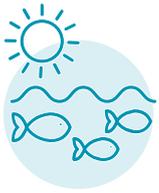
We cannot attempt to feed a rising population of humans sustainably, if we don't safeguard our natural fishery resources. **Wild fisheries need no external input. Within well-- managed fisheries, fish is the "greenest" large food supply of our whole food system, so anything that diminishes it's potential by putting additional pressure on wild stocks or on aquatic environments is counterproductive.**



### Wild fish for human consumption, not animal feed

If we truly want to feed the world, very much in the same way we need to stop feeding grains to herbivores for beef production, we need to **stop wasting our fish, and feed more of it to people and less to animals** – be they fish or other terrestrially farmed animals.





## Integrated sustainable food model

If we truly want to achieve sustainability, we need to acknowledge the many downsides to large scale farming of carnivorous fish, as well as large scale farming of any animal or crop for a global market and find better answers. We must rethink the model to include small--scale sustainable operations **that nurture and enrich our ecosystems and recreate our food systems and food cultures**. We need to create an economically sustainable food system that is based on **quality, respect of the environment and the people**, and not on maximizing profit at all costs.



## Market effect, and a central question about Food Availability and the global market

**Larger effects on the market** must also be considered when evaluating aquaculture. Current unsustainable global markets lead to reducing consumer knowledge and choice, as well as overall food quality. They reinforce the dictatorship of lower prices while the real cost is paid by the resource or the consumer. They reduce consumer desirability to a few varieties and species. Industrial aquaculture plays a big role in this scenario. It can easily feed the belief that we are entitled to fresh fish, of any variety, year round, contributing to the scenario we just described and further disconnecting humans from oceans and waterways. The current omnipresence of farmed salmon, sea bass and sea bream in most restaurants and supermarkets around the Mediterranean and the western world is a perfect example...



## Community empowerment and climate change

Considering the impacts of climate change on all aspects of our lives, particularly on the ocean, and considering the probable high volatility of food and energy and migration patterns that will ensue, **community empowerment is key to any resilient, mitigating and adaptive food system**. Communities that will be the most familiar with local systems will best know how to sustainably navigate them, secure food production with minimum external inputs and less reliance on fuel and petrol related products and packaging.



## Healthy societies

Slow Food promotes food systems that **roots food production in communities and participate to their wellbeing** through access to quality food and local economy resilience, while furthering our **understanding and sustainable use of local ecosystems**. We believe this to be a cornerstone for democratic, sustainable, and stable societies.



## Regionality

Good, Clean and Fair aquaculture, just like any food production, will be regional. What is appropriate in one area with one species, will not be appropriate in another or for another community or species. Participative informed processes centred on regional cultural, social and ecological characteristics can determine the best possible production systems as well as acceptable trade--offs, while fostering shared stewardship dynamics.



## A CASE BY CASE APPROACH

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Any food production generates an impact, on ecosystems, cultures, knowledge, social and political organization, etc. Defining the boundaries of acceptable ecological impact is a difficult task, and moreover, it does not necessarily mean Good Clean and Fair, which includes aspects of societal organization around resources.

**There are so many variables, that defining general rules is counterproductive and tends to miss the core of the issues and omit a multidimensional perspective.**

Any type of seafood, be it carnivorous, omnivorous, and herbivorous or shellfish, benthic or pelagic, or even vegetal organisms such as kelp, will bring specific set of challenges. Whether they are farmed in coastal or inland rural areas, in open ocean pens (and even the specific location in the ocean), in closed pens, warm or cold water, in lagoons, in ponds or lakes connected to waterways, or aquaponics, will mean another set of challenges. Whether aquaculture operations comprise the reproduction of fish or start with wild specimens as ranching does, or collecting eggs in the wild, for example, they create deep differences among otherwise similar productions. Oyster production provides good examples. A small-scale production, requiring no external inputs, can rely on mass produced triploid spats, on local research hatcheries enhancing local stocks, or on natural spat gathered in the wild. Some cases might be far from Good, Clean and Fair, some might be right in a region and not in another.

In any case, the **scale** of the operation (single and aggregated) and its **intensity** are a determinant factor of sustainability. No matter the type of aquaculture, Good, Clean and Fair will be determined by how local and regional aquaculture production participates in the general cycle of life, in a way that breeds increased understanding, ecologically sound practices and resilient cultures, as well as options for sustainable and democratic self-- determination.

## CRITICAL KEY POINTS

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We examine critical points of aquaculture to get a sense of how they relate to the primary assumptions described earlier in the document.

### Feed

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- Does the feed ratio necessitate more wild fish than the resulting farmed fish? Is that detrimental to the wild ocean on a large systemic scale? Does the feed given exceed the weight gain in the animals? Is the feed conversion ratio high?
- Does the feed integrate grain? What is the origin of the grain? Does the feed rely on an overproduction or deviation of grain cultivated on a large scale and at a distance? Are these grain GMO? How far does the feed travel?
- Is the fish being fed outside of its natural diet? Feeding fishmeal pellets to herbivorous fish due to price or fattening efficiency considerations is detrimental to ecosystems and animals, and is as unsustainable than feeding fish or high protein grain to herbivorous animals such as cows.



- When the feed consists of whole fish, where does the fish come from? Bringing fish, even dead fish, from distant ecosystems can also bring new viruses, bacteria or parasites.
- Who controls the feed? Is the feed production a monopoly? What happens if the feed company doubles the prices? What happens if the stock on which the feed company relies on collapses? Are there alternatives?
- What impacts does the fishery for reduction have on stocks and communities where it takes place (the Peruvian anchoveta for example)?

## Hatchery

- Is a hatchery necessary to the production?
- Who controls the hatchery?
- Is the hatchery in a monopolistic position?
- Is the hatchery using indigenous species, and changing reproducers on a regular basis to mitigate reducing the local genetic pool and mimic nature's selectiveness and adaptability?
- How many producers does the hatchery provide for?
- Is the hatchery presenting any threats to local environment? Contamination with non-indigenous species, viruses, etc.? What are the safety procedures?
- Who works in the hatchery? Where do profits go? How much of the profits stay locally?
- How much water does the hatchery use/need?
- Is the hatcher or funds from it supporting endangered or threatened species?

## Escapes

- Are escapes possible, of individual specimens or eggs?
- How high is the risk of genetic contamination of wild species and or propagation of new/invasive species? Can escapes outcompete local species?
- Is there a risk of sterilization of the wild stock? For example if tetraploid oysters are released in the natural environment?

## Contamination

- Are there any pesticides used and how much?
- Are there any chemical products used? (Chlorine in the case of some shrimp farming for example).
- Are these entrants degradable? dispersible? How do they accumulate, in the fish and in the ecosystem?
- Is there need for antibiotics? What is the mitigation/containment plan when they are used in open-ocean systems? Will there be traces in the food product?
- How is the feed leakage controlled?
- How are the animal excrements and fouled water treated?



## Carbon footprint

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- How much fuel and energy is used in the whole chain, including those used by the production of the entrants (feed and pesticides for example) and the postproduction chain (packaging and transportation)? What is the overall carbon footprint?

## Overall carrying capacity

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- Is the planktonic activity sufficient to match the shellfish aquaculture scale?
- Is the area a high primary production area?
- What are the levels of biodiversity in the specific area?
- How do tides and currents patterns contribute to the renewal of the water and dispersion of contaminants?
- If specimens or eggs are removed from the wild to be hatched and raised, how does it affect the natural abundance?

## Disease

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- What risk is there for virus, bacterial or parasitic outbreaks? If yes how are they addressed?
- Has there been parasitic activity, such as lice, in higher numbers than in the wild environment?

## Relationships

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- Who controls and owns the operation (a removed multinational? Is it a family owned company? Is it a case of community or cooperative ownership?)?
- What is the contribution or return, if any, to community development? How many jobs and local investment does the facility create? Which proportion of the profits and salaries “stays within the local community”?
- How is the wealth generated by the production distributed?
- Does the production increase community resilience? Does it feed the understanding of ecosystem and good ecological praxis and culture?
- What need does the aquaculture respond to? How does it increase the community’s well-- being? Is production providing a source of seafood to those who need it? To those who otherwise wouldn’t have access to enough protein? Is it a luxury good?
- Are there social conflicts occurring over this production?

## Quality of the fish

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- What is the fat ratio compared to its wild counterpart?
- What is the nutritional value compared to the wild equivalent?
- Is there presence of antibiotics or other chemical products in the fish?



- How is possible external contamination and toxicity dealt with (coming from agricultural run offs, city waste, mining contamination, etc.)?

## Fish welfare

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- Does the fish show signs of stress and physical wounds?
- What is the spontaneous mortality rate?
- Are they doing what they'd normally do in the wild?

## Multitrophic and integrated

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- Are more than one complementary species being raised? Does this contribute to limiting reliance on feed, water contamination issues, as well as dependency on one single species?
- Does this lead to seasonal products?

## Effects on the larger ecosystem

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- Does the production create economic and ecological stability in the region, helping for example, preservation of forests or providing alternatives to a community, which would otherwise engage in more detrimental activities?
- Is the waste and fertilized water used for other agricultural production?
- Does the building or running of the facility harm the local ecosystem? E.g. did it clear out a mangrove forest?

## Markets

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- Does the production need a global market to be absorbed? Can it be absorbed within the region in which it is produced?
- Is the production contributing to a reduction in the number of species that the public wants to eat? Does it give the impression that we should be entitled to buy any given species at any time of the year?

## Human rights

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- Have local communities been displaced in order to develop the production?
- Have livelihoods of marginal communities been affected?
- Has there been a participative, inclusive process to determine the opportunity and possible consequences of the production.
- Do workers receive a fair, living wage?
- Where do workers live in relation to the operation?



## WHAT SLOW FOOD STRONGLY OPPOSES

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**Large-scale factory farming with high input and output, with increased pressure to local stocks and the carrying capacity** of the environment, whether from one individual farm, or many of them put together (scale effect). We oppose any project which **does not fully involve** the (entire) communities affected by it from the start, and which does not consider at least a partial control over the production by the communities, hence leading to more consolidation of our food system. **We oppose any project that violates human rights.**





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