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GUIDE #23

Resilient coastal communities: a guide for FLAGs

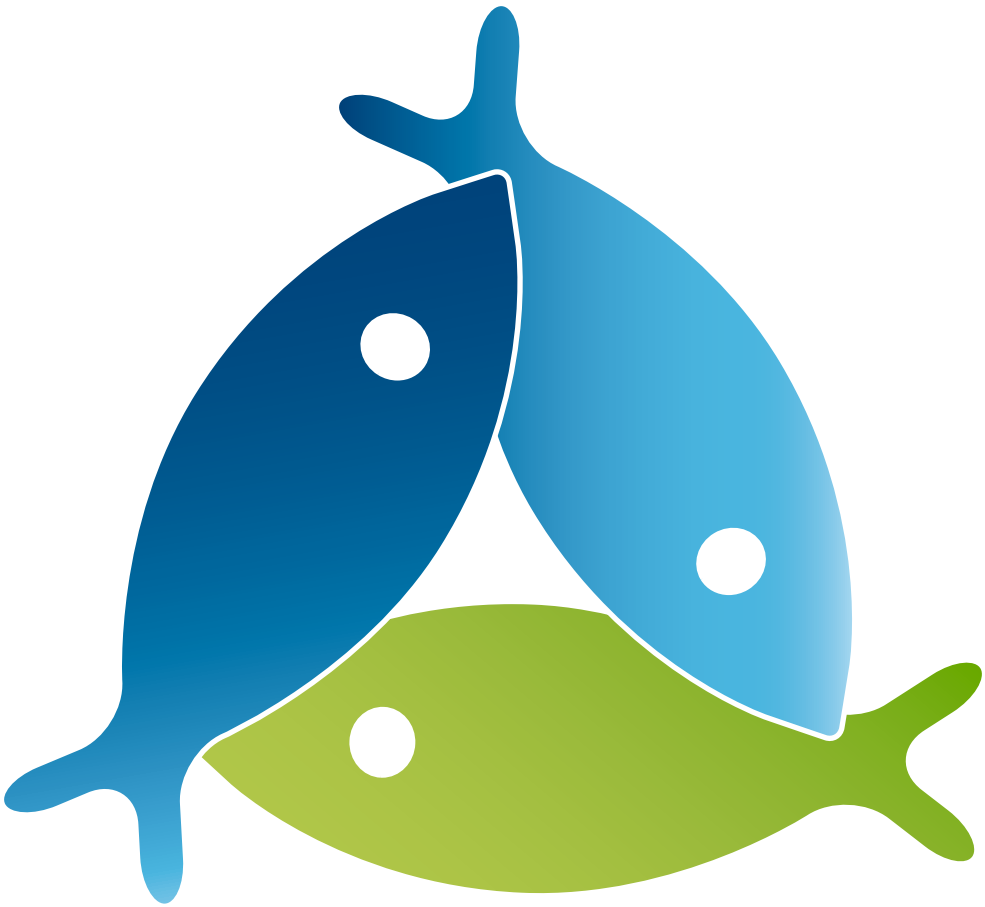

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Table of contents

Introduction: What is resilience? 4

1. Strengthening the social fabric of local communities 6

1.1 Social capital 6

1.2 Social inclusion 10

1.3 Social innovation 13

2. Environmentally resilient economies 17

2.1 Resilience in the face of climate change 18

2.2 Securing the long-term supply of energy and natural resources 21

2.3 Healthy and resistant ecosystems 24

3. A digital future 29

3.1 Efficient and resilient businesses 31

3.2 Facilitating access to information and services 35

3.3 Broader participation and better governance 38

Resilience checklist for FLAGs 41

Introduction: What is resilience?

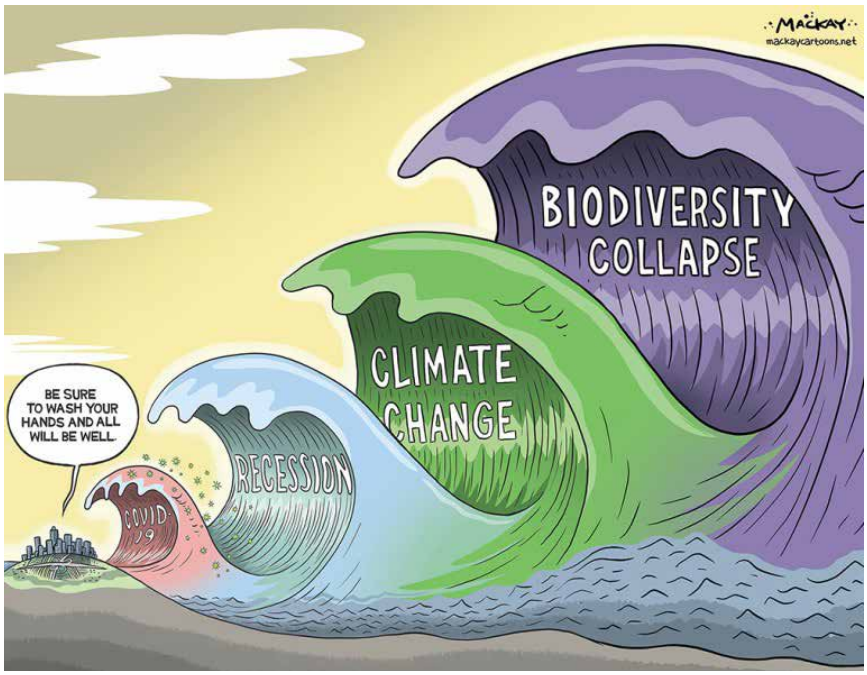
Resilience can be defined as ***the ability to resist, absorb and recover from – or successfully adapt to – adversity or change.***

For individuals, psychologists point to the importance of autonomy, confidence, self-knowledge, pragmatism, flexibility and connectedness. For communities, the same qualities are equally relevant. However, communities are also dependent on their natural resources and a functioning economy if they are to survive and, ideally, thrive in the face of change.

Resilience is not a fixed state but rather "a continuous process of acquiring and sustaining the resources required to function well under stress".[1] Local communities can do a lot to build social, environmental and economic resilience into all their activities. This guide offers ideas to FLAGs on how to help coastal communities emerge from the recent crises and be prepared for future ones.

Why is resilience important for local communities?

Coastal communities deal with change all the time. Recently, however, they have been faced with a tsunami of change: the 2008 financial crisis, and subsequent fiscal austerity; the global COVID-19 pandemic which knocked the world flat in 2020; and, all the while, global warming which is leading to rising sea levels and increasingly extreme weather.



After any shock, we all have to get up again – and keep standing. But how?

FLAGs have an important role to play in helping their local communities to reinvent themselves, building a future that is stronger and more resilient than before.

Crises are not all bad. When adverse circumstances oblige us to radically rethink our situation, this is an opportunity. The future will not be the same as the past but if we undertake the proper analysis, we give ourselves the best chance to reset the system and come out smiling.

Devising a different future: What can FLAGs do?

Resilience includes the ability to recover from a shock. In the case of a short-term shock like a storm or flood, recovery may mean going back to the way things were beforehand. However, if the shock is a major one, going back may not be an option. Survival may depend on your ability to devise a different future. And for this, a short-term disaster recovery plan won´t be enough.

1 Ungar, M. (2018) '**Systemic resilience: principles and processes for a science of change in contexts of adversity**', *Ecology and Society* 23 (4): 34.

When designing their new strategies, FLAGs have a major role to play in preparing for a new future, especially for those changes that need a long-term plan. Designing a local strategy requires an understanding of the processes that are under way that may eventually present threats. It also needs reliable monitoring of information to ensure warning as threats develop – and an armoury of possible responses which will lead to viable future scenarios. 2020 has proved that big changes can happen in a blink of the eye; they can also vary enormously from one area to another. The presence of the FLAG in the area itself is, therefore, an asset that can become essential.

As trends evolve and mature, FLAG areas must transform themselves to reach a new equilibrium which is sustainable – at least for a while.

Being resilient therefore relies on:

- **Openness:** having access to many types of information from the outside, which enable you to anticipate impending change.
- **Connectedness:** being able to communicate quickly and easily within your area, so that you can muster your forces to make a rapid response.
- **Diversity:** the availability of numerous different responses and resources, contributed by a wide range of people and institutions. Having a range of different economic activities means your area's prosperity does not depend on just a single make-or-break endeavour.
- **Participation**: having a large number of moblised people with different skills, enabling a response at sufficient scale.
- **Redundancy:** having back-up systems in case your primary system fails.
- **Learning:** the capacity to continually adapt to change, gradually transforming the area.
- **Flexibility:** sufficient number of people willing to do things differently.

This Guide aims to offer FLAGs ideas and inspiration to help their local communities become more resilient, socially, environmentally and economically, making strategic use of technology and the opportunities of digitalisation for better communication and governance processes.

These topics are covered in three chapters:

1. Strengthening the social fabric of local communities
2. Environmentally resilient economies
3. A digital future

1. Strengthening the social fabric of local communities

The social fabric of a community is knitted together by the links, commonalities and interactions that members of a community share. It is what differentiates a community from a loose group of individuals. Interactions bring power and resilience relies on these social dynamics of a community.

Sharing the same culture or traditions, a common feeling of belonging to a place where different activities are undertaken, or the goal of keeping alive the different heritages that constitute a local identity, give an area a wealth of possibilities and can be essential for its survival in times of crisis. To guarantee the continuity of our local communities, we need to strengthen this fabric. This will help make our areas more adaptable in the face of change and enable us to capitalise on their full potential.

1.1 Social capital

Social capital is that invisible wealth and strength that we possess by being able to act *together* as a community. It consists of intangible things like human relationships, values, identity, trust, reciprocity and networks. Individuals alone are next to powerless, but a local community that combines its forces can achieve great things.

It is described as a sort of capital because it is a necessary factor in our economies. To create a viable business, we need to put together raw materials, processing equipment and human effort. If we invest in machinery (physical capital) and skills (human capital) we can produce more efficiently. But our business will not be able to work without a whole set of human relationships and institutions that we mostly take for granted: the rule of law and *trust between people*.

The unique thing about social capital is that as you use it, far from being depleted, it grows even stronger!

Where social capital is high, people are able to work together easily, they trust each other, they do each other favours (there is a sense of reciprocity) and the whole community benefits. Cooperation is part of humanity's DNA. These human strengths are the most important component of a resilient community.

Where social capital is low, the costs of running a business or an organisation are higher. Indeed, transaction costs (the costs of buying and selling products and services, including for example staff time spent on negotiations, legal and security costs) can be significantly lower in societies with a higher level of trust.

Contacts and trust to keep fishers in action

When COVID-19 hit in 2020 and social distancing rules closed down many operations, the **Basque FLAG**, Spain, was quick to make contact with different members of its network in search of a solution that would allow fishers and other related workers to carry on their activities.

Agreement was soon found with the Regional Administration that FLAG money could be made available to fund personal protective equipment (PPE) that would make it safe for fishers and auction workers to continue their work. The local fishing organisation advanced the money until the grant came through. Meanwhile, protocols were put in place such as social distancing and limiting the number of vessels allowed in the port. The existence of the FLAG (which also started distributing PPE itself within 14 days of lockdown) and the social capital it had developed locally, allowed the community to react quickly to the crisis, helping activities to continue safely. **FARNET Good Practice.**

Mobilising the community in support of front-line workers

Medical staff came under incredible pressure as the COVID-19 crisis overwhelmed hospitals. The **Estérel-Côte d'Azur FLAG** in France rallied its network to provide meals to front-line workers such as nurses and firefighters.

With the support of the provincial fishing committee, it formed a collaborative centre involving fishers, fish farmers, a filleting company and restaurants, which prepared ready meals. These were distributed free of charge to front-line workers, whose canteens were closed. They were also made available to people in need. Not only did the initiative help temper the effects of the crisis on many individuals, but a stronger, multi-stakeholder local food network has emerged for the future. **FARNET Good Practice.**

High social capital is shown by the existence of multiple and lively associations, from sports clubs to choirs to children's nurseries. The existence of a FLAG is in itself evidence of social capital.

Bonds and bridges

There is an important distinction to be made between different types of social capital. 'Bonding' social capital is that which exists between people of the same type – a group of friends who are ever ready to help each other out, or members of the same trade association. The trouble with this type of social capital is that it can be exclusive: those who are 'insiders' may consciously or unconsciously see 'outsiders' as a threat. By contrast 'bridging' social capital is that which exists between people of different types and consists, for example, of hospitality and respect for diversity.

Diversity is an important element of community resilience. It helps ensure we are not dependent on a single resource, market or response to a given challenge. We can never know what the future holds – the COVID-19 pandemic caught the world unawares. Being resilient means being flexible and able to draw on an array of possible responses to unpredictable challenges. In other words, local communities should have what cyberneticians call 'requisite variety'.

This means that you must have at least as many responses at your disposal as the environment has ways to challenge you. Therefore, **FLAGs should welcome a diverse population**, court strangers and ask them what they think, and gather their unusual perceptions and outlandish suggestions. You never know when they might suddenly make sense.

Diverse people eat diverse fish

The **Ostrobothnia FLAG** in Finland wanted to make better use of unpopular fish species which have a lower ecological footprint. In its **Smarthfisk** (Smartfish) project, administrated by the women's association Marthaförbundet, it invited migrants from different cultures to show local residents and restaurant owners how to prepare new dishes using these seldom used species. The result has been an increase in sales of abundant species that were underutilised (bream, roach, ide and smelt), as well as the better integration of immigrants of all ages. **FARNET Good Practice**.

Social capital thrives on transparency, participation and, in the end, ownership.

FLAGs can also fortify their resilience by maintaining connections and networks with centres of **expertise from outside**, perhaps from far away. These can include universities and research institutions, as well as LAGs from other types of areas and their respective EU networks.

As well as diversity and expertise, every community need **spaces** (physical and virtual) where its members can meet, think collectively, and formulate ideas and plans. As public-private partnerships that mobilise a cross-section of the community, FLAGs are well placed to identify spaces that can be used as such hubs and stimulate creative ways for them to strengthen the local community.

Mixing heritage and innovation to build a new future

On the Danish island of Ærø, the **LLSÆ FLAG** financed the transformation of a disused boat engine factory in the main town of Marstal into a community hub supporting local maritime entrepreneurship.

The building, which housed Marstal's key industrial enterprise for 60 years, closed in 1993 and was reopened in 2019, adapted for a new world. Retaining a link with its heritage, it now contains a workshop where the factory's former apprentices restore and showcase old engines, and mechanics experiment with new ideas. There are also workspace units, a "fab lab[2]", a coffee bar and a conference centre. The conversion of the Marstal factory preserves a significant landmark in the island's maritime history. **FARNET Good Practice.**

2 A fab lab (**fab**rication **lab**oratory), is a small-scale workshop allowing for (personal) digital fabrication of different objects

Accumulating a diverse range of responses to threats thus relies on:

- having access to a wide range of experience, information, knowledge and skills coming from a **diverse population**
- being **connected** to national and worldwide expertise
- having spaces and institutions (physical and virtual) where **innovators can meet** and develop ideas

Use your network and animation skills to sow the seeds of local development projects! Community groups, trade associations, churches, parent-teacher associations and pubs are all possible starting points.

1.2 Social inclusion

The United Nations defines social inclusion as *"the process of improving the terms of participation in society, particularly for people who are disadvantaged, through enhancing opportunities, access to resources, voice and respect for rights".* Taking an inclusive approach means caring for the welfare and prospects of all members of the local population, not only those who are best organised or most vociferous.

> ***A community that can take care of all its members and empower them to be fulfilled individuals and proactive citizens is one that is better placed to secure a viable and prosperous future as times change and new challenges emerge.***

Social inclusion can also help an area to become more competitive in attracting diverse talent that can contribute in different ways to the life and economy of the community.

ADA Mar Menor – leading the way in adapted water sports

Special needs can translate into new market niches. In 2019, the Murcia FLAG helped establish the Asociación Deporte Adaptado Mar Menor, Spain's first sailing and diving school for disabled people, based at the Lo Pagán nautical centre, alongside the local fishing association. Now, it attracts people from all over the country, not only as a sport club, but as a new physical rehab method taking advantage of the local environmental resources. In addition to a new economic opportunity, in a socially and environmentally responsible way, this has proven to have added value for the natural environment and local institutions.

As well as being a model for adapted sport clubs and social inclusion in Spain, in 2021 ADA was selected to be filmed as part of a transnational ERASMUS+ project (involving partners from Spain, Italy, Bulgaria and Turkey) about adapted sports and their integration into all-level competition teams. FARNET Good Practice.

The inclusion of every part of the local community is one of the daily concerns of FLAGs. They should not only aim to reflect the strengths, interests and challenges of as many people as possible in the local strategy, but also promote ideas and projects put forward by groups of all sorts.

It is part of a FLAG's job to ensure that its impact is cross-sectoral, cross-cutting and inclusive. It should **mobilise the skills and potential of as many groups as possible**, and benefit both men and women, young and old. As previously mentioned, diversity is an important factor of resilience.

Mobilising women to defend traditional know-how while learning new skills

Two FLAGs in Catalonia, Spain, worked with the Federation of Catalan Fishing Organisations to help set up an association of women in fishing.

Founded in 2018, the Dones de la Mar association is now self-supporting through its membership fees. It organises training sessions on skills that are at risk of dying out, such as net-making, as well as on entrepreneurship and business management. It also promotes local fisheries products by holding fairs and has helped build social capital thanks to the contacts and collaboration it has generated across the region. This has energised women linked to fisheries, and put in place a support network to foster the skills and confidence to undertake new activities. FARNET Good Practice.

Preparing for demographic change

The ageing of Europe's population is a major change to our society. However, it is also one we can prepare for. How well we do so will be key to developing resilience. An ageing population can present increasing health and social care needs, yet the elderly also possess valuable knowledge and experience, and often the time to get involved in volunteering and supporting community projects.

> ***Studies have shown that the presence of elderly members can strengthen a community's resilience and ability to cope with change.***

FLAGs should, therefore, give careful thought to the role that elderly community members can play in building a stronger, more resilient community. For this, it will be important to ensure they are not left behind in a fast-moving, digitalised world, where society is increasingly fragmented.

Bridging different groups but also different generations is important to preserving social cohesion. It can also help retain the know-how that their generation acquired! The ability for a community to build on existing knowledge will allow it to make better decisions when adapting to new contexts.

Inter-generational learning

Simbioza Genesis is a Slovenian social enterprise that promotes intergenerational cooperation. It began in 2011 with nationwide workshops, where young volunteers taught elderly people how to use computers. Since 2014, it has run an intergenerational centre in Ljubljana at which young people teach older people digital skills. Simbioza teaches e-literacy in local schools, and its Digital Academy offers a holistically designed form of non-formal adult education. The enterprise also organises international projects. **More information**.

Training the next generation

Most fishers on Lake Lokka, Finland, are nearing retirement age and the local fishing industry risks disappearing, along with the skills and capacity to feed the community with its own fish. The fishers asked the **Lapland FLAG** how they could attract younger people to the sector in order to safeguard its future.

In the 'Path to Become a Fisher' project, which ran between 2017 and 2020 with the support of the Sodankylä municipality, senior fishers mentored 30 young people, and 12 of them are now fishing the lake. Half come from outside the area, and two are women. **FARNET Good Practice**

Working differently while strengthening inclusion

Ensuring that *all* community members have the opportunity to make their own living and contribute to the community in different ways is an important part of building local social – and economic – resilience.

With good planning and some creativity, the elderly, disabled, long-term unemployed and many others can be supported through all sorts of projects to strengthen their local economy and social fabric. Adapted workplaces can help people with disabilities or injuries into meaningful activities. The same is true for the elderly.

Flexible timetables can help local people combine employment with care responsibilities. Part-time and voluntary opportunities can allow the elderly to remain active as long as possible while putting their skills and experience at the service of the community.

FLAGs can support new business models that give priority to social objectives, such as providing employment for people with disabilities or other difficulties to enter the workforce. Others may combine social objectives with environmental goals, while remaining economically viable.

A social enterprise with a triple profit

In Grau d'Agde in the Thau FLAG area (France), the Red Cross partnered with the fish market to set up a social enterprise that created five jobs for unemployed people while capitalising on under-used fish species and opening up a new local market.

The enterprise, launched in 2019, uses less popular local fish species to produce frozen food, which is sold to schools and retirement homes, as well as ready-made meals for the general public. FARNET Good Practice

More information and examples about social inclusion in the FARNET Guide #13, Social inclusion for vibrant fishing communities .

How to be inclusive

- hold open meetings and advertise them widely through a variety of channels
- proactively invite representatives of all social groups (women, the elderly, the young, disabled people, ethnic minorities, the unemployed, etc.) to speak at meetings about what they need and what they can contribute
- look at local public policies for opportunities to act in favour of excluded people.

TIP

Local projects doesn't have to mean local people acting alone. Don't be afraid to ask for help. Telephone your contacts, send delegates to conferences – and ensure they report back!

1.3 Social innovation

The European Commission defines social innovation as *"new ideas that meet social needs, create social relationships and form new collaborations"*. Social innovation can be a tool to develop increased economic, social or environmental resilience.

The crucial distinguishing feature of social innovations is that **people behave in new ways and interact with new people**. They elicit new relationships, mindsets and behaviour. Social innovations let new actors in, and they strengthen civil society. They empower people, which increases their impact. They can bring out people's hidden potential.

FLAGs can help local communities to pilot new ideas and encourage uptake by others where trials prove successful. They can also help foster new ideas through research or exchange with other areas.

New ways of acting at the local level might include:

- ✔ going beyond the established idea of a fishing cooperative to create a multi-stakeholder cooperative that brings together not only fishers but also processors and consumers, both corporate and individual
- ✔ repurposing premises that have fallen into disuse for community projects or local businesses
- ✔ exploiting the educational value of projects supported, for example, ensuring they are made accessible for public or school visits

A fishing cooperative buys the local fishing quota

A particularly high-level social innovation took place on the northern coast of Jutland in Denmark, when the fishing community in **Thorupstrand** saw the forced privatisation of fishing quotas in 2006 as a threat to their traditional method of fishing. The quotas were going only to large boat owners, leaving many fishers out of work.

It therefore founded a cooperative which bought the area's whole fishing quota, which it now manages for the benefit of its members. Any Danish coastal fisher, who is using environmentally friendly gear, who is registered with the Danish state's scheme for careful coastal fishing, and who is landing the catch in Thorupstrand, can join the cooperative and lease a certain amount of quota. The revenue generated is used to repay loans used to buy additional fishing quotas. Each member of the cooperative has one vote, no matter how much of the common quota they are leasing. This has helped Thorupstrand to keep fishing rights within the community, and hence to ensure the future of its local fishery. The cooperative has also helped to retain a higher share of the added value locally by investing in processing facilities and joint marketing.

Flexible jobs and flexible skills

Faced with an extremely variable seasonal demand for labour, the **Arcachon FLAG** in southwest France supported the start-up of a shellfish industry employers' association, the Groupement d'Employeurs des Métiers de la Mer (**GE2M**), in 2017. Through it, over 800 businesses share a pool of multi-skilled workers who can fish for oysters one day, shuck them the next and then deliver them to customers. By working for a number of employers, the workers benefit from full-time jobs.

Innovation is more than creativity or invention – it includes implementation. It depends on some new idea, which may require research and development, but most importantly, must be put into action.

The right type of organisations

Many social innovations are initiated by public-benefit organisations and often supported by voluntary work and donations. However, more recently the social enterprise movement has started to apply business methods to the resolution of social needs. **Social economy enterprises** can often create a viable business where conventional business cannot, by putting together a package of different funding sources – among them earned income, environmental grants, employment and training subsidies and volunteering. They are a way of bringing economic sustainability to social innovations, helping them develop a stable source of income beyond grant aid.

Social economy enterprises are usually structured as cooperatives, mutuals, foundations or associations. Their key feature is that they are organisations in which **people and the environment come first, and economic activity and profit serve this end**. In a world in which the maximisation of profits has become determinant, social economy enterprises offer a model for building resilient local economies that are not dependent solely on profit margins and within which the community remains at the heart.

Empowering the community: The Eigg´s buyout

In 1997, a community trust bought the entire island of Eigg off Scotland's west coast, within the Highlands LEADER LAG area. Eigg's residents had become dissatisfied with the disinterest of the island's previous private owner, which had led to poor housing, lack of facilities and high unemployment.

They set up a community trust and launched a campaign to buy the island. Members of the public donated the price of €1.7 million. The community developed a strategic plan which has led to house renovations, a new multi-purpose centre providing a shop, post office, tearoom and craft shop, reforestation, broadband, a website and a renewable electricity grid. Now, young people are returning to the island, not leaving, and the population has risen from 65 to 100. A community right to buy was passed into Scottish law in 2003, and a score of other community buyouts have taken place. More information.

Within the FLAG community, many interesting projects exist in which local cooperatives or other forms of collaboration are strengthening social capital, self-reliance and resilience in the face of economic and other pressures.

Cooperation for resource sharing

Cooperation between fishing businesses is a good way to maximise the productivity of assets. The Elbe-Röder Triangle and Dresdner Heidebogen FLAGs in Saxony, Germany, cooperated to launch *Maschinenring* (machine ring), a cooperative which collectively buys expensive items of equipment for fish pond maintenance and the transport of live fish, and rents them out to members.

Thanks to support from the FLAG, the cooperative could purchase equipment that was made available to its fishers while fostering cooperation among companies in the two FLAG areas and building social cohesion.

The building blocks of social innovation

Anyone can initiate social innovation: a local business, a university, an association or an individual. What these initiatives have in common is that they:

- aim to meet a social need and have a social impact
- are multi-disciplinary, bringing about new relationships and collaborations
- motivate and empower people to solve social problems
- are open, participatory and transparent
- are often hybrids of existing approaches
- often have an entrepreneurial approach

FLAGs have a unique ability to bring together different groups of individuals or organisations. This is something they should capitalise on to encourage debate on where innovation is needed but also to share ideas and match those who, together, can develop a solution.

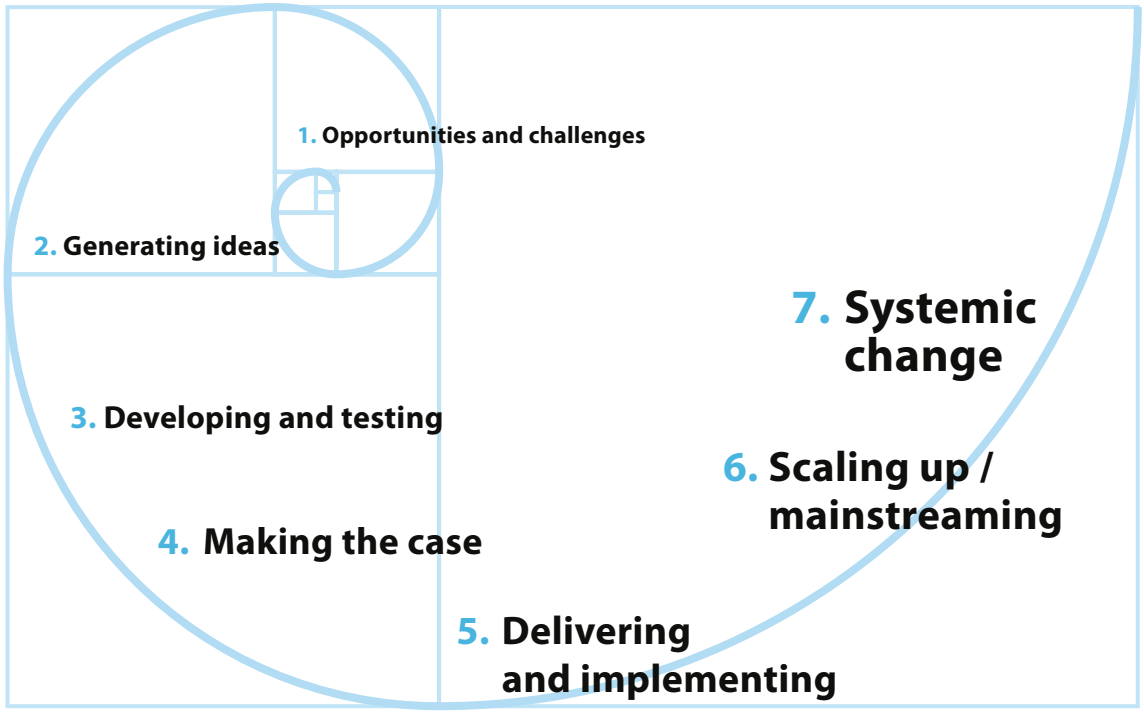
FLAG brings innovators together

Each year, the **Opale Coast FLAG**, based at Boulogne-sur-Mer, France's biggest fishing port, has taken part in the **Festival Innovation Mer et Littoral** (Sea and Coast Innovation Festival) which combines innovation workshops, hackathons and conferences in a friendly and creative atmosphere. Since 2019, it has been actively participating in designing hackathon themes to find solutions to challenges faced by its fisheries community. Recently, a solution was found to avoiding conflicts between fishers and shell fishers whose lobster pots were regularly getting caught in fishing nets. Technology was designed to geolocalise pots and get this information to local fishing boats. **FARNET Good Practice**

If not me, who? And if not now, when?

Social innovations start small but can change whole societies. They typically go through a seven-stage process of growth, usually depicted in the form of a spiral: from opportunities and challenges → generating ideas → developing and testing → making the case → delivering and implementing → scaling up / mainstreaming → systemic change.

Remember: someone has to go first!



Lessons for FLAGs

- As resilience depends on access to different ideas, skills and knowledge sets, **encourage maximum participation** in your strategy development and planning. Hold events where people of all sorts can attend, irrespective of disability or caring responsibilities.
- **Don't underestimate people who don't quite "fit in"** to your community! Retired professors, weekend sailors, newly settled residents – they can all be a valuable source of contacts or innovative ideas.
- **Find the connectors** in your community – those that bring different groups of people together to build social cohesion.
- Innovation, including social innovation, always involves a risk of failure. **Learn to accept risks and control them** with realistic analysis and planning.
- **Social change involves new mindsets and therefore takes time** – so if you want to be ready for different threats and challenges, start now!

2. Environmentally resilient economies

A second challenge for increasing the resilience of coastal communities is to ensure they can depend on robust natural ecosystems. Safeguarding our natural environment is an increasingly urgent challenge to ensure the continuity of human activity. Limiting and adapting to **global warming** is a fundamental part of this. Reducing **pressure on natural resources** and protecting **biodiversity** are also key if future generations are to have a viable and sustainable future in a fast-moving and competitive world.

The EU has pledged to be carbon-neutral by 2050, and the **European Green Deal** plots the route to this target. The Green Deal is a holistic programme, and covers the quality of the natural environment, the food system, energy, buildings, transport, waste, skills and competition.

Within this, the **Blue Economy strategy** addresses issues such as biodiversity, food, mobility, security and data, for example offshore renewable energy, decarbonising maritime transport, greening ports, making fishing gear and ships more easily recyclable and preserving biodiversity and landscapes.

The financial and regulatory environment is steadily changing to encourage more environmentally responsible behaviour, and FLAGs should bear this in mind as they plan their activity.

Resilience means having the capacity to counter threats. This requires:

1. being aware of the changes that are underway and the threats they present
2. having the knowledge, information and skills to choose the best responses
3. having the means to make these options a reality

Awareness of the threats and possible responses relies on intelligence: being connected to external sources of information and expertise – and having an 'ideas factory' with the inventiveness needed to plan a response. Options might include harvesting new species, addressing new market segments, developing new products, adopting less wasteful processes, or switching to lower-impact delivery systems.

The variety of responses available depends on the degree of **diversity** within the locality: diverse sets of knowledge and experience, diverse material resources, diverse economic activities and diverse markets. It also depends on **redundancy**, the existence of fall-back options which can be brought into play should this be necessary.

To summarise, an area's **resilience depends on having a range of natural resources** which have not been depleted, and access to a range of markets where its products and services can be sold. To connect these, it needs the **capacity to innovate**, to make use of different species and resources, to develop new products, to use new packaging methods and delivery systems and to reach new customer segments.

Let us consider some of the major threats that are looming on the horizon – or in some cases are already having very evident effects:

- ✔ climate change
- ✔ resource depletion and energy shortages
- ✔ loss of biodiversity and destruction of natural ecosystems

2.1 Resilience in the face of climate change

Rising sea levels is one of the most obvious threats to coastal areas in the face of global warming. According to the Intergovernmental Panel on Climate Change, the sea is likely to rise by between 0.4 and 0.8m by 2100[3] and, unless preventive action is taken, will flood the homes of several hundred million people. Countering this threat calls for major infrastructural investment by national governments. FLAGs are among the organisations that will be witnessing, first-hand, the impacts of global warming on their local areas and should **set up communication channels** with the relevant bodies to exchange on how their locality is included in national or regional plans.

Direct action can also be taken at local level, primarily by helping coastal and other fisheries communities to adapt to the consequences of climate change (adaptation), and – to some extent – by trying to address its causes (mitigation).

Adaptation at local level

FLAGs can support the communities to protect wetlands or take part in depoldering schemes, which return low-lying land to its original purpose as a floodplain. Where rising sea levels are likely to flood homes or businesses, care should be taken to locate any new or replacement building development on safe, high, ground.

Scallop shells for paving stones which help reduce flooding

The Opale Coast FLAG helped a local firm to find a supply of scallop shells to make paving stones. Paving stones made with an input of 30-40% of scallop shells are more porous. They allow surface water to percolate away and are thus well suited for areas at risk of flooding. At the same time, the use of this waste product from the local scallop productions reduces the use of new raw materials and avoids the pile up of vast quantities of scallop shells.

More extreme weather is also an effect of climate change and FLAGs may need to consider the associated risks for their fisheries communities of increased storms and other weather phenomena. Improved design standards and weatherproofing of buildings and other infrastructure might be necessary. Developing new types of equipment can also help communities ensure they are more resilient when storms hit. The mussel industry in the South FLAG area, Ireland, for example, has developed mussel ropes that are more resistant to storms, reducing the risk of losing precious equipment.

Rising temperatures are also having a profound effect on our natural ecosystems. Species that are unable to adapt die out in warmer areas or migrate to cooler ones. FLAGs can be proactive at helping their communities to adapt to the loss of species that they have traditionally been dependent on and embrace opportunities – or limit the risks – brought by new species.

Adapting economic activities to control an invasive species

The blue crab, *Callinectes sapidus*, is a decapod crustacean native of the Atlantic Ocean. The presence of this species in the Mediterranean has gradually increased since 1900, partly thanks to global warming. Its arrival is posing a threat to the region's established natural eco-systems and biodiversity, due to its voracious nature and lack of predators. It has also had a negative impact on fishers' gear when caught in their nets.

La Safor FLAG, Spain, is one of several FLAGs supporting their fishing communities to adapt to the presence this invasive species. It has helped the local fishing sector launch a "Blue crab control plan" with two primary objectives: 1) developing a better understanding of the species' movements, feeding and breeding habits; and 2) reducing their impact on the natural habitat by increasing their capture and finding outlets for it as a gourmet seafood product. Cooperation between local research institutions and fishers was key to making this happen.

3 https://www.ipcc.ch/site/assets/uploads/2018/02/WG1AR5_Chapter13_FINAL.pdf

Mitigation: reducing the causes

Local communities can also help **reduce the causes of climate change.** Greenhouse gases generated from burning fossil fuels and emissions of methane from agriculture (and aquaculture), as well as from industry and waste are known contributors to global warming. Therefore, local projects that encourage a **change in behaviour** to reduce such emissions can all contribute to slowing climate change.

Moving towards "clean" sources of energy such as solar, wind and tidal power – and reducing energy consumption generally – are obvious actions that FLAGs can support**. Improving waste management and water treatment** to reduce methane emissions can also play a valuable role.

From waste CO_2 and nutrients to seaweed

The Djursland FLAG in Denmark has supported a project to introduce vertical seaweed cultivation to a land-based recirculated aquaculture system (RAS) that produces fin fish. The unit allows CO_2 emissions and nutrients (nitrogen and phosphorus) produced from its aquaculture activities to be captured and utilised to grow macroalgae through Integrated Multitrophic RAS. In this way, the waste products from aquaculture which can otherwise harm the environment are prevented from escaping and instead turned into valuable revenue streams. FARNET Good Practice.

Decarbonising industry and transport

Fishing vessels are heavily reliant on fossil fuels, emitting large quantities of greenhouse gases[4], and a number of FLAGs have explored solutions to power fishing boats with **alternative fuels** ranging from hydrogen to solar energy to sunflower oil. Others have worked on trialling technology that **reduces fuel consumption**.

Decarbonising the fishing industry is important, but FLAGs can also support a **transition of their local blue economy in general** towards lower energy consumption or less harmful energy sources. As technology evolves, FLAGs have an important role to play in supporting an energy transition both within local industry and local transport.

Installing charging points for electric cars and boats can help prepare your area for the future. Less energy dependent forms of coastal tourism can be supported, as well as more energy-efficient aquaculture or fish processing plants. Some FLAGs (for example the Polish Lake District Leader FLAG) **encourage the use of renewable energies** by businesses benefitting from FLAG support through their project selection criteria.

Moving to solar power

June 2021 saw the launch of Elettra, Italy's first solar-powered tourist vessel, converted from a disused aquaculture boat. Its electric motor is powered by solar panels installed on its roof and can reach a speed of 5 knots with a range of 10 hours. This propulsion system uses 40kg less CO_2 per day. The boat also has diesel engines, which it can use to extend its range and speed if necessary. Collaboration between aquaculture producers and research partners helped develop the prototype and the idea is now being promoted as a sustainable model for other local aquaculture producers wishing to diversify into tourism.

4 According to 2018 figures quoted in https://euobserver.com/climate/152957, the EU fishing fleet burns 2.3 billion litres of fuel each year, producing nearly 7.3 million tons of CO_2.

Another solution is to promote activities and products that are not heavily reliant on fuels or electricity in the first place. **"Active mobility"**, for example, can be encouraged as it benefits human health and the environment. Cycling is increasingly popular in many places, and there are opportunities to diversify the leisure options available to tourists.

Examples include laying bicycle paths, signposting bicycle routes, creating numbered-node networks, installing bicycle hire and repair facilities, providing secure bicycle racks and tyre pumps and so on. Steps should be taken to integrate the transport system so that residents and visitors alike can move about easily without resorting to private cars. Local amenities and leisure activities should be linked with cycle paths, where possible. In Italy, for example, the **Trabocchi coast FLAG** has integrated cycle paths (funded by the local LEADER LAG) with fisheries infrastructure and related products and activities in **integrated tourist trail** along the coast.

Electric bikes to reduce the carbon footprint of tourism

North East FLAG in Ireland has financed the acquisition of 10 electric bikes and a trailer to increase the sustainable tourism offer in Howth, near Dublin. This has enabled a **local small business** specialising in coastal walking tours to open up to new publics, like elderly people. Its income has risen, but its environmental impact has not.

Many FLAG support initiatives that reduce energy consumption by promoting locally sourced food, including fish from local catches. Such projects not only strengthen the local food system, but "zero km food" also helps to cut emissions from food transport.

2.2 Securing the long-term supply of energy and natural resources

Local communities cannot survive if they lack access to the natural resources on which they depend, and the energy sources to make use of them. As such, protecting and making careful use of these resources is fundamental to developing resilience.

Energy sources for the future

Apart from the harmful impact of fossil fuels on our climate, a move away from these finite resources and towards renewable ones is vital to **guarantee the availability of energy sources in the future**. FLAGs can help this transition by taking every opportunity to support their communities switch to renewable energies such as wind, sun, tide, hydro-power, biomass or even geothermal.

Renewable energy communities, mostly organised as cooperatives, in which local residents club together to install generators, have taken off in many countries, often encouraged by tax incentives. On a smaller scale, fishing associations, aquaculture farms and other business and organisations in FLAG areas can show the way.

Making oyster farming energy self-sufficient

The *Ria d'Etel* area has over 50 oyster farms, which produce 3 000 tons of oysters a year. The activity is highly dependent on fossil fuels and consumes over 60 000 litres of oil a year to move oyster barges around, as well as using electricity to power water pumps and sorting engines.

The **Auray & Vannes FLAG** supported a project to pilot a transition to renewable energy. This has involved the development a 20 kW tidal turbine, installed in an estuarine environment, and the design and testing of an electric oyster barge. Together, this technology is expected to cater for all energy needs of the local oyster activity. **FARNET Good Practice**.

Capturing methane from waste mussels

Mussel producers in the area of the **Mont Saint-Michel FLAG** were producing organic waste from mussels that were too small to commercialise. The waste would end up in the sea and on the beaches, causing unpleasant smells. With support from the FLAG, a cooperative of local mussel and oyster producers called Cultimar, together with local researchers, set up a pilot plant to produce biogas (methane) for electricity from the unwanted mussels. The plant can currently process up to 50kg of undersize mussels per day, minimising waste and generating valuable energy. **FARNET Good Practice**.

Adapting how society and businesses are organised in terms of energy production, use and distribution is an exciting challenge and far reaching. It will involve awareness-raising, rethinking, risk taking, economic incentives and infrastructure – as well as new skills and ways of interacting.

FLAGs can be proactive in supporting local public and private sectors to undertake such actions. They can also bring different stakeholders together to rethink and reorganise how they go about their daily business. FLAGs that can help foster a smooth energy transition will play a valuable role in making their communities more resilient and their economies better adapted to a new world in which renewable energy will be fundamental.

Encouraging home energy production

The Polish **North Kaszuby FLAG** promotes sustainability and renewable energy through its own activities – for example by setting up an educational centre for renewable energies – and through the projects it supports. In 2018, the FLAG convinced a local engineer to install, as a part of his investment project, a small wind turbine next to his company's renovated building. The engineer can inform his clients about the practicalities of home energy production. The turbine also attracts many visitors from local schools and kindergartens (450 children visited the company within 19 months of its installation). This helps to raise awareness in the local community about the potential of home generated renewable energy, and it is a step towards improving the area's resilience to energy shocks. **FARNET Good Practice**.

A new local economy built around offshore wind

Bornholm is one of two "energy islands" identified by the Danish government in its push to make the country one of the biggest producers of offshore windmills. **Bornholm FLAG** recognised the opportunity this offered the island and supported the launch of **Offshore Center Bornholm** (OCB), a network of 17 local businesses and facilities offering services to companies and workers in the offshore wind sector. After 10 years, the network is consolidated and the island is now 80% self-sufficient in renewable energy. **FARNET Good Practice**.

TIP

Think holistically! Some projects can create improvements in one place or sector while causing damage or pollution elsewhere. Watch out for greenwashing!

Using natural resources sustainably

Safeguarding natural resources for future use means ensuring that their exploitation does not surpass the rate at which they are regenerated. It also means not wasting precious resources that could still be put to use instead of extracting or producing new materials/natural resources.

This applies to fish stocks which must be preserved for them to continue providing food and economic activities in the future. It also applies to fresh water, our most vital resource and one whose future availability is increasingly under threat. Promoting better systems for making use of by-products and reducing the consumption and waste of natural resources is something that should find a place in most FLAG strategies.

Below are just three examples of how FLAGs are taking care to ensure that precious resources continue to be available for future generations.

Securing wild fish stocks

Cuttlefish are an important product in the Bay of Arcachon on France's Atlantic coast, but too many of their eggs are lost. Cuttlefish often lay their eggs on submerged fishing gear, and they are disturbed when the gear is taken out of the water at the end of the season. To prevent this, the **Arcachon FLAG** is supporting a **research project** in which the eggs are collected and placed in incubators where they can hatch safely and grow to adulthood before being released back into the wild. It is hoped that this will help preserve cuttlefish stocks at healthy levels for sustainable fishing.

Farming for the future: indoor aquaponics

A Finnish FLAG has supported a research project to create a business model based on indoor aquaponic farming (the combination of aquaculture and hydroponics in a closed circuit in which water from the fish tanks is recirculated through filters to feed beds of plants, and then back to the fish tanks). This innovative concept reduces water use by 85% and produces both fish and vegetables with near zero-waste discharge.

The **Central Finland FLAG** has funded a local research institute to undertake a feasibility study and small-scale laboratory testing, along with the construction of a pilot plant to develop and monitor the performance of the system.

The third phase of the project will start in 2022 with the aim of scaling up the aquaponic system to commercial viability. The ultimate goal of the project is to create a profitable, environmentally friendly and innovative business model. **FARNET Good Practice**.

Adapting processing practice to minimise waste

North East FLAG, in Ireland, has supported a local, family aquaculture business that farms giga oysters to make better use of natural resources by improving its handling, grading, and packaging processes.

The investment went into redesigning the company's processing layout and innovative equipment, which included a gentler and more accurate grading machine, allowing the oysters to be kept in seawater up to the point of grading.

Through these changes, Cooley Oysters Ltd. has been able to reduce oyster mortalities, energy needs and the consumption of public water supply. **FARNET Good Practice**.

More information on reducing waste can be found in FARNET Guide #17: Circular economy in fisheries and aquaculture areas.

2.3 Healthy and resistant ecosystems

The Earth has evolved over the last 4.5 billion years to reach a more or less stable biological state which supports human life and an estimated 8.7 million different species of animals, plants and other organisms. The seasons, atmospheric and ocean currents and temperatures are all interdependent with these different forms of life.

In the course of evolution, some species die out, as random mutations give other species a competitive advantage. However, human activity has disrupted the longstanding natural equilibrium and the rate of extinction has rocketed. According to a UN report[5], a million different species are threatened with extinction, many within the next decades.

> ***"The health of ecosystems on which we and all other species depend is deteriorating more rapidly than ever. We are eroding the very foundations of our economies, livelihoods, food security, health and quality of life worldwide",***
>
> **Sir Robert Watson, Chair of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services.**

One of the key factors of resilience is the range of different responses available when a threat must be met ('requisite variety' in systems theory). The natural world supplies this variety in the form of large numbers of species that can move in to fill gaps in the ecosystem if and when these open up. This is why biodiversity is important for resilience. When biodiversity is reduced, so too is the equilibrium of the natural ecosystems on which communities depend.

Defending biodiversity for robust ecosystems

Fishing and aquaculture communities depend on healthy ecosystems in which the fish species on which they have built their food systems and economies can thrive. For these species to thrive, so too must other living species each of which plays its part in maintaining the balance of the marine, delta or freshwater ecosystem in question.

FLAGs therefore have an important role to play in defending biodiversity. This means nurturing the balance of animal and plant species that has developed in a given environment.

FLAGs can help preserve the balance of the ecosystem by supporting projects that reduce pressure on particular species. This might include reducing captures by limiting fishing (especially illegal or uncontrolled fishing) or by adapting fishing techniques and gear to minimise their impact on the balance of species and the marine environment.

5 **UN 2019 Global Assessment Report on Biodiversity and Ecosystem Services**

Marine protected areas

Fisheries and tourism are important activities in Murcia's oldest fisheries marine reserve, Cabo de Palos, Spain. Both activities are highly dependent on the quality of the marine ecosystem and biodiversity. However, much illegal fishing takes place during the summer months, when tourism leads to high demand for seafood in restaurants, putting heavy pressure on species such as grouper, lobster and pollock.

With support from the **Murcia FLAG**, local fishers are helping restore the natural balance of marine species. Each summer, instead of fishing, one fisher is now employed by the local fishing organisation to patrol an area against illegal fishing. Its improved protection has resulted in an increase of endemic species. **FARNET Good Practice.**

More sustainable fishing gear

Fishing techniques in many commercial freshwater fisheries are designed to target just the most valuable fish, for example gill net fishing targeting big predatory species. However, this is considered by many scientists to have a negative impact on lake ecosystems and fish stocks.

Fishers in the **Lapland FLAG** area have developed various fishing techniques for different fish species and seasons, including box capture, that allow the captured fish to swim freely, instead of getting entangled in the net. This makes it possible to release the fish that are too small or protected by legislation. Such gear can also help to rehabilitate water ecosystems at risk of eutrophication by removing small plankton feeders and other detrimental fish.

The techniques are considered to have been so successful in Lapland that two Polish FLAGs (**Zegrze Lagoon** and **Masurian Sea** FLAGs) have cooperated with the Finnish fishers to transfer the practice to Polish inland fisheries. **FARNET Good Practice**.

Keeping seabirds out of fishing nets

A key component in the food web, birds also have a vital role to play in maintaining the balance of natural ecosystems, from reoxygenating the air to seed pollination. The **Oeste FLAG** in Portugal acted as the intermediary between an environmental NGO and local fishers to pilot two methods of reducing the number of seabirds that are accidentally caught in fishing nets and killed. The first device uses LED lights attached to the ropes on fishing nets to make them easier for birds to see them underwater and avoid getting tangled in them. The other scares birds away by mimicking a bird of prey. **FARNET Good Practice.**

Measures to restore species and ecosystems

In some cases, proactive steps may be necessary to restore a specific species where the balance has tipped too far for it to recover naturally, even with a halt on fishing. This might also be necessary for particularly fragile species which reproduce too slowly to keep up with human demand.

Far-reaching restoration plans of certain ecosystems may also be needed and FLAGs can play an active role in bringing together the partners necessary for such restoration and/or management plans.

Improving eel stocks in Lake Bolmen

The **Halland FLAG** has supported an initiative aimed at investigating why eel stocks are lower than expected in Lake Bolmen, compared to other similar sized lakes in Sweden. The project has brought together the Lake Bolmen Fisheries Conservation Area Association and the Swedish University of Agricultural Sciences. It aims to increase eel stocks by analysing underlying ecological factors and experimenting with new methods of releasing fry. **FARNET Good Practice**.

Farming sea urchins to reduce pressure on wild stocks

Sea urchins are considered a delicacy along the coast of Portugal, however the species cannot reproduce quickly enough to meet the high demand. As such, wild stocks are at risk of depletion.

To tackle this threat, **Mondego Mar FLAG** supported a research project led by Coímbra University to investigate the possibility and economic viability of breeding sea urchins in disused salt pans. If successful, the project will reduce pressure on wild stocks and breathe new life into the abandoned salt marshes. **FARNET Good Practice**.

Reinstating wetlands and pike spawning grounds

Key predators in the Baltic, pike are essential to maintaining biodiversity and healthy waters in the area. The **Stockholmsbygd FLAG** area, off the coast of Sweden, has many shallow coastal areas and wetlands which are spawning grounds for pike and perch. However, in recent years, over a quarter of these natural wetlands have been lost due to increased cultivation and agriculture, causing pike numbers to dwindle. As a result, non-predatory whitefish species such as flounder, roach, and herring, which are normally prey to pike, have increased substantially causing eutrophication on the archipelago and an imbalanced ecosystem.

To restore natural balance to ecosystems on the Swedish archipelago, the **Stockholmsbygd FLAG** has supported an initiative to develop a new manmade wetland system that replicates the natural spawning grounds of pike. The aim is to increase pike stocks in the area and reduce eutrophication, thus restoring a balanced natural environment. **FARNET Good Practice**.

Diversity for resilient food systems

As mentioned above, resilience relies on the presence of alternative options that can be brought into play as circumstances dictate. This is true in nature. It is also true in business. While specialisation – relying on a single species, product or market – may be good for achieving economies of scale, it is not good for resilience. Diversification, on the other hand, avoids excessive pressure on individual species and over-dependence on their exploitation.

FLAGs may be able to support fishers and aquaculture producers to harvest a **variety of species,** develop new processing industries and **products**, and diversify into new **markets**. Equally, ensuring a diverse range of suppliers feeding into a given supply chain can strengthen its resilience to unforeseen events. For example, a local company that processes oysters from a single producer is a lot more vulnerable to supply disruptions than a company that handles oysters from a range of oyster farms, or that processes cockles and mussels as well as oysters.

Diversifying shellfish species commercialised

Testing out the production of new species for aquaculture is something that FLAGs can be well-placed to support if under-exploited species exist in their areas. With support from the **VeGAL FLAG**, Italy, a local fisheries cooperative and research institute successfully piloted the farming of warty venus clams, or "sea truffles", a species never previously commercialised. This has helped diversify the area's aquaculture production and increase the market supply of local fisheries products. **FARNET Good Practice**.

Broadening the product range for better resilience

Relying on a single product from your catch can be risky. Indeed, fishing is inherently unpredictable and seasonal, therefore the ability to propose different products, year-round, is fundamental to a resilient business. The **Western Lithuania FLAG** helped a small fish farm in its area acquire the facilities and equipment to better manage its production by ensuring good storage facilities as well as developing a range of processed products that can be sold throughout the year, meeting different market needs. New products include species such as roach, bream and hake, and a series of dried products made from flounder and cod. **FARNET Good Practice**.

Diversifying the market for local products

A seafood conditioning and processing business in Chalastra, Greece, identified a strong demand among local Asian communities for blue crab, originally an invasive species in the area, and set about developing a product adapted to this niche market. The **Thessaloniki FLAG** helped with the investment needed to set up the production line and the company now works with around 25 local fishermen, who catch blue crab as well as other fish and shellfish species. The company supplies Asian communities in seven different European countries with live blue crab as well as producing a range of processed products. These are sold to intermediaries as well as directly to consumers, ensuring a broad and diversified customer base. **FARNET Good Practice**.

TIP

A robust business ecosystem is fundamental to local resilience: as well as securing access to diverse markets, don't forget about securing the inputs necessary for a given sector to function!

Lessons for FLAGs

- **Take care of your natural environment**, especially those parts of it that harbour biodiversity or help absorb extreme weather.
- **Prioritise the health of important species** in your area, including those whose behaviour indicates changes in the environment and those at risk of extinction.
- Make sure your community **uses resources sustainably,** reducing waste and avoiding excessive pressure on specific species.
- Encourage a **reduction of energy consumption**, and where it is not possible, move to renewable energy.
- Reach out to those working on **conservation and transition research** and connect them with other local stakeholders that can apply the knowledge developed.
- Consider the **ecological footprint of businesses** supported and help those that want to pilot new environmentally-friendly ways of doing things.

More examples of FLAG projects to protect biodiversity can be found in the 2021 FARNET Biodiversity Case Study.

3. A digital future

Just as the bicycle transformed rural life and the railway transformed industry and made suburban living possible, so digital technologies are transforming the way we live and work. Digitalisation can help make processes more efficient, reducing time and money spent traveling or circulating information (for example, to consumers or among producers). It facilitates advanced analysis of data, improving understanding of different phenomena and related decision making. It also offers the possibility of automation and remote control which can improve safety and regularity of operations, as well as reducing time spent on monotonous or unattractive tasks, thereby improving quality of life.

Whether we like it or not, digitalisation is here to stay – this has become particularly evident since the COVID-19 pandemic. Millions of people have found they can be just as productive working from home instead of commuting to an office. Others have found that online entertainment and shopping are more convenient than driving into town. A move towards online sales, including for fisheries products, has been consolidated. And digital procedures for approving decisions are increasingly accepted.

FLAGs must keep abreast of the changing digital landscape to support their communities to adapt to this new paradigm and make it work to their advantage!

Digitalisation is not a panacea – like any process of change, it **impacts on different people in different ways**. In the pandemic, many of those living in a digitised world, with administrative or other jobs that could, with a little creativity, be undertaken from home, innovated and thrived.

However, the opportunities afforded by digitalisation did not offer solutions to all. Fishers still need to board their fishing boats, factory workers must generally operate on site and hospitality only works if people can physically travel. Moreover, in some cases, digitalisation actually replaces human effort, leading to job losses.

However, **digitalisation is not a one-way process** either. Changes in technology influence people's behaviour, but new patterns of behaviour can also signal opportunities to develop new technology. When developed locally, this can bring new, higher skilled businesses and jobs. It can also result in useful services and applications to enhance the quality of life and/or work efficiency.

Coastal areas will be affected in different ways by digitalisation. The pandemic's legacy of **home working and e-commerce is likely to encourage a significant population move away from cities and into smaller communities, including those by the sea.** This will have both positive and negative consequences.

A growing population of relatively well-off people will spend a large part of their incomes, earned in the cities, in their new home communities. This should support local businesses and help create employment. New connections to urban centres will also offer opportunities.

However, property prices will rise, and housing may become difficult to afford for local people, especially on the waterfront. This will hit those working in fishing and aquaculture particularly hard if their access to the waterfront is not protected. Moreover, the move to a digital economy **requires people to acquire digital skills**, and those without these skills risk becoming a new excluded group.

Therefore, resilient **coastal communities should take pre-emptive action**. FLAGs have a role to play in safeguarding their areas' primary sector activities such as fishing and aquaculture. These are fundamental for food security and essential to many other related sectors. They must also push for the provision of digital skills training, and facilities for digital work, to ensure that the digital transition does not result in a new digital divide.

An EU priority

The digital transition is a key priority for the EU and, in 2018, the European Commission adopted a **Digital Strategy** promoting agility, innovation and co-creation by all Commission services. It also underlines the importance of enabling actions — on governance, resources and digital skills – to achieve this transition. **More information**

Digitalisation and resilience principles

Pre-COVID, fishers were often reluctant to make the jump to online sales. However, the new context has pushed many into new ways of working and selling their produce. Those who had made the transition to online sales before the pandemic struck were cushioned from some of its impacts thanks to having a sales channel which could withstand the disruption to international supply chains and the temporary closure of physical outlets. In this case, online sales direct to local consumers proved a resilient sales channel.

Put in terms of resilience principles, digital tools can improve the **diversity** of your capacity to respond by improving the quality and breadth of information you have to work with, and the speed and number of people who can be mobilised when action needs to be taken. They can also support '**redundancy**', through which risks are reduced by having back-up responses to each challenge. All this gives more **flexibility** to react to changes.

Some examples of the benefits of digital tools include:

- **Data breadth and quality:** sensors can provide a constant stream of information on fish stocks, consumer preferences, and environmental conditions such as water level, temperature and salinity.
- **Data timeliness:** telematic data transfer provides instantaneous update of information, so that changes are detected immediately, giving you more time to respond if a worrying trend develops (for example, water pollution or toxic micro-algae in shellfish growing areas).
- **Speed of response** to threats: electronic and mobile telephone communication mean you can mobilise members of your network very quickly.
- **Diversity of response:** The number of different organisations and sectors that can be brought on board, and consequently the range of solutions to address issues, can be increased significantly.

FLAGs can explore how these opportunities can be used to:

- ✔ make local businesses more efficient – but also more sustainable and resilient.
- ✔ improve access to information and services.
- ✔ facilitate better participation in decision-making and governance.

3.1 Efficient and resilient businesses

Digitalisation can strengthen the production process, help diversify supply chains and ensure management and logistics are efficient, dependable and flexible.

Although resource, time or skills constraints may dissuade small businesses from investing in digitalisation, the COVID-19 crisis has highlighted a number of benefits it can bring. FLAGs can help with supporting some of the costs related to digitalisation. They can also foster an increased awareness of the opportunities that digital tools can offer to develop better resilience of the fisheries and other coastal sectors.

Making the production process more resilient to potential threats

If used effectively, digital tools can make food production activities more efficient and resilient by ensuring that local businesses make the best possible use of resources available and can resist competitive pressure and unforeseen changes. In turn, these businesses will be equipped to continue providing good livelihoods for residents.

Various FLAGs have helped coastal communities create or capitalise on digital tools to counter threats faced by local fishers and aquaculture producers. In the production stage of the value chain, better, faster information on environmental conditions can enable local fishers and aquaculture producers to react quickly to change. Realtime data can allow catches and fish stocks to be monitored on a regular basis, ensuring the ecological sustainability of a given fishery.

Digital reporting to monitor catches and fish stocks

The **East Finland FLAG** brought together app developers, fisheries management authorities and research centres to develop and test a simple mobile phone app that allows fishers to report their catch quickly at the end of each day. The tool aims to improve the ecological sustainability of inland fisheries by facilitating access to reliable and transparent catch data in real-time. This provides information to the Natural Resource Institute of Finland (LUKE), allowing it to monitor catches and fish stocks and make better-informed decisions to manage the fisheries resource. It also makes the reporting process significantly more efficient for fishers who save time previously spent completing voluminous annual reports on paper or via a complex IT systems. **FARNET Good Practice**.

A digital sensor to help secure a local supply of oyster spat

Oyster farming in the Bay of Quiberon, France, is threatened by increasingly changeable water temperatures, as well as by pollution and viruses. In 2018, the **Auray & Vannes FLAG** in Brittany supported the installation of a high-frequency multi-sensing buoy to improve the understanding of how oyster larvae ('spat') settle on the seabed to grow. The sensor measures the temperature and salinity of the water every 20 minutes and sends the data to an online platform twice a day. These data can be used by the whole local shellfish farming community as well as the research institutes involved, and can be converted into graphics, which oyster farmers and researchers can use to develop models and improve their understanding of the environment.

This is allowing them to predict when the oysters will spawn, helping to maximise spat collection and develop better self-sufficiency for spat. Indeed, in the face of viruses that can wipe out large proportions of oyster population, local oyster producers often have to import spat from other areas leaving them vulnerable to additional costs and supply shortages. **FARNET Good Practice**.

Diversifying supply chains while securing the local community's access to fish

Recently, digitalisation has had its most visible impact at the marketing stage of the value chain, with online shopping soaring since physical shops were closed during the COVID-19 pandemic. At the same time, consumers are becoming more aware about where their food comes from – and are increasingly seeking out local food producers as an alternative to globalised supply chains.

Digital tools can help all along the supply chain, in particular, to ensure that the companies making up each supply chain are connected through efficient processes that allow supply and demand signals to flow smoothly, matching available products with different markets. This connectedness also ensures reactiveness to sudden changes in market supply or demand.

From the fisheries products made available, to how they are delivered, greater diversification and cooperation will help reduce risk and increase capacity to respond to change.

A number of FLAGs have successfully helped local businesses embrace digital tools in order to diversify their supply chains and promote cooperation while ensuring the community has easy access to local fish.

Connecting fish resources with markets

The **Central Finland FLAG** supported the creation of a network that aims to find commercial outlets for different fish species, especially those that tend to overpopulate. The project involves the mapping of raw material streams of poorly exploited lakes to enable an economically viable fishing activity. Local entrepreneurs have started to cooperate and share information through a designated website, and existing projects have been linked to the network. Processing and logistical chains are also starting to be built up for underused fish species. **FARNET Good Practice**.

Pooling the production of small-scale producers

The area of the **Pontevedra FLAG**, Spain, is home to four small fish and seafood auctions marketing mainly artisanal catches. Despite each auction's specialisation, competition from the bigger, global auction in the nearby city of Vigo is fierce, threatening the viability of these smaller markets.

The **Pontevedra FLAG** helped set up an online sales portal that links the different parts of the value chain (fishers, auctions, fishmongers, distributors, restaurants and consumers) pooling the supply of the auctions. The digital platform instantly informs fish buyers what will be available at these four auctions via a unique information point. The diversified supplier base and the wider range of products for potential customers has helped secure viable prices for local products while attracting new, including international, buyers. **FARNET Good Practice**.

Enabling short supply chains

To be resilient to potential shocks, fishers should have different options for selling their catch. Short supply chains are an important component of the potential mix, and digital tools can help facilitate them.

The **Baltic Sea coast FLAG** on the Baltic coast of Germany set up a web portal, **Fisch vom Kutter**, as early as 2009 to enable local fishers to communicate details of their catch by text message while at sea, and then, upon arrival, sell it direct to consumers on the quay. This was radically different from the concept of running a market stall for customers to browse. Instead, information is communicated in advance and customers come to the port at a specific time to pick up their pre-ordered fresh fish.

This early adoption of digital tools to strengthen direct sales meant that participating fisheries were less impacted by the effect of COVID-19 on global supply chains. When the crisis struck, the fishers saw direct sales rise by 10-20%, compensating for other losses and ensuring the local population still had easy access to fisheries products.

Strengthening management and logistics

As well as strengthening the production process and helping diversify supply chains, digitalisation can also ensure management and logistics are **more efficient, dependable and flexible**. This will ensure local business are more competitive but also better equipped to adapt to change.

Digital tools can be used to facilitate the recording and monitoring of milestones, and the analysis of performance, allowing companies to adapt and improve on a regular basis. They are also vital for communicating proactively within any company and with its external partners. FLAGs can encourage and support the uptake of digital technologies which may improve the management of local activities, including through collaborative platforms.

A digital app for managing shellfish activities

As well as harvesting, shell-fishing also involves "farming" activities: planting shellfish seed, transferring the maturing shellfish, cleaning the production beaches, monitoring stocks and captures, etc. The need for complex planning, adapted daily to the tides and including set days of fishing closure and other emergency shutdowns due to toxins and weather warnings, implied a significant amount of time was spent by shellfish gatherers finding out, for example, whether they could work on a given day. Notices of closures were posted in the *cofradía* (fishing and shell-fishing association), which meant a trip to the workplace to access information, and captures were recorded on paper which the *cofradía* would then need to digitalise for reporting to the regional administration.

With support from the **Arousa FLAG** in Spain, a digital platform developed by and for the shellfish sector – along with the relevant training on the tools – has simplified and improved the day-to-day management, control and planning of shellfish activities. **FARNET Good Practice**.

Blockchain improves traceability for small-scale fishers

Blockchain is a system of recording information in a way that makes it difficult or impossible to change, hack, or cheat the system. Rather than requiring a central register to manage the flow of data, the blockchain principle allows a set of organisations to securely verify, execute, and record the transactions between them, creating a peer-to-peer network without relying on an intermediary.

Based on this concept, three Italian FLAGs in Campania cooperated to create FLAGCHAIN to pilot the use of blockchain by small-scale fishers to label their catches. Using smartphones, the system records the geo-localisation and adds the date of the catches automatically, while the fisher adds the estimated quantities and species. A QR code is then produced providing all the information to the consumers (fish market, restaurants and consumers).

The technology is helping to modernise the small-scale fisheries value chain, moving the sector forward in the digitalisation process. It allows artisanal fishers to get ahead of their competitors, meeting the pressing demand for transparency, and enabling promotional actions to increase consumer awareness of sustainable practices and local consumption. **FARNET Good Practice**.

Enhancing logistics: a mobile shop for the 'land of 1 000 ponds'

In 2018, the **Tirschenreuth FLAG** in Bavaria introduced a **mobile village shop** selling groceries and other goods. It incorporates a digital platform allowing online ordering, intelligent route planning and stock checking. The platform promotes local food producers by connecting them with their customers – and ensures the local population of 40 000 people has easy access to the food and goods they need.

3.2 Facilitating access to information and services

Resilient communities need to ensure that their populations have continued access to essential services, even in adverse conditions. This can include guaranteeing access to food, health services, education and information, as well as leisure and well-being activities. Local communities may also need to develop new services if they are to attract new residents who can bring diversity to their societies and economies.

The COVID-19 pandemic has turbo-driven a trend towards digitalising services. FLAGs can help to facilitate this transition, both for local businesses seeking to offer their services in new ways and for residents who need support to learn new skills and behaviour in order to benefit from such opportunities.

Virtual training

The **Murcia FLAG** in southern Spain had selected a training project to equip local people with the necessary skills to find employment in the fisheries and agriculture sector. Then, COVID-19 hit and opportunities for physical meetings, including training and job interviews, were interrupted. Instead, such activities moved online, making it apparent that many people lacked the digital skills to take full advantage of online opportunities.

The project was, therefore, adapted to be delivered online – but also four additional 90-minute sessions were added to the offer, covering digital skills. These included:

- Creating your personal brand and CV
- Tools to support your job search
- Using social media to increase your contacts and online presence
- Tips for online interviews

The workshops were promoted by the Town Council's website and the possibility to win a tablet through active participation in each session was used as an incentive to encourage attendance. A total of seven different training sessions took place online, each attracting over 15 participants and receiving excellent feedback from users.

Online medical consultations

Culatra is a small island off to coast of southern Portugal. Its population of 1 000 inhabitants is largely dependent of fishing and, increasingly, on tourism too. Other activities on the island are limited and, to access most services, the community needs to make the trip to the mainland.

To improve access to healthcare, the **Sotavento do Algarve FLAG** has encouraged a collaboration between a mainland medical clinic (International Clinic of Olhão), the Town Hall of Sé and São Pedro, and the Culatra Island Residents Association. They all came together to develop a remote emergency consultation service. Community members seeking medical advice can now go to the telemedicine clinic in Culatra, where they are received by a resident nurse. They then enter the International Clinic of Olhão virtually, where a doctor performs a telemedicine consultation through videoconference.

The digitalisation of many services can increase their accessibility to different sections of the population. This must be done carefully, however, to ensure a **variety of ways of accessing services,** for two key reasons:

1. to remain **accessible to all**, including to those who do not have the skills or equipment to benefit from digital tools.
2. to remain **accessible in the event of unforeseen events**, such as power cuts, internet failure, the loss of one's smart phone, etc.

TIP

Remember that digital systems and tools also need to be resilient in themselves. It is important to have a back-up solution, in case of internet failure, viruses, etc.

Supporting the transition

The effective use of information technology requires two investments: firstly, in hardware and secondly in learning. True, nowadays more or less everybody owns a mobile telephone. But fewer have their own computers, and even fewer can use more complex software, such as spreadsheets.

Providing **training in digital skills is more necessary than ever before**, while **good digital infrastructure** based on optical fibre connections is a must for entrepreneurs and for home-office workers. Quality digital infrastructure can allow many public services to be digitalised, making them available on the spot, saving trips to town and generally facilitating life for residents.

Internet centres that are open to the public can ensure access to digital services for those who lack digital skills, do not own a computer or have reliable wi-fi access; and co-working spaces can help small-scale and start-up businesses take advantage of digital opportunities without the need for large upfront investments in equipment and infrastructure.

The digital transformation of Lormes

The town of Lormes in central France (population 1 300) has dubbed itself *"la petite ville du futur"* (the small town of the future) after carrying through a digital transformation. In 2000, its mayor, faced with a lack of digital infrastructure and skills, adopted a digital policy and, in 2003, a digital association was established. In 2008, it converted a slaughterhouse into a digital hub, with a fablab added in 2015. It has also installed optical fibre and digitised its hospital. 2017 saw the creation of a skills centre offering training on digital skills. Throughout, its approach has been participatory and based on local needs, not on technology. Over more than two decades, the digital transformation of Lormes evolved through the following five stages:

1. **Excluded:** *Poor or no mobile signal, broadband, skills or digital services.*
   The first step was to avoid digital exclusion, thanks to an innovative digital policy that promotes the economic and social potential that ICT and the internet can bring to remote rural areas.
2. **Connected:** *Basic broadband, elementary capacity building, entry-level digital literacy/inclusion, engaging target stakeholders and co-identifying priority actions.*
   2003: Digital Mission partnership provides digital inclusion and education support services;
3. **Engaged**: *Widespread digital literacy and service use, local training and business services, stakeholder input.*
   2007-8: Portes du Morvan Rural Hub provides high-speed broadband**, technical support,** meeting rooms, videoconferencing facilities etc.
4. **Experienced:** *Fibre broadband, services as good as in towns, citizens able to exploit digital innovation.*
   2014-16: Fibre-to-the-home pilot + community consultation to prioritise new digital services.

5. **Player**: *Community owns its data and has full capacity to innovate.*
   2017: National financial support for the Villages of the Future process; Rural Hub starts training and mediation services for the business, public and community sectors.

The smart solutions implemented by Lormes show that a true digital transformation of local communities requires more than bridging the gap in terms of infrastructure and skills. It requires a **continuous partnership** with and between inhabitants to **co-design digital services** that meet local needs and a realistic "smart" assessment of the role that the village can play in a broader territorial development.

More information about this and other examples of digitalisation local initiatives can be found in the **Smart Villages and rural digital transformation Briefing**, European Network for Rural Development (ENRD), 2020.

Access to quality information and effective communication channels are essential to any community, business or service provider. The vital role of telecommunications in supporting everyday life processes during the COVID-19 crisis was particularly apparent, replacing many direct communication channels which were put on hold. However, the digitalisation of communication channels can have both positive and negative impacts:

- On the one hand, working and meeting online is cheaper, faster and usually uses less energy. It can even increase democratic participation (see section 3.3 for further information).
- The downside is that the depth and quality of interpersonal relationships is reduced in the absence of multi-channel communication, for example through body language. Debates can become reduced and simplified.

TIP

Digital communication should complement, not replace, physical communication! In an increasingly digitalised world, promoting opportunities for people to meet others face-to-face is fundamental for preserving a community's social fabric.

Adapting to a new normality: changes to stay

In Catalonia, project selection used to require physical visits by the FLAGs to the places where the project was taking place. When COVID started, the Regional Administration published a regulation replacing these mandatory visits by the provision of georeferenced pictures and other data. This allowed it to approve projects even during a period of strict confinement. The measure has proved to be practical – and more environmentally friendly – as it saves travel time, transport emissions and costs. Since the confinement finished, it seems the digital procedure may continue to be used.

3.3 Broader participation and better governance

Broader participation of those affected by different issues usually leads to better decision-making and better governance. This is because it results in **more information and points of view being built into any solutions developed**. It also means that decisions are more likely to be accepted by the community as they better reflect their understanding and needs.

Making it easier for community members to be involved should lead to more sustainable action in the long term and lay the ground for more resilient behaviour. Moreover, **engaged citizens are easier to mobilise quickly in the event of a crisis** and more willing to change behaviour in the case that a changing environment makes this necessary.

Digital tools can substantially facilitate the involvement of multiple stakeholders in discussions which affect them as well as the circulation of information and the mobilisation of different talent and resources when needed.

Facilitating discussion and debate

Meetings via video conference have become commonplace since the outbreak of the COVID-19 pandemic. Moreover, many have found that virtual meetings are more efficient than physical meetings, as there is no lost travelling time or expense.

More interestingly, they open participation for many people who previously found it difficult to contribute to certain meetings that could have been relevant for them. **Combined with a flexible approach to the timing of meetings**, virtual tools have the potential to significantly boost the participation of a more diverse group of stakeholders, including:

- Fishers who are out at sea and therefore not physically present.
- Other businesses which would find it difficult to carve out the time in their day to travel to a physical meeting.
- Those with caring responsibilities who cannot easily leave the home for long periods of time, or would need to pay for a babysitter or other support to do so.
- Those with reduced mobility (for example, from lack of a car or inadequate public transport).
- Young people who are simply not often associated with public meetings.
- People who are shy to speak in front of a group but who might be more at ease posting comments in an online chat function.

Boosting participation through virtual meetings

During the lockdown resulting from the COVID-19 pandemic, the Costa Brava FLAG, Spain, made increasing use of online meetings and interviews. These became key tools to feed its reflections on how to adapt its local development strategy for a new future.

The FLAG now holds regular online meetings, noting improved attendance rates from all its board members. Those who could previously not afford the best part of a day to drive long distances to a FLAG meeting can now easily connect for 1-2 hours. This has improved information flow within the FLAG and transfer of good practice and project ideas across the FLAG area.

It has also facilitated the participation of many people that are not formal members of the FLAG, such as multiple representatives from the fisheries sector and from the regional administration, including decision-makers. Participation sometimes reaches around 70 people. The online meetings are building up trust with the public administration and generating increased visibility on the ground for the FLAG and its objectives.

Meetings have become more spontaneous, less formal and more flexible, sometimes being held in the evening to accommodate different people's agendas. In parallel, in-depth interviews have been held online with different local stakeholders and the video recordings disseminated online.

Collaborative data platforms and information sharing

As well as bringing people together for debate, discussion and decision-making, digital technologies can play a fundamental role in **enabling collaboration and building networks of stakeholders working on related issues**. They can facilitate the exchange of experience and information, including solutions found in other areas and mistakes to avoid.

In particular, such digital platforms allow for a **360º flow of information**, rather than the traditional, one-directional flow of information, for example, in the form of fishers declaring their captures to a central authority with no feedback on how this information relates to the overall state of a specific fisheries resource.

Co-generated and co-owned data fosters trust, transparency and ownership. When it comes to building a more sustainable and resilient economy based on a common resource, this is paramount. Many FLAGs have supported projects that enable real participation of small-scale fishers, shellfish producers and other local stakeholders in collaborative efforts to improve the management of natural resources.

A collaborative data source for small-scale fishers

The Cabfishman project, involves the development of an online interactive tool to allow users to describe and map small-scale fishing activities, in order to facilitate a collaborative, ecosystem-led fisheries management.

By supporting engagement and participation, the project is building up an in-depth understanding of the economic, social, biological and cultural benefits of a healthy ecosystem in the north-eastern Atlantic, with the aim of securing fisheries resources and small-scale fishing activities long into the future.

The project is funded by Interreg and led by 12 research institutions from Portugal, Spain, France, Ireland and the UK. It will create online information tools to enable stakeholders to work together to improve fisheries management.

A database for the sustainable exploitation of a new natural resource

The Baltic Sea is brackish and full of nutrients, and so is rich in seaweed. Yet this resource goes largely unharvested. Led by Laukiem Jūrai FLAG, Latvia's six FLAGs collaborated to develop a publicly available database which shows the different types of seaweed present, their locations and potential uses, along with guidance on business development and environmental advice such as the identification of the nesting and feeding places of coastal birds. It aims to support new business activities to make careful and sustainable use of this resource. FARNET Good Practice.

Mobilising community members

Finally, digital tools are extremely well suited to **disseminating information** quickly to a large number of people, and to **encouraging direct action**. In this sense, they can play a valuable role in:

- helping to **change behaviour** towards more sustainable production and consumption habits, thereby laying the ground for more resilient communities.
- mobilising people to **respond quickly** to emerging problems or crises.

Combined with physical activities, such as gatherings or printed information, digital technology can significantly enhance the impact of efforts to mobilise the local community.

FLAGs can harness the opportunities provided by the internet, social media and a plethora of different apps to encourage their communities to act in a more responsible way and to participate in building coastal communities that are resilient to different environmental, social and economic challenges.

An app to launch beach clean-ups

Pollution in the form of litter is a problem on many of Europe's beaches, often finding its way into the marine environment and harming wildlife. The Costa Brava FLAG sponsored the development of Twinapp, a mobile phone application invented by a local fisheries family to encourage the new sport of 'plogging' – picking up litter while you jog. By 2020 the app had 3 500 downloads in two countries and had facilitated 1 216 beach clean-up events with thousands of participants of different ages and locations. FARNET Good Practice.

Communication campaign for sustainable fish

The Cornouaille and Brest FLAGs cooperated to raise public awareness around the sustainability of their local line fishing activities and to encourage a consumer shift towards less popular local species, such as conger eel and gurnard. The communication campaign combined physical events and festivals with digital tools such as social media, television and the website of the Line Fishers Association. Such tools, and numerous online press articles were instrumental in getting the message of sustainable consumption out to the public. FARNET Good Practice.

Lessons for FLAGs

- **Prepare your community** well to take advantage of digital opportunities – make sure they have the skills and infrastructure needed!
- Exploit digital channels to **mobilise people and foster participation** in local development and decision-making.
- Use digitalisation to **network effectively** *within* the community, to broaden **access to information from outside** and to **connect information** to be better prepared for future challenges.
- **Do not rely on one single system** – always have a back-up!
- Ensure that new digital tools are accessible to all members of the community, to **avoid creating a new digital divide.**

Resilience checklist for FLAGs

- ✔ Be prepared for change: every community can start right away on the process of strengthening its capacity to react to unexpected shocks.
- ✔ Support a local economy that can meet most of its needs itself, for example, through self-sufficiency in food and energy production.
- ✔ Move towards a circular economy: reduce consumption, reuse natural resources and materials and recycle.
- ✔ Preserve variety in as many ways as possible: in species fished, in economic activities, in skills and experience among the population, and in markets served.
- ✔ Capitalise on all the skills and talent your population has to offer.
- ✔ Build external antennae: link up with knowledge from other areas and groups.
- ✔ Influence policy: support or lobby for policies on environmental issues that are too big for a FLAG to address on its own.
- ✔ Be ready to adapt. Always have a 'plan B' up your sleeve.