



Integrating aquaculture within local communities



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Foreword

Aquaculture producers are present in many FLAG areas, both coastal and inland, and quite a few FLAGs are already working or actively establishing links with the sector. Strengthening links between aquaculture and other sectors in the fisheries area and improving recognition of aquaculture's positive contribution are some of the main areas where FLAGs can play a role, while also bearing in mind, and responding to, the great diversity of the aquaculture sector.

The present guide is designed mainly for FLAGs (managers, employees and board members) seeking to improve linkages between aquaculture producers and other actors in their territories in an effort to boost societal acceptance and consumer perceptions of aquaculture. It will also be a useful tool for aquaculture producers in FLAG areas, and for managing authorities and national networks supporting FLAGs in this work.

The guide consists of five practical factsheets providing information, ideas and examples of how FLAGs can better integrate aquaculture into their area.

Factsheet 1 “Aquaculture as a driver of blue growth in CLLD areas”, provides basic facts about the sector, describes the different types of aquaculture present in FLAG areas and the potential contribution of the sector to local development. It also highlights the wide range of challenges faced by aquaculture, which the FLAGs can help to address; the remaining Factsheets, 2-5, focus on these challenges.

Factsheet 2 “Addressing consumer and environmental concerns at the local level”, underlines the major challenges linked to these key concerns and their impacts on the aquaculture sector. It also provides examples of activities FLAGs can initiate or support to address these challenges.

Factsheet 3 “Mitigation of user conflicts and facilitating participation in local decisions”, focuses on challenges linked to user conflicts that can arise in relation to aquaculture production, providing examples of how FLAGs can help avert such conflicts and enable producers to play a greater role in decision-making processes concerning local spatial planning.

Factsheets 4 and 5 deal with the challenges of diversifying aquaculture and generating alternative income.

Factsheet 4 focuses on “**Diversification of activities within the aquaculture sector**”, including recirculated systems, aquaponics, integrated production, etc.

Factsheet 5 looks at “**Diversification outside the aquaculture sector**”, mainly in the field of tourism, but also in the use of by-products in innovative industries.

Readers can consult the factsheets that are most relevant to the situation in their area. Each factsheet also includes a number of examples of FLAG activities, and references to further sources of information.

Throughout the text, the following types of practical information are distinguished:

 **Legislation and guidance**

 **Examples from FLAG practice**

 **Ideas emerging from group work during the FARNET aquaculture seminar.**

Factsheet

Aquaculture as a driver of blue growth in CLLD areas

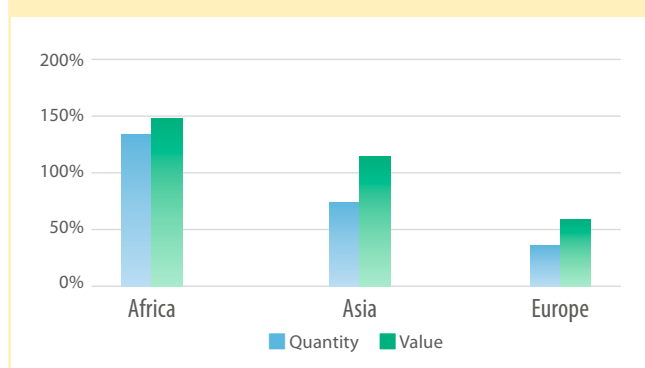
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Aquaculture in FLAG areas

Aquaculture is understood here as the **cultivation of aquatic organisms** (animals and plants). It is increasingly recognised as a vital source of food and a sustainable alternative to the capture of wild fish. Globally, aquaculture production has risen quickly over the last decade, but in Europe growth has been much slower than in other continents (see Fig. 1¹), and more than half of Europe's production comes from outside the EU (i.e. from Norway).

In the EU, aquaculture production was estimated at 1.3 million tonnes in 2015, which accounted for only 1.2% of global production². Aquaculture development is, therefore, a key priority for EU policy makers.

Fig. 1. Increase in total aquaculture production in % (2006–2015)



Aquaculture is present in many FLAG areas, but there are **significant differences** between areas. For example, in terms of the:

Coexistence of aquaculture and fisheries in the same area

In some FLAG areas, aquaculture and fishing activities coexist, while in other areas, especially inland areas in Germany, Lithuania, Poland and Slovenia, the focus is almost exclusively on aquaculture.

Scale of production

The aquaculture sector is highly diversified in terms of the scale of production. Most FLAGs are trying to support small-scale, family-owned fish or shellfish farms, but in some areas, much larger producers can also be interested in participating in the work of the FLAG³.

Type of production

The nature of aquaculture varies greatly, depending on the type of organisms farmed. These can be freshwater, marine or diadromous (species that migrate between oceans and rivers, such as salmon, trout and eels), and they are usually grouped into finfish (e.g. salmon, trout, seabass, carp and tuna), molluscs (e.g. mussels, oysters and clams), crustaceans (e.g. shrimp, crab and lobster), plants (e.g. algae) and other organisms (e.g. frogs, pearls and aquatic mammals).

1 Based on FAO data in "[Fisheries and Aquaculture Statistics](#)"

2 [Aquaculture statistics – eurostat Statistics Explained](#), September 2017

3 For example, the Croatian FLAG Plodovi Mora, where the largest tuna producer in the Adriatic is located.

FLAGs need considerable flexibility in their CLLD strategies, and a wide range of tools and methods, to cater for this diversity.

In preparation for the seminar on “[Integrating aquaculture into local communities](#)”, the FARNET Support Unit asked FLAG representatives to provide information about aquaculture in their areas. Below is a summary of the responses received from 112 FLAGs.

Marine finfish production is the most common aquaculture activity in FLAG areas, followed by freshwater fish farming and marine shellfish farming. Some coastal FLAGs combine finfish and shellfish production. A smaller number of FLAG areas also have seaweed production, usually as an additional activity to fish or shellfish farming (see Fig. 2)

Fig. 2. Type of aquaculture production in the FLAG area (%)

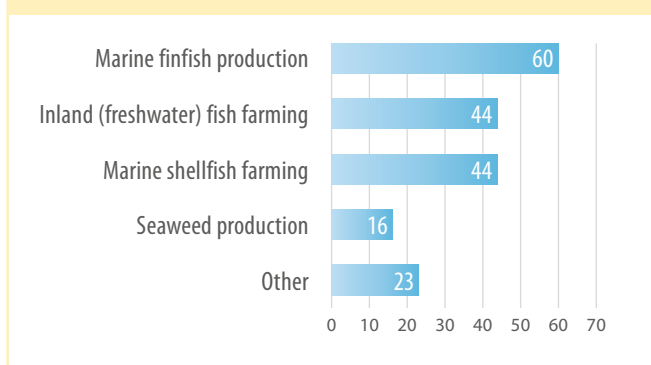
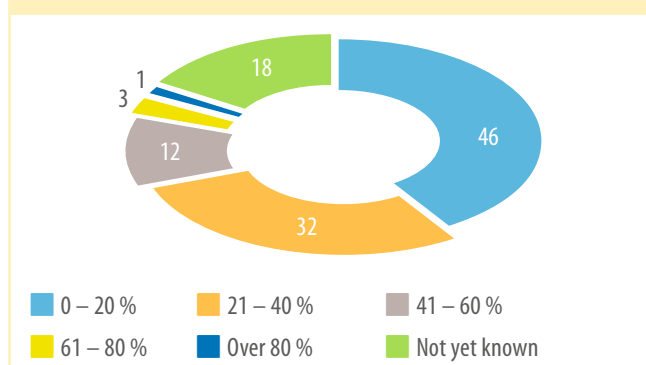


Fig. 3. The proportion of FLAG budgets allocated to aquaculture (# FLAGs)



The proportion of FLAG budgets allocated to aquaculture varies greatly, with most FLAGs allocating less than 40% of their budget to this sector (Fig. 3). Also, it seems most FLAGs have relatively little experience in working with aquaculture producers – the vast majority have supported less than five projects specifically targeting this sector (Fig. 4).

Fig. 4. Number of aquaculture projects supported

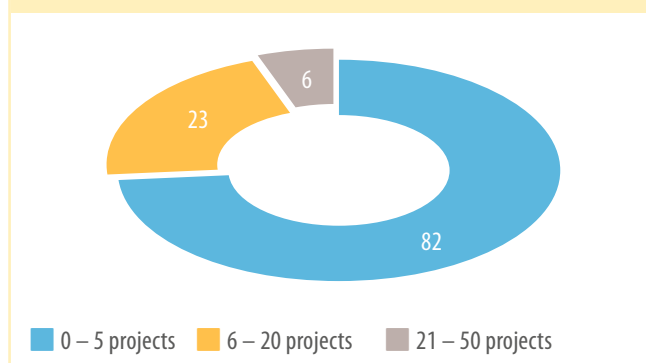
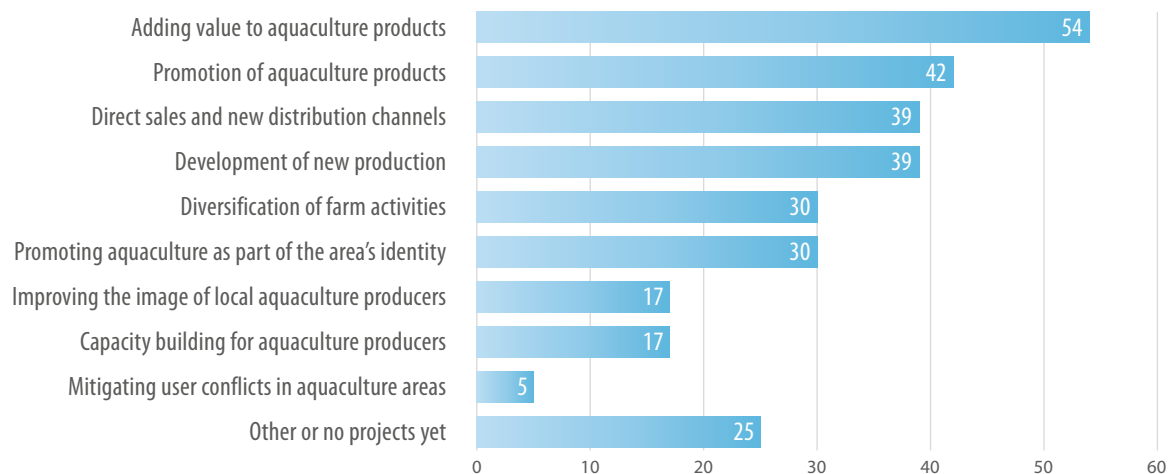


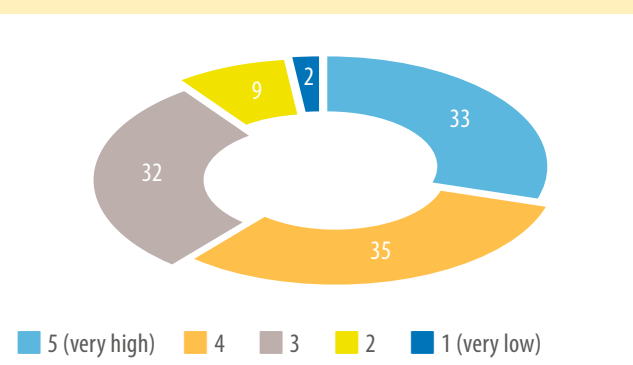
Fig. 5. Types of aquaculture projects supported by FLAGs (%)



FLAGs have financed a wide range of activities in support of aquaculture, focusing mainly on adding value to, or promoting, aquaculture products. Relatively few projects aim at capacity building, improving the image of the sector or mitigating conflicts (Fig. 5), even though many of the challenges faced by producers are linked to these issues.

FLAG respondents were also asked for their view on the potential for aquaculture development in their area. In spite of the many challenges facing the sector, most are quite optimistic in this respect (see Fig. 6).

Fig. 6. Potential for aquaculture development according to FLAGs (number of responses)



The contribution of aquaculture to local development

It has already been mentioned that aquaculture is a major source of food, and this is important not only at the global level, but also at the local level, enabling communities to produce their own food. However, at the local level, aquaculture can also provide other benefits – it can be an important driver of local development, providing employment and incomes, and contributing to the social cohesion of the area. FLAG strategies should aim at maximising the benefits of aquaculture in their areas.

Aquaculture can create jobs

According to EUROSTAT (2015), EU aquaculture provides employment for 39.000 people⁴. These jobs can be of particular importance in remote areas (both coastal, e.g. small islands, and inland), where there are few other employment opportunities. In some FLAG areas with large aquaculture farms, the sector can even be a major employer. Aquaculture jobs require specific knowledge and skills, so this sector can also contribute to raising the skills levels of the local community. However, FLAGs may have to support the development of such skills before the community can benefit from aquaculture opportunities.

Aquaculture can boost the local economy

In addition to direct income for fish or shellfish farmers and their employees, aquaculture can also be a source of additional revenue for other local businesses. Even where the production sector itself is highly concentrated, the supply chain may involve various local SMEs (such as veterinary, transportation or repair services, processing and retail etc.), which depend on aquaculture for at least part of their income. It is, therefore, important to foster local business linkages to enable SMEs from the FLAG area to benefit from the potential spin-offs from aquaculture. Aquaculture can also increase the area's attractiveness, helping to boost tourism (see Factsheet 5).

Aquaculture can contribute to social cohesion

In some remote areas, aquaculture can help to attract public investment, which in turn helps to maintain schools and other public services and to prevent depopulation⁵. In areas where the local culture, landscape and traditions are strongly linked to aquaculture, it can also contribute to a sense of local identity. Some FLAG strategies focus on strengthening the aquaculture-related image of the area, recognising the importance of identity for local development and community resilience.

Aquaculture can bring valuable linkages

Many aquaculture producers have established links outside the FLAG area, and some of these links can benefit the wider area. For example, aquaculture farmers often work closely with the research sector, and this can help FLAG areas to strengthen links with the scientific community: aquaculture research institutes are increasingly located near production sites, and some academic institutions organise traineeship for students on aquaculture farms.

It is important to remember that taking advantage of these opportunities requires a coordinated effort by the FLAG. In the remaining factsheets we present some ideas as to how FLAGs can approach this.

⁴ [Aquaculture statistics – eurostat Statistics Explained](#), September 2017

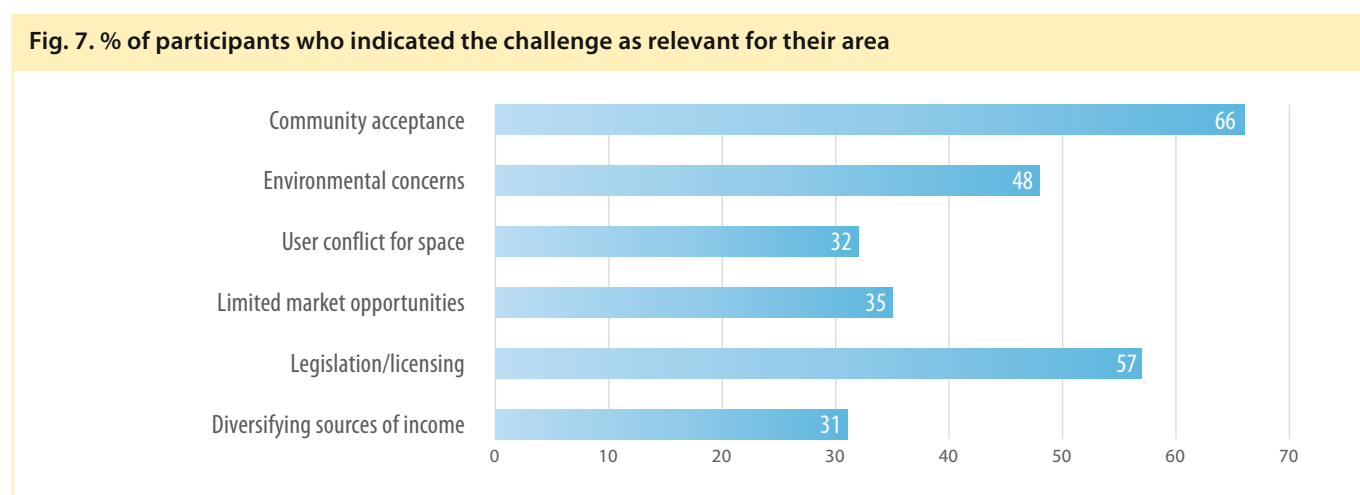
⁵ This is the case, for example, on some Scottish islands.

Challenges faced by aquaculture producers

The fact that aquaculture development in the EU is so much slower than in other parts of the world suggests that EU aquaculture producers face greater challenges, which seem to be less related to business or technological issues, and more to other types of concerns, e.g. social or environmental. Many of these challenges can be addressed with the help of FLAGs. For example:

- **Social/community acceptance:** aquaculture's potential to deliver high quality products is often not recognised; the sector can have a negative image;
- **Environmental concerns:** aquaculture can be perceived as a source of pollution, disease or biodiversity loss; it can also suffer from pollution caused by other sectors;
- **User conflicts:** aquaculture producers can have difficulties in finding space to develop or expand their activities, especially in areas with competing demands from other sectors, such as tourism, leisure or housing;
- **Limited market opportunities:** very few producers sell their products locally or manage to diversify their market channels. Many sell exclusively to highly competitive supra-national markets;
- **Legislation/licencing:** many producers find the administrative and regulatory system to be complex and not user-friendly; licencing procedures are also slow (partly linked to the lack of social acceptance);
- **Diversifying sources of income:** additional income sources (seaweed production, processing, gastronomy, tourism...) can be necessary for some aquaculture producers but they may lack the necessary contacts or skills.

During the FARNET aquaculture seminar in November 2017, participants were asked to indicate (through an on-line voting system) which of these challenges were most significant in their FLAG areas. The responses are represented in Fig. 7:



Participants also highlighted some additional challenges that were not included in the original poll but can have an important impact in some FLAG areas. These include:

- **Protected predators:** protected fish-eating predators (such as cormorants) can cause serious damages;
- **Lack of appropriate financial instruments** and bureaucracy linked to applying for funding.

The following factsheets explore options for addressing these challenges, drawing on practical examples of activities already undertaken by FLAGs.

Factsheet

Addressing consumer and environmental concerns at the local level



What is the challenge?

Aquaculture has significant potential to contribute to economic growth and job creation, and to bring new products of high nutritional value to the market, but the activities of the sector must be transparent and environmentally sustainable in order to meet with the approval of increasingly informed and environmentally literate consumers.

Following some adverse media attention, and in the context of a surge in consumer awareness of food safety issues, aquaculture is frequently seen as a potential source of problems rather than solutions. With or without supporting evidence, the sector has been implicated in cases associated with damage to the environment, animal welfare, human health and landscapes. This negative image can extend to all aspects of the aquaculture **sector**, including its **products**.

In particular, the aquaculture **sector** has to contend with some or all of the following perceptions:

- Fish farming can be a source of water pollution arising from nutrients, faeces, cleaning agents, etc.; antibiotics, hormones and other chemicals used on fish farms are also associated with certain health risks;
- Aquaculture puts pressure on wild fish stocks, as farmed fish are often fed with wild fish;
- There are also risks of genetic pollution or the spreading of parasites and diseases by alien species that escape from fish farms;
- Fish or shellfish farms have a negative impact on the landscape.

The image of aquaculture **products** is influenced by these perceptions, which can impact on consumer decisions. In addition:

- Consumers may be concerned that production conditions could be sub-optimal, with some fish suffering from overcrowding, parasites and disease;
- They may worry that some (especially frozen) fish may have been transported long distances;
- In spite of the EU rules in place to protect public health, some consumers may be concerned that water pollution may lead to periodic outbreaks of disease on shellfish farms;
- Fish from aquaculture can be perceived as being of lower quality than wild fish.

FLAGs may have to help their aquaculture producers deal with some of the above stereotypes.

What does this mean for local aquaculture producers?

This negative image of aquaculture can have an important impact on the market for farmed fish, which in turn drives down the prices of aquaculture products. Some studies⁶ show that consumers tend to prefer wild fish rather than farmed fish, primarily because of environmental concerns linked with fish farming, and not because of the quality of the product.

The negative image of the sector can have an impact not only on the behaviour of consumers, but also of decision-makers – for example, in the process of designing legislation or granting production licences decision-makers can be extremely cautious and impose excessive restriction on (potential) producers. As a result, obtaining a licence for a new fish farm can be extremely complex and time-consuming.

The importance of a supportive legal framework⁷

The impact of the legal framework on the setting up and running of an aquaculture business should not be underestimated. For many producers in the EU, this is one of the main barriers to the development of the aquaculture sector. In some Member States, the procedure for obtaining authorisation for an aquaculture farm can take two to three years⁸. Several Member States have recently launched processes to simplify aquaculture legislation. **Greece**, for example, where previously there were 14 different administrative bodies involved in issuing a licence, is now finalising a new legal framework with a simplified procedure involving a one-stop-shop for investors.

Ireland has carried out a complete review of licensing procedures, through a participatory process which involved a stakeholder consultation and a survey to identify obstacles and propose improvements. Some of the recommendations include: setting a time limit of six months for a decision on a licence application; a licencing period of up to 20 years to make it commercially viable for businesses, which have the possibility of adjusting their operations during implementation; an on-line application and monitoring system; a pre-application process which helps ensure applications are complete before the full procedure is launched; training for the staff of the licensing authority; a transparent system of informing the public about applications, etc. The review has also helped to identify the need to better link aquaculture licencing with Maritime Spatial Planning (MSP; cf. Factsheet 3 for more details), e.g. the online management system should indicate areas that are available for aquaculture.

While the legislative framework is usually handled at the national or regional level, FLAGs should be aware of its functioning in order to provide guidance to their aquaculture businesses and possibly to help them get organised in order to discuss concerns with the relevant authorities.

6 “Sustainable Seafood from Aquaculture and Wild Fisheries: Insights From a Discrete Choice Experiment in Germany”, *Ecological Economics*, Volume 142, December 2017.

7 Examples presented in this section are based on information provided at the Aquaculture Workshop for Member State administrations, organised by DG MARE in Brussels on 5 December 2017.

8 [Strategic Guidelines for the sustainable development of EU aquaculture, COM\(2013\) 229](#)

Issues concerning the image of aquaculture can also be seen as an opportunity.

In most FLAG areas local producers can, justifiably, argue that their fish or shellfish are of high quality and have been farmed sustainably. The majority of aquaculture producers supported by FLAGs are also small or medium-sized enterprises, with extensive production systems. Indeed, **some types of aquaculture are recognised as having a positive impact on the environment.**

In particular, fish farming in ponds (for example, the 1000-year-old method of carp production in Central Europe) can play an important role in protecting landscapes and biodiversity. Pond farms can also act as water reservoirs, retaining water during dry periods and helping to manage flooding during periods of high rainfall.

Shellfish and seaweed farming can also provide environmental benefits by sequestering nutrients. Shellfish farms, which are particularly sensitive to water quality, can act as an early warning for authorities of potential pollution problems.

What can FLAGs do to help producers?

FLAGs that would like to help local producers overcome barriers linked to the negative image of aquaculture or environmental concerns should consider:

1. How to address issues associated with environmental impact and product quality at farm level by capacity building and investment support;
2. How to help producers gain acceptance among the local community by raising awareness and building trust;
3. What can be done to change the perception of consumers, demonstrating the quality and the global environmental benefits of locally farmed aquaculture product;
4. How to link up with activities at the regional, national and EU levels;

Some ideas of how these questions can be addressed are presented below.

Addressing concerns at farm level

Although many aquaculture farms in FLAG areas already have a low impact on the environment, there are still producers who need support to help reduce adverse impacts. FLAGs can assist by providing:

- Guidance, training and other forms of **capacity building** in order to, for example, help producers to meet environmental obligations. This can be done in cooperation with research and educational institutions. Useful information on this topic can be found on the website of the European Commission;



EU aquaculture online, a toolbox of environmental guidelines for aquaculture in Europe



The Commission has published online a comprehensive list of resources to help producers, local authorities and the public to address the environmental impacts of aquaculture activities. Amongst the different topics covered, the following tools and advice could be particularly useful for FLAGs:

- Guidelines on the application of the Water Framework Directive and the Marine Strategy Framework Directive in relation to aquaculture (2016);

- Criteria and thresholds for requiring an Environmental Impact Assessment;
- Reports comparing regulations and technology for freshwater trout farming in selected EU countries;
- Site selection and carrying capacity indicators for Mediterranean fish farms.

More information on [Guidance documents](#) and [Exchange of national practices](#)

- **Financial support** to reduce the environmental impact of fish farms. For example, by investing in water recirculation systems (see more information in Factsheet 4), in sustainable energy systems or in other innovative solutions that can help to make aquaculture more environmentally-friendly;

Reducing the environmental impact of aquaculture (marine litter)



The Spanish **Arousa FLAG** supported the production of biodegradable nets for mussel cultivation. After carrying out various studies, and linking up with researchers, the company promoting the project created a biodegradable net, which is respectful of the marine environment and resistant to predators. This has enabled producers to obtain a certificate of ecological production, thus improving the marketability of the mussel farming sector, reducing the environmental impact of the production process, and opening up a new product line in the beneficiary company, helping to consolidate employment.

[More information](#)

- Some FLAGs also support projects that help to improve the **quality of water** used by fish producers. Such activities usually require a broader perspective, going beyond a single aquaculture farm – in this way the FLAG can help develop solutions relevant for the wider area, and beyond.

Water quality innovation for aquaculture



The French FLAG, **Auray & Vannes**, supported a project that brought together fishermen, shellfish producers and farmers, with the aim of improving water quality. The association CAP2000 helped fisheries professionals, local authorities and other stakeholders to coordinate attempts to identify and reduce the sources of bacteriological pollution that impact on local shellfish production. The ultimate goal is to help local authorities develop action plans to tackle the identified pollution, assigning specific responsibilities to each sector.

[More information](#)



The Polish FLAG, **Bytow Lake District**, supported the aquaculture company Aquamar Ltd. to address poor water quality in fish ponds and lakes due to eutrophication. The company tested many different methods of water purification, but as they were all too expensive and too invasive, Aquamar developed its own environmentally friendly biological method of water purification, which was patented in 2011. This new method proved to be very effective and 5-6 times cheaper than other chemical methods available on the market. It quickly attracted interest from customers in Poland and abroad. The FLAG also supported the purchase of a mobile laboratory which provides on-site measurements and analysis, which are necessary to plan and/or monitor water purification processes.

[More information](#)



Oyster farms in the Leucate Mediterranean lagoon in France are regularly affected by toxic phytoplankton contamination, which can lead to economic losses, especially during the busy Christmas season. In order to prevent this, the farm has teamed up with the research company, "Microbia Environnement", to develop an innovative solution to detect toxic marine microalgae and anticipate any toxic proliferation. Identifying the presence and growth of toxic phytoplankton allows farmers to harvest early and to safely store their production before placing it on the market. The **Pyrenees Mediterranean FLAG**, provided communication support to this project (initially funded by LEADER).

[More information](#)

Raising awareness among the local community and building trust

In many cases, the negative image of aquaculture results simply from a lack of knowledge. There is often no communication between fish farms and the local community: aquaculture producers tend to source their supplies from outside the area and usually they sell their products on the wider market, rather than locally. Moreover, the local population does not always have the skills needed for aquaculture, so fish or shellfish farms often employ people from elsewhere.

FLAGs can help build linkages between aquaculture producers and the local community, and thus raise awareness of and trust in aquaculture. This should also, eventually, lead to greater acceptance of aquaculture farms in the FLAG area (and beyond) and help improve the overall image of aquaculture. Where possible, FLAGs can also support skills development among the local inhabitants, and help to strengthen business linkages within the area, for example by organising business-to-business events.



Helping aquaculture producers develop links in the community



The **West FLAG** from Ireland has supported cooperation among a group of shellfish farmers, shellfish exporters, inshore fishermen, and marine heritage enthusiasts who have formed a community-based organisation to improve the quality of life, environment, economy and maritime heritage around Galway Bay. Together they work to reconnect the local community with the bay's activities, organising demonstrations and tasting events, as well as workshops to plan the rejuvenation of the native oyster. Linkages have been established with schools, local authorities and state agencies. Promotional material and a website are also being developed.

[More information](#)



To ensure a better integration of the fisheries sector within the community, the Polish FLAG, **Our Krajna and Pałuki**, has been working closely with the largest carp producer in its region to encourage local fish consumption and improve environmental awareness. In cooperation with the fish farm and other actors, the FLAG has organised a series of activities including fish farming demonstrations and carp filleting shows, bird camps, cross-country running and geocaching on and around the farm, all of which have helped the farm take on a more active role in the community, while also increasing direct sales.

[More information](#)



In the harbour town of Ebeltoft in the **Djursland FLAG** area in Denmark, where fishing activities have declined, a voluntary association was created to set up a sustainable sea garden near the port for local community members to grow shellfish and seaweed on a small-scale. A dynamic network of about 80 gardeners has taken root, bringing new life into the harbour. They mainly grow mussels, but also seaweed and oysters, contributing to a cleaner marine environment.

[More information](#)

Getting the message across to consumers

Even when aquaculture producers can demonstrate that their products are of high quality and produced in an environmentally sustainable way, they may need help to get this message across to consumers. FLAGs can have an important role to play here, not only by helping producers establish contacts with the local retail or gastronomy sectors (as discussed in the previous section), but also by supporting **promotional activities** that can help convince consumers to buy local aquaculture products. Such activities may include:

- Fish/shellfish festivals and fairs, with attractions such as tasting sessions, angling competitions, etc.;
- Cookery books with recipes or cooking lessons showing how local fish can be prepared (this can be particularly important for some, especially freshwater fish species which have a reputation of being difficult to cook);
- Activities organised jointly with local schools and youth organisations to promote fish consumption and healthy lifestyles;
- Working with local canteens in schools, kindergartens, hospitals, prisons etc. to encourage them to serve locally sourced fish (see more ideas at the end of the factsheet).

One way of responding to consumer concerns about the quality, safety, or sustainability of aquaculture product is through **certification**. In Europe there are over 35 different voluntary certification schemes for aquaculture products (see the [ITC Standards Map](#)). This gives considerable choice to producers, but as a result, consumers can sometimes be confused and uncertain as to which of the many labels they can trust. FLAGs should encourage their local producers to carry out a careful analysis of the costs involved (these costs can be quite high) and the expected benefit from increased sales or better prices.

The Aquaculture Stewardship Council



One of the most trusted certification and labelling schemes is managed by the Aquaculture Stewardship Council (ASC), an independent, international non-profit organisation established in 2010 to help boost the development of aquaculture, whilst minimising its negative impacts on the environment. Over 10 000 products from over 600 aquaculture farms located across the world have so far been certified. In recognition of the fact that the certification process for small or medium-sized fish farms can be very costly, the ASC is currently adjusting its certification requirements to enable groups of farms to work collectively towards compliance with ASC standards for responsible aquaculture. This group certification system, which should be put in place in 2018, will also reduce the cost of audits for individual producers.

[More information](#)

Some fish farmers may seek certification as **organic producers**, as in the examples below.

Organic certification of aquaculture



In the area of Oberlausitz (Germany), producers have been witnessing a decrease in the consumption of carp due to a lack of interest and awareness among the younger generation. They have also struggled with KHV, a fish disease that impacts negatively on production levels and for which no solution has yet been found. In an effort to improve the environmental conditions in which carp are being raised, and promote a fresh and healthy image, producers in Upper Lusatia decided to convert to organic production. With the support of the **East Oberlausitz FLAG**, production methods were overhauled and a range of new fresh and smoked products were developed, in cooperation with a modern Saxon processing plant. A common branding was also created for the organic carp products. Marketing of the products is carried out jointly, and a small group of local fish farmers oversee the quality of the fish. The project also involved the design and production of consumer brochures and equipment for participating in relevant trade fairs.

[More information](#)



On the French Mediterranean coast, an aquaculture business called “Provence Aquaculture”, which was set up in 1989, is breeding finfish in a creek off one of the Frioul Islands (located in Calanques National Park). It was the first Mediterranean aquaculture farm to obtain a certificate for organic finfish production in 2002. The organic production system requires the company to follow strict rules, ensuring the fish do not suffer from stress or diseases. It is guided by three principles: respect for the environment, respect for animal welfare and respect for the consumer. Advocating quality over quantity, the business currently produces around 60 tonnes of fish per year, which is 100% organic, and employs three people.

[More information](#)

Linking up with campaigns at regional, national and EU levels

Although FLAGs can have a very important role to play in helping to improve the image of aquaculture at the local level, their impact is rather limited when it comes to reaching consumers at regional, national or EU levels, which is important for aquaculture producers, who often sell their products a long distance from the place of origin. If FLAGs wish to help with this, they may need to link up with broader campaigns aiming to raise awareness about aquaculture, such as the “Farmed in the EU campaign” launched by DG MARE.

Farmed in the EU



“Farmed in the EU” is an information campaign which aims to inform potential consumers about aquaculture and aquaculture products, presenting them as “fresh, local and healthy”. It provides information and free educational material. One of the key tools of the campaign is an educational project, designed to raise awareness among teenagers, e.g. through visits to schools by local fish farmers. The project encourages young people to research different marine and freshwater species and different aquaculture production methods, explore the role of aquaculture in food production and in preserving the environment, and to discover the different business and career

opportunities aquaculture offers. Some Member States (e.g. Spain) have launched their own national campaigns using the EU material.

[More information](#)

Ideas that emerged from the FLAG discussions

The challenges addressed in this factsheet were discussed during the FARNET seminar on “[Integrating aquaculture within local communities](#)”.



Facilitate exchanges and trust-building between aquaculture producers and the community through:

- The organisation of meetings with all local stakeholders, including those opposed to aquaculture;
- “Aquaculture Open Days”, to increase opportunities for encounters between the local community and aquaculture producers, ensuring that the “human face” of aquaculture is visible to the public;
- The organisation of summer camps in fish farms;
- A quality label for local aquaculture to improve traceability and as a new tool for communication;
- Encouraging “local peer review” – self-monitoring by producers leading potentially to a local trust-based label;
- A media campaign to increase fish consumption, making sure that producers use a common logo and message;
- Developing “school gardens” to help young people get acquainted with aquaculture in practice – in Ireland, the **North FLAG** is helping a local primary school to develop a site where children can cultivate indigenous species of molluscs and seaweeds. They expect to receive a licence in 2018.

An **Action plan** that helps develop business linkages with aquaculture could include the following:

- **“Dynamic mapping”** – listing all aquaculture businesses with links with other companies, identifying any gaps;
- **“Aquaculture B2B Open Days”** – a matchmaking event to improve linkages between aquaculture companies and other local SMEs (taking into account that business professionals are usually very busy and need to be convinced of the benefits before they come to such events)
- **Analysis of results** of the matchmaking (contracts, projects, partnership, applications for FLAG funding)
- **Engaging with the public** based on these results, including cookery shows, events and awareness raising activities.

Related research:

TAPAS (Tools for Assessment and Planning of Aquaculture Sustainability) is a collaborative research project funded by the EU’s Horizon 2020 programme for research and innovation. The project will help the European aquaculture sector to investigate the constraints to fish farming in different locations, the public perception, the potential environmental impacts and future risks. It will develop tools to support transparent and efficient licensing, and to enhance environment sustainability and aquatic food security, while also tapping into the potential for food production and jobs. Training and outreach activities will help to improve the image of European aquaculture and promote an integrated strategy for long term sustainability.

Factsheet

3

Mitigation of user conflicts and facilitating participation in local decisions

What is the challenge?

Whether carried out at sea or on land, aquaculture production usually takes up a lot of space and needs access to good quality water. In many areas there are conflicts between stakeholders wanting to use the same space for different purposes, and this can limit the development potential of the aquaculture sector.

Decisions about the use of space can be extremely controversial and can cause long-lasting conflicts in the local community. One of the key tools to mitigate these conflicts is spatial planning, i.e. defining what types of activities are allowed in different zones. A variety of legal acts regulate planning at Member State (and sometimes regional) level. In order to ensure that the development of aquaculture in the FLAG area is not constrained by user conflicts, the FLAGs should understand how spatial planning decisions are made in their Member State (or region) and who is responsible.

In addition to national/regional rules, the planning process also has to take account of EU legislation, such as the [Marine Strategy Framework Directive \(MSFD\)](#), the [Water Framework Directive \(WFD\)](#), the [Habitats Directive](#), the [Birds Directive](#), as well as the [Strategic Environmental Assessment \(SEA\) Directive](#) (dealing with plans and programmes for land use, transport, energy, waste etc., adopted by public authorities at national, regional or local levels), and the [Environmental Impact Directive](#) (relevant for individual projects). Recent EU legislation also requires Member States to implement [Maritime Spatial Planning \(MSP\)](#).

Maritime Spatial Planning (MSP)



The term “marine spatial planning” was first defined in 2006 at a UNESCO international workshop: *“Marine spatial planning is a way of improving decision making and delivering an ecosystem-based approach to managing human activities in the marine environment. It is a planning process that enables integrated, forward looking, and consistent decision making on the human uses of the sea. Marine spatial planning is analogous to spatial or land use planning in terrestrial environments”.*

Even before the emergence of the MSP concept, several Member States were already implementing similar measures, following the EU Integrated Coastal Zone Management (ICZM) Recommendation ([2002/413/EC](#)). This Recommendation encourages MS to take a strategic approach to the management of coastal zones and outlines key principles and steps for developing national strategies for ICZM.

The Integrated Maritime Policy (IMP) of the EU identifies maritime spatial planning as a cross-cutting policy tool, enabling public authorities and stakeholders to apply a coordinated, integrated and trans-boundary approach to the use of maritime space. The Maritime Spatial Planning Directive (MSPD, [2014/89/EU](#)) establishes a framework for maritime spatial planning using an ecosystem-based approach to contribute to the sustainable development of land-sea activities and promote their coexistence by involving all stakeholders. The MSPD requires all Members States to:

- Develop and implement maritime spatial plans and coastal management;
- Mutually coordinate or integrate plans and strategies to ensure land-sea connectivity;
- Cooperate with other MSs and third countries to ensure coherent approaches across sea-basins;
- Ensure appropriate consultation with stakeholders (including fishing and aquaculture communities).

The effectiveness of this process is greatly enhanced when information is publicly available at an early stage and where relevant stakeholders, authorities and the public are involved from the beginning.

The European Commission has put in place an assistance mechanism to provide administrative and technical support to EU countries implementing the MSP legislation. This includes a dedicated website: www.msp-platform.eu

One way to ensure that certain areas are earmarked for the development of aquaculture is the “Allocated Zones for Aquaculture” (AZA) designation. For example, the designation of AZAs is recommended by the General Fisheries Commission for the Mediterranean and Black Sea (GFCM), which in 2012 adopted a resolution for the establishment of an AZA ([GFCM/36/2012/1](#)). Zoning may determine i.e. “areas suitable for aquaculture activities where its development will be given priority”, “areas suitable for aquaculture activities but with special regulations and/or restrictions”, and “areas unsuitable for aquaculture activities”. The zoning process for the establishment of AZAs should be transparent and follow a participatory approach. It should also be coordinated with aquaculture licencing procedures (see Factsheet 2).

What does it mean for local aquaculture producers?

Aquaculture producers have to take account of relevant rules and regulations at national/regional and EU level, and also the multiple interests of actors at the local level. The following sectors in particular can have interests conflicting with those of aquaculture:

- › Tourism, recreation or construction, which can compete for space along the coast or for access to coastal waters⁹;
- › The agriculture sector, especially in relation to water quality;
- › Other users of marine waters, in particular fishermen, the marine transport sector or the dredging industry.

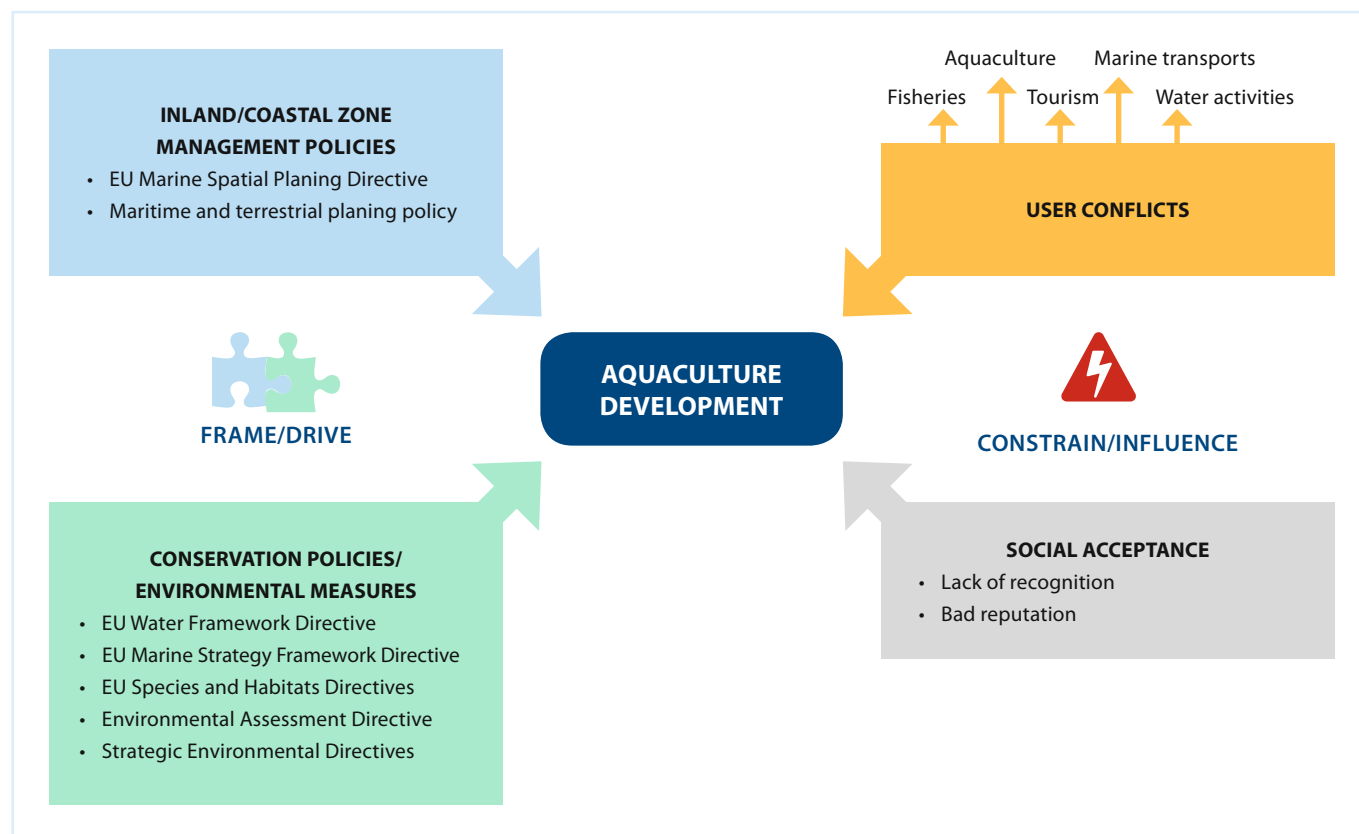
These conflicts can be further exacerbated by administrative obstacles, such as:

- › Overlapping responsibilities of entities in charge of environmental and nature conservation issues;
- › Lack of flexibility of planning legislation, where public officials have no scope to negotiate between different interests and look for compromise solutions;
- › In some areas, inadequate planning processes, where decisions are driven by the strongest stakeholders (e.g. developers).

These conflicts and obstacles can impede the development of the aquaculture sector, e.g. when authorities taking decisions about space for aquaculture overuse the precautionary principle and, consequently, refuse applications for the development of new production sites.

⁹ Even when they are not competing for the same space, these actors may be opposed to aquaculture developments for fear that it could spoil the view or reduce the value of the property.

The diagram below illustrates the complex situation of aquaculture development in the EU.



Once a situation of conflict emerges, it requires a lot of time and effort by many parties to find a resolution, especially if emotions come into play. This is why it is better to try and prevent conflicts instead of having to mitigate them. Some of the possible ways to do this include:

- Better communication and dialogue between stakeholders, making sure that different interests are clearly voiced;
- Ensuring the involvement of the aquaculture sector in local decision-making;
- Improved planning of land and marine space, with sufficient flexibility to adapt to the local context;
- Safeguarding the activities of the primary sectors, including aquaculture, in spatial planning;
- Using planning tools that take into account updated information, using research results and web-based instruments;
- Where possible, promoting synergies between actors, e.g. with wind farms or oil/gas extraction facilities¹⁰.

It is also essential to address the negative image of aquaculture through information, education, developing trust and through demonstrating the potential benefits of the sector, in terms of its social, environmental and economic impacts (see more information in Factsheets 1 and 2).

¹⁰ The Belgian Research Institute for Agriculture, Fisheries and Food (ILVO) has carried out [a study on how fishing can be combined with offshore wind farms](#)

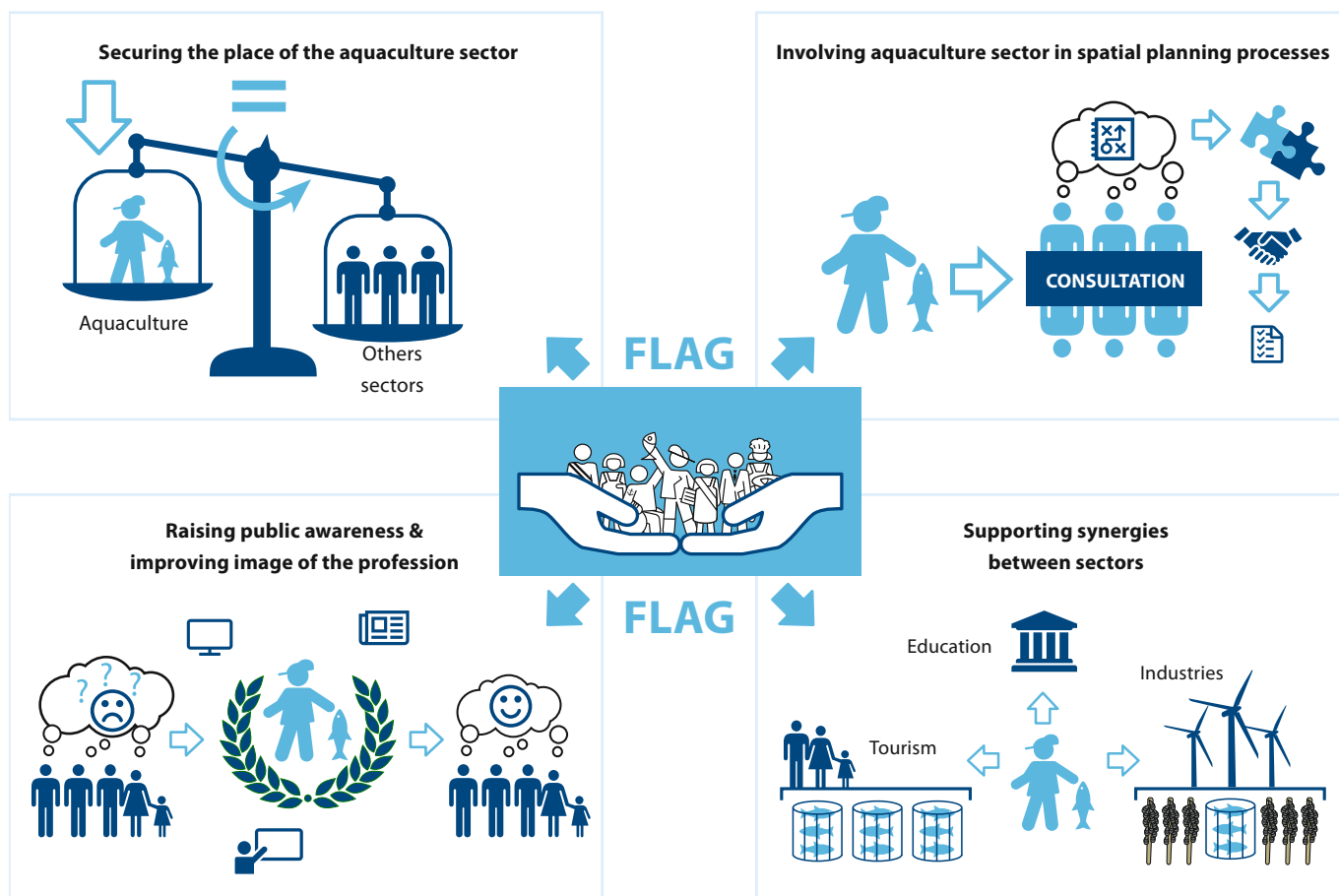
What can FLAGs do to help?

Although most planning rules and regulations are developed at the national, regional or EU levels, their application usually happens at the local level. FLAGs can, therefore, play an important role in mitigating or preventing local user conflicts, and some examples already exist of how this can be done.

FLAGs support in mitigating or preventing user conflicts can involve:

1. Securing the place of the aquaculture sector;
2. Raising public awareness and improving the public image of the profession;
3. Involving aquaculture in spatial planning processes;
4. Supporting synergies between sectors.

These four types of FLAG activities are illustrated below.



Some ideas for improving the image of the profession are found in Factsheet 2, and for supporting synergies between sectors in Factsheet 5, so in this Factsheet we will primarily focus on ideas for how FLAGs can strengthen the position of the aquaculture sector and ensure its involvement in spatial planning processes.

Securing the place of the aquaculture sector

FLAGs are very well placed to help the aquaculture sector to become more visible and better supported by the local community. This is especially the case in areas where aquaculture is an important source of jobs and/or a key element of the area's identity. FLAGs can help to ensure that the sector is not restricted or pushed out by potentially more profitable industries.



Strengthening the position of aquaculture producers



The French FLAG, **Auray & Vannes**, has supported the local shellfish sector in its endeavours to restrict the conversion of oyster farms into secondary residences and other developments. It has been instrumental in attracting the support of a wide range of actors for a shellfish farming charter, "*charte conchylicole*" (signed in July 2011), which regulates such conversions and provides guidelines to all members of the regional shellfish committee. The charter is not a legally binding document, but it derives its strength from the collective process underpinning its development and the mutual commitment of the partners. Thus, the project has helped to strengthen the place of aquaculture producers in the territory, prevented new user conflicts (e.g. with tourism), and contributed to the preservation of the area's shellfish culture and identity.

The Pays d'Auray has also developed a territorial planning strategy known as the SCOT (*Schéma de Cohérence Territoriale*) and ensured representation of the fisheries and aquaculture sector in the process. This resulted, for example, in one of the objectives of the SCOT focusing on preventing urbanisation near shellfish areas and keeping water quality issues high on the local agenda.

[More information](#)

Involving the aquaculture sector in spatial planning

Many FLAGs try to help local fisheries or aquaculture representatives to play a more active role in local governance. Supporting aquaculture producers to have a voice in local spatial planning can be an important step in this direction.

For example, a FLAG can work with different local actors involved in decision-making to inform and convince them of the need to take into account the needs of the aquaculture sector. However, the FLAG should also make sure that the aquaculture producers themselves are capable of taking part in the planning process. This may mean helping the producers to get organised and speak with one voice, as well as training and capacity building to help them understand the challenges and to be able to come up with forward-looking proposals. They may also need help to be able to participate in meetings and discussions.



Enabling the aquaculture sector's involvement in local planning



The area of the Portuguese FLAG, **Sotavento do Algarve**, includes a valuable Natura 2000 site – Ria Formosa (designated as a Special Protection Area), which is also subject to heavy pressure linked to the development of tourism and water-based activities. An ICZM plan for the area is implemented by the publicly owned company, *Polis Litoral Ria Formosa*. The company has launched, among others, a project to analyse shellfish and finfish aquaculture activities in the Ria Formosa, to gain a better understanding of the interactions between aquaculture and the environment, and to promote the sustainable development of aquaculture. The aim is to harmonise different uses and activities without compromising ecosystem services and respecting environmental, economic and social objectives.

Potential conflicts of interests can arise between environmental protection and the aquaculture activities in or near the Ria Formosa Natural Park. However, the farms can also be affected by shipping activities. Spatial planning aims to help resolve these conflicts, based on an analysis of alternative scenarios and ecological models. The FLAG is working hand in hand with the Polis Litoral company to support this process, including facilitating consultation with aquaculture stakeholders.

More information



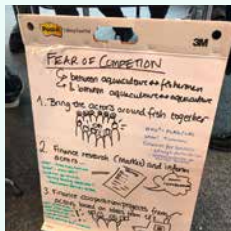
The French FLAG, **Marenes Oléron**, has supported its fisheries and aquaculture sector to take part in the process of developing a Marine Natural Park (MNP). Discussions about the strategy for the MNP lasted for over a year and involved about 150 people and thirty working groups. Representatives of the sector were motivated to have their views taken on board in the design of the MNP. However, to guarantee a permanent presence at meetings and ensure the voice of the sector was not only heard but also understood by non-fisheries stakeholders (scientists, NGOs, society representatives), the recruitment of a mission coordinator on a one-year renewable contract was funded by the

FLAG. The coordinator, with both scientific knowledge and practical experience in fisheries, represented the fisheries and aquaculture sector's interests in all advisory committee meetings and ensured on-going information about the process, summarising technical information and communicating it to the fisheries stakeholders. As a result of this work, several concerns of the sector were taken into account in designing the MPA. Increased cooperation and mutual understanding among the different fisheries actors has also been observed.

More information

Ideas that emerged from the FLAG discussions

The challenges addressed in this factsheet were discussed during the FARNET seminar on “**Integrating aquaculture within local communities**”.



One of the potentially important user conflicts identified by FLAGs was that between aquaculture and fisheries (in areas where these two sectors co-exist). Several ideas were put forward to avoid this, such as:

- ensuring that some projects targeting aquaculture also involve fisheries actors;
- involving “hybrid” stakeholders – professionals or local community members with knowledge of both sectors.

An **Action plan** that could help overcome conflicts between aquaculture and fisheries (and also help avert competition between aquaculture producers themselves) could include the following:

Bringing actors from both sectors together; this requires communicating to them the potential benefits of cooperation;

Financing market research to explore possibilities for joint marketing, while also tackling barriers identified in the preliminary phase of cooperation;

Supporting joint projects developed by actors from both sectors.

Other ideas to overcome potential user conflicts include:

- setting up a local “steering committee”, involving producers, local politicians and NGOs, to promote dialogue across sectors (this could, for example, help to reduce the risk of appeals against the approval of new aquaculture farms);
- the use of gamification techniques to mitigate user conflicts (for example, a number of games, with or without computers, have been developed to simulate the process of maritime spatial planning, see: www.mspchallenge.info).

Related research:

COEXIST – a multidisciplinary project funded by the EU’s 7th Framework Programme for Research and Technological Development (project completed in 2013) – aimed to evaluate competing activities and interactions in European coastal areas in order to develop a roadmap to sustainable integration of aquaculture and fisheries. A number of tools and resources were developed by the project partners, including a model (for licensing purposes) to determine the appropriate shellfish or fish densities for optimal carrying capacity, and a tool for stakeholder consultations.

AquaSpace – a Horizon 2020 project to identify key planning issues for aquaculture development using the ecosystem approach, and to evaluate a wide variety of tools and spatial planning methods. One of the outputs will be a toolbox to facilitate an analysis of spatial management options to support the licensing process and investment decisions in a given spatial planning context, while also taking into account the constraints identified through the stakeholder engagement process.

Factsheet

4

Diversification of activities within the aquaculture sector

Description of the challenge

Aquaculture literally means culture in water and therefore encompasses a wide variety of production activities, from shellfish to seaweed, from fish to urchins, inshore and offshore, in recirculation or other systems, the possibilities are endless. With the more traditional types of production (traditional cage or flow through fish production systems or oyster and mussel production) facing increasing challenges associated with their impact on the environment or the use of coveted coastal space, the development of alternative or complementary production methods are becoming more and more attractive.

Some of these new production methods can make use of space which was previously not suitable for aquaculture, such as the offshore marine environment or rural areas where conflict and pollution can be more easily managed. Others can serve to mitigate the environmental impacts of production by creating a virtuous cycle, where the outputs of one part of the production system are recycled as inputs for another.

What can FLAGs do to help?

The common challenge with these new production techniques is that they are innovative and, as yet, unproven. Some rely heavily on new technologies which have to be developed and tested before becoming commercially viable, others challenge the existing legal framework, which are not adapted to these new production processes.

As multi-stakeholder bodies active at local level, FLAGs are well placed to nurture innovation. By pooling competences, resources and networks, they have helped to support the development of many innovative projects at local level. More specifically, FLAGs can:

- › Finance small scale research initiatives aimed at solving local technical problems;
- › Bring together the different competences (scientific, technical business, marketing knowledge) needed to transform research into workable local solutions;
- › Support networking between producers (from the same or different FLAGs) willing to develop similar initiatives to exchange knowledge and experience;
- › Help local producers navigate the regulatory framework;
- › Help bridge the gap between local authorities and innovators;
- › Reach out to the local community to ensure that the benefits of innovation are felt locally, thereby helping to secure local acceptance of innovative projects.

Recent developments in the aquaculture industry

We present below a selection of the most important developments in the aquaculture sector in recent years, illustrated with concrete project examples. Some of these activities or technologies are more mature than others, but none are fully mainstreamed, leaving considerable room for development at local level.

Recirculation systems

Recirculation systems in aquaculture (RAS) have been developed in response to increasing pressure on classical “flow through” fish farming systems and aim to reduce discharges in the natural environment. In traditional farming systems, water enters the farm on one side and exits it on the other, carrying with it the by-products of fish production (fish faeces, ammonia...) which can impact negatively on water quality. These production systems require large amounts of water, ideally with a stable temperature and flow, and discharge high levels of nutrients in the environment. In addition, there is also a risk of fish escaping or disease spreading as the production process is directly connected to the ecosystem.

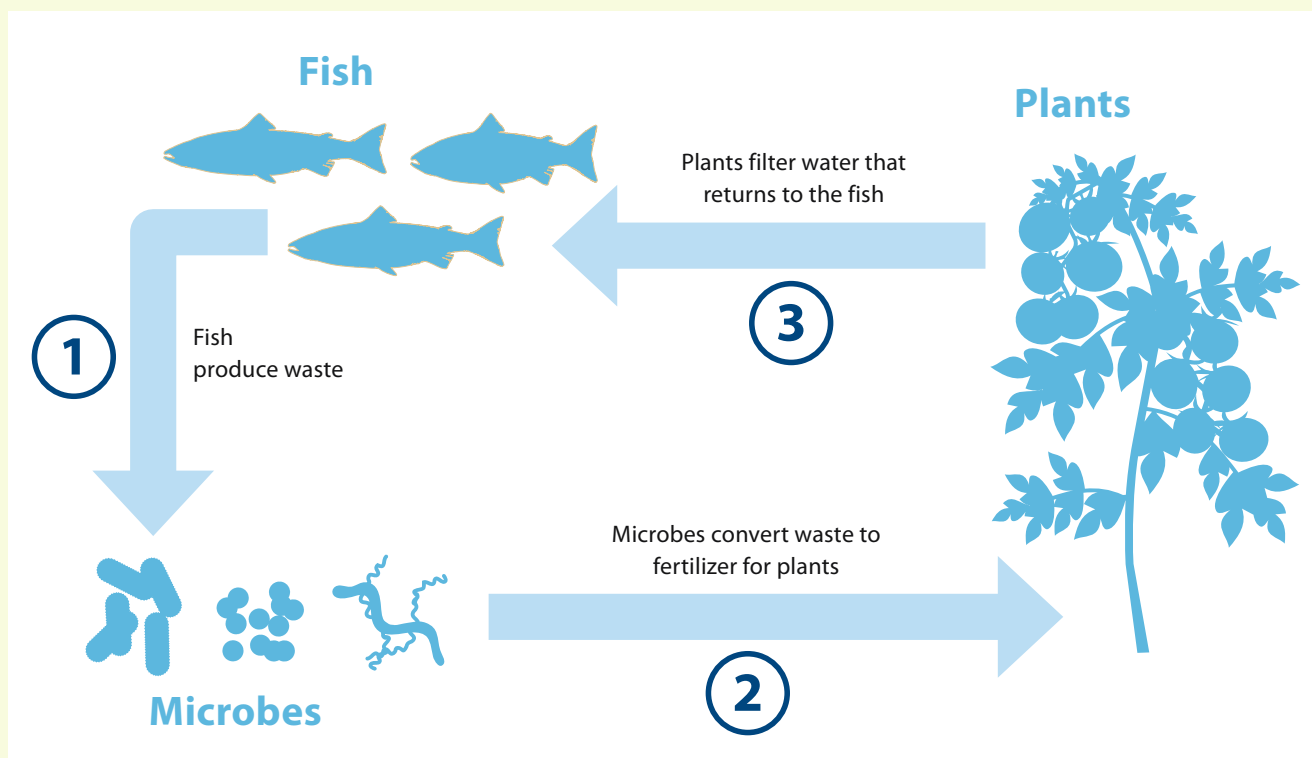
In recirculation systems, the water used for during the production stage is recycled and reused, significantly reducing water intake but also allowing for the by-products of the production to be collected, thereby limiting the impact on local water bodies. If well insulated and fitted with an efficient heating system, these systems also present the advantage of maintaining a stable temperature, which can mirror the optimal condition for growing any species, even those that are not naturally present in the local environment.

By reducing discharge levels and with location possibilities independent from specific environment features, these systems help to mitigate social acceptance risks linked with local pollution or competition for space.

However, these systems are capital and technology intensive. Indeed, the investments required to set up such a system are high as facilities have to be of the highest standard (in particular, to limit energy consumption for maintaining the temperature and cleaning the water) while they also require a high level of expertise to run the system, which relies on advanced filter mechanisms to ensure optimum water quality.

[More information on recirculation systems](#)

Aquaponics



A recent development of recirculated systems is their integration with plant production. Indeed, the name aquaponics derives from aquaculture on one side and hydroponics on the other. Hydroponics is the culture of plants on nutrient-enriched water, limiting the need for substrate (e.g. soil).

In aquaponics, the nutrients produced by the fish and dissolved in the water serve as a food source for the plants. This method allows fish farmers to diversify their production while reducing their environmental impact by making use of outputs that would otherwise be discarded. These systems can, however, be quite challenging to run as they require advanced expertise in both fish and plant production.

The [EU aquaponics hub](#), funded by the [COST](#) programme, provides useful information on the four main components of aquaponics: systems, fish, plants and legislation. "[Backyard aquaponics](#)" proposes a more hands on introduction to aquaponics.

The [TomatoFish project](#) in the [Inland fishing Mecklenburg Lake District FLAG](#) area (North East Germany) was set up as a demonstration site for the integration of tomato and fish production. The aim is to produce around 25 tonnes of fish (catfish/tilapia) and 10 tonnes of tomato every year in an aquaponics system. The project is the result of a collaboration between the largest traditional freshwater fishery in Germany ([Fischerei Müritz](#)) and a research institute specialising in water ecology and inland fisheries ([IGB](#)). The Müritz fisheries was keen to get involved in this project as its traditional fisheries activities have come under pressure due to predation (cormorants) and the need to maintain high water quality. It has already successfully diversified into tourism activities (such as angling, boating, accommodation, hospitality, fish sales) and aquaponics represents yet another way to generate additional income.

More information

Integrated multi trophic aquaculture (IMTA)

As demonstrated by the aquaponics systems, the output generated by fish farming can represent a valuable source of nutrients for other types of production. Integrated multi trophic aquaculture (IMTA) pushes this logic further by looking for symbiotic or positive interactions between different types of aquaculture located at various trophic levels (i.e. feeding on different food sources) to create a virtuous production loop, improving the sustainability of the entire system.

The most common types of IMTA are those seeking to integrate fish production with shellfish (mussels, cockles...) and/or seaweed cultivation. A common issue faced by IMTA systems (and often experienced with innovative systems) is the lack of an appropriate regulatory framework, which can lead to non-adapted regulatory measures and limited availability of public support or, worse, block developments due to the void in the legislation governing production licenses or planning permits.

FLAGs can act as brokers between local regulators and entrepreneurs willing to develop IMTA projects. In cases where new or revised legislation is needed, input from FLAGs facing similar constraints can help in finding good solutions, as was the case for pesca-tourism in France, an activity previously forbidden but subsequently allowed under certain conditions, thanks partly to the combined action of FLAGs¹¹.



GreenWave (IMTA) as a model for the next sustainable farming revolution



While IMTA has been struggling to take off in the EU, the **GreenWave project** is leading the charge in the development of this technology in the US. GreenWave is led by a former fisherman and aims to replicate a model of “3D ocean farming” (or underwater gardens) to create clusters of sustainable integrated farms around the US and the world, growing a mix of seaweed and shellfish that require zero inputs, while sequestering carbon and rebuilding reef ecosystems. GreenWave has started training would-be farmers and aims to make IMTA easy and affordable (it claims capital investment can be as low as US\$20 000). GreenWave provides advice and support on legal and permit issues, technical issues, equipment, seeds and marketing. The potential of the GreenWave model has been acclaimed widely. It has even been nominated by both the **Time** and Rolling Stones magazine for its innovation potential.

Seaweed culture

Seaweed is becoming increasingly popular, consumed directly (e.g. in salads, sushi, etc..) or indirectly (as a dietary supplement, gelling agent, animal feed, etc..) or as a raw material for the biotechnology industry (for use in cosmetics, fertilisers, fuels, effluent water clean-up, etc.). The innovation potential of seaweed is almost limitless. Increasing popularity means that wild harvests of seaweed will increasingly struggle to meet demand, both in terms of quantity and quality and this presents a major opportunity for aquaculture.

Micro algae (mostly used in the biotechnology or indirect human consumption) can be grown using the recirculation systems presented above, but macro algae (used by all sectors) still require large amounts of space. And while cultivation of algae can actually benefit the environment, for example by removing excess nutrient stemming from fish farming, the space it requires on the coastline can generate conflicts with other users. In addition, monocultures of seaweed support a less diverse ecosystem than naturally occurring seaweed fields, which could lead to concerns regarding the loss of biodiversity. On the other hand, seaweed farming can produce more tonnage per hectare than the controversial land-based soy culture, which is currently the main source of global vegetable proteins.

11 FARNET Good Practice

Supporting innovative uses of seaweed



The Finnish FLAG, **Kainuu-Koillismaa**, supported a project that explored the possibility of using duckweed (*Lemna minor*) to capture nutrients from a fish farm to produce feed ingredients that can replace imported feed such as soybean. If successful, this pilot project will help fish farms become more environmentally sustainable and more cost-effective.

[More information](#)



The range of applications for seaweed by-products is very wide, as exemplified by the Omega 3 seaweed project supported by the Spanish **Costa da Morte FLAG**. This project was led by two young entrepreneurs who worked with local fishermen to collect and identify the best local micro algae from which to derive Omega 3 rich oil. The aim was to farm this seaweed to develop an alternative eco-friendly source of Omega 3 without increasing the fishing effort. Two new jobs have already been created and commercial production is starting soon, with contracts already signed with the first customers.

[More information](#)



In Latvia, there is no seaweed industry, despite the fact that seaweed is abundant in Latvian waters, to the point that it sometimes becomes a nuisance for the tourism industry when washed up on beaches. All Latvian FLAGs are, therefore, teaming up in a cooperation project to finance a study aimed at assessing the seaweed production potential from Latvian waters along with options for a production management plan to ensure a sustainable exploitation of this resource.

[More information](#)

Seaweed production can also represent an interesting option for the conversion of former saltpans or oyster production areas, as demonstrated by the **Necton** company (Portugal), which successfully integrates seaweed production with salt and fish farming in the Ria Formosa National Park.

At EU level, the **Algal Information Network** supports the transfer of information and knowledge on algae production. The network has developed a series of **decision support tools**, which allow different production hypothesis to be tested, and provide a mapping of stakeholders and production sites in the EU. NETALGAE is another European network that aims to connect the different stakeholders involved in the marine macroalgae sector. It produces an **industry directory**, mapping out the key players in this value chain (from primary producers to processing) in the EU.

Marine worm farming

Marine worm farming is still a relatively unknown, marginal industry, but a **recent study** valued the global market for marine worms at around UK£6 billion for a production of close to 120 000 tonnes. Marine worms are one of the main bait used by anglers throughout the world.

Sea worms are mainly collected from the wild, but this activity is not strongly regulated at the moment and its impact on the environment is unknown. However, wild sea worms represent an important source of food for many animals (birds, fish etc.), so growing concerns about the sustainability of wild harvesting has led to increased interest in worm farming.

In addition to the bait market, worms can also be used as a food source in the fish farming industry, either directly as a source of live food for fish or crustaceans or indirectly to be incorporated as one of the components in fish meal. Indeed, with aquaculture increasingly seen as one of the ways to meet the growing demand for food in the future, the harvesting of wild fish to produce fish meal is no longer considered to be sustainable. The search for alternative sources of fish meal is very much under way and marine worms represent a very interesting option.

Beyond their value to the angling and feed markets, some species of worms have also attracted the interest of the medical industry. The French company, **HEMARINA**, has discovered that the blood cells of the blood worm, *Arenicola marina*, can not only carry 40 times more oxygen than human blood cells but are also compatible with all blood types, which means they could have important medical applications. Clinical trials are underway and if successful this could give a major boost to marine worm farming. Hémарina has already started its own bloodworm farm, having converted a former fish farm.

Marine worm farming is one of the hottest recent developments in the aquaculture industry and could be an interesting diversification possibility for aquaculture producers.



Ideas that emerged from the FLAG discussions

The challenges addressed in this factsheet were discussed during the FARNET seminar on “**Integrating aquaculture within local communities**”.



Possible initiatives to diversify fish/shellfish farming could include:

- Combining aquaculture with solar energy production (for example, a fish farm entirely covered with solar panels – this could also help to protect the fish from cormorants);
- Diversification into fish species requiring less water and/or oxygen;
- Using fish droppings as an input for agriculture (fertiliser);
- Using precision farming technologies in aquaculture.

Related research:

IDREEM (Increasing Industrial Efficiency in European Mariculture): a project funded by the 7th Framework Programme, in which 15 partners from across Europe were involved in developing and assessing the social, economic and environmental performance of Integrated Multi-Trophic Aquaculture.

As mentioned above, a key factor in the development of new activities in the aquaculture sector is access to new technologies and knowledge. FLAGs do not wish to become technological hubs but they can rely on their network and partners to facilitate access to the required knowledge, through collaboration with local technical/research institutes. In situations where this information is not available locally, FLAGs could look to the **European Aquaculture Technology Platform (EATIP)**, which is an industry-led forum providing information and networking on technological developments in aquaculture in the EU¹².

12 For more information on how FLAGs can work with science and research, please refer to p. 30 of the FARNET guide on **Boosting business along the supply chain**.

Factsheet

5

Diversification outside the aquaculture sector

What is the challenge?

While the aquaculture sector can be an important source of growth and jobs in FLAG areas, it is not likely to meet all the employment or income needs of local communities. Complementary activities, that bring additional revenue to the area, may also have to be found. FLAGs strategies may envisage a wide range of such complementary activities, ranging from tourism and gastronomy to the processing of by-products.

When planning to diversify the economic activities of their areas, FLAGs should keep in mind the following considerations¹³:

- Make sure the activities to diversify the area's economy create **real benefits for the local community**; the FLAG should ask, for example: will the local people get jobs in this new activity? Will the jobs be sustainable and, ideally, non-seasonal (sometimes it may be better to invest in a business with lower revenues but ensuring all-year-round employment)? Will there be spin-off benefits for local businesses (e.g. more customers in the local shops or restaurants, greater purchasing power of the community)?
- Verify that the additional activity is **sustainable** and will not lead to conflicts with existing businesses or damage the environmental or landscape assets of the area. In particular, the FLAG should ask: will the new activity push some existing businesses out of the market, leading to job losses? Is there a risk that the new activities will lead to conflicts with existing fisheries and aquaculture businesses (see more information about user conflicts in Factsheet 3)? What is the "carrying capacity" of the area?
- Make sure that the local aquaculture sector is **involved** in the design and implementation of diversification projects, and that it **benefits** from these projects. The FLAG could ask: what will be the direct benefits (for instance, when an aquaculture farm gets additional income from tourists who visit the production sites)? What will be the indirect benefits (e.g. increased consumption of locally produced fish)? What are the producers' expectations concerning the new activities? Can these expectations be met by the planned developments?

A careful analysis of the above questions should underpin all FLAG activities aiming to diversify the aquaculture sector, including information and animation activities, the selection of projects, as well as the monitoring and evaluation of results.

Below, we present some possible diversification activities that may be of interest to FLAGs. We pay particular attention to **tourism and related sectors**, as this type of diversification is relevant for most FLAGs. A few other ideas are presented in the second part of the chapter.

¹³ More detail about diversification of fisheries and aquaculture areas can be found in the FARNET guide on "[Diversification of fisheries areas](#)".

Supporting tourism, gastronomy and recreation

A large proportion of FLAG strategies envisage the development of what is sometimes called “hospitality industries”, in particular tourism, gastronomy, angling or other recreational activities related to fishing and/or aquaculture¹⁴. In such situations, there are a number of steps that FLAGs should take in order to ensure that the supported activities generate maximum benefit to the community.

Step 1: Analyse the key assets that can make the area and its aquaculture attractive

Unlike areas with fishing activities, aquaculture areas are sometimes considered less attractive: aquaculture production is usually less “picturesque” and the sector has a more industrial image. However, the potential of fish or shellfish farms to attract visitors should not be underestimated. Many are located in areas of high natural value, and sometimes fish farms can create a highly valuable landscape and habitats, as is the case of many Central European areas with carp ponds.

With the growth of the “experience economy¹⁵”, many visitors want to take part in something memorable, out of the ordinary – for example, a visit to an oyster farm or a land-based shrimp production site. Such visits can offer tourists a more easily accessible experience than going out to sea in a fishing boat. Visits to fish or shellfish farms can also provide an opportunity to tell the owner’s personal story, of how they developed the business, and to organise a tasting of the products. Thus, an aquaculture producer with good communications skills can become a “tourist attraction” in the FLAG area. Learning how to clean and fillet a fish can also be a memorable experience. Remember: what is one person’s routine activity, can be somebody else’s adventure!

Local aquaculture assets as tourist attractions



The area of the French **Arcachon FLAG** is well known for its oysters. Local producers offer tourists the possibility of accompanying them in their flat-bottom boats as they go out at low tide and pick the oysters. For many visitors, this is a unique educational experience, providing insights into the techniques of oyster farming. It is generally followed by oyster-tasting. Such visits are also organised for young people, with a view to encourage them to consider careers in this sector.

[FARNET Good Practice](#) and [more information](#)



Another French FLAG, **Marennes Oléron**, has supported the creation of an “Oyster City” (*La Cité de l’Huître*), which offers a large variety of attractions, including oyster farming presentations, educational visits for schools, meals and tasting events, business meetings and seminars, etc.

[More information](#)

14 More detail on developing fisheries- and aquaculture-related tourism can be found in the FARNET guide on “[Fisheries and tourism: Creating benefits for the community](#)”.

15 See “[Experience Economy Strategies: Adding Value to Small Rural Businesses](#)” in *Journal of Extension* for an explanation and examples of how experience economy can be used to add value to small rural businesses.



The **Tirschenreuth / Land of a thousand ponds FLAG** in Bavaria (Germany) has decided to build its strategy around carp farming, which has been practiced in the area for over 800 years. A flagship project is a viewing platform (“Stairway to heaven”), which enables visitors to have a bird’s-eye view on the picturesque fish ponds and the surrounding protected area. The FLAG has also supported the creation of a fisheries museum, presenting the history and practices of freshwater fishing and carp farming, as well as educational aquariums and multimedia displays. The FLAG strategy also includes the preparation of promotion material on locally farmed fish (brochures, calendars, packaging, recipe book), the organisation of events, and the “Phantastic Carp Trail”: a series of huge carp statues, which can be found at fish farms, restaurants and other places of interest across the area. In this way, carp has become a trademark for the entire area.

More information: [FARNET Good Practice](#) and the [FARNET Magazine No. 15](#) (p.23-26)

Aquaculture farms also offer potential to develop recreational activities, such as angling, and this is something FLAGs can encourage.



Angling on a fish farm



The Spanish **Huelva FLAG** has supported a local business that produces fish (seabass and seabream) in abandoned salt pans located in a natural park. The company, *Salinas de Astur*, uses sustainable feed (made using fish discarded from auctions) and it offers tours to the public, who have the possibility of catching their own fish, which can be cooked on the spot. It also offers activities related to environmental education, and visitors can enjoy outdoor pursuits such as cycling, horse riding and kayaking, and a playground for children.

[FARNET video](#)

Step 2: Upskilling of aquaculture producers

If tourism or gastronomy activities are to benefit the aquaculture sector, local fish or shellfish farmers, or members of their families, must be able to present their work and their products in a way that appeals to visitors. Therefore, FLAGs may have to help aquaculture producers to acquire the necessary skills, for example:

- Communication skills (including knowledge of foreign languages, where relevant);
- Business management and marketing skills, to ensure the viability of any new enterprises;
- Other necessary skills, such as health and safety, veterinary, or hygiene regulations, which might be relevant for such activities as taking tourists on a boat or direct sale of fish from the farm, and environmental legislation (e.g. Natura 2000) that can have an impact on the planned activities.



Strengthening the capacity of producers



The Finnish FLAG, **Northern and Eastern Lapland**, organised a tailor-made course to help local fishermen diversify into tourism. The training included several modules, covering product development, pricing, customer service, as well as study visits to tourism businesses. Participants also received seven days of personalised consultancy, to help them develop their own tourism products. Although this project focused on the fishing sector, it could also be applied to the aquaculture sector, where most producers are likely to need specially designed training and advice before they can launch new tourism activities.

[More information](#)



The **Tirschenreuth / Land of a thousand ponds FLAG** (see box above) has financed training courses to enable fish farmers to organise guided tours of their fish ponds. In addition to boosting the area's attractiveness, the tours also provide additional income for the fish farmers involved. The FLAG is also helping the farmers with publicity and with organising the farm visits.

[More information](#)

Step 3: Fostering linkages with other actors

While aquaculture producers and their families will be able to deal with many aspects of their new hospitality businesses, the involvement of tourism and gastronomy professionals is also essential for long term success. FLAGs should make sure from the beginning that other local tourism organisations such as hotels, rural tourism accommodation providers, restaurants, sports and recreational centres, etc. are aware of the development of aquaculture-related attractions and are willing to support and promote them, for example by distributing leaflets and by including these new attractions in tourist packages.

This will require awareness raising, trust-building and, in some cases, overcoming scepticism. FLAGs can facilitate this process by organising meetings, match-making events and by exploring other opportunities to establish links between representatives of the aquaculture and hospitality sectors. With some actors, a more consistent effort will be needed to overcome their negative perceptions of aquaculture. For example, some restaurant chefs – especially in the northern part of Europe – may still have to be convinced that fish (especially locally produced fish) can be a valuable culinary product.



Involving partners from other sectors



The **Auray & Vannes FLAG** in Brittany (France) has supported a tourism enterprise focusing on the discovery of shellfish farming. *Au Rythme des Marées* organises visits to oyster farms (similar to those described above in Arcachon – Val de l'Éyre). This successful project involved a whole range of local actors, of which 38 are mentioned on the company website as “partners”. The list includes hotels and agri-tourism establishments, restaurants, tourism offices, golf courses, museums etc.

[More information](#)



In Poland, fish consumption per capita is low and local fish species are considered unattractive and difficult to cook. Two FLAGs (the inland aquaculture FLAG **Kaszuby** and the coastal FLAG **North Kaszuby**) have developed a training programme targeting students of gastronomy schools (future chefs) on the origins of local fish species and how they can be prepared. The course helped to change some negative perceptions about fish and encouraged many students (and teachers) to prepare fish dishes. In addition, a cookery book was produced to encourage other people to try new recipes using local fish.

[More information](#)

Step 4: Provide project funding

Once aquaculture producers are ready to undertake additional activities, and other relevant partners are involved, FLAGs should be prepared to provide funding. The amounts and conditions of such funding will depend on the type of aquaculture area, the priorities of the FLAG strategy and the specific opportunities in the hospitality sector. In some cases, the FLAG may only provide seed funding for market studies, in others it may wish to finance a larger part of the project. This will also depend on such factors as the overall budget of the FLAG, and the beneficiary's capacity to access other sources of funding. Below we provide just a few examples of the various diversification projects supported by FLAGs across the EU.

Supporting tourism-related investment projects



The Fonda Farm in Slovenia produces high quality sea-bass in an environmentally sustainable way. The local **Izola FLAG** has supported the Fonda family to diversify their activities into tourism and the experience economy by co-financing equipment for kayak and canoe tours, and a photovoltaic electric hybrid boat to organise trips to the fish production sites to demonstrate the farm's sustainable production techniques. A documentary film about marine fish and shellfish farming in Slovenia was also developed.

[More information](#)



The **Braila FLAG** in Romania has supported a local fish farmer to purchase equipment and renovate a fisherman's restaurant on the lakeside, in an area highly valued by anglers but where tourism infrastructure is poorly developed. The fish farmer has also built a pontoon on the lake using over 100 m² of floating modules, with an anchoring system and a bridge. This pontoon links the fish restaurant with the fishing and recreational activities on the lake. In the future, the beneficiary is also planning to develop accommodation, to help further increase the tourism potential of the area.

[More information](#)

Step 5: Ensure coherent promotion

For small-scale operators, independently promoting tourism or gastronomy activities to potential customers from outside the area can be difficult and expensive. To overcome this, they need to join forces with other local operators, promoting a wider range of attractions, which will be more cost-effective and also more appealing to potential customers.

Many FLAGs decide to develop a **local brand**, which ensures coherent promotion of different products and services (with a uniform logo/name/visual identity). Such a brand can be used by local businesses (hotels, restaurants, shops, galleries, etc.) that agree to comply with certain conditions (e.g. use only/mostly locally sourced fish, ensure a minimum quality standard of their services, etc.). This type of branding can help promote the businesses that are allowed to use it, and if a critical mass of users is reached, it can also strengthen the local sense of identity and boost the image of the area among visitors.

However, while it is relatively easy to create a new brand, it is more difficult to build brand awareness among potential customers. It will take time and effort to encourage a critical mass of local businesses to participate and to gain brand recognition within and outside the area. More advice about promoting fisheries and aquaculture products and areas, developing a marketing strategy, using on-line and off-line promotion tools, etc. can be found in the FARNET guide on “Fisheries and Tourism: Creating benefits for the community”.

Promoting local tourism activities



The **East Sardinia FLAG** (Italy) focuses a large part of its strategy on promoting attractions linked to local fisheries and aquaculture, such as tourism and gastronomy based around shellfish farming in the local lagoons. The strategy envisages the setting up of a consortium to market local products, the development of educational nature trails & eco-museums, the development of tourism packages, and the setting up of a local agency to coordinate and promote pesca-tourism and other fisheries-related tourism. The FLAG also supports the development of new fisheries and aquaculture-related tourism products, including eco-tourism, restaurant and accommodation services, and the packaging and marketing of these products as a coordinated tourist offer of the territory.

[More information](#)



The Polish **Carp Valley LAG/FLAG** has developed a local brand which can be used by local businesses and organisations that provide goods and services meeting certain criteria, such as: links with the area, environmental sustainability, user-friendliness and cooperation with the Carp Valley Association. It has taken several years to develop the brand and encourage local businesses to use it. Currently seven carp products (all based around the Zator carp, the only Polish fish product to obtain the PDO¹⁶) have obtained the brand. The FLAG has also supported the development of an “Eco-museum”, which consists of several attractions spread across the area (fish farm, bee farms,

centres of local arts and crafts), which have facilitated the development of special tourist products for school groups and families with children. The tourism offer is consolidated through annual events such as the “Carp Valley Festival” and the “Carp Valley Tourism Fair”, where visitors can obtain the “Carp Valley Passport” with promotional coupons and price reductions to encourage them to return to the area in the future.

[More information](#)

Diversifying into other types of activities

In addition to tourism, gastronomy and recreation, there is a wide range of other activities that FLAGs can support when looking for additional sources of income. We cannot mention them all here, so we will limit ourselves to mentioning a few examples of successful projects already implemented with EFF or EMFF support, which could serve as a source of inspiration. More diversification ideas can be found in the FARNET Guide on “Diversification of fisheries areas”.

FLAGs should remember that developing new activities will require similar steps to those described above in relation to the hospitality industries, e.g. building the skills and capacity of the aquaculture producers and other community members to engage in new activities or fostering linkages with other key actors.

Examples of non-tourism diversification

New products: food components from seaweed



Seaweed is increasingly recognised throughout Europe as a tasty and healthy food. In 2011, the **North Jutland FLAG** (Denmark) supported a new business called “Havets spisekammer”, literally “the dining room of the sea”, selling different food products that all use seaweed as an ingredient, such as seaweed spread, seaweed salad and seaweed flavoured salt. The company also outsourced the manufacture of various products such as local bread, pasta and ham – with seaweed as condiment – to local producers, selling the final products under the “Havets spisekammer” common brand. On top of four new jobs created in the new “Havets spisekammer” venture, this new range of products has also provided additional work for the local producers manufacturing the final products. Although the seaweed used in the project was imported from abroad, this type of businesses can also use locally produced seaweed, where available.

[More information](#)

Using by-products from aquaculture



The shells of fresh mussels are considered waste, and only a small part is used as a by-product. The **North Sardinia FLAG** (Italy) has supported a project developed jointly by a local college and mussel producers, which uses mussel shells in 3D printing. Various types of objects, such as kitchen tiles, mosaics, jewellery etc. can be produced by mixing the shells with resin. The paste is then put into moulds and left to solidify. The project is still at the prototype phase. The North Sardinia FLAG also intends to support the construction of a small shell crushing plant, with the crushed shells to be used for pH correction of acidic soils in the area.

[More information](#)

Ideas that emerged from the FLAG discussions

The challenges addressed in this factsheet were discussed during the FARNET seminar on “**Integrating aquaculture within local communities**”.



An **action plan** to attract tourists to aquaculture-related activities could draw inspiration from the example of the **Darlowo FLAG** in Poland, which includes a coastal zone (with fishing) and an inland, fluvial area (with fish farming). The FLAG activities focused on the following steps:

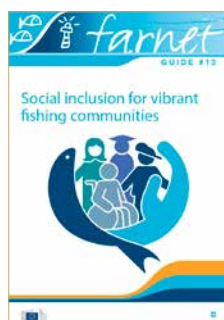
- Investment in fish farms to help improve the environment, in particular water quality;
- Development of tourist products linked to fish farming and water sports on the river;
- A promotional campaign targeting customers of holiday resorts along the coast, to attract them further inland to visit the fish farms and taste their products.

In this way, the highly touristic coastal area was used as a “gateway” to attract tourists to inland fish farms. The action plan required a long-term commitment by the FLAG and coordinated action by coastal and inland stakeholders.

Other proposals to help improve the recognition of aquaculture assets:

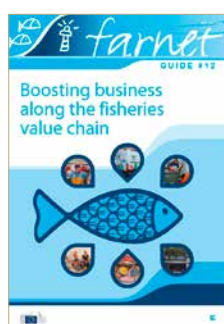
- On-site visits to aquaculture farms linked to currently popular activities (e.g. sport fishing);
- Organisation of interactive games and thematic routes around the farms.

For further information, ideas and examples,
more FARNET Guides are available



FARNET Guide #13: Social inclusion for vibrant fishing communities

Helping FLAGs identify different types of social inclusion issues, providing recommendations and tips on how FLAGs could address them and find solutions in their areas.



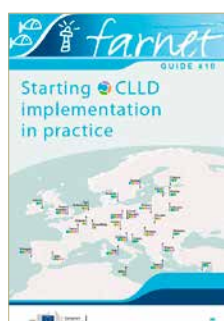
FARNET Guide #12: Boosting business along the fisheries value chain

Encouraging FLAGs to strengthen the value chains in their area and ensure that local businesses, and especially fishermen and local aquaculture producers, capture as big a portion of that value as possible.



FARNET Guide #11: Results-oriented CLLD in fisheries areas

Providing FLAGs the tools to reinforce their focus on results through the design and implementation of their local development strategies.



FARNET Guide #10: Starting CLLD implementation in practice

Looking into how EU funds can be integrated in practice at local level, ensuring simplification and good coordination between funds and presenting different perspectives from previous experience across Europe.