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Pascal Raux, José Perez Agundez, Jean Emmanuel Rougier, Loeiza Lancelot,
Audrey Barbe

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PRINCIPLES AND TOOLS TO FOSTER SOCIAL ACCEPTABILITY OF AQUACULTURE DEVELOPMENT

AUTHORS:

Pascal Raux (UBO-UMR AMURE),
José A. Pérez Agúndez (Ifremer-UMR AMURE),
Jean-Emmanuel Rougier (Lisode),
Loeiza Lancelot (UBO-UMR AMURE),
Audrey Barbe (Lisode)

*The analysis, views and opinions expressed
are those of the authors and do not necessarily
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EXECUTIVE SUMMARY

Within the Blue Growth Strategy, aquaculture is perceived and quoted as a sector that has a high potential for sustainable jobs and growth and that has to be developed. Despite a strong initial growth at the beginning of the Blue Revolution, European aquaculture, and in particular marine fish farming, began to stall and stagnate. The new drivers initiated by the Blue Growth seem to have great difficulty in reversing that trend and progressing towards the stated objectives in terms of production volumes, in the light of the production statistics over the last decade. Marine socio-ecosystems are complex systems, they demonstrate non-matching scales, surprises (non-linearities), interconnection with other systems, memory effects, choke points and so on. This complexity calls for more integrated assessment through integration of existing knowledge: integration of sciences (among disciplines), integration of sciences and society, integration of sciences and policy and integration of uses. If some integrated assessment framework were developed such as the Ecosystem Approach to Fisheries, and its counterpart for aquaculture the Ecosystem Approach to Aquaculture, in practice they never really reach the required level of integration. In particular, by focusing on the ecological carrying capacity and leaving aside the social and institutional dimensions and especially the governance issues of these socio-ecosystems.

While much effort has been put into technological innovations and the measure of their impact on farms, relatively little has been put into institutional innovations. But beyond of technical and profitability issues, social acceptability is now considered as one of the main bottlenecks to aquaculture development. As already underlined, existing assessment frameworks are not able to catch that key dimension of aquaculture development. There is then a need to propose and develop such an assessment framework of Social Acceptability (SA) of aquaculture development. In addition to the reviewing of existing frameworks and experiences in other industries, taking into account the complexity of marine socio-ecosystems, main drivers and bottlenecks to aquaculture development were identified to better understand the factors contributing to SA. Main bottlenecks are attached to the way aquaculture development was thought and implemented: forgetting the way of production to solely focus on the volume to produce; basing aquaculture development on scientific and technical expertise and imposing top-down projects developed «ex nihilo» without insights on local integration; implementing such projects based on communication approach by solely providing information without participatory processes and stakeholders engagement; misperceiving SA through the solely acceptability of the product and not the acceptability of the activity. All this leads to a series of adverse effects such as markets disconnection, vicious circle of unprofitability, lack of trust and confidence in aquaculture, fuzzy developments, contributing to aggravating factors of social unacceptability.

The MedAID research project (www.medaid-h2020.eu, Mediterranean Integrated Aquaculture Development, financed by the H2020 EU program) worked in an attempt to integrate all these dimensions to support sustainable marine aquaculture development in the Mediterranean. It proposes an integrated framework to rethink the development of marine aquaculture in Europe and beyond, through the SA dimension as an integrating dimension. An assessment framework for SA of aquaculture development was developed and implemented over several case studies in the Mediterranean through the proposal of a 3 steps approach experimentation. Participatory approaches are at the core of the assessment framework and introduction and recommendations to these approaches are produced too, with references to existing tools.

The implementation of the 3 steps approach to assess SA of aquaculture development underlined four main recommendations: 1) Support concertation, 2) Give importance to the adequacy between the territory and the project, 3) Value the benefits of the project and promote transparency and 4) Establish a framework that support aquaculture development and compliance to the development process. These recommendations finally appear as an essential prerequisite for a more peaceful, more virtuous and acceptable development that will drive back marine aquaculture to sustainability. A maybe not sufficient condition to sustainable aquaculture development but, a necessary one.

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INTRODUCTION

Unlocking the potential of aquaculture development is an important challenge for the Blue Growth Strategy and for food security in Europe. However, despite the political emphasis on encouraging the expansion of this sector through financial support and administrative simplification, aquaculture, and in particular marine fish farming, follows stagnation (Guillen et al, 2019). The majority of the plans of aquaculture development built by the EU countries in the framework of the new Common Fisheries Policy are far from the initial objectives programmed. Beyond the inefficiencies in production systems and in the value chain explaining this trend, social acceptability is now considered as one of the main bottlenecks to aquaculture development (see for instance EATIP, 2012; Hishamunda et al; 2014, FAO, 2016a; Ruiz-Chico et al, 2020).

Social acceptability is a key issue included in the political agenda in many areas, including aquaculture development. This social opposition relies on the complexity of social-ecological systems in a context of the intensification of uses in coastal and marine areas with a stronger expectation from stakeholders for a better involvement in decision-making processes. This complexity is characterized by the existence of high stakes at the individual and collective level that lead to conflicts of interest between stakeholders. These systems are subject to rapid change and their governance requires adaptive processes to deal with their multi-level complexity within a framework of uncertainty and adaptation to unforeseen future changes. To cope with this complexity, the construction of a policy decision has often been based on scientific and technical expertise (carrying capacity analysis, GIS, etc.) in order to define and assess scenarios and projections on the basis of which aquaculture development planning will be implemented. The mobilization of this expertise supported by significant financial means has been the modus operandi of aquaculture planning. However, in such a context characterized by high complexity and uncertainty, it is necessary to mobilize processes of adaptive management, collaborative learning networks, and knowledge co-production (Funtowicz, 1991; Ravetz, 2006). The participatory approach is an efficient way of producing collective knowledge in order to facilitate more acceptable decision-making.

This document presents first the issues of aquaculture development to derive the main drivers and bottlenecks that will contribute to the social acceptability or unacceptability of aquaculture development (Chapter 1). Then the basic principles underlying the social acceptability of aquaculture from a conceptual point of view are introduced and analysed and the way it is approached by institutions involved in the development of aquaculture in the Mediterranean is presented (Chapter 2). Chapters 3 and 4 respectively detail the principles of the participatory approach as a key way of addressing social acceptability and how it is implemented in practice. Chapter 5 describes the methodology for assessing the social acceptability of aquaculture developments at local and territorial scale. Chapter 6 compiles a set of recommendations, including lessons learned from the analyses of social acceptability in the MedAID project case studies and other examples from the literature or previous work carried out. Finally, Chapter 7 provides some general recommendations regarding social acceptability and aquaculture developments, as well as lists of tools and good practices rules when implementing participatory processes.

These Guidelines are based on the MedAID project deliverable reports on «Principles and tools to foster social acceptability in Mediterranean Aquaculture» (D7.2) and «Lessons learned from study site implementation and recommendations» (D7.3). These documents are available at the project website: www.medaid-h2020.eu/index.php/deliverables/



1

DRIVERS AND BOTTLENECKS
TO AQUACULTURE DEVELOPMENT

Although marine fish farming developed strongly and rapidly in Europe in the early stages of development (1980's), it has also rapidly stagnated and faced significant difficulties. While overall growth in the European aquaculture industry is positive, it still lags far behind other producing regions in the world. Numerous and successive reasons have been put forward: conflicts of use, environmental impact, misperception of the sector and the product by the general public and consumers, time consuming legislative and regulation constraints limiting development, disconnection from markets, etc. (FAO SOFIA 2018). These constraints or explanations to the difficulties of aquaculture development, many of which were perceived as external to the sector, each called for different policies, strategies, tools or concepts, suggesting that each difficulty or issue had its own response. The management of marine aquaculture and its development in Europe, like that of many other developments based on the exploitation of a shared natural resource, is thus more based on a crisis management than on a holistic and systemic approach that would better meet the challenges of aquaculture development and allow integrating all the dimensions of marine aquaculture development.

To better identify, understand and analyse drivers and bottlenecks to aquaculture development, there's then a need to review the history of aquaculture development, its logic, rationality and development profiles. There is no one aquaculture, but there are "aquacultures". Diversity is one of the characteristics of the sector, even if development policies tend to level out and reduce this diversity by supporting certain productive models on the basis of objectives defined in terms of volume and on spaces free of constraints.

1.1. A DIVERSITY OF PRODUCTION SYSTEMS LEADING TO DIFFERENT PRODUCTIONS AND DEVELOPMENTS

The diversity of aquaculture production systems, both in terms of species and techniques, underlines strategic and commercial choices as well as constraints of access to production factors (capital, knowledge, land, etc.). It highlights constraints and adaptations to the environment (ecological, social and economic) and induces more differentiated productions. Usually production systems are rather read in terms of techniques through intensification levels: extensive systems (estuaries, semi-confined, lagoons, intertidal areas, marshes... in ponds, ropes, baskets...), semi-intensive systems (intensification in structures similar to extensive ones), intensive systems (concrete, liner or earthen ponds, offshore or coastal cages) and super-intensive systems (cages, concrete ponds or liner, recirculation, enjoying the highest carrying capacity). But with no real official standards, this diversity makes comparisons, assessments and regulations difficult. In addition, there is an intensification gap between these systems and moving from a less intensive system to a more intensive one is not a linear process as it induces technical leaps.

But aquaculture development policies do not really pay attention, or insufficiently, to the diversity of production systems. Production systems are also often perceived in terms of stocking density and its relationship to the environment as illustrated by the following figure depicting built-in unsustainability of industrial shrimp farming based on past performance by Kautsky and as reproduced in Quarto (1998).

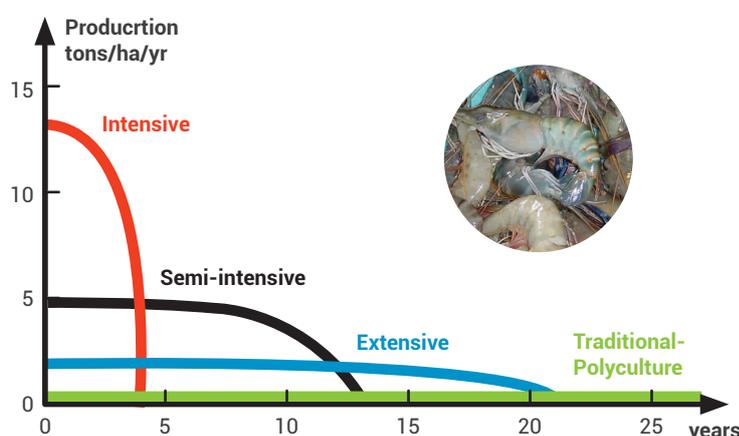


Figure 1 : Graph depicting built-in unsustainability of Industrial Shrimp Farming by Nils Kautsky, as reproduced in Quarto (1998).

The above graph summarizes quite well the issues attached to a development rather oriented to meet the world demand (maximise the profit/ha rather than the way to produce i.e. profit/kg). But it can also appear as too simplistic when the development issues in terms of sustainability are much complex and depend a lot on the local context. If numerous examples can support such a view, others can also disprove it if more attention is paid to development profiles rather than technical systems (Raux, 2006). For instance, whatever the intensification level, the potential for collective action, being private or public, has been proved as key to ensure the sustainability of developments based on the exploitation of a common and shared natural resource (Ostrom, 1990; Raux, 1997).

Each development profile also answers to a specific logic of development regarding constraints and drivers. Production systems are not closed systems, there are interrelated through ecological relationships, but they also interact in different economic and social environments. There are therefore several development logics which, if they are not contextualised and analysed, call for just as many biases in the implementation of policies and development schemes for European and world mariculture.

1.2. DRIVERS TO AQUACULTURE DEVELOPMENT

World fisheries and aquaculture production reached 178.5 million tons in 2018 (excluded aquatic plants and ornamental fish). Of this amount fisheries counted for 96.4 million tons and aquaculture for 82.1 million tons (Figure 2).

	1986-1995	1996-2005	2006-2015	2016	2017	2018
	Average per year					
	<i>(million tonnes, lives weight)</i>					
PRODUCTION						
Capture						
Inland	6.4	8.3	10.6	11.4	11.9	12.0
Marine	80.5	83.0	79.3	78.3	81.2	84.4
Total capture	86.9	91.4	89.8	89.6	93.1	96.4
Aquaculture						
Inland	8.6	19.8	36.8	48.0	49.6	51.3
Marine	6.3	14.4	22.8	28.5	30.0	30.8
Total aquaculture	14.9	34.2	59.7	76.5	79.5	82.1
Total world fisheries and aquaculture	101.8	125.6	149.5	166.1	172.7	178.5

Figure 2 : World fisheries and aquaculture production (million tonnes); extracted from SOFIA 2020.

According to FAO (SOFIA 2020), in 2018, the estimated value of the production for the aquaculture sector was about USD 263.6 billion, including 32.4 million tons of seaweeds and other aquatic plants (USD 13.3 billion), 54.3 million tons of fish (USD 139.7 billion), 17.7 million tons of molluscs (USD 34.6 billion), 9.4 million tons of crustaceans (USD 69.3 billion) and 0.93 million tons of other aquatic animals (USD 6.5 billion). Aquaculture is first and foremost continental aquaculture (62.5% in volume), but marine aquaculture is growing at the same rate as inland aquaculture. Over the last decade the continuous growth of aquaculture is opposed to the decline or stagnation of catches from fisheries. Aquaculture is progressing everywhere, but an increasingly dominant share of Asia and a shrinking Europe. Asia has contributed up to 89% to global aquaculture production over the last 20 years. Europe increased its production by 80% but moved from 12% to 4% of the world production from 1990 to 2012 when at the same time Asia more than quintuples its production.

Over the last three decades (1980-2010), world production of farmed fish for human consumption has increased almost 12-fold, with an average annual growth rate of 8.8%. Aquaculture showed average annual growth rates that were particularly high during the 1980s (10.8%) and 1990s (9.5%) before falling back to 6.3%. Since the mid-1990s, aquaculture has been the engine of growth in total fish production, while world capture fisheries production has stagnated. The contribution of aquaculture to total world fish production has

increased steadily from 20.9% in 1995 to 32.4% in 2005 and 40.3% in 2010. Its share in total world production of fish for human consumption was 47% in 2010 compared to only 9% in 1980. In 2014 and for the first time, the supply of fish for human consumption from aquaculture was higher than that from catches.

World aquaculture production grew rapidly over 1950-2008, but with an initial slowdown (still growing but at a lower rate) from that date. If growth rates are still high they are declining in recent years by continent and by species.

In Europe, the stated aim is to develop aquaculture to reduce imports of fish for human consumption. According to the International Food Policy Research Institute (IFPRI) and the World Bank, the most important increase in fish consumption will take place in developed countries (North) and in China, reinforcing the regional unbalance between supply and demand.

There is an ever-increasing demand for seafood products and an apparent individual consumption that increases from 10 to 20 kg from 1964 to 2014 (Figure 3).

	1986-1995	1996-2005	2006-2015	2016	2017	2018
	Average per year					
	<i>(million tonnes, lives weight)</i>					
PRODUCTION						
Total aquaculture	14.9	34.2	59.7	76.5	79.5	82.1
Total world fisheries and aquaculture	101.8	125.6	149.5	166.1	172.7	178.5
UTILIZATION²						
Human consumption	71.8	98.5	129.2	148.2	152.9	156.4
Non-food uses	29.9	27.1	20.3	17.9	19.7	22.2
Population (<i>billions</i>) ³	5.4	6.2	7.0	7.5	7.5	7.6
Per capita apparent consumption (<i>kg</i>)	13.4	15.9	18.4	19.9	20.3	20.5

² Utilization data for 2014–2018 are provisional estimates. ³ Source of population figures: UN DESA, 2019

Figure 3 : World fisheries and aquaculture production and utilization; extracted from SOFIA 2020 (FAO).

According to the IFPRI's IMPACT Model, in 2030, 2 out of 3 fish will be produced outside of fisheries (World Bank 2013). Aquaculture has grown from 5 to 63 million tons of farmed fish in just three decades, with the tonnage of fish from farms expected to reach 93.6 million in 2030, according to World Bank projections (World Bank 2013).

Aquaculture remains the fastest-growing food production sector (50% of the supply of aquatic products). Seafood accounts for 20% of the world's animal food consumption and since 2010 farmed fish production has exceeded beef production. It is today the highest growth rate of all animal protein foods. The demand for seafood products is still growing due to a combination of factors: population growth, urbanization, rising living standards, international trade offering greater choices...

For the institutions in charge of the development of aquaculture, the main driver to development remains the continuous growth of the per capita apparent consumption of seafood products. Apparent individual consumption increased from 9.9 kg in the 1960s to 14.4 kg in the 1990s, to 19.9 kg in 2016 and 20.5 kg in 2018 (FAO 2018, FAO 2020¹). On the basis of a scenario up to 2022, the FAO has estimated that consumption would increase to 20.7 kg or even 22.4 kg depending on the trend or optimistic scenario (FAO 2014), with, however, significant disparities between developed and developing countries (25 kg per capita in Europe). Facing stagnating fisheries (Figure 2), aquaculture is therefore required to meet these needs by increasing its production by 50% from 2008 to 2022 and doubling it by 2030 (IFPRI's IMPACT model). In view of demographic trends, an additional 40 million tons will be needed to maintain the per capita consumption in 2030 and reach a production of 93.6 million tons devoted to human consumption. Catches are effectively declining or stagnating since the 90s' (around 90 million tons) when aquaculture strongly grows. But marine catches account for 87.3% of total catches, when aquaculture is outermost continental.

Beyond of the growth of the per capita consumption, aquaculture still has advantages over fisheries especially in terms of traceability and price and volume contract compared to the uncertainties of catches. On the other hand, while aquaculture is often presented as an opportunity for job creation on coastal areas, it must

1 - The figures can differ from those in Figure 3 because FAO may update them regularly

nevertheless be acknowledged that aquaculture is far less human capital intensive than fisheries for the same volume of production: 0.44 employment/ton for fisheries vs. 0.24 employment/ton for aquaculture in 2016 (processed from employment and production figures from SOFIA 2018).

However, these promising context and drivers to development need to be put into perspective in Europe specifically and more broadly in the rest of the World. Aquaculture production in Europe has stabilized at around 1.2 million tonnes over the period 1995-2012 (Figure 4), while over the same period world production has risen from around 120 million tonnes to almost 160 million tons (FAO, 2016b).

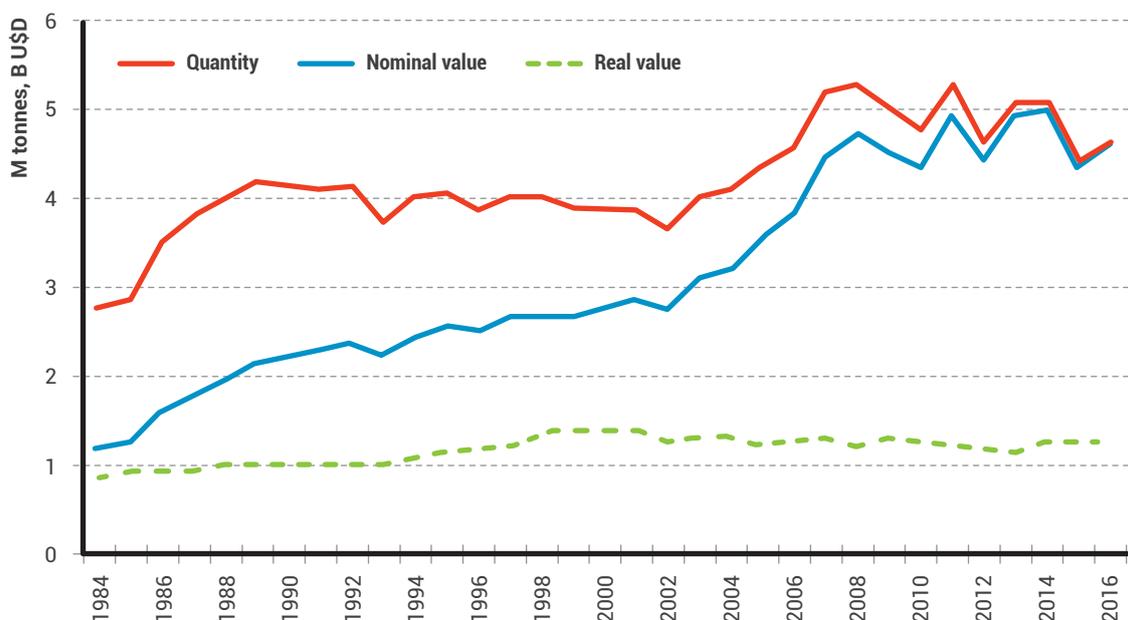


Figure 4 : Evolution of aquaculture production in the EU (Source: Guillen et al. 2019)

Regarding the supply side, fish farming has to face a higher concentration for some species (salmon, seabass / seabream in Europe), has to seek for cost reduction targets and economies of scale and has to deal with market and distribution issues. On the demand side, fish farming is subject to a large concentration of traders leading to weaker bargaining power for fish farmers. But what could be the reasons for this if drivers and incentives to development are so strong? Could this limit or inhibit the development of aquaculture and question the stated objectives of institutions in charge of this development?

There are then strong drivers and incentives to aquaculture development and dynamics to growth. But is that sufficient to ensure the development of marine aquaculture and especially fish farming in Europe? Is that necessary but not sufficient? And how addressing these development issues...? Is the "just produce" approach the simple answer to marine aquaculture development?

1.3. DEVELOPMENT ISSUES AND BOTTLENECKS TO AQUACULTURE DEVELOPMENT

The expected growth of fish supply over the next few decades will rely or is expected to rely heavily on aquaculture. World production of farmed fish for consumption has increased almost 12-fold, with an average annual growth rate of 8.8%. Aquaculture showed average annual growth rates that were particularly high during the 1980s (10.8%) and 1990s (9.5%) before falling back to 6.3%. In Europe the increasing ratio between aquaculture and fisheries is more due to fisheries decline than to aquaculture growth. Aquaculture is the engine of growth in total fish production. Its share in total world production of fish for human consumption has increased from 9% in 1980 to more than half of all fish today. The results of FAO models (fish model in particular) over the period 2016-2025 predict an expansion of world production to 196 million tons (+17%). Most of this growth will come from developing countries through aquaculture, which is expected to reach

102 million tons (+39%), mainly via freshwater species (including pangasius and tilapia) (FAO 2016). Annual growth in aquaculture is expected to decline from 5.4% to 3% over the same period. But to maintain production and continue to grow, aquaculture will have to overcome a number of growing issues and bottlenecks:

- access to water resources and spaces with associated conflicts,
- nutrition and fry supply,
- environmental integrity and diseases,
- development and adoption of new farming practices,
- markets and health security,
- climate change,
- the ability to invest.

Nutrition is perceived as the most limiting factor to growth regarding fish oils and fish meals supply constraints and their dependencies to declining fisheries. In 2016 if almost half of the aquaculture production is carried out without nutrition (mainly algae and shellfish), almost 70% of the farmed fish are artificially fed compared to 45% 15 years ago (FAO 2018). There are concerns about the production of fishmeal and fish oil for the next decade, particularly in view of the growing demand for fish for human consumption. There's an issue of conversion to more herbivorous species and the substitution with herbivorous feeds or use of insects as feed as a way of converting proteins for human consumption.

But beyond of technological issues attached to production factors, there are also a number of bottlenecks and adverse effects that are rooted in development issues and in the history of aquaculture development and its dynamics. Two main key periods or moments in the European aquaculture development can be underlined: the Blue Revolution and the Blue Growth Strategy meeting fisheries stagnation and the increasing demand for seafood products. Each of these periods faces different challenges but also develop their own difficulties in the way aquaculture development was thought, formulated and implemented.

1.3.1. THE BLUE REVOLUTION AND AQUACULTURE DEVELOPMENT: EXPECTATIONS AND LIMITS

The Blue Revolution was the period of rapid expansion of intensive commercial aquaculture. It aims at increasing global food production and reduce world hunger. In the 80s, it is then the development of the so-called «new marine aquaculture» with the production of species like salmon, shrimps (penaeid), seabass and seabream as the main and high value species.

But its implementation has raised many concerns: production becoming energy-intensive, nutrient pollution comparable to that of small cities, vector of invasive species, habitat destruction, ecosystem destructuration through changes in hydrological functionalities, spread of diseases..., and an aquaculture becoming a consumer of resources through fishmeal and fish oil instead of being a net producer of animal proteins (Costa-Pierce, 2002).

The blue revolution is marked by the availability of new technologies that make it possible to develop the new marine aquaculture sector: reproduction, nutrition and, above all, control of larval rearing, for a long time the most important barrier to development. But through this development, aquaculture has developed a technologically centred approach to cope with aquaculture development issues, whatever their origins, which could be summed up in a somewhat caricatured way by: to a problem a technological solution. As a consequence, technical or engineering responses are the DNA of aquaculture (species, genetics, disease, nutrition, Codes of Conduct, Best Management Practices, simplification of administrative procedures...). But there's little or no institutional and organisational innovation when aquaculture faces for some years a number of societal bottlenecks. In addition, the aquaculture development is too often disconnected from the characteristics of demand and preferences, leading to economic bottlenecks too.

In its initial stage of development, marine aquaculture has to cope with strong technological issues. The issue is not whether the production will or will be able to sell, but how to produce it. Thus, high value species such

as salmon, seabream and seabass, are selected in order to target higher price and overpass high production costs that integrate development costs. In Spain and Italy along the Mediterranean coast, in the early stage of development, it was not uncommon to see a farmed sea bream sold for more than a wild sea bream. But the answers rooted in technological behaviours could also lead to adverse effects or social and economic biases. The “just produce” issue from the early development stage has led to a disconnection from markets and a number of farms are trapped in a vicious circle of profitability.

Figure 5 depicts the cycle of products in aquaculture industry. In the introduction phase of marine fish farming development, a few number of farms leads the industry and drives the market. In the growth phase, aquaculture continues to develop like any other industry with an increasing number of farms enjoying quite good level of profitability (Raux, 2010.) and often driven by attractive public subsidies from the EU in Europe. Then the industry entered in a maturity phase where farms use to face profitability issues. The increasing supply on market through the classical market mechanism of price supply elasticity lead to significant price contraction at the farm gate. This is exacerbated by productions arriving on the market at the same time on early autumn to avoid to spend an additional and expensive winter crop. Despite strong growth in demand the industry is struggling. If demand explodes, the industry cannot keep up with the conditions of this demand (lower prices), particularly in terms of profitability for the intermediate segments of the industry that represent the largest number of farms (Raux, 2010). Markets' adaptation leads to a contraction and concentration of the production through a more limited number of medium to large scales farms. The following step is either a consolidation of the industry, i.e. a stabilisation phase (those usually able to balance lower profit margins with higher production volumes), or a decline. This transition between maturity and stabilisation is the key point to be tackled in order to ensure the stability and sustainability of aquaculture development.

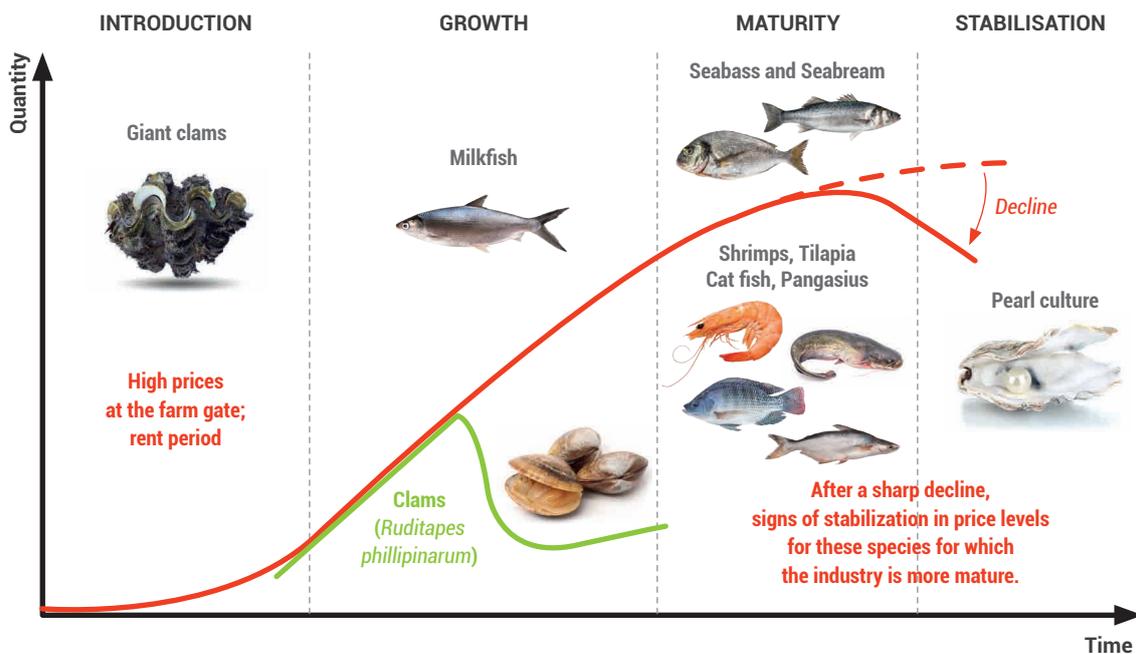


Figure 5 : Product cycle of aquaculture industry. Aquaculture development Adapted from Tisdell (2018)

The disconnection from markets is rooted in the way aquaculture developed: to any issue there is an engineering or technical solution. In the maturity phase of development, many farmers are trapped into profitability issue when prices at the farm gate start to decrease. Under such context of price and profit margins decrease and to maintain the same level of turnover and income, the rational and individual response at farm level is to increase farm's production. This usually done through higher stocking density of fingerlings to avoid additional investments facing increasing difficulties of access to capital. If successful, it often leads to lower economic efficiency in the use of resources, and fewer induced effects (jobs), despite greater technical efficiency to maintain and increase production volumes (Raux, 2010). But it can also induce an adverse effect in terms of difficulties to control higher stocking density in some infrastructures originally not designed to support such intensification level. Finally, the sum of individual and rationale choices at farm level results in an increase of production and supply on markets at the industry or collective level, leading to additional prices decrease. The most vulnerable farms, usually the intermediate ones in terms of intensification, are then trapped into this profitability vicious circle of aquaculture development at farm level. For most of sectors and species farmed,

it results in a higher concentration of production and capital with low profit margins balanced by high level of production. Requests from the industry to the research community are rather then expressed in terms of needs toward technological progress and innovations aiming at reducing production costs through a better technical efficiency through FCR and survival rate. But such kind of response is a non-immediate and medium-term response and ultimately results in increased supply on the markets and again lower prices due to the lower demand growth dynamics. After a rapid initial development, the market disconnection is finally expressed in terms of stagnation for some species despite new technologies and developments (domestication, diversification, new species) and declining growth rate. This came in addition or together with conflicts of use and environmental issues, making difficult the achievement of the initial objective.

The purpose is not to question whether the development that has resulted from the Blue Revolution is good or bad, but to relate it or to read it at the light of the initial objectives. Failures in achieving some of these initial objectives could have given birth to important factors contributing to social unacceptability of aquaculture development. In the 80s and beginning of 90s the objectives of aquaculture development were often set in terms of feeding the world, mitigate potential global food shortage and reduce world hunger (in a world marked by mediated famines at that time). In addition to the "Just produce" approach, it contributed to establish some objectives that have been set in terms of volumes that was supported by a rather engineering approach to aquaculture development (if you don't produce you can't sell). The issue of aquaculture development was then expressed in terms of "Where" to produce (i.e. finding suitable ecological conditions) and "How much" (i.e. according to carrying capacity). But development didn't really pay or didn't pay enough attention to the way to produce and especially "Produce for whom? Produce for what?". Production for production's sake is an approach that rapidly meets its limits. If technology is obviously necessary and the basis to support the development of aquaculture, it is not sufficient to ensure its sustainability. Today, the main bottlenecks to aquaculture development are socio-economic. It questions the different potential development paths between the present situation and the objectives set: path to sustainability, transition shocks (who gains, who loses), vulnerability and adaptation of existing farms to new developments, relevance of the objectives and means of achieving them. If the demand for seafood is there and can meet the objectives in terms of volumes, how is the transition being made to reach these objectives at the level of producers? Are present technology and species suitable to objectives from a market point of view: will producers always be able to sell their production above their cost price under this new development context? Where? But also from which territory and according to which social, cultural and institutional context?

Answering the question of for whom and for what aquaculture is produced makes it possible to question the connection to markets and then the way of producing. Through that formulation, the social dimension of bottlenecks can also be addressed and integrated in the assessment of the social acceptability of aquaculture development, something that the Blue Revolution wasn't able to do. This thus raises the question of the social impact, the link to the territory where the development takes place, the diversity of productions and production systems, etc.

Following the Blue Revolution and the initial steps of aquaculture development, that were first and foremost a technological development, aquaculture met new drivers and dynamics to development through the Blue Growth Strategy.

1.3.2. AQUACULTURE DEVELOPMENT WITHIN THE BLUE GROWTH STRATEGY

The «Blue Growth Strategy» (BG) (2012) was launched by the European Commission to analyse and stimulate the potential for growth and job creation in maritime sectors, in line with EU's 2020 strategy for smart, sustainable and inclusive growth. The sea and oceans are seen as a source of growth in response to the post financial crisis and an economic growth based on different maritime sectors (EC, 2017). BG strategy is supported by the Integrated Maritime Policy (IMP) and the Marine Spatial Planning (MSP) and is broken down into several sea basin strategies.

Aquaculture's objectives attached to BG

Together with coastal tourism, marine biotechnology, ocean energy and seabed mining, aquaculture is quoted as a sector that has a high potential for sustainable jobs and growth and that has to be developed. This statement mainly relies on the fact that supplies from marine and inland fisheries are declining or stagnating and that only aquaculture expansion could meet the shortfall from fisheries and the increasing demand (see

Figure 3 regarding the growth of per capita fish consumption). Today wild-caught products still predominate in the EU fish and seafood market and account for 75% of the total per capita consumption. Aquaculture is effectively one of the world's fastest growing food sectors and already provides the planet with about half of all the fish devoted to human consumption. But highlighting this strong dynamic in the aquaculture sector and the related opportunities in terms of food security, generation of employment and foreign currencies is rather based on past observation of the rapid expansion of aquaculture and strong growth rate from the 80s, without references to the decrease of that growth rate since the last decade.

An additional and complementary objective at the European Union scale to develop aquaculture is also to reduce the dependency to imports. Europe is the world's second largest importer of fish and seafood and is on continuous growth. Imports cover around 60% of the total supply in the EU in 2017 (EUMOFA 2019). Europe imports more fish and seafood than it exports and the EU trade balance deficit is more than €20 billion (EUMOFA 2019).

Finally, in addition to IMP and MSP, strategic guidelines for the sustainable development of aquaculture in the EU (EC COM 2013) as well as National and Regional Strategic Aquaculture Plans had been published to specifically support aquaculture development in the EU.

Strategies of aquaculture development within the BG

In order to achieve the objectives assigned to aquaculture, facilitate its development and alleviate existing barriers, a diversity of new production systems is promoted with a trend to move to offshore in exclusive and dedicated zones. Aquaculture development is constrained by space and environmental factors, the issue is then to break free from environmental constraints and conflicts of use. Less attention is paid to historical semi-extensive and semi-intensive production systems in intertidal and coastal areas. Aside existing cages that are pushed to offshore and expanded, the newly promoted systems often takes the form of Integrated Multi-Trophic Aquaculture (IMTA) in order to meet the higher environmental demands of consumers and Multi-uses Offshore Platforms (MOP) in an exploratory way.

Aquaculture development within the BG strategy is still a rather technical and technological response to aquaculture sustainability, through an approach in terms of environmental sustainability, and to answer to a quantitative objective in terms of production. When looking at the H2020 European Framework Programme, the support to aquaculture development was first expressed through research topics about the Implementation of an Ecosystem-based approach for European aquaculture declined in : i) "Optimizing space availability for European Aquaculture" (2014) addressing the question "where to produce" and ii) "Consolidating the environmental sustainability of European aquaculture" (2015) addressing the issue of the carrying capacity trying to assess how far and how much it is possible to produce. These two issues have led to the question of sites selection and carrying capacity with the definition for instance of Allocated Zones to Aquaculture (AZA) in the Mediterranean and regional development schemes for aquaculture with the support of the MSP in order to avoid conflicts of use.

The research topic that followed (2016-2017) was about "Promoting and supporting innovation in aquaculture production systems: eco-intensification inland (including fresh water), coastal zone and offshore". That is to say that once site selection and carrying capacity are addressed, how far is it possible to overpass or push environmental limits to get an additional production surplus.

Such strategies of "eco-intensification" were already implemented in the early stage of modern aquaculture development, through a different name but the same meaning. It was for instance the case of shrimp culture in Asia in the 90s where international institutions and agencies promoting the development of aquaculture advised to intensify small scale traditional farms to semi-intensive systems by increasing the stocking density in the same farming infrastructures. Objective was both to combine the advantage of a more important production at local and national scale and to avoid the environmental pressure of intensive systems. If it had any initial and punctual success following the first crops, it rapidly led such production systems to important difficulties regarding the lack of knowledge and infrastructures to manage the intensification leading to lower technical efficiency and a number of bankruptcies while exacerbating the environmental impacts (Raux, 1997, 2010), at the exact opposite of the initial objective.

It's again a technical and engineering approach for a mass production of proteins and decrease dependencies from imports need. It is quite well illustrated by the Food from the Oceans question formulated to the EC's Scientific Advice Mechanism (SAM) by the EC commissioner Karmenu Vella: "how can more food and biomass be obtained from the oceans in a way that does not deprive future generations of their benefits?" (2016). But

previous issues from the Blue Revolution are still not yet addressed, and the same causes leading to the same consequences question again the sustainability of such development.

Limits of aquaculture development within the BG strategy

While there are new drivers to aquaculture development, the main bottlenecks remain unchanged. However, these appear to be less technological or environmental (or not only), but rather social and economic.

Aquaculture development in support to or through Blue Growth remains sold on the same basis, although knowledge about its development dynamics has progressed a lot. It is still disconnected (or insufficiently connected) from the demand and its characteristics, from the evolution of demand, from the development of territories... Aquaculture development is thus rather thought through available technologies and high value of species related to initial prices of the introduction period.

Once again, before asking the question where and how much aquaculture has to produce, we should first ask the question of aquaculture for whom and why, that would then allow answering to where and how much. For instance, if the objective of aquaculture development is to ensure a mass protein production to feed the world, there may thus be better candidates in terms of species than those introduced early in development and characterised by their initial high value. This approach could help avoiding depreciating or degrading such noble species in terms of economic value.

All this questions the soundness of such a development. For instance, there's no new aquaculture development for marine fish farming in France since 1996. Despite the stated objective of tripling marine aquaculture production (fish farming) to 20,000 t (multiannual plan 2014-2020), the national production decreased from 4,400 t in 2012 to 4,000 t in 2017... Objectives are set in volumes through multiannual plans without addressing the issue of the better reconciliation of uses over a shared area. Such issues, perceived as difficult to achieve by public authorities are often pushed in later planning phases where they are again more difficult to address and act as bottlenecks.

The pressure on aquaculture to make up for the shortfall in catches, or even its partial substitution for the fishing industry, seems disconnected from the bottlenecks and obstacles to aquaculture development, which cannot be solely reduced to problems of carrying capacity, technological control and conflicts of use. The Blue Growth context that produced new drivers to aquaculture development also generated its own bottlenecks to development. Step by step, Blue Growth has shifted from a perception of opportunities to one of increasing perception of an industrialization of the sea and raises the question of its social acceptability.

Aquaculture development and Marine Spatial Planning (MSP)

European Commission's top scientific advisers published an opinion on Food from the Oceans (SAM 2017) and one of the advices was to "Enabling the full potential of mariculture, including through greater attention in policies such as the implementation of the 2014 EU Directive on Marine Spatial Planning and including southern partner countries". MSP makes it also preferable than the Marine Strategy Framework Directive (MSFD) which is more focused on conservation (SAM 2017).

Within the framework of the MSP (which is intended to be an ecosystem and integrated approach), spatial planning for aquaculture purposes must make it possible: better prevention and management of disease risks; working at the carrying capacity level; reduction of conflicts; improvement of the image of aquaculture; facilitation of certification; access to financing; better management practices; better links with markets (proximity).

But Maritime Spatial Planning, which is intended to be an Integrated Management Tool (ICZM), is maybe closer to the former zoning from the 80s, supported with new numerical tools and devoted to the allocation of rights to produce, rather than a real strategy for an integrated and holistic approach to the sustainable development of maritime areas. The initial draft of the MSP Directive was about Marine Spatial Planning and Integrated Coastal Zone Management (ICZM). Finally, ICZM was excluded from the Directive on the argument that it was already integrated into the MSP..

After several years of implementation, the rhetoric about MSP is becoming increasingly critical, while others argue that there are few operational alternatives. Not enough attention is paid to who gains and who loses and consequences of exclusion that can lead to bottlenecks and unacceptability of aquaculture development. According to Flannery and Clarke (2018, 2019, 2020), MSP has been critiqued for: "maintaining the agendas

of dominant actors through the use of empty participatory rhetoric", "the development of weak objectives that fail to address critical marine problems", "the deployment of technocratic-managerial forms of governance that favour elites" and finally "nothing different than before, same winners and losers".

There's then a lack of real integrated and holistic approach to aquaculture development. In addition, although stakeholder participation is transversal to the MSP process, there's also a lack of evaluation of this participation (Quesada-Silva, 2019). Participation is key to integrated and holistic approach to aquaculture development and there's then a need of an assessment framework such as the Stakeholder Participation Assessment Framework proposed by Quesada-Silva et al. (2019).

1.4. LESSONS TO FURTHER AQUACULTURE DEVELOPMENT IN EUROPE SPECIFICALLY AND ELSEWHERE MORE GLOBALLY

There are new drivers to aquaculture development, but issues and bottlenecks remain unchanged. Aquaculture development remains mainly thought and expressed in terms of volume or export value based on the observation of declining catches and fish stocks. But it is still too often disconnected, and not sufficiently integrated with other development issues (markets and demand characteristics, territories where it takes place...). Antagonisms can thus arise among different options and choices: developing employment and maximizing sources of foreign exchange, poverty alleviation and environmental conservation... Most of these objectives are grouped altogether amongst the benefits from aquaculture, without assessing potential antagonisms between them according to different economic, cultural, social or environmental contexts. These antagonisms are often not sufficiently acknowledged or identified in development projects and act as major bottlenecks in the implementation of projects, often resulting in social unacceptability.

To cope with development issues, aquaculture has evolved. But it was more an evolution in terms of species rather than in production systems. Products differentiation through niche markets and labels cannot offer a long-term and global alternative at the scale of the industry. Integrated production systems partially address many of the criticisms (internalization and multi-activity), but under cost constraints and question the transition path to new developments.

If integration is declared and stated (Marine Spatial Planning), it is rather missing in practice (segmentation, exclusion rather than integration). Faced with the difficulty of implementing integration, the tools come before the questions and the concepts succeed the concepts. This integration argues rather for a systemic approach to aquaculture development.

This questions the validity and viability of an initial development often supported and driven by subsidies but poorly positioned in the long term. In Europe, when subsidies were granted to develop aquaculture, insufficient account was taken of the long-term viability of farms and the consequences of development. Only the development of the sector was important, supported politically by a context of increasing scarcity of fish resources, which legitimized action. The «just produce» of the initial development is no longer sufficient to ensure the development and its sustainability.

The nature and the evolution of aquaculture development can also be a matter of social acceptability. For instance, in its initial stage of development, farmed shrimp was the competitor to salmon on international seafood markets. Today shrimp is the competitor of pork and poultry on international food markets. What was the interest to use shrimp to that purpose? Weren't there better candidates in terms of species or production systems better able to suit with this objective of a mass production of proteins. The question of economically "degrading" an initially high value species (shrimps, seabass, seabreams, pearls...) is also part of the Social Acceptability of aquaculture development.

However, this does not mean that there are no development paths for aquaculture. The majority of farmers have confidence in the future of aquaculture, but doubt that they will be able to take part in it in a form that they necessarily know is different (species, production methods, markets, etc.).

To cope with development issues there is then a need to rethink aquaculture development and its legitimacy. Asking the question of the type of development is also asking the question of which aquaculture and for whom? In what context and what territorial context or socio-ecosystem before asking the question Where? How much? How far? Is it the role of aquaculture to feed the world? Is it the role of aquaculture to substitute to fisheries? If yes,

what does that mean in terms of demand and consumption, markets and then in terms of species and production systems to be developed over different socio-ecosystems and territories, having each of them their own cultural and social identity. Under such context and objectives does part of marine aquaculture has still to be considered at sea? There's then a wide range of issues and objectives to be addressed and correctly formulated instead of being implicitly pushed back at the end of the development stage where they cannot be properly addressed.

Rethinking aquaculture means also to escape from the dichotomous approach of pro vs. anti-aquaculture development, of intensive vs. extensive aquaculture, to move to clever, smart and appeased development avoiding to waste million into projects that are not socially accepted with no turning back possible once rejected, whatever the improvements brought to the project.

Aquaculture is a complex sub-system interacting with other complex subsystems and part of a wider system (Figure 6). The analysis of aquaculture cannot be limited to its sub-system and there's again needs for more integrated, holistic and systemic approaches to assess and support aquaculture development.

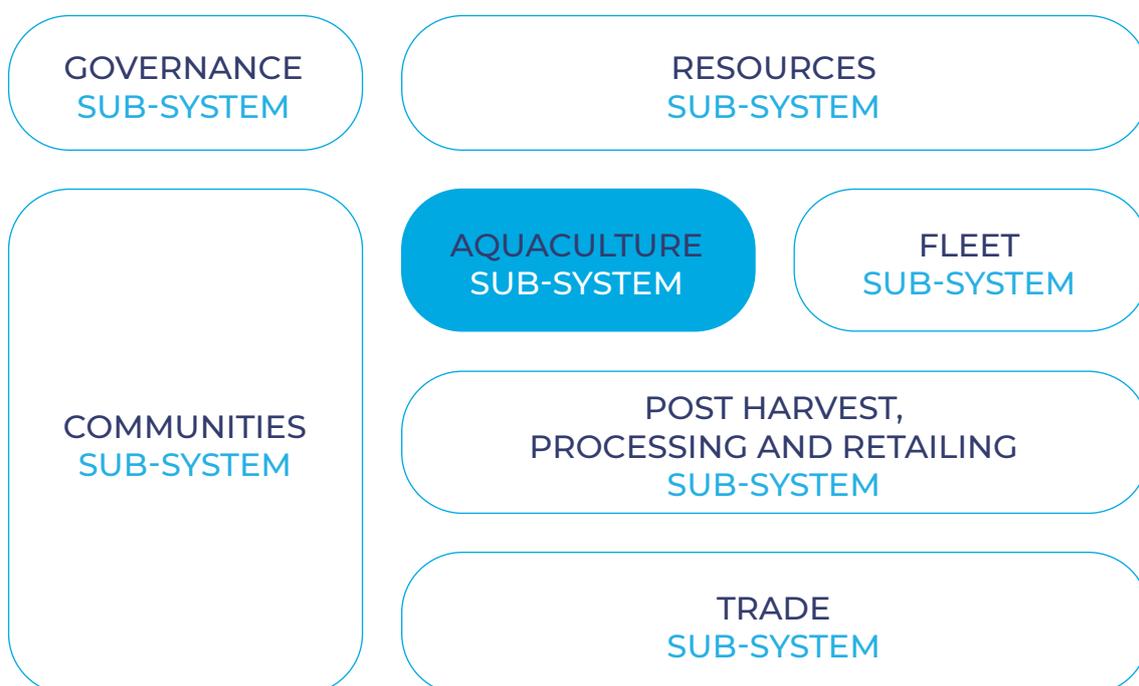


Figure 6 : The fisheries and aquaculture system

Based on the lessons from the history of aquaculture development and the identification of bottlenecks, these integrated approaches have to be problem-based or problem oriented, issue-driven, context specific and based on case study. Few area is let to social and economic dimensions as well as institutional innovation when addressing aquaculture development issues. To be effective and socially accepted, aquaculture development has to be co-constructed with stakeholders, a condition which, while perhaps not sufficient, is at the very least necessary to adequately identify and formulate the issues. It's a time-consuming process that's hard to compress. The present strategy to develop aquaculture in the EU is rather to accelerate the process of development especially by speeding up the issuing of operating permits. But speed is a requirement of capital not good governance (Flannery et al. 2019). Poor governance is an additional bottleneck to development that could dramatically increase the long-term costs and a factor to social unacceptability that will ultimately result in an again longer process.

Finally, that's nothing else than the Social Acceptability (SA) of aquaculture development that arises through integration. SA of aquaculture development may propose a suitable integrated approach and framework to cope with development issues. Its assessment, as proposed in the present guidelines, relies on a holistic approach to address complex societal problems. It also relies on collaborative process based on stakeholders engagement in order to consider multiple actors and "knowledge holders", co-identify problems, co-design solutions, co-produce knowledge as advised by Chuenpagdee et al. (2013, 2019).







2

COMPLEXITY OF SOCIAL ECOLOGICAL
SYSTEMS GOVERNANCE AND SOCIAL
ACCEPTABILITY.
PRINCIPLES AND MAIN ISSUES.

Getting whatever it takes to get a project implemented can be questionable and could raise issues such as: corruption, manipulation, forced and coerced implementation... As a consequence, it is no more considered as an effective and operational way of implementing projects in the EU. For instance, the Aarhus convention, the Plan and Programme Directive (2001/42/CE), the recent (2016) modification of the French environmental law that extends the referral scope of the Public Debate National Commission (CNDP), the Water Framework Directive (2006/118/EC) are just a few of the growing number of examples that require the integration of public consultation in the development of projects involving public areas and resources. Citizens have higher and higher demands about projects that are implemented around them (relevancy, public cost, environmental impact, etc.), but also about the way they are involved in the decision making process leading to the implementation of these projects (transparency, trust, participation, etc.). It goes far beyond of the "Not In My Backyard (NIMBY)"² that is too easily and too often used to deny and hide the roots of the opposition movement to such projects, while not providing solutions or alternatives. The Social Acceptability approach is a way of addressing this issue by questioning and assessing the acceptability by the society of projects involving public issues. As an integrated and holistic approach it has to deal with the complexity of social ecological systems and their governance and goes beyond of the solely social dimension or impact of a project.

2.1. THE SOCIAL ACCEPTABILITY CONCEPT

Social acceptability is a complex, unclear and conflicting notion (Fournis and Fortin, 2015), often used as a «catch-all» in the form of different synonyms that have distinct legal and conceptual bases such as social acceptance, social license, free consent, among others (Batellier, 2015). Its use is sometimes abusive and with shortcuts, in a large number of research fields and themes, in the social sciences but also in the natural sciences. The literature addresses social acceptability issues from different perspectives. A large number of works have focused on analyses of public opinion to identify the main factors of social acceptability (Campos et al., 2010). This work analyses social acceptability from the perspective of the institutional dimensions of governance and the dynamics associated with social interaction processes (Shindler et al., 2004). These interactions may take the form of social negotiations that lead to social acceptance or rejection in private or public decision-making spheres (Fortin and Fournis, 2011).

The growing success of the concept of social acceptability is linked to its apparent simplicity due to the dichotomous nature of the term «acceptability», which translates into acceptance or rejection, yes or no. The response to problems of social acceptability often focuses on understanding the factors underlying social opposition in order to find mechanisms to reduce this social constraint. On the other hand, the term «social» is highly plastic and encompasses many components that are more difficult to deal with, particularly in the context of governance.

Social acceptability is also a subject of growing importance in the context of marine resource management. For aquaculture, an example mobilized in this work to address this issue, the main question is how to regulate complex social relations in the case of the use of common resources and spaces. From the governance point of view, this relies on the co-construction of collective choices to support the sustainable development of coastal and marine social-ecological systems. The complexity of dealing with this issue is further reinforced by the intensification of uses and the existence of many stakes and issues within these spaces. This leads to social conflicts that can range from disputes between users to contestation of political decisions of different intensity. The importance of taking social considerations into account and integrating stakeholders into governance is not new. It is reinforced with the emergence of the sustainability concept (Brundtland, 1987). Afterwards, Integrated Coastal Zone Management (ICZM) (Cicin-Sain and Knecht, 1998) and the Ecosystem Approach (Soto et al, 2008) deepen the way of dealing with sustainability issues by integrating environmental, economic and social dimensions in decision making.

However, the concepts of integrated management and ecosystem-based management are often too abstract and complex and therefore not operational (Young, 2010; Arkema, 2006; Yaffee, 1996). In this context of intellectual vagueness between concepts and methods, Marine Spatial Planning (MSP) has emerged as a practical and tangible tool to achieve effective implementation of ecosystem-based management in the

2 - « Not In My BackYard", an acronym to describe situation where locals oppose their own interest to a public good they can support ("it's a good project, but I don't want it in my backyard")

marine environment (Douve, 2008). However, despite the expectations that MSP has generated, recent works question its effectiveness and capacity to sufficiently integrate stakeholders into decision-making processes and contrary to what should be done, MSP favors «top-down» processes (e.g. Flannery et al., 2012; Kyriazi et al., 2013; Jones et al., 2016). Moreover, within this management framework, geopolitical objectives related to the Blue Growth strategy (EC, 2014) often dominate, in which social dimensions are either secondary or neglected. Finally, MSP is also questioned as to its capacity to deal with issues relying on increasingly complex social-ecological systems (Brugère et al, 2018). Finally, spatial planning in the case of aquaculture, often based on the production of spatialized information for decision-making, is insufficient and cannot replace the implementation of holistic integrated management processes (Yucel et al, 2010).

Despite the important contributions provided by these various recent governance frameworks, the consideration of social dimensions and the integration of stakeholders in decision-making processes remains a key issue that has not yet been solved. Today, social acceptability is emerging as a framework, approach or tool that can help to address these social dimensions in public policies, particularly in cases where decision-making is contested by groups of social actors or simply by citizens. Intuitively, the objective is mobilizing means to foster the acceptance of policy decisions by the stakeholders concerned. Social acceptability becomes a «new grail» for promoters of private or public projects. Avoiding social rejection is a mean of ensuring that the implementation of the decision is initiated.

This work is based on the case of aquaculture development in the European context analyzed in the framework of the European research project H2020-MedAID which deals with the integrated development of Mediterranean aquaculture. Considering that the identification of social acceptability as a key issue for unlocking aquaculture development, this work highlights the gaps between policy-making at the supranational level and their implementation at the territorial scale. These gaps are illustrated on the one hand by the large focus on economic and environmental issues of regulatory and financial tools in support of the implementation of the European Commission's «Blue Growth Strategy», which includes aquaculture development. On the other hand, the social dimensions of this policies remain insufficiently addressed in their implementation at the territorial level (Krause et al, 2015). To analyze this issue, this work focuses on the example of aquaculture development in the region of Andalusia in Spain, which is subject to processes of social stress similar to other European territories. The global context relies on aquaculture pro-development policies built through supranational frameworks, at EU or Mediterranean level, which aims at coping with the stagnation or insufficient development of aquaculture development.



2.2. SOCIAL ACCEPTABILITY UNDER THE INSTITUTIONAL POINT OF VIEW

Aquaculture development is a relatively recent phenomenon. It was made possible in the second half of the last century thanks in particular to the technical progress of production systems. This growth is now being compared with the decline in production in the fisheries sector. Aquaculture is often seen as a response to food security. Moreover, aquaculture contributes to the economic development of coastal territories, particularly in developing countries, and hence to reduce poverty in the world (FAO, 2016b). This global dynamic contrasts the European situation. After a strong expansion of the sector during the last quarter of the past century, aquaculture faces stagnation despite the support from public institutions (Figure 4). This general lack of growth of aquaculture in the EU can be explained by various economic, regulatory and bureaucratic constraints

(Guillen et al. 2019). Social acceptability is also a key bottleneck in the context of increasing anthropogenic uses in coastal areas leading to conflicts of use (EATIP, 2012).

Despite the growing awareness of the importance of the social dimensions of aquaculture, the concept of social acceptability is often mobilized as a technical issue that must be taken into account in a project (or a decision), but while the project is one aspect, its acceptance is another one. Quite often, social acceptability is considered as a mechanism for informing citizens about what aquaculture is and what positive effects it has on society to foster its acceptance. According to the scientific literature, information and communication are factors that may positively influence the public's response to a project (Batellier, 2015; Gendron, 2014; Fortin and Fournis, 2013). However, these tools do not allow for the resolution of all claims, such as those related to conflicts of use (Hoagland et al., 2003). Some studies highlight the importance of governance mechanisms to support project implementation (Rey Valette, 2017). According to the principles of participatory engineering, the procedure implemented to develop a project is a subject of acceptance or rejection. The frequent disconnection between the objectives of a development project constructed by high-level institutions (national, supranational) with the reality and needs of the territory at local scale are often at the root of emergences of social contestation. The inadequacy of institutional frameworks to manage the social complexity that derives from the gaps between these two local and supra-local rationalities is reflected in the existence of social bottlenecks and inefficiency of policy action.

2.2.1. EUROPEAN FRAMEWORK

To cope with the stagnation of the aquaculture development in Europe, the EU launched a strategy for the development of this sector in 2002 (COM(2002)0511). The objectives were mainly economic and food safety basis, while trying to minimize the environmental impact of this development. However, the strategy has not achieved its objectives, particularly as regards increasing production and employment. For this reason, seven years later, the EU updated this strategy. All the measures taken were based on technical and economic considerations. The social dimensions focused mainly on improving the image of the sector. This general strategy was completed by guides which put forward concrete actions to accompany the development of the sector. From a governance point of view, two main pillars supported this policy: the construction by each Member State of a multi-annual national strategic plan for the promotion of sustainable aquaculture (Article 34 of the Common Fisheries Policy), which also serves as a basis for the mobilization of European Funds (FEAMP), and the implementation of these plans within the MSP framework Directive.

With regard to the aquaculture development plans, all the objectives that have been set have proved to be too optimistic. As an example, the global objective at the UE aggregated level was an increase in European marine fish farming production close to 500,000 tons (EC, 2016), which represented a growth of around 60% between 2014 and 2020 (target of +25% for shellfish farming). The specific plan for France expected an increase in total aquaculture production of around 20% and a multiplication between 2 and 4 of marine fish production. Despite this voluntarism, no new marine fish farming licenses has been granted in this country since 1996.

The European Court of Auditors (ECA, 2014) concluded that this failure of policy action is the result of poor design and implementation of measures to support the sustainable development of aquaculture by Member States (Guillen et al, 2019). In response to these difficulties, The Aquaculture Advisory Council published in January 2020 a set of recommendations to build a new strategy for aquaculture development in Europe (AAC, 2020). Among all these recommendations based on economic and administrative measures, improving the social acceptability of aquaculture and its products appears as a key issue that needs to be addressed. However, a very restrictive vision of the concept of social acceptability is reflected in a proposal for actions to be taken at State level which is reduced to (1) promoting public awareness of European aquaculture, (2) using public procurement of seafood products to improve the welfare and sustainability of fish, and (3) promoting gender equality in aquaculture. Today, raising public awareness appears to be the lever for action to better explain to citizens the benefits of aquaculture, to correct the misperceptions often associated with a lack of knowledge of the improvement of production systems and the positive economic and social effects that the sector can have at local and regional level.

2.2.2. MEDITERRANEAN FRAMEWORK

The General Fisheries Commission for the Mediterranean (GFCM) also promotes and provides institutional support for the development of aquaculture in the international framework of the Mediterranean and the Black Sea. This institution has the competence to adopt binding recommendations for the conservation and management of fisheries and for the development of aquaculture. In this context, a work program has been built for many years to build a strategy in support to the sustainable development of aquaculture in this ecoregion. A particular consideration is being given to social acceptability as a key issue for unlocking aquaculture development.

However, the term social acceptability in this policy framework only appears explicitly in a more recent period in which this notion takes force following the different diagnoses developed in different frameworks and contexts. Initially, the aquaculture development strategy addressed the social dimensions through three main objectives.

The first objective concerns the construction of a regulatory and administrative management framework to facilitate and accelerate the allocation of licenses. The stagnation of aquaculture is often attributed to administrative and regulatory complexity that discourage potential investors. The administrative simplifications are being carried out by the institutions in charge of aquaculture to facilitate the establishment of new companies. This approach is also being carried out by the European Commission in its geographical area of competence.

The second objective concerns the improvement of governance through the implementation of participatory approaches which foster the integration of stakeholders in decision-making processes, with in particular (1) the promotion of the ecosystem approach (Soto et al, 2007) as «a strategy for the integration of aquaculture into the wider ecosystem in a way that promotes sustainable development, equity and resilience of interconnected social and ecological systems» and (2) the mobilization of site selection approaches for aquaculture development through Allocated Zones for Aquaculture (AZA) processes. The participatory approach is an important part of this selection process. Implementation guides have been developed to accompany such approaches as principles of good governance essential for social acceptability (Macias et al, 2019).

The third objective refers to the construction of proactive approaches to promote the development of aquaculture by improving the image of the sector and its products among the general public. This pillar of GFCM policy action also aims to change a vision of aquaculture that has traditionally focused on production strategies according to its productive capacity, taking into account existing technology and controlled species. Though this new perspective, it is important to adapt production systems to the needs of the markets («market-oriented aquaculture») to improve consumer acceptance of the product. This proactive vision for improving the sector's image is initially set out in the Conduct for Responsible Fisheries in the Mediterranean Region, and was discussed in greater detail in a consultation session on the application of Article 9 of the Conduct for Responsible Fisheries in the Mediterranean Region to aquaculture development. The improvement of the image of aquaculture and the promotion of the sector are put forward as a key point to accompany the development of the sector. Consequently, producer organizations play a key role in coordinating and applying this code of responsibility.

The refocusing of political action on improving the sector image through «public awareness» will then be used and extrapolated to other dimensions of public policy on aquaculture development. Thus, in the framework of the social dimensions, the increase in social rejection of the sector is associated with the misperception that the general public may have of the sector and its products. In this way, the perception of a poor quality from aquaculture products, the lack of information on the positive effects of aquaculture in terms of supplying healthy products, in terms of providing employment opportunities and income for coastal territories, etc., are issues that must be highlighted in the public debate in order to better consider the place of the sector in its social-ecological systems (Bacher et al, 2015, FAO 2016).

2.3. STAKEHOLDERS, CITIZENS, AND SOCIAL ACCEPTABILITY

The key to improving social acceptability lies in the integration of stakeholders in decision-making processes. But first, it is necessary to clarify the concept of stakeholders and their roles within the territories where they have particular influence. Understanding how social networks operate in the realm is a crucial information to better address social acceptability in a practical way.

2.3.1 CLARIFICATION OF THE CONCEPT OF STAKEHOLDERS

The stakeholder concept has been historically (Mercier, 2010) mobilized in opposition to the concept of “shareholder” in a private company (Freeman, 1984), to stress out that the management of the externalities of a firm could be done not only with shareholders (the owners of the firm) but also with other agents (NGO, consumer associations, etc.). The stakeholder concept mainly questions how to address stakeholders inclusive management rather than their merely identification. Consequently, people arguing specific stakes associated to a project or a political decision can be “managed” accordingly to this project and this stake. As a result, stakeholders management is mainly related to dialogic arenas accordingly to a stake rather than understanding what are the stakes in question.

In the case of aquaculture development, everyone can be a consumer, a citizen concerned by environmental or health issues, member of an association, etc. Stakeholder management would be also about inviting people, not as interested people, but as people connected to a specific stake. Upstream this concept, the notion of stakeholding is, very often, connected to membership of an organisation holding this stake (NGO, consumer association, professional organisation, etc.). Therefore, there is a common misconception of the concept of stakeholder management which consist in dealing a project management with stakeholder organisations only, which put aside all stakeholders which are not represented by these organisations (for instance, small scale fishermen who are not represented by Cofradias in southern Spain). But the main criticism which can be mentioned to stakeholder management is the fact that having a recognised stake is the condition to be part of the project. One can participate if, and only if, he is a fisherman, a consumer, a member of an environmental NGO. And even worse, he will be restricted to this identity. This excludes, ipso facto, people to participate just because they are interested, and legitimate to do so, as living in a democracy.

Finally, whereas stakeholders management is widely spread at least in Europe, (as illustrated by the Water Framework Directive, see below), it would be adventurous to argue that public participation (of citizens) is so common. At least, there is still a rich debate between experts about how to strengthen and enforce public participation in decision making process.

2.3.2. SOCIAL ACCEPTATION AND BLOCKING STAKEHOLDERS

Another concept that should be clarified is to which stakeholders the social acceptance is aimed at. It is necessary to distinguish a situation of conflict with a specific group of actors from a situation of lack of social acceptance. «Social acceptance» refers to society as a whole, not suggesting that it is conditional on everyone's approval, but insisting that something is wrong with the usual approval process by society. This clarification makes it possible to distinguish the causes and consequences of social acceptability: opposition to a project by certain actors is not necessarily translated into a lack of social acceptability. Even if a project is supported by «usual» stakeholders, the project does not necessarily benefit from social acceptability, which means that stakeholder management is not sufficient to ensure social acceptability (Figure 7).

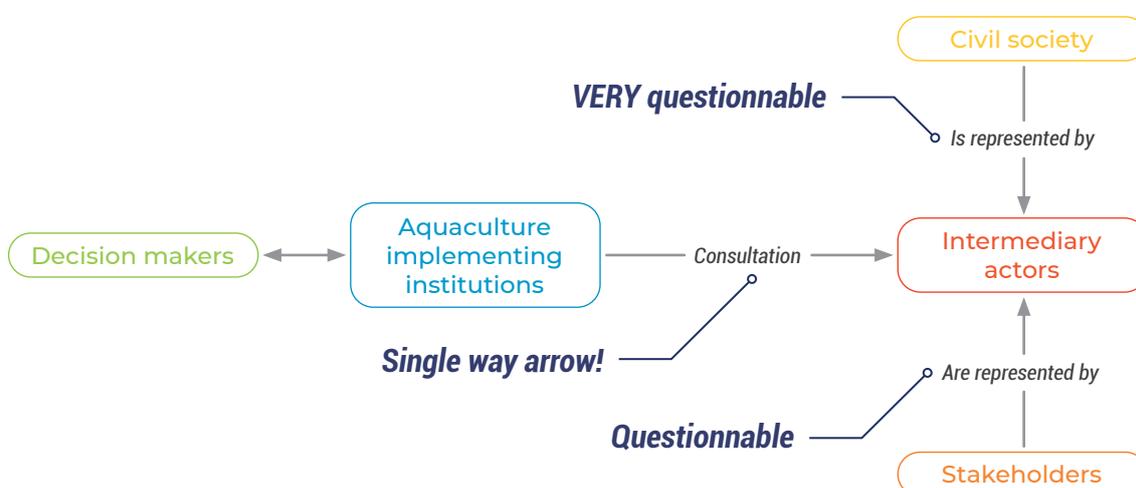


Figure 7 : The “business as usual” process of projects' implementation in aquaculture

Figure 7 illustrates the questionable schematic of the business as usual process of implementing aquaculture projects. Issues relies in single way arrow between implementing institutions and intermediary actors, unicity of representativeness despite specificity of the territory and project dimensions. Some of these issues can be rooted in the territory where the development takes place, and even to the lack of consideration of the territorial dimension attached to aquaculture.

2.3.3. THE SEA AS A TERRITORY

It would be trivial mistake to consider the sea as a non-territory, meaning, as an empty space, weakly populated or characterised by low issues. The following table (Figure 8) summarizes the quantity and diversity of the issues associated with the use of coastal spaces and resources by a multitude of stakeholders in the Territory.

This overview of issues highlights that, excepting for public institutions with high and specific issues (defence, shipping roads, harbour infrastructures, etc.), all issues are overlapping, with, for some of them, lack of representativeness, and fuzzy, or disputed territories; and covering all these issues, additional connected issues characterise this social complexity, including political representativeness, climate change management and sociotechnics controversies (as it occurs in the context of offshore wind farm or aquaculture development).

2.3.4. THE CASE OF AQUACULTURE PLANNING IN EUROPE

The implementation of marine spatial planning by local institutions usually deals with a small scope of intermediary actors (see definition in Figure 9), without questioning their representativeness, and with two constraints: make it fast, and make it simple. That's the "business as usual" way of proceeding into which public institutions deal with civil society by questioning usual intermediary actors, with no other participatory strategy, and having little (if any) skills, budgetary means, and time.

On the other hand, opposed stakeholders, either because the dialogic process with the intermediary actors was not satisfying to them, or because they were not even represented in this process, can directly mobilize the civil society, by their political or personal networks, or by any other potential mean, but they can also call for external players with a stronger power of mobilization. Therefore, social unacceptability is raising, and put pressure on the decision makers, who are in charge of tradeoffs associated to the project (as they probably manage various issues of the territory) by stopping the process to maintain the social peace. We can also mention the fact that some external players can come into the game without local expectations, which makes the situation even more difficult to handle. This was, for example, the case of the construction of the Sivains river dam in France, which generated very strong social mobilization with, in particular, the convergence of local and foreign protest movements. In such a case, when a project gets out of control, and relies on other civil society organizations, it can be very hard to step back. Strategically speaking, it means that the process of stakeholders integration have to be thought wisely, and implemented carefully, to keep the various stakeholders (and not only their intermediary actors) in a dialogic process. This implies a maximum flexibility of the institution in charge of implementing decision-making. Furthermore, it also pleads for dealing directly with "civil society", meaning citizens not necessarily polarized on a specific stake, for preventing stakeholders to manipulate them.

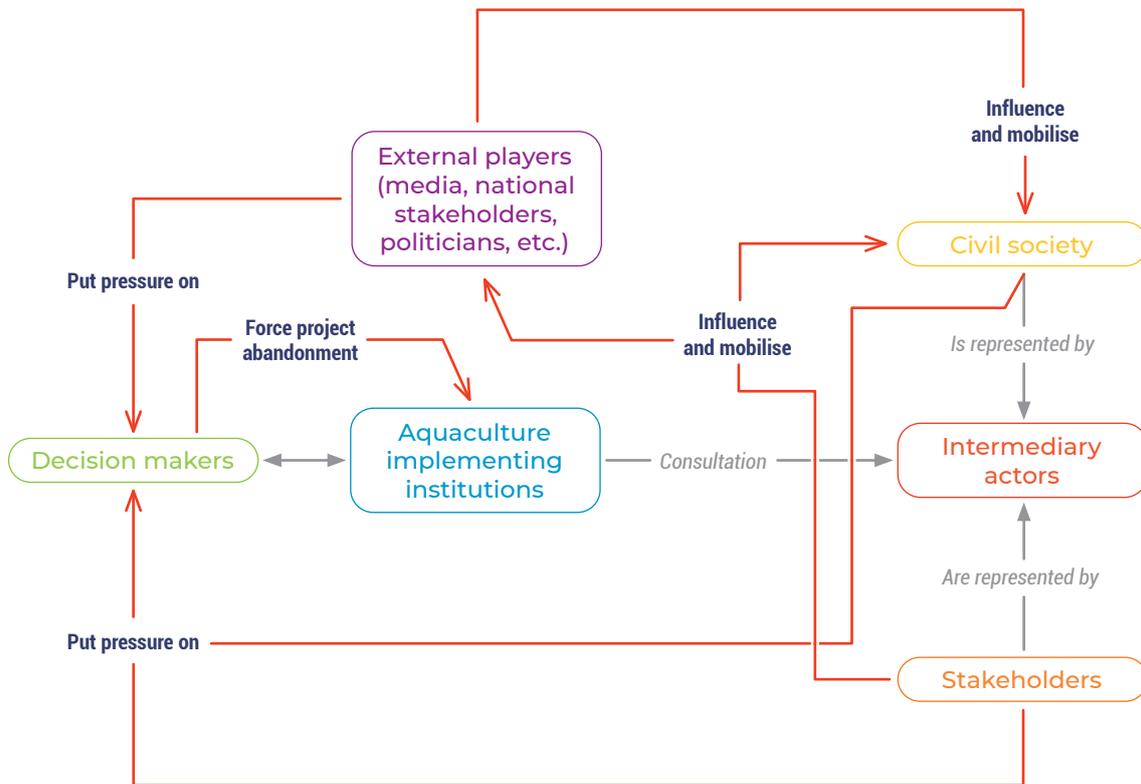


Uses and issues (stakes)	Type of stakeholders	Ashore representation	Fixed territory
Borders management and defence issues	National public institutions	Yes	Yes
Shipping roads	International and national public institutions, big size businesses	Only the national public institutions	Yes
Offshore wind farm	Public institutions and big size businesses, professional organisations	Yes	Not completely (most of the time, some fixed areas are defined to be used, but not with an exclusive usage)
Offshore aquaculture	Public institutions and private sector, small to big size businesses, professional organisations	Public institutions, professional organisation and existing farms businesses representatives (the "potential" business developers are missing most of the time)	Various scenarios (in Europe, the chosen scenario tends to define an exclusive area)
Small scale fisheries	Small size businesses, professional organisations	Small scale fishermen are not always represented	Near the shore: no, but not present at large
Deep sea fishing	Medium to big size businesses, professional organisations	Yes	Delimited navigation areas close to the shore, but no delimited areas at large
Recreational fisheries	People (tourists) and small size businesses, professional organisations	Only professional organisations, most of the time	Some know spot, but significant illegal fishing
Recreational diving	People (tourists) and small size businesses, professional organisations	Only professional organisations, most of the time	Some know spot, but significant illegal fishing
Archaeological sites	Public institutions	Yes	Yes for the known site, no for the sites yet to discover!
Protected natural areas	Public institutions and environmental NGOs	Yes	Yes
Various ecosystems	Public institutions and environmental NGOs	Some knowledge, but if not included in a protected area, not so well represented	Depends to the interest from authorities to make strict zoning
Nautical sports	People (tourists) and small size businesses, professional organisations	Only professional organisations, most of the time	Along the shore
Coastal tourism	People (tourists), small size businesses, professional organisations, municipalities	Only professional organisations, and municipalities	Yes, but with the matter if "landscape interest" which is not geographically bounded
Landscape issues	Inhabitants, tourists, private sector, municipalities	Not really	Yes, but with the matter if "landscape interest" which is not geographically bounded
Coastal residents	Inhabitants	As holders of many stakes and electors, yes	Yes, for the primary inhabitants, no for the tourists
Harbours	Public institutions, private operators	Yes	Yes

Figure 8 : Diversity of issues associated to uses of coastal areas and resources

Figure 7 illustrated the business as usual process of projects' implementation in aquaculture by questioning its consultation mechanism and rising issues about the representativeness of stakeholders. The unacceptability process or blocking process is then strongly related to the existence of feed back mechanisms (red arrows in Figure 9) between stakeholders. Figure 9 illustrates in a schematic way how social networking processes may rely on social mobilization and social opposition. The complexity for the administration is strengthened by the potential interconnections between the local and external networks that can converge to a powerful social opposition to decision-making. Contrary to a current sector-based policy based on decision-making, by industry or by social collective, the social complexity also claims for the necessity of engage holistic and integrated management processes which involves a large category of stakeholders linked by cross-cutting issues. The existence or capacity to build coping strategies able to integrate these feed back loops and cross cutting issues will strongly impact the social acceptability.

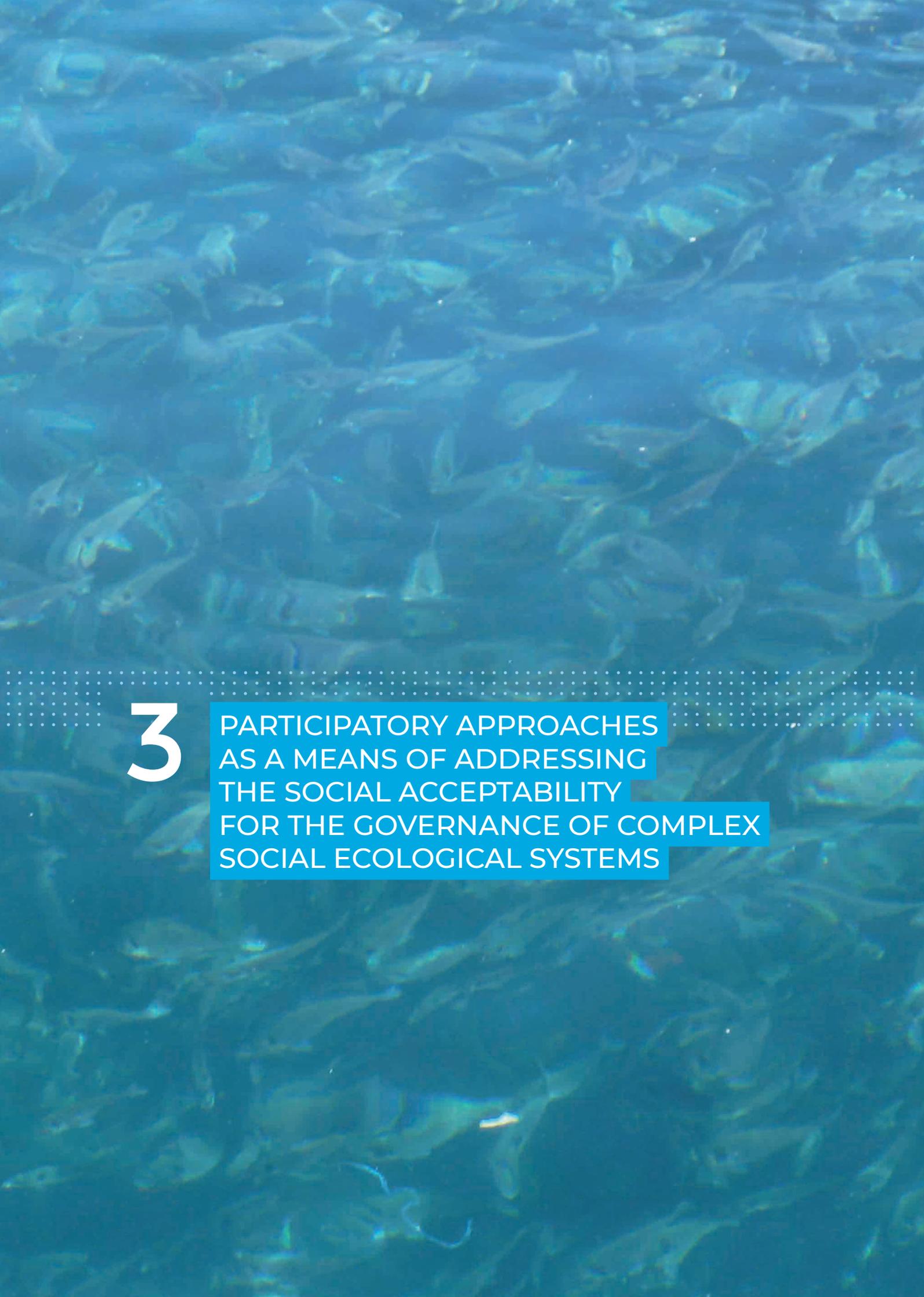
In this sense, addressing the development of aquaculture also raises the question of the sustainability of fisheries, tourism or any other coastal use. The social acceptability of aquaculture (and its development) can only be dealt efficiently in a more holistic framework that takes into account the reality of the territory.



- External players** People outside the local network but which can be connected to, and influence, it, in a way or another (media, national NGOs, national politicians, etc.)
- Civil society** Basically, the people living in the impacted area
- Intermediary actors** People that are "called" to represent other actors. For instance, the corporatists, the member of NGOs, the chairman of a professional organization, etc.
- Stakeholders** People who are connected to a stake/an issue. Included also in the civil society, but with networks, links, social tools, etc., that can be specific to the stake they hold
- Aquaculture implementing institutions** The local/regional public institution in charge of implementing marine spatial planning
- Decision makers** People who will take the decisions (politicians or high level technicians)

Figure 9: How the blocking stakeholders can lead to social unacceptability





3

PARTICIPATORY APPROACHES
AS A MEANS OF ADDRESSING
THE SOCIAL ACCEPTABILITY
FOR THE GOVERNANCE OF COMPLEX
SOCIAL ECOLOGICAL SYSTEMS

3.1. MAIN BASIS OF THE PARTICIPATORY APPROACH CONCEPT

Participation is a key issue to enhance social acceptability (Prno, 2013; Urvoas, 2015; Fortin et Fournis, 2013; Batellier, 2015). The International Union for Conservation of Nature (IUCN, 2009), states in a methodological guide for the selection of areas for aquaculture development that «the participatory approach, as a well-structured and properly implemented strategy, applied to the selection and management of aquaculture sites, represents an opportunity to guarantee the acceptance and permanence of any aquaculture project, since it allows all stakeholders to be involved in the definition and implementation of the process». According to Yates and Caron (2012), this allows stakeholders to take the leadership of the project and contribute to making it more favourable. Moreover, participation promotes trust between stakeholders and allows stakeholders to feel more respected and considered (Moffat and Zhang, 2014). The top-down rational frequently used for the implementation of this type of project should therefore be replaced by a more horizontal process (Fortin and Fournis, 2013).

The definition of participation is controversial and varies greatly from different authors. There are different forms of participatory processes depending on the degree of stakeholder participation, which can take the form of information, consultation, public participation and co-decision (Arnstein, 1969; Ehler and Douvere, 2009) (Figure 10). Co-decision is the most favourable to social acceptability, but it is also the more complex to implement, mainly in large projects. A participatory process involves engaging and bringing together different stakeholders in a private or public project³ to collectively formulate proposals about it. In this perspective, it differs from consultation, as the goal goes beyond knowing the views of the participants. A participatory process is more a collaborative work where participants share and compare ideas, develop collective objectives, produce a vision on a subject together, etc. The process is not a consultation, but a process of collaboration.



Figure 10 : Simplified ladder of the participation within a decision-making process

A participatory process can be included in a project frame for different reasons. One of the main motivations for a project holder comes from the idea that having stakeholders working together will help increasing the project efficiency. This is what we call the instrumental objective of a participatory process.

Starting the process enables to create an opportunity for the participants to get to know each other, to exchange on everyone knowledge, expectations, daily issues they face, etc. All these interactions will inevitably impact the group functioning and then contribute to produce a shared knowledge and vision on the project topic. In that way the initial instrumental objective may come along with group effects and boost social change. This is

3 - A project can take very broad forms, from a simple project associated with a new individual installation to a private or public collective project on a larger scale.

a reason why creating or strengthening links between the participants is highly valuable in this type of process. Another effect may also be observed as a process is on-going. While the participants are working together, different specific issues may raise such as social equity, social justice, etc. For instance, on a project related to water resources with a technical component, the financial question will emerge at some point. Talking about the cost and use of infrastructures may drive the discussion towards the willingness and ability to pay of social categories of stakeholders as well as the question of access to resources.

From the initial instrumental objective, a participatory process will finally raise a panel of questions and issues related to the initial topic. Which is why its implementation may have impacts in terms of social change, equity to access resources, social justice, etc., even if broaching those issues was not initially "planned".

An efficient consultation process must respect a certain number of conditions, and the reactions observed in the field are very important (Dionnet et al, 2017). Important conditions must be met:

- the work of the participants must have an impact on the decision-making process (Urvoas, 2015),
- the objectives must be defined upstream so that the participants are aware of the elements in order to be able to act,
- all categories of actors must be represented and the delegates must have representative legitimacy (Yates and Caron, 2012),
- the process must be transparent to build trust among participants (Moffat and Zhang, 2014),
- all categories of actors are represented, the process must adapt to each territory and case (Boutillier and Thomson, 2011),
- as conditions may change over time and therefore the process must also do so.

Consultation does not necessarily have to result in an acceptance of aquaculture development. A rejection should not be seen as a failure but as a building process over time that is likely to evolve. The objective of this process is to verify the suitability of a project to the needs of the territory and to explore the positive and negative effects of the scenarios considered.



3.2. SOME EXAMPLES OF STAKEHOLDERS INVOLVEMENT IN OTHER FRAMEWORKS

The European Water Framework Directive (EU WFD, 2000)

This directive has been adopted by the European Parliament on the 23rd of October, 2000. Since 20 years now, it institutionalizes, at different levels of intensity across European countries, the participation of stakeholders to integrate water management at the scale of water basin (Jager et al., 2016). The purpose of "Integrated Water Resources Management" (IWRM, dedicated terms), as it is implemented by the EU WFD, is to institutionalize a mechanism by which local water problems (including tough ones: pollution, scarcity, flooding, etc.) can be solved locally, with the integration of every stakeholders in the resolution process. The idea is to promote efficient, integrative, local, and acceptable solutions for water problems.

As noticed by the reference above, even if there are different implementations of the EU WFD across Europe, there are three leading countries in terms of participation: France, Spain and The Netherlands. It is not the purpose here to make comparisons between these different implementations, but to explore potentiality for fostering social acceptability through participation.

In many cases, this integrated governance of water occurred by institutionalizing an "assembly of users" (directly citizens in some cases, various colleges of stakeholders in other cases, elected, or nominated), which is in charge of ruling of the various disputes between stakeholders, but also, and more importantly, of the compliance of the basin regulations, ecological status, and governance, to EU WFD standards. In some cases, these assemblies can have only a consultative role, in some few cases, it is a final decision-making entity, as in France (Commission Locale de l'Eau, CLE). These "water assemblies", however, do not exclude participation dedicated to specific projects (dams, ecological restoration projects, water scarcity mitigation plans, etc.), or in broader public than just their members, but support it by having initiated peaceful dialogic governance between stakeholders.

It would be presumptuous to state that these mechanisms solves any matter concerning participation or social acceptability issues. It is also partially wrong to argue that every water basin in Europe experiments a "peaceful concerted governance", but still, it is widely considered that EU WFD foster a large positive and efficient integrated management (De Coninck, 2015; Seguin, 2015).

Le Parlement de la Mer (Parliament of the Sea) of the Occitanie region in France

The « Parlement de la Mer » (Parliament of the Sea) is a unique experiment in France (<https://www.laregion.fr/Parlement-de-la-mer>) to implement an integrated coastal management in the Occitanie region (northern Mediterranean). This geographical area is economically specialized on industrial tourism. However, other traditional activities coexist such as fisheries, shellfish farming in lagoon and offshore, and an emerging massive demand for offshore wind farm development. These past, present and future activities are struggling, as highlighted in several MedAID case studies for instance, and probably, in most places. Struggling for sea access, political representation, exclusivity on the activity allocation decision making process, existence.

And it was by finally noting that every new coastal or "sea related" project was endangered by these struggles, that the idea of a sea assembly ("Parlement de la Mer") emerged in the arena of both the decision makers and the stakeholders.

The « Parlement de la Mer » has been implemented in 2013, in order to set up a peaceful dialogic and integrated governance of the coast (Beynet, 2019). It's a consultative assembly, but involved in every coastal project, which try to reach exhaustiveness in terms of stakes and stakeholders representation.

This institution supports stakeholders mobilization in various projects, such as industrial harbour rehabilitation, participative governance definition (Lisode, 2019), onshore wind farm planning (see below), etc.

Onshore and offshore wind farm planning and implementation in France

Wind farm energy is an interesting comparison point, as it has some similarities with the actual European process of offshore aquaculture planning:

- Wind farms energy development is a centralized process (national or regional decision making process, regional zoning, and local implementation).
- The product, wind farm power, is promoted as a positive value product.
- Till very recently, the positive value of the product was opposed to local opponents, and the NIMBY syndrome was frequently invoked to delegitimize their claims (Nadaï, 2007).
- Wind farm production implies high capital mobilizing which cannot cope with too many implementation uncertainties. While the ordination or planification of wind energy settlements is on public hands, the promotion and investment is on private hands.

In the current context, the lack of social acceptability could question the European objective of developing the renewable energy production in the framework of the energy transition (Bauwens 2015). Since opponents are still very focused on refusing the development of wind farms, the lack of an adapted governance of the project itself is a main argument against. On the basis of these claims, the public authorities have reacted by implementing participatory approaches that are more in line with the experts' recommendations. These processes are organized as follows:

1. A first phase of zoning where offshore wind farm can be implemented:

- A preliminary stage for mobilizing stakeholders in order to make them ready for participating to the process, support them, group by group, for enhancing their capabilities to produce relevant data and collecting missing data, in particular the ones required by some stakeholder groups.
- A second stage for collecting stakeholders global concerns about the proposed zoning.
- A third stage for debating between stakeholders groups about a consensual zoning and for debating about the governance of future implementing projects of offshore wind farms.
- A final public debate (widely open) is organized when the consensual zoning proposals are evaluated by the citizens.

2. A second phase of implementation when participatory processes are organised accordingly to preliminary participation charters debated in the first phase, within the finally chosen areas.

As a result, wind farm planning in France suggests the factual lack of social acceptability is not linked to be associated to the "product" (positive value of "green energy"), but to the planning and the implementation of the infrastructure of production, i.e. wind farms themselves. This can be translated in terms of the lack of a suitable institutional framework that strongly limits the ability to implement participatory approaches (lack of means, institutions, technicians and experts, time, etc.).

Intensive offshore aquaculture is quite new in most areas in Europe, and intensively implemented in countries where social acceptability may not have the same value, or the same consequences, but it's unlikely the fact the aquaculture production has positive values that could lead to a better social acceptance.

3.3. KEY PRINCIPLES TO ENSURE AN ETHICAL, USEFUL AND PRODUCTIVE PARTICIPATORY PROCESS

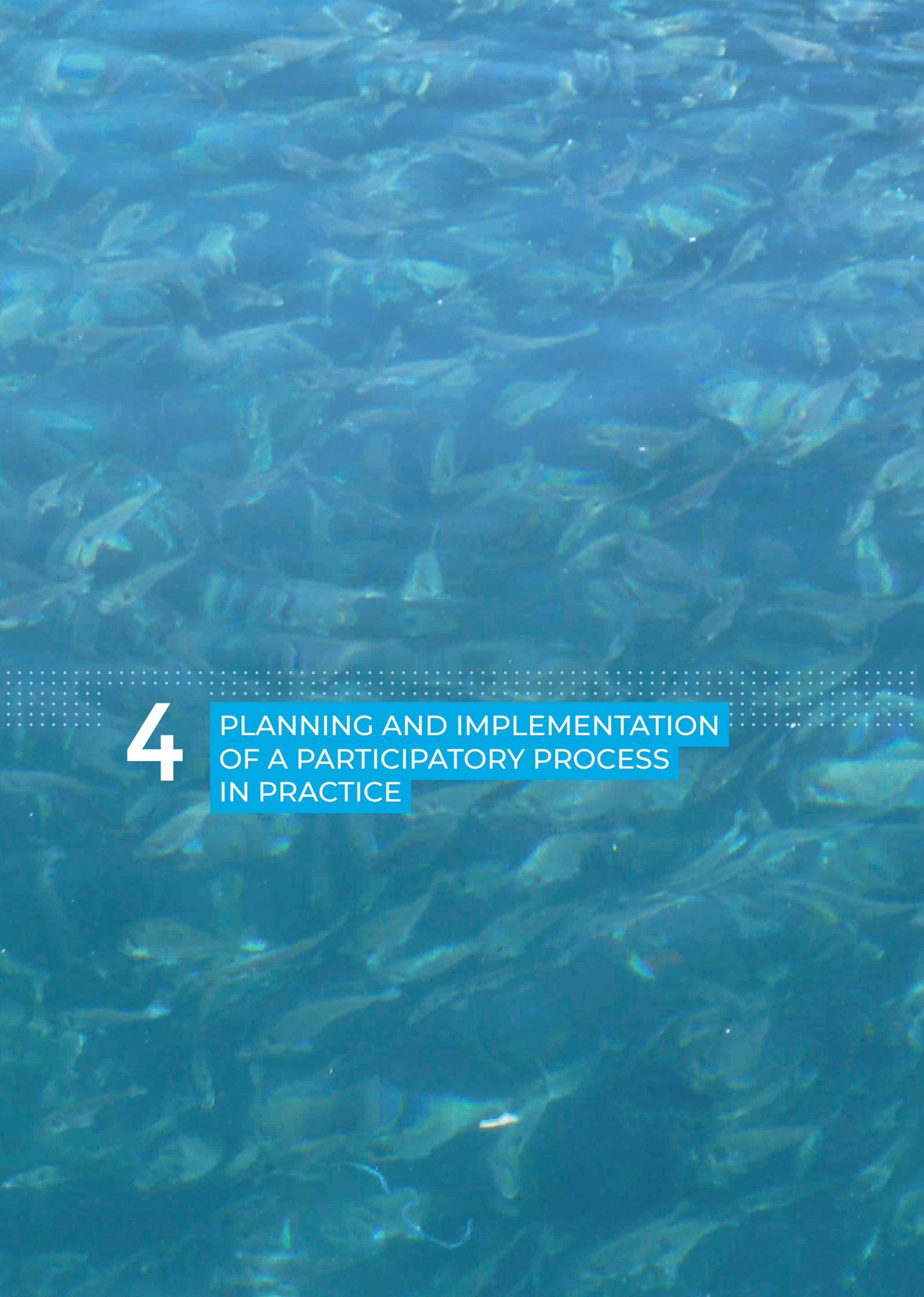
As a participatory process can be a good way to reach ambitious goals, it can be tempting to "help" stakeholders finding an interest in participation. The main formalized fundamental principles to support good conditions of use and implementation for those processes are summarized as follow:

1. A participatory process has an impact on the final decision, meaning that it has to be clear from the beginning how the participants' suggestions and recommendations will be taken into account in the decision process and why.
2. A participatory process **has specific objectives** determined upfront, but it should **remain open to a**

variety of proposals. It is never possible to know the final solution when the process starts; participants may bring conflicting proposals and decision-makers have to **take every proposal into account, with no judgment** on one or another.

3. **Participants are free to participate** or not and must be fully informed from the beginning; participation cannot be paid or forced in any way.
4. During the process **all stakeholders are represented** to diversify the viewpoints and stimulate interactions.
5. A participatory process must be transparent about: the final decision-maker(s) and how the participants' contribution is used; the process implementation and the participants' place in it; and the existing doubts on the project or required data.
6. A participatory process recognizes the **existence of multiple viewpoints.**
7. A high-quality and neutral animation will be decisive for the success of a participatory process.
8. A participatory process is both **iterative and adaptable, and is built step by step.** The process may evolve as new needs, ideas or expectations may rise along the steps.
9. Stakeholders involved and concerned by a participatory process need to **be given access to resources and information** (project documents, studies..., in a manner that is understandable).





4

PLANNING AND IMPLEMENTATION OF A PARTICIPATORY PROCESS IN PRACTICE

The previous sections have drawn an overview of participatory processes and the principles guiding their design. We will now explain the different steps to design and plan this type of process. We have decided to make a distinction between the process planning in a three steps procedure (chapter 5) and the mobilization of stakeholders, as the latter constitutes a critical step of the process and the efforts required should not be underestimated.

4.1. PLANNING A PARTICIPATORY PROCESS

Planning a participatory process is a complex work due to three main reasons: the problem complexity; the diversity of stakeholders' objectives and constraints; and the uncertainties on stakeholders' reactions. Thus, we suggest to follow three main steps, in parallel by creating a team of stakeholders (called "project team") directly responsible for the final decision and the strategy for stakeholders' mobilization (Figure 10). The chronology suggested provides some guidance on how to articulate the different steps; it can surely be adapted to the context's specificities.

The project team is in charge of clarifying any questions about the space for participation in the project, and is involved in the strategic planning illustrated in Figure 11.



Figure 11 : main steps to plan a participatory process (Lisode, 2019)

4.1.1. CONTEXT ASSESSMENT

Assessing the project context is required to understand where comes the need for participation, if the selected level of participation is adequate, and also to ensure that implementation means and resources mobilized are well adapted to the situation. This analysis should be done by the project team in charge of facilitating the process. The following questions can be used to check that all important issues are effectively taken into account:

1. **Global approach:** is the process integrated in a broader approach? Which one?
2. **Promoter and its goals:** who decided to organize it? What are the motivations and the expectations?
3. **Space/time:** what is the geographical perimeter of the process? How long the process is expected to last?
4. **Participants and expectations:** who will participate? What are their expectations?
5. **Mental bottlenecks:** are there any potential conflicts that can be anticipated?
6. **Impacts:** what will happen to the outcome of the process?

Additional interviews and a bibliographic review (including recent legislation for example) can be conducted in order to develop a more complete vision of the context.

4.1.2. STAKEHOLDERS ANALYSIS: ASSESSMENT OF STAKEHOLDERS' POWER RELATIONS

The second stage aims at understanding and assessing the power relations (or influence) between the stakeholders involved in the process. You should be able to answer questions such as:

- Who are the stakeholders involved? What are their relationships and interactions? What are their roles and responsibilities?
- Who may be winning or losing something through the project? How and why? What are the relationships between the "winners" and "losers"?

This analysis should help to assess the power relations (or influence) between stakeholders, to understand how the process can be impacted by these interactions, and how they should be integrated in the process design.

Finally, this work contributes to determine the strategy and efforts to mobilize, the dialogue platforms needed, and its adaptation to the type of stakeholders identified. While working on this assessment, it is necessary to keep in mind that potential participants will attend the collective sessions only if they have an interest in doing so (see the Stakeholders mobilization and engagement part for details below).

4.1.3. PARTICIPATORY PLANNING OF THE PROCESS

The final stage of this planning process relies on setting out the different components of the participation process in a strategic plan. The project team will define different steps and for each step, the associated objectives, the participants concerned, the tools mobilized and some means that can be added. This plan is a tool that should be followed as much as possible along the process.

In addition, this step is already an opportunity to consider how the process will be evaluated; it may require documents, tools or data to be collected from the beginning of the fieldwork.



4.2. IMPLEMENTING A PARTICIPATORY PROCESS

4.2.1. STAKEHOLDERS MOBILIZATION AND ENGAGEMENT

According to the Cambridge dictionary, mobilization is “the act of organizing or preparing something, such as a group of people, for a purpose” and the engagement can be defined as “the process of encouraging people to be interested in the work of an organization, etc.” Thus, mobilization should be considered as a process itself (with its own dedicated staff, resources and timeline), implemented all along the project and starting approximately with the participatory process (or before) – the design and planning steps can provide useful information that contribute to a good mobilization. The aim is to engage stakeholders who will be involved in the entire participatory process and who will be willing to attend the meetings. This work is a crucial step in a participatory process as far as this is indeed the main goal of the whole process.

Stakeholders mobilization requires to previously work on selecting who to mobilize (and why); and then on how mobilize participants.

- **Who to mobilize and why:** Mobilization is about having a group of stakeholders who will be able and willing to come to each session of the process; and this group of stakeholders should be the same all along the project. For instance, we can consider a set of consecutive workshops on a water reuse project; each workshop will be based on some information used or developed during the previous sessions. If you have the same participants all along the process, all of them will gradually learn information on water reuse; all of them will learn to know each other; and the group will probably have a better functioning as the project goes along. For each session it will not be necessary to spend too much time on participants' presentation and on reminders of the past session.

Thus, the idea is to find the “good participant” for each category of stakeholder; this participant can be considered as the “project manager” within his institution. Once chosen well, this participant will relay information from the workshop sessions to its colleagues and pairs, on the technical part as well as on the methodological and participatory approach.

Working on “who do you mobilize” can come with the representativeness question. But what you might be looking for in a participatory process is the exhaustiveness in terms of type of stakeholders. An important point in a participatory process is that every voice is recognized and ideally, every voice is represented. If you have minorities, the process is aiming at integrating them; and it might be better to have one representative of minorities discussing with one representative of a majority, instead of keeping the proportion in the process.

Besides, representativeness means an important cost. In a representative group of stakeholders, it might also be difficult to have every one willing to participate to the process.

Thus, representativeness of people within a given territory is not really adapted to a participatory process. What you can rather reach is having a good and diverse mix of stakeholders, ensuring at least that each voice participates. At any time of the process you shall describe who participates and how the participants were chosen.

- **How to mobilize participants:** The stakeholder analysis is useful in mobilization as it helps understanding the participants' objectives and constraints, and the power relations or influences between potential participants. It will help you understand why people can be motivated to participate, why they would decide not to be involved, etc. Then you can use this information to adapt your mobilization plan and efforts. Depending on the situation, the formal invitation letter is compulsory. Though it is not always enough and you should also have a face-to-face meeting with the participant. This interview is the occasion to better explain the reasons why you want the person to participate in, and the opportunity to convince this person to get involved in the process.

Whatever form the mobilization takes, it should bring sufficiently detailed information on the project, on the process, and state the specific goals from the very beginning in order to raise people's interest and stimulate their motivation to participate.

4.2.2. CONSOLIDATING THE CORRECT IMPLEMENTATION OF WORKING SESSIONS WITH STAKEHOLDERS

The objective of participatory sessions with stakeholders is to collectively produce something (an action plan, a diagnosis, a decision, etc.). This objective can only be achieved, if at least the participants communicate and work together effectively. There is a wide range of useful tools available to handle the complexity of this collective exercise with a large variety of actors. These tools can take the form of complex data and information available to participants and are indeed formalized and enable the interaction between participants and the production of knowledge.

The tools mobilized in a participatory approach must be adapted to the objectives of each session organized, (for instance: role-plays used to carry out prospective work (a); participatory natural resource management plan (b); participatory mapping for a diagnosis (c)). The use of these tools by a facilitator will help communicating, listening and interacting among participants. The role of the facilitator is to ensure that:

- each participant can actively participate in the discussions,
- make feel confident with the rest of the group,
- is being able to give each opinion without judgement,
- there is mutual understanding within the group.

If necessary, the facilitator can help to formulate an idea to ensure that everyone understands the main basis of the discussion. The facilitator's role is then to help participants to find common and shared solutions, through encouraging the acceptance of the decision by everyone. In addition, the choice of venue and date will contribute to the smooth running of the sessions and the whole process. During the planning of the process it is necessary to ensure that participants are available and that the proposed time is appropriate for everyone; for instance, participants should not have to make a choice such as "I can attend and participate to the workshop or I can watch the football match with friends".

4.2.3. THE BEST MOMENT FOR PARTICIPATION

Participation is always possible and most of the time it has positive consequences if it meets certain standards (see below). Planning may vary according to the specific context, but the majority of the operational activities to be implemented can be partially or fully generalized. The description of a generic participatory process, as in the case of aquaculture development in Europe, should contain the following four steps:

1. Policy making stage

Depending of the countries, it can be national or regional scale

It occurs when the decision of promoting offshore aquaculture is made

Participation can be understood in a traditional way, accordingly to the democratic infrastructure of the countries relatively to policy making

Or in a more innovative way (national consensus conference, etc.)

2. Planning stage

It's mostly a regional process

It occurs when "optimal areas" are studied, and decided

Participation is often suggested...

...but merely genuinely implemented

3. Implementation stage

It occurs when the farms and other required infrastructures are built

We don't talk about participation anymore but more about "participatory site supervision"

Everything is already decided, the monitoring of citizens helps to reduce the negative externalities of the construction

4. Functioning stage

The farms are in place and functioning

We are not anymore in the field of "participation" but more in the field of "corporate social responsibility" (which can include some participation, but in a different way).

Participation needs to be strengthened and enforced in the planning stage, as it is the optimal moment. In case of low acceptability despite having gone to step 3 implementation, it is more difficult to go back to a more peaceful and acceptable situation. Managers of marine aquaculture projects are often too focused on these conflictual social situations, demanding «tools and methods» to inform social acceptance at this early stage, forgetting that these situations are consequences of both the past context and the lack of upstream participation. Indeed, as it is consensually accepted by experts in participatory processes, improving social acceptability requires participation at the earliest possible stage. There are two logics associated with the implementation of participation in late stage processes:

1. Everything is already shaped and decided, and it is impossible to integrate the constraints of the participants, and then the project will be unsuited to their needs;
2. The process in which participation occurs may appear to be rigged (because participation seems useless to opponents), and diminish the legitimacy of the project.

This last point should not be overlooked, as poor or inadequate governance could be the most serious obstacle to social acceptability.



5

ASSESSING THE SOCIAL ACCEPTABILITY
THROUGH A THREE STEPS
APPROACH EXPERIMENTATION

The proposed research-action approach consists in working with the stakeholders in charge of aquaculture development on the issue of social acceptability. The objective is to exchange on their perceptions of the problem, on the way it is taken into account in their strategies, in order to understand what makes a project not acceptable and to build a common and rational vision of the problem. Social acceptability, which is a complex issue, is thus questioned through constraints and bottlenecks in order to express a degree of social acceptability.

5.1. A THREE STEPS APPROACH TO ASSESS SA OF AQUACULTURE DEVELOPMENT

Working with stakeholders needs to mobilize tools such as interviews and workshops. This enables the involvement of various institutional actors (local, regional and national administrations), intermediaries (representatives of fishermen, from the tourism sector, NGOs, industries relying on or impacting the resources and area where the project could take place, citizens...), researchers, and fish farmers. It will group stakeholders that are all part of the aquaculture development issue. The purpose of these interviews and workshops is to work directly on the issue of acceptability, to reintroduce the concept at the core of aquaculture development issues, and not as a secondary amenity that could be dealt with «at a later stage». This approach makes it possible to move away from a normative assessment of social acceptability that is highly context-dependent. The issue of social acceptability is generally addressed in «northern» countries, and is formulated through inductive normative assumptions about what social acceptability is and which are the factors affecting it.

To implement this approach over a case study, the process is organized in 3 phases, as illustrated in Figure 12. Each of these phases will build over the previous one in a continuum of research-actions.

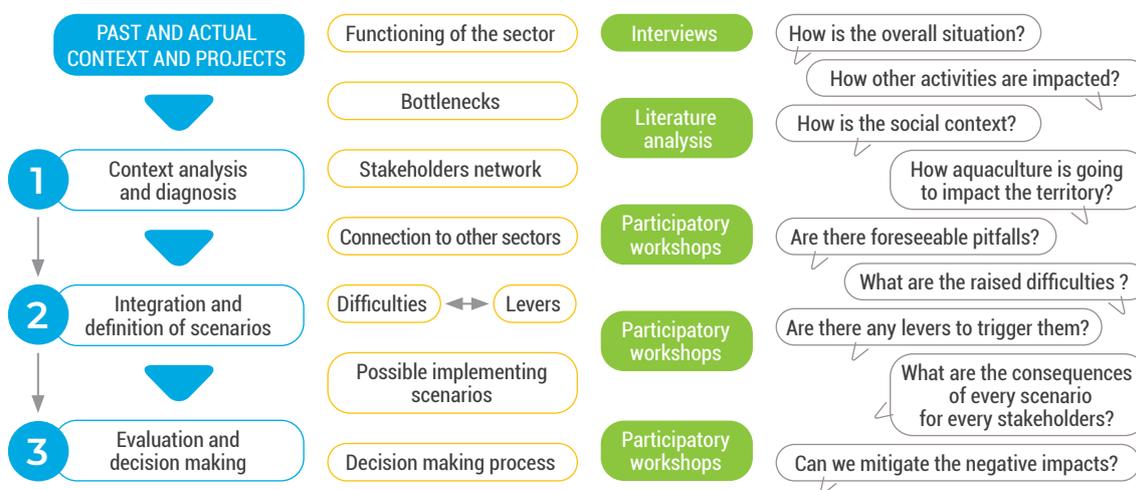


Figure 12 : A 3 steps approach to assess Social Acceptability of Aquaculture Development

1st Phase: Context analysis and diagnosis of the aquaculture development

The objective of the first phase is to get a good understanding of the context and the place occupied by the issues of social acceptability of aquaculture in the case study. Questions are for instance: how is the overall situation at the scale of the territory where the project could take place? What are the social, economic, institutional and environmental context? How aquaculture is going to impact the territory, positively and negatively? What will be the activities impacted and how they will be impacted by aquaculture? Identify potential biases of development and uncover hidden conflicts. To that purpose, literature review (existing studies), stakeholders mapping, individual interviews and/or participatory workshops are useful tools to support this 1st phase. Individual interviews with different stakeholders at the central, regional and local levels will have to reflect the diversity of stakeholders, opinions and perceptions about aquaculture development (see chapter 4 about "Who to mobilize"). Additional interviews can take place later in the process if additional stakeholders and/or issues are identified in the next phases. This survey work allows the elaboration of an exhaustive diagnosis of the context, to meet the stakeholders and to sound out their interest for a participatory approach. Individual interviews also allow stakeholders to express themselves more freely before working in groups.

2nd Phase: Integration and definition of scenarios

The integration and definition of scenarios will be achieved through the implementation of a participatory workshop on the evolution of aquaculture activity and its impact on the various components of society. The process can be divided into several workshops if needed. The objective of the workshop is to understand, in an empirical way, which elements contribute to the social unacceptability of aquaculture and what are the conditions to be implemented to promote the development of sustainable projects. What are the raised difficulties? Is there any lever to trigger them? What are the possible combinations of these actions that could give birth to scenarios?

If needed, a separate participatory workshop with a specific sector of the society can be planned if it is perceived as more efficient before joining other stakeholders in a second participatory workshop or in the 3rd phase. Feel free and as adaptive as needed.

3rd Phase: Evaluation and Decision Making

The evaluation and decision making phase will rely again on participatory workshops. This objective of the 3rd phase is to bring the participants to build a shared vision of the social acceptability issues on the territory. The objective of the workshop (with the same participants) is to work directly with them on the issue of acceptability. Participants will then have to evaluate aquaculture development scenarios with a view to social acceptability.

The interviews and the previous workshops in phases 1 and 2 should provide a good understanding of the context and the factors that could lead to social unacceptability. Participants will work on scenarios built from the two previous workshops. What are the consequences of every scenario for every stakeholder? Can we mitigate the negative impacts?... These scenarios will be evaluated and adapted to feed the decision making process with a proposal of a socially acceptable project. But it could also be reported a context which is inappropriate to the development of aquaculture. That doesn't have to be perceived as a failure of the process, but as avoided costs (transaction and investment costs) of a non-sustainable project.

5.2. RECOMMENDATIONS ON THE IMPLEMENTATION OF THE 3 STEPS APPROACH

The proposed 3 steps approach is rather a logical, embedded and continuous framework. But a set of recommendations has to be formulated prior to its implementation.

5.2.1. THE THREE HOTSPOTS

Informing, debating, co-building, consulting are different words with different meanings.

Informing is always the minimum way to insure trust and to avoid escalation. But the maximum benefit from participation is reached when people impacted by a project are invited to propose adaptation of it... and when their participation has an impact on this project!

Stakeholders inclusion and public participation are different

It's always useful to work with stakeholders, group of interests, professionals, who are directly impacted by a project. First of all, because you probably want them aboard rather than against you, and secondly, because they will help improving the project. This could be enough for small scale projects. But if you plan to implement projects that could significantly change everything around, that alone couldn't be enough to insure social acceptability. Therefore, you will also have to implement a participatory process oriented to civil society, and to jump out from the usual arena.

Skills, budget, time

The implementation of a participatory process requires long time, but it represents less time than recovering for a massive "social unacceptability" failure. And time is always a problem... if the project hasn't been well planned with people able to design participatory processes. The processes we discuss below are examples of technical projects with an intensive well designed participatory process.

A participatory process takes time but also requires to mobilize budgetary means and experts with specific skills on sociology, politology, anthropology or participatory engineering. Planning and implementing participatory approaches is a profession and cannot be improvised in large-scale projects. It is therefore preferable to consult experts in stakeholder engagement, in order to avoid an unadapted participatory process that may lead to blockages or fail to meet the expectations that have been generated, but also to anticipate possible biases linked to the implementation of such processes. Such experts will also be able to train you according to the dimension and complexity of the case study, so that you can operate on your own. However, most of the European public institutions in charge of natural resources management (water, agriculture, protected areas, etc.), have now the soft skills that allow them to address issues related to social acceptability in their fields of competence.

5.2.2. EVERY SITUATION IS DIFFERENT

But asking the good questions can help in framing the participatory process.

- How is the overall situation?
- How other activities are impacted?
- How is the social context?
- How aquaculture is going to impact the territory?
- Are there foreseeable pitfalls?
- What are the raised difficulties?
- Are there any levers to trigger them?
- What are the possible combinations of these actions?
- What are the consequences of every scenario for every stakeholder?
- Can we mitigate the negative impacts?

5.2.3. THREE POSSIBLE STEPS



Context analysis and diagnosis

Beside everything technical, the important point to investigate, is the impact of your project on the existing usages, and not from an expert point of view, but from the stakeholders themselves. This is an important stage for a genuine participatory process. It can be organized in many different ways, including an authentic dialog with experts, but it must be focused on the understanding on the activities of the stakeholders, not in explaining them how your project is good for them.

Integration and definition of scenarios

A way to simplify the debates, and to operationalize the interactions between the project manager and the stakeholders is to build various scenarios for the project, with iterations between proposals from one group to the other. It's possible to start with proposal from scratch of the stakeholders, but if you want to make it simple and shorter, you would probably prefer to propose different (smart) scenarios to the stakeholders, then to evaluate, and adapt them. The idea is to have (really) different scenarios, not to close too much the interactions. Then, you can evaluate (desk job) the feasibility of these scenarios, and to prepare (counter) proposals for the final stage. But it's very important that these counterproposals really take into account the proposal of the stakeholders, by integrating them, or, if it's not possible, by explaining why.

Evaluation and decision making process

Then, on the base of the counterproposal scenarios, you can organise a final debate between stakeholders to evaluate the consequences of every scenario, to find mitigations actions, and to prepare the final decision making process.

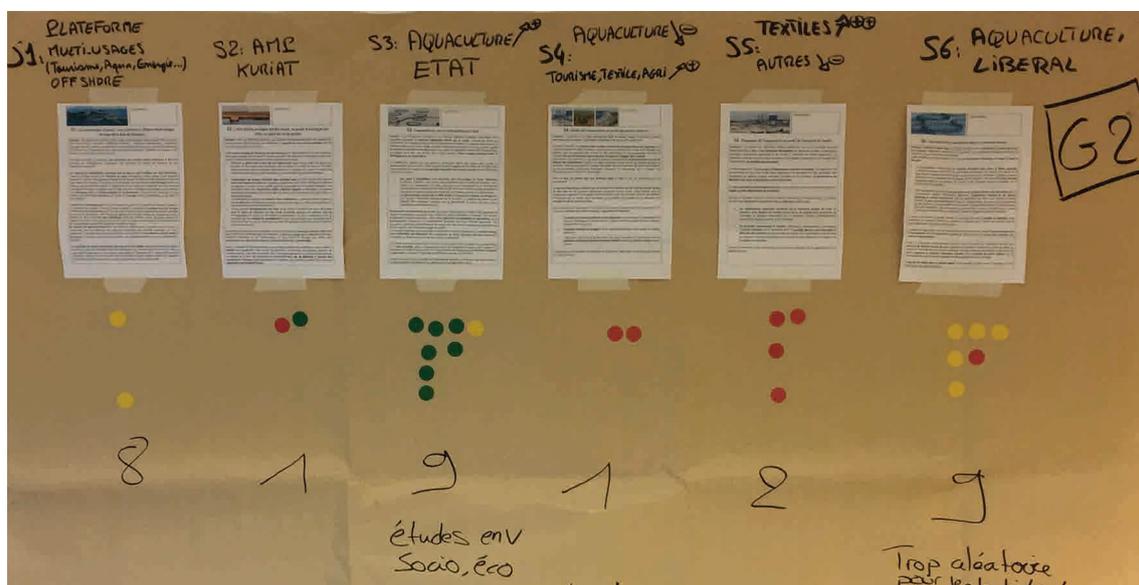
What about civil society?

As mentioned below, you should take into account the fact that civil society has to be involved. It can be done at any stage, as another iteration: at the second stage, for instance, you propose scenarios, modified by stakeholders, evaluated in public meetings by citizens, then you build counterproposals based on that.

Or it can be done in parallel: at the first stage, it is possible to organise public meetings to gather public perception about aquaculture, and to make an evaluation of the expectations of the civil society. But definitively, this has to be done at the third stage, to present the final scenarios and evaluate the participatory process.

5.2.4. FINALLY...

The 3-step approach aims to develop processes and capacities to overcome barriers related to representativeness bias and deficient or inadequate participatory processes that leads to social unacceptability as already illustrated in Figures 7 and 9. It leads to a more suitable process to improve social acceptability of aquaculture development by implementing a participatory process (Figure 13).



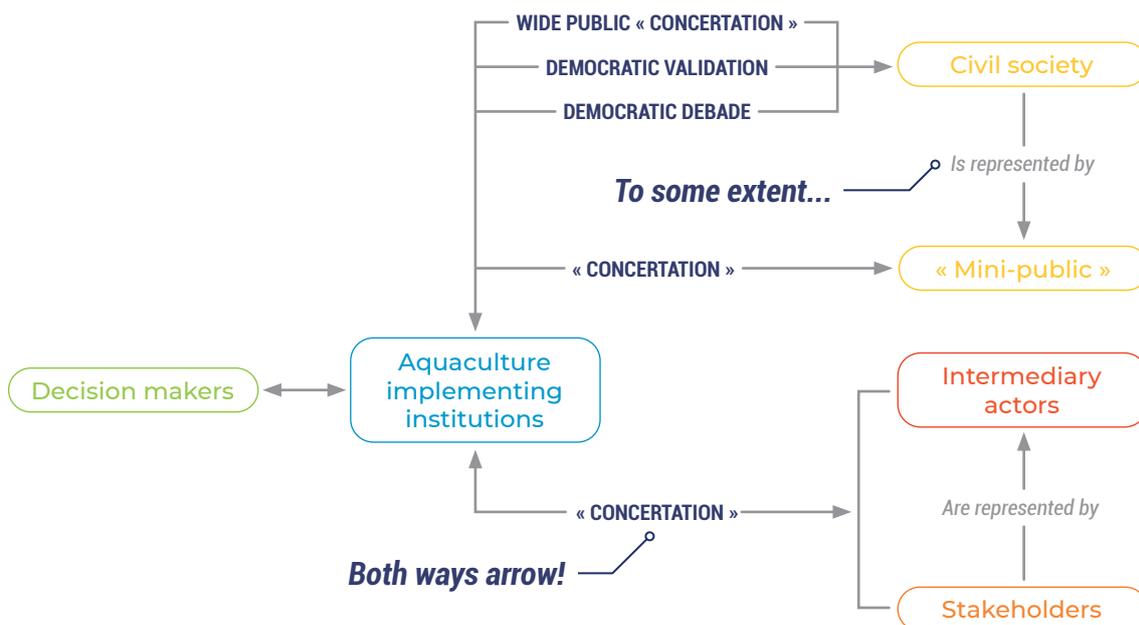


Figure 13 : A more suitable process to improve social acceptability by implementing a participatory process

Figure 13 depicts how to design a participatory process to enforce social acceptability of aquaculture development. The existing networks of impacted or impacting stakeholders and intermediate actors are now associated to a genuine participatory process, in a way of a "Concertation"⁴, to improve, mitigate, adapt it, but civil society as a whole is included in the participatory process.

"Aquaculture implementing institutions" is intended as the local/regional authority in charge of planning the development of aquaculture. It can be a regional authority, decentralized state services, independent public agency, etc., depending on the local context. It should be the institution in charge of the participation process also.

From the above, we can consider three different participatory actions that complement each other:

1. Including stakeholders and their representatives in a fair and genuine dialogue process where their constraints can be identified, integrated into the planning process, and mitigated as much as possible.
2. Civil society itself can be questioned using "mini-public"⁵ processes" (representative panels). This process involves the selection of randomly chosen citizens to deliberate on a chosen issue and enlighten and inform the decision making process. It can be an adequate tool to investigate the perception of aquaculture by civil society. Such tools are documented and explained in the various guidelines proposed in Chapter 6.
3. And finally, the participatory process can be oriented towards a process of dialogue with the civil society itself, using wide public meetings, online participation, etc., both for problem identification, elicitation of scenarios, validation of solutions, etc.

These three participatory actions should also be considered in term of risk management, the wider the participation process is, and the more reliable the process will be, although it is likely to be more complicated to deal with in terms of the complexity of the aquaculture management plan.

To help you with this three-step process, guides for implementing participatory approaches and good practices

4 - « Concertation » is a French word and means a participatory process where participants build together proposals and where the rationality to include, or not, these proposals into the design of the project is transparent to the participants (they have a clear answer on why their proposals are included or not).

5 - Mini-public is a concept defined in participative processes. It refers to citizens assemblies that group citizens that are usually not part of the concertation process and that could be one of the reason of the unacceptability

are presented in the next chapter, but some key activities to consider when implementing the approach are listed in Figure 14.

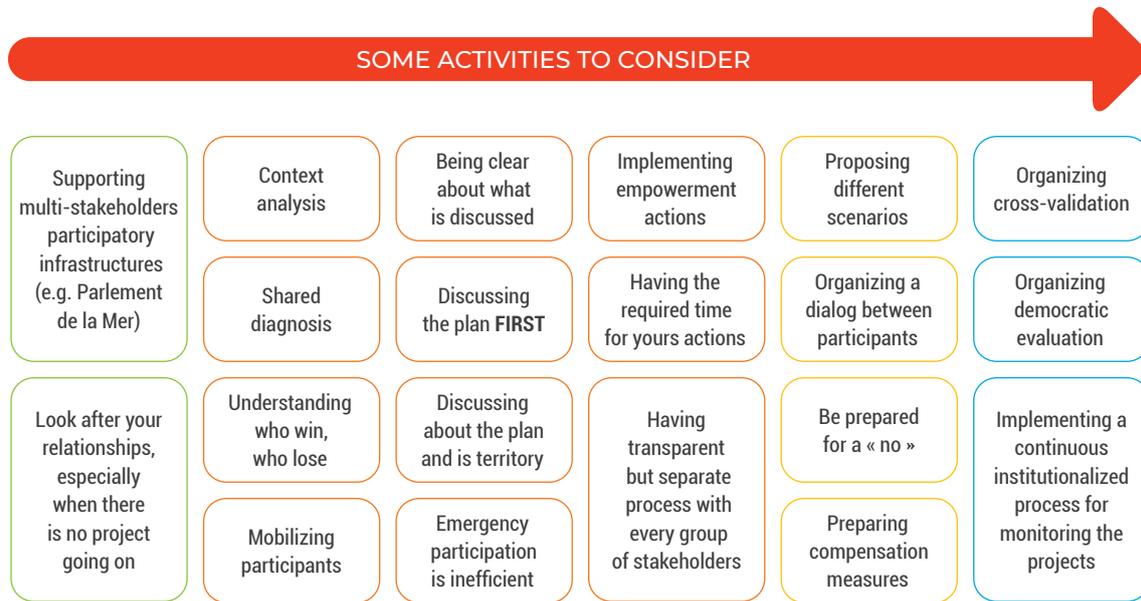
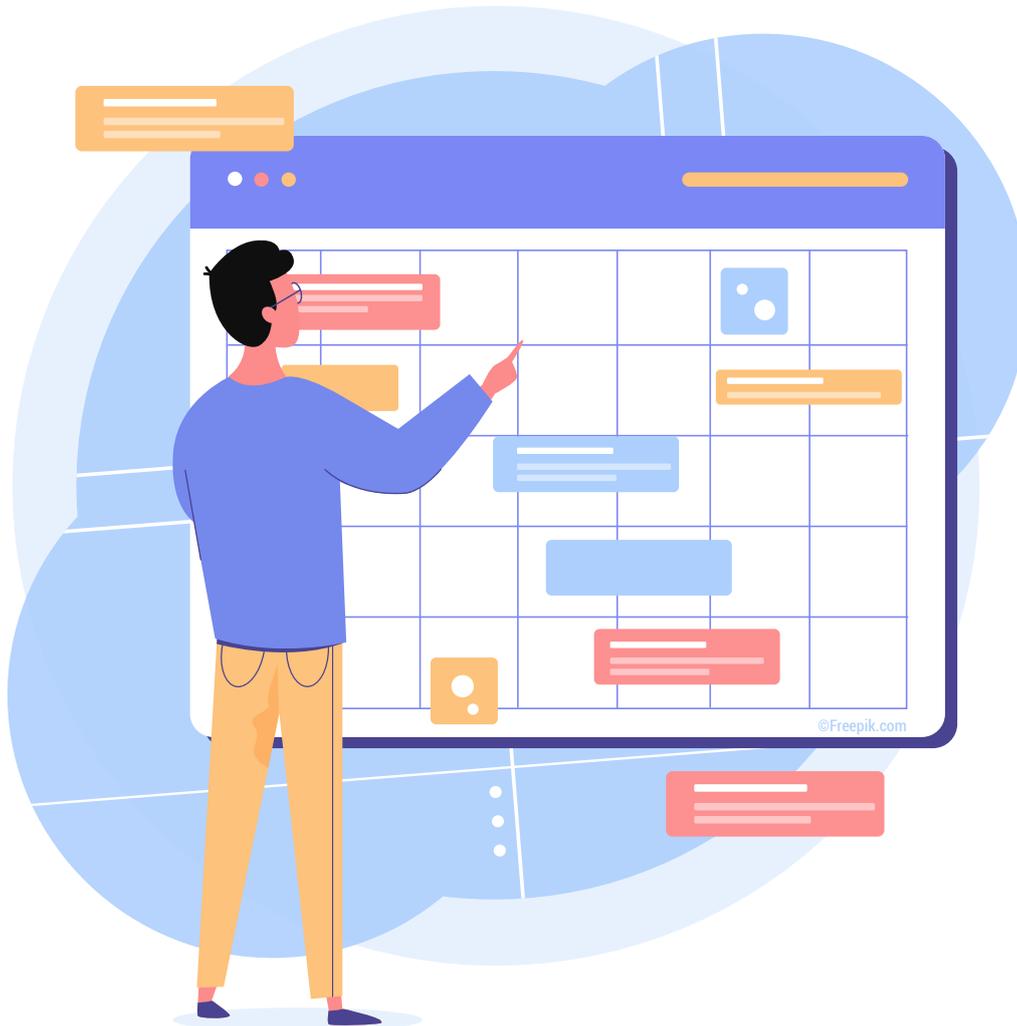


Figure 14 : Some activities to consider while assessing the social acceptability of aquaculture development under a participatory approach.





6

PARTICIPATORY TOOLS
AND GOOD PRACTICES RULES

Various guides are available worldwide, among which:

- English language: Lisode's Guide to public participation and facilitation: http://www.lisode.com/wp-content/uploads/2019/06/Guide_Lisode_version_finale_EN_publication.pdf
- English language: King Baudouin Foundation. 2006. Participatory Methods Toolkit: A Practitioner's Manual. <http://80.65.129.195/en/Virtual-Library/2006/294864> A review of 13 methods that can also be downloaded separately.
- English language: BiodivERsA Stakeholder Engagement Handbook (2014). Best practice guidelines for stakeholder engagement in research projects. Guidelines and Additional resources: Practical Method Notes, Conflict management Tools, Templates. <https://www.biodiversa.org/702>
- Various languages (English, German, Spanish, Italian, Dutch, French, Hungarian, Russian) Harmonicop's Guide: Learning together to manage together. <https://www.ecologic.eu/1625>
- French language: Lisode : Guide de concertation territoriale et de facilitation : http://www.lisode.com/wp-content/uploads/2017/03/Lisode_Guide_concertation.pdf
- French language : Fondation Nicolas Hulot pour la Nature et l'Homme. 2015. Démocratie participative, Guide des outils pour Agir. http://www.fondation-nature-homme.org/sites/default/files/publications/130912_democratie_participative-guide_des_outils_pour_agir.pdf
- French language : Fondation Roi Baudouin. 2006. Méthodes participatives. Un guide pour l'utilisateur. <https://www.kbs-frb.be/fr/Virtual-Library/2006/294864>
<https://www.issuelab.org/resources/29723/29723.pdf>

So it would be pointless and possibly counterproductive to make another list of tools which can be used for public participation, group facilitation and stakeholder engagement. The above selected manuals and guidelines are among the most efficient ones, clearly designed and supported by a number of practical materials and templates for public participatory process. However, there are a few rules to be observed in the use and implementation of these tools:

Rule 1: No improvisation

Most of the tools for public participation are inspired, or very closely connected to management or knowledge engineering sciences. And, as for project management, there are different moments, different objectives, different contexts, etc., which should gain advantage to be equipped with the adequate tool. You won't use the same tool for gathering perception about landscape impact with wide public, and for fine tuning a technical option with a small group of stakeholders. As for project management, objectives, public, contexts, have to be clarified prior to choosing the corresponding tool.

Rule 2: Consultation and deliberation, extraction and co-building

Most of the time, public participation is reduced to extracting data from the participants (consultation), for diagnosis purpose for instance. For a participatory process to be useful, you have to emphasize the co-building stages between participants (deliberation). Participation is not about collecting single views, but about supporting the building of a collective vision.

Rule 3: No limit? The means!

With the required means (skills, budget, time), it's possible to make everything participatory.

Rule 4: Small or large groups?

There are two ways to handle large groups, the first one, is to make a selection of people (with election, of statistic filtering), and to work with them as a small group. That's the spirit of Citizen Jury for instance.

Or, you can address large groups directly, with, most of the time, a large group of facilitators, professional or specifically trained, and adapted methods (open forum, world café, etc.).

Rule 5: Stakeholders or citizens?

Citizen participation is connected to public communication, and most of the time, it's a mix between workshops (in large group or smaller groups, cf. Rule 4), and communication processes, to inform the people who don't participate, to make the project, and the results of the participation, visible.

Stakeholders participation is easier in the way they are less, more visible, and more connected to the existing decision-making processes. But not all of them!

Rule 6: Eventually, someone will be in charge of facilitating a workshop

"Facilitation technics" are tools to handle a group during a workshop. This is the minimum skill to acquire to keep control on a workshop.

Rule 7: A rich repository of tools for participation

Role playing games to explore complexity, participatory modelling, participatory simulation, participatory mapping, theatre, post-it, drawing, photo safari, walking diagnosis... a lot of things are already tested, and used. You just have to pick one.





7

DISCUSSION AND GENERAL RECOMMENDATIONS

Can aquaculture, and in particular marine and coastal aquaculture, fulfill the objectives assigned to it or the hopes placed in it, both by the Blue Revolution and Blue Growth?

Probably not in its current form or according to the way aquaculture development is and has been thought. After years of assured positivism, mainly based on the fact that World aquaculture production has gradually overpassed that of capture, for the first time FAO expresses some doubts about the ability of marine fish farming to cope with the "farming more than catch" issue: "*despite the increasing output from global aquaculture, farming of marine fishes is unlikely to overtake marine capture production in the future*" (FAO 2020, the State of World Fisheries and Aquaculture 2020).

Yes, if development is rethought in a more peaceful and integrated way by taking the time to formulate and debate the stakes and objectives of its development. If there are strong drivers and incentives to marine aquaculture development, these drivers and incentives also carry with them adverse effects and development biases that may question the sustainability of aquaculture development. These effects and biases have to be carefully addressed and taken into account through an objective that has to be clearly explained, transparent, shared and understandable by all and, above all, correctly formulated. This results today in the Social Acceptability issue.

All along the present document, the importance of assessing Social Acceptability through participatory processes has been underlined as key to support aquaculture development in a sustainable way, as well as for other maritime sectors of the Blue growth. To that purpose, participatory approaches present a number of advantages and benefits.

First of all, robustness of policy actions is higher when they are supported and legitimized by social groups that have a certain critical mass and relays in other social groups. For instance, in the case of onshore wind energy in France and after an initial positive growth, the opponents have been able to aggregate around their struggle a multitude of other social groups to completely change the vision of wind power by rural territories. Secondly, the implementation of programs, plans and projects always fits into a local context that cannot be neglected. Finally, it is currently a fundamental expectation of European citizens to be involved in the decision-making processes concerning projects that affect or impact them.

Consultation/concertation is a participatory process aiming at co-producing proposals between the stakeholders of a territory in order to design or adapt a project. But concertation is possible as far as a sincere will to work with everyone exists, nothing is decided yet, many different alternatives are still possible. That doesn't ensure the acceptability as the project still can be refused and it has to be considered as the price of acceptability.

The importance of participatory approaches is again more crucial in the context of marine territories and marine socio-ecosystems where decision making is currently based on technical and expert paradigms due to the historical context of European maritime management. Coastal areas are also socially and economically perturbed (collapse of the fishing economy, risks of submersion, questioning intensive tourism, outermost maritime regions and often poorer areas, etc.), under strong environmental pressures and at the same time have to face huge development projects within the Blue Growth Strategy (wind farms, marine aquaculture, etc.).

To implement such projects and achieve the BG's objectives, there is a lack of transfer of skills and experience from traditional territorial approaches (integration of stakeholders, territorial facilitation, long-term consultation bodies, etc.) to the proposed approaches for coastal areas that remain more based on technical and engineering approaches driven by external objectives (e.g. developing marine and offshore aquaculture without consideration to the territorial demand). As already underlined in the chapter about the identification of bottlenecks, there're still important gaps to manage the social acceptability by spatial planning through the MSP, while good practices and experience from the Water Framework Directive could have been of significant help and an inspiring example. The planning of aquaculture development is still mainly based on sectoral approaches. The question which arises is to address this development by avoiding taking into account the solely constraints of this or that sector, but by adapting the development to the needs and opportunities of the territories which host it.

There are needs to raise awareness among project holders and public authorities in charge of aquaculture development of the social issues that can result in processes of social unacceptability. Figure 15 proposed schematically a set of recommendations that illustrates some of the benefits when adopting a virtuous approach assessing SA through participation vs. costs of the dominant technical approach of projects engineering.

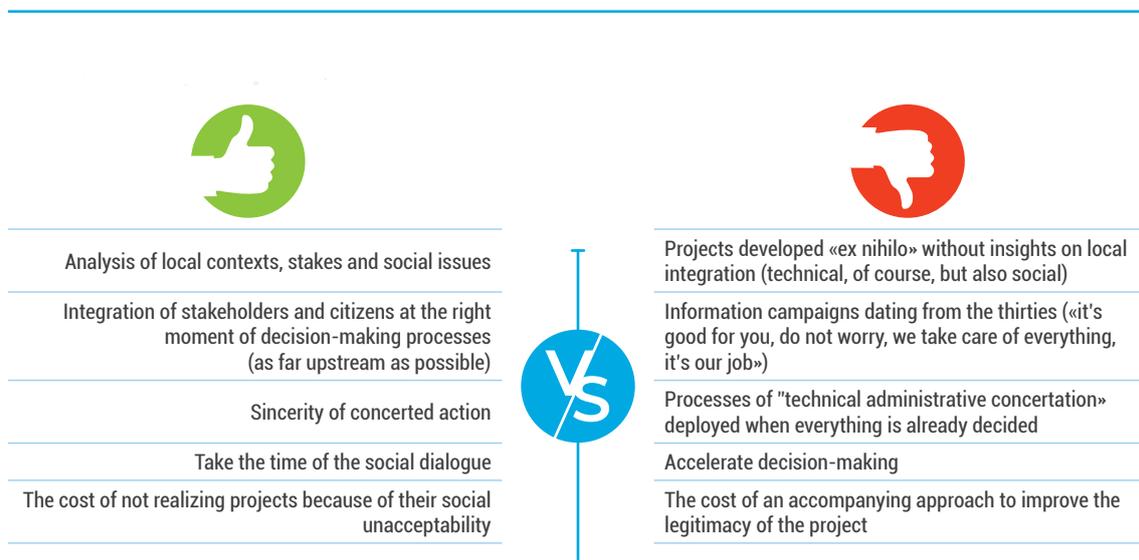


Figure 15 : Factors influencing SA through integration of the local context and legitimization with stakeholders

Social acceptability is a social construct. Consultation in social acceptability concerns is of importance, making it possible to pass from an individual vision to a collective interest integrating all the stakeholders to co-construct a common and shared vision of aquaculture development on a territory. It requires to adapt the governance framework and the project construction process to the context of each territory.

After implementing the 3 steps approach under different contexts and experiences, a cross-comparison was made between the results of the interviews and workshops with materials from the scientific literature. Results of the interviews and participatory workshops were about the proposals that have been put forward by stakeholders to think about aquaculture development in a different way, i.e. one that would be more socially acceptable. These proposals can be cross-referenced with and structured according to four main recommendations: **1) Support concertation, 2) Give importance to the adequacy between the territory and the project, 3) Value the benefits of the project and promote transparency and 4) Establish a framework that support aquaculture development and compliance to the development process.**

The following four sheets present these four recommendations by quoting and synthetizing main proposals from stakeholders and illustrating where it fits into the scientific literature.

1. SUPPORT CONCERTATION

FROM INTERVIEWS AND WORKSHOPS:

”
Various stakeholders have expressed their willingness to participate in decision-making and advocate the involvement of all stakeholders.

”
In the evaluations process, participants expressed the wish for a feedback on the study and that results of the workshops should be taken into account in decision-making.

”
Do not start from a negative premise as to the willingness of certain stakeholders to participate in the debate. Implement an initial and separate workshop if needed.

”
In scenario games or prospective work, participants have often difficulties in projecting oneself for others (inhabitants, civil society).

- According to scientific literature, **participation is key to social acceptability process**. IUCN (2009) states that «the participatory approach, as a well-structured and properly implemented strategy applied to selection and management of aquaculture sites, represents an opportunity to ensure the acceptance and permanence of any aquaculture project, since **it allows all stakeholders to be involved in the definition and implementation of the process**».
- A participatory process allows stakeholders to **take ownership of the project** and thus be more supportive of it, and this **promotes trust** between actors and allows stakeholders to **feel more respected and considered**.
- The top-down logic, i.e. «top down» frequently used for the implementation of aquaculture projects, should therefore be replaced by a more horizontal process (Fortin and Fournis; 2013).
- There are **different forms of participatory processes**. Depending on the degree of stakeholder participation, it can take the form of information/communication, consultation, concertation and co-decision. Concertation and co-decision are the most favourable levels for social acceptability, but co-decision seems difficult to apply to projects of this scale. To be effective, **concertation** must respect a certain number of conditions:
 - The work of the participants must have an impact on the decision-making process
 - The objectives of the participatory process must be defined upstream
 - All categories of stakeholders must be represented
 - The participatory process must be transparent
 - This should allow the expression of different points of view
 - It must be adaptive in time and space
- It should also be kept in mind that **public participation does not always promote a positive public response** to a project. Thus, a participatory process that would lead to a negative response to aquaculture should not be seen as a failure. Especially when regarding the avoidable sunk costs of socially unacceptable projects.

2. GIVE IMPORTANCE TO THE ADEQUACY BETWEEN THE TERRITORY AND THE PROJECT

TO ADDRESS ISSUES RELATED TO AQUACULTURE DEVELOPMENT, WORKSHOP PARTICIPANTS PROPOSED:

”
Check that the territory is suitable:
Assess the impact of aquaculture over the environment.

”
Anticipate needs: Extension of ports, reservation of areas at port level for aquaculture farms, increase the capacity of training centres, etc.

”
Adopt an integrated and holistic view and adapt the project to the territory:
Do maritime spatial planning.

- Implementation of a global pollution management plan (source by source).
- Take into account the needs of activities already present in the territory.
- Take into account the specific characteristics of the territory (bathymetry, seabeds, compliance to carrying capacity...)

By adopting a participative and concertation approach

- **An exhaustive diagnosis of the territory**, carried out at the beginning of the process, makes it possible to check if the **territory is suitable to a project** and get the necessary information to build a project adapted to the territory. To be relevant, it must address economic, social and environmental issues, but also governance assets and the values that the «public» attaches to places, landscapes, etc. (Batellier, 2015). Ideally, this diagnosis should be carried out in a participatory way, it will be richer and will contribute all the more to reducing the unacceptability of projects (Wolsink, 2012). **Stakeholders feel more respected when we do not decide for them what they need and what impacts them** (Moffat and Zhang, 2014).
- It is important to pay attention to the different uses present in the area. The coastline is covered by a large number of activities that use common resources, so it is essential to think about its management in an **integrated way**. This approach is particularly valued by IUCN in its guide to aquaculture site selection: «As aquaculture is currently one of the last sectors to establish itself in a specific area, it is essential that **synergies and incompatibilities with other sectors be identified** to ensure that aquaculture is integrated into the local economy and that sites are selected and managed in an appropriate manner».
- **Spatial planning** is an effective tool for managing a large number of activities. This makes it easier to analyse the constraints of the territory and therefore to take them into account more effectively. However, it must be built on the basis of an exhaustive diagnosis as explained above.

3. VALUE THE BENEFITS OF THE PROJECT AND PROMOTE TRANSPARENCY

TO ADDRESS ISSUES RELATED TO AQUACULTURE DEVELOPMENT, WORKSHOP PARTICIPANTS PROPOSED:

”

The benefits of the project must be well distributed:

- *Help fishermen who wish to convert to aquaculture.*
- *Allow fishermen to enter concessions.*
- *Review laws regarding taxes paid by fishermen.*
- *Compensate inshore fishermen for the impacts they suffer either directly from aquaculture farms (a percentage of the farm's profits could be dedicated to fishermen) or from the government.*
- *Replace off-shore farms with on-shore farms.*
- *Distribute aquaculture companies along the coast in order to reduce their concentration in a single place.*

”

More feedback from the studies carried out.

”

Implementation of a label to inform the consumer and improve product traceability.

Informing the «public» is important because it allows them to assess whether a project is «good in itself». But it is important that the «public» be able to react, express their concerns and points of view and, above all, that these feedbacks be taken into account. This information, while unilateral, is closer to the «utilitarian» vision of social acceptability. Because it means that the State does not understand that citizens are opposed to aquaculture and that it is up to it to judge which option is the best in terms of the alternatives available. This seems to run counter to a good process.

Secondly, it is essential that communication be done on the impact/fall out of the project. Benefits and negative impacts are important elements in the social acceptability of aquaculture. Many bottlenecks in case studies revolve around the negative impacts of aquaculture or poorly distributed positive impacts. It is therefore important that the project leader discusses these aspects with the «public». Because even if it is not possible to erase certain impacts, the fact that they are known to the «public» at the beginning of the project facilitates their acceptance. This is even more important if the impacts are predictable but there is still considerable uncertainty about their nature and magnitude (Yates and Caron, 2012).

Once these benefits are expressed, it is also important that they are well distributed (Wolsink, 2012). There must be benefits that balance the impacts and that they are well distributed (Prno, 2013). Actors will have more difficulty withstanding the constraints of the activity if they do not see the positive benefits for their territory.

In a number of case studies where aquaculture is developing alongside an existing fishing activity, fishermen suffer a number of inconveniences with aquaculture, but do not benefit from the positive effects on employment. They are doubly penalised, because aquaculture could enable some fishermen in difficulty to retrain, but they are not part of the process, and aquaculture attracts the most qualified jobs from the fishing industry and thus penalises this sector, which lacks this qualified workforce.

4. ESTABLISH A FRAMEWORK THAT SUPPORTS AQUACULTURE DEVELOPMENT AND COMPLIANCE TO THE DEVELOPMENT PROCESS

TO ADDRESS ISSUES RELATED TO AQUACULTURE DEVELOPMENT, WORKSHOP PARTICIPANTS PROPOSED:

”

- More control and monitoring of operators' practices (licences limits, home ports, etc.).
- Scientific monitoring of the state of the ecosystem at least twice a year (or every season) under and around the cages with qualified personnel.

”

- More stringent regulations.
- A normative framework for the disposal of cages at sea.
- Sound and proven impact studies.
- Allocation of licence subject to the absence of *Posidonia* beds and sufficient depth.

”

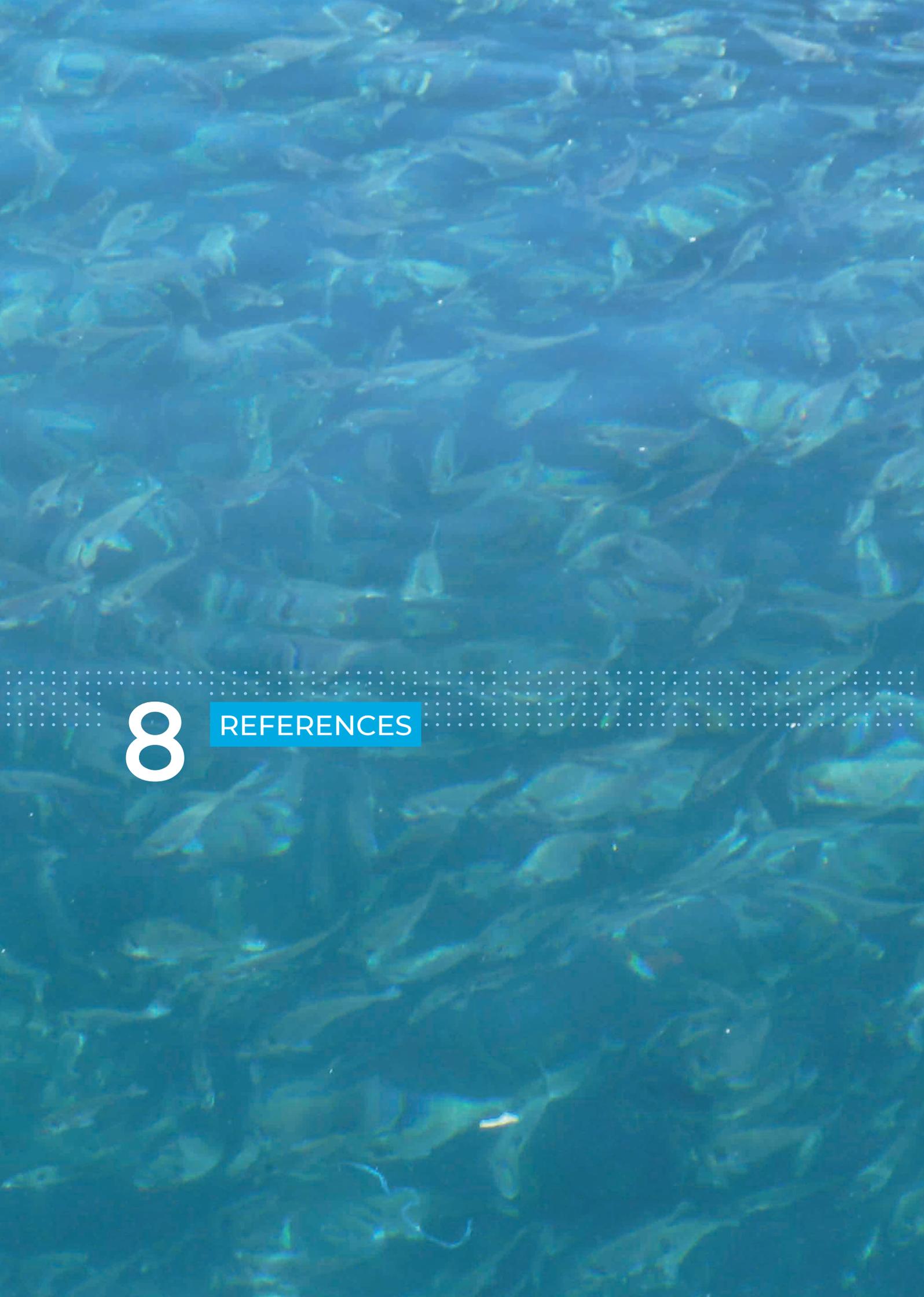
- Political will (more human and financial resources allocated).
- Create a Ministry of the Sea.

It is important that the construction process of a project is well framed and that the result of this process is respected. Prno (2013) explains that this framework is important because for such projects, stakeholders want to be sure that the project will be conducted in a reliable and responsible manner. The stakeholders met during the study attach great importance to this. Of the 20 concerns mentioned, 5 are directly related to non-compliance with agreements/regulations.

According to IUCN, the State can play the role of administrator and facilitator in this process. For instance, the actors of the Bay of Monastir (Tunisia) seem to be waiting for the State to take on this role more. But it is important that this be done in the public interest. For according to Fortin and Fournis (2013), «for several decades, the State has tended to open up as a partner or companion to economic development in the field of natural resources, creating confusion with its role as guarantor of the general interest and the common good in relation to that of economic enterprises».

This framework must be adapted to the context of the territory.





8

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