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GUIDE #6



Green Growth in Europe's Fisheries Areas

European Commission

EN

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List of acronyms

CFP	Common Fisheries Policy
CRPMEM	Regional Maritime Fisheries and Aquaculture Committee (Comité Régional des Pêches Maritimes et des Elevages Marins)
EEA	European Environment Agency
EFF	European Fisheries Fund (and its likely successor, the European Maritime and Fisheries Fund, EMMF)
EMAS	Eco-Management and Audit Scheme
ERDF	European Regional Development Fund
FAO	Food and Agriculture Organisation of the United Nations
FLAG(s)	Fisheries Local Action Group(s)
FP 7	the EU's Seventh Framework Programme for Research
GDP	Gross Domestic Product
ICZM	Integrated Coastal Zone Management
IMS	Integrated Management System
IUCN	International Union for Conservation of Nature
MNP	Marine National Park
MPA	Marine Protected Area
MS	Member State
MSFD	Marine Strategy Framework Directive
MSY	Maximum Sustainable Yield
SAC	Special Areas of Conservation
SCI	Sites of Community Importance
SPA	Special Protection Areas
TEEB	The Economics of Ecosystem and Biodiversity
UNEP	United Nations Environment Programme

Foreword

The quest for economic growth and a better quality of life is a natural instinct for mankind, but it can no longer take place in isolation of the environment on which it depends. Thanks to technological and medical innovations, the pace of human development has been increasing exponentially since the end of the Second World War. The earth's population now stands at seven billion, while at the end of the Second World War it was only 2.5 billion. This rapid population growth has placed unprecedented pressure on our natural resources and there is now an urgent need to recognise the key role of nature in sustaining our civilisation.

Through the increased complexity of distribution channels and production processes (it is hard to imagine that supermarkets or plastic containers barely existed 60 years ago), we have gradually lost our immediate perception of the services provided by the environment and hence their importance. In many instances, for example, we do not know where the fish we buy comes from, whether it is farmed or wild, or produced/caught in a sustainable way.

However, ecosystems remain at the centre of all human activities. Without properly functioning marine ecosystems, for example, fish stocks would inevitably collapse and the farming of fish would be impossible. There is, therefore, an urgent need for man to reconnect with nature, to ensure that further development happens in a sustainable way and does not threaten the well-being of future generations, be it of fishermen or of landlubbers.

We hope that this guide will offer some paths, reflections and ideas, which will inspire and motivate Fisheries Local Action Groups (FLAGs) in achieving their goals as drivers of sustainable development in European fisheries areas.

"We fundamentally depend on natural systems and resources for our existence and development. Our efforts to defeat poverty and pursue sustainable development will be in vain if environmental degradation and natural resource depletion continue unabated. At the country level, national strategies must include investments in improved environmental management and make the structural changes required for environmental sustainability."[1]

Kofi Annan,
former Secretary General of the United Nations

[1] *Kofi Annan, In larger Freedom, Report of the Secretary General of the United Nations for decision by Heads of State and Government in September 2005, Section D. Ensuring Environmental Sustainability, Point 57*

A. Introduction

Rivers, lakes, wetlands, estuaries, seas and oceans… Freshwater and marine environments are among the planet's most productive and attractive ecosystems: around 40% of the EU's population already live within 50 km of the coast[2] and this figure is on the increase, leading to an unprecedented demand for land, and putting increasing pressure on coastal ecosystems. At a global level, it is estimated that coastal habitats account for approximately a third of all marine biological productivity[3], and estuarine ecosystems (i.e. salt marshes, sea grasses, mangrove forests) are among the most productive regions on the planet. At the same time, freshwater ecosystems also support an unparalleled abundance of species, yet they are even more imperiled, with extinction rates as high as 15 times greater than in the marine environment[4].

Society must, therefore, find a balance between environmental protection and facilitating the different uses of these areas, whether it is for the provision of food, residential or industrial development, leisure activities, or as sources of clean energy. New forms of management (sometimes inspired by old principles) are needed to balance these activities with the preservation of the complex system which makes it all happen: the environment and the ecosystem services it provides through its biodiversity and the physical and cultural elements it supports.

At the frontier between land and aquatic environments, fisheries areas share both worlds' potentials but also their threats. As some of the richest, most varied and sought after environments for human activities, these areas represent one of the most challenging contexts in which to achieve sustainable social and economic development.

In this context, and also bearing in mind future challenges in terms of maritime resources, climate change, and the ever evolving needs of human populations, coastal areas and fisheries communities are in need of a clear vision for a sustainable future. Europe 2020 (see box below) is the overarching strategy providing this vision at EU level, while shared management funds such as the European Fisheries Fund (EFF) are instruments that can be used to help translate this vision into reality. Within the EFF, Axis 4 is the instrument dedicated to the sustainable development of fisheries areas, and hence, one of the tools local communities can use in their transition towards a more sustainable future.

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2 *http://epp.eurostat.ec.europa.eu/cache/ITY_OFFPUB/KS-SF-10-038/EN/KS-SF-10-038-EN.PDF*

3 *http://www.epa.gov/bioiweb1/aquatic/marine.html*

4 Fresh water: an essential resource – Conservation International report: *https://learning.conservation.org/SouthAmericaEcosystemServices/Documents/ES%20Articles%20and%20Documents/CI_Freshwater_Factsheet.pdf*

Info Box 1 • Europe 2020: the EU's growth strategy for the coming decade

The EU has set itself the goal of becoming a smart, sustainable and inclusive economy. These three mutually reinforcing priorities should help the EU and the Member States (MS) to deliver high levels of employment, productivity and social cohesion. In terms of the environment, the strategy aims to:

> reduce greenhouse gas emissions by 20%;

> source 20% of energy from renewables;

> achieve a 20% increase in energy efficiency.

The Union has set five ambitious objectives – on employment, innovation, education, social inclusion and climate/energy – to be reached by 2020. In each of these areas, Member States have adopted their own national targets. Concrete actions at EU and national level underpin the strategy, which calls for European citizens to learn, get involved and benefit from the day to day aspects of sustainable growth.

The following priorities of the Europe 2020 strategy for sustainable growth, should, therefore, be the key focal points of local strategies, both in their development phase and during the analysis and selection of projects.

Sustainable growth in the context of the Europe 2020 strategy means:

> building a more competitive, low-carbon economy that uses resources more efficiently and in a sustainable way;

> protecting the environment, reducing emissions and preventing the loss of biodiversity;

> capitalising on Europe's leadership in developing new, green technologies and production methods;

> harnessing EU-scale networks to give businesses (especially small manufacturing firms) an additional competitive advantage;

> improving the business environment, in particular for SMEs;

> helping consumers make well-informed choices.

http://ec.europa.eu/europe2020/index_en.htm

This guide is divided into several sections (Figure 1): Section B aims to provide information about **the environmental challenges faced by EU areas**, with a specific focus on climate change and its potential impact on EU fisheries areas; Section C highlights **the central role of the environment** at the heart of sustainable development, and introduces the reader to key concepts such as ecosystem services and environmental valuation, two key elements of green growth; and Section D focuses on some of the **paths FLAGs can follow** to generate green growth in their areas.

We are aware that the latter is likely to be of most interest to those involved in the day to day operation of FLAGs. Indeed, this section presents case studies and highlights potential fields of action which will

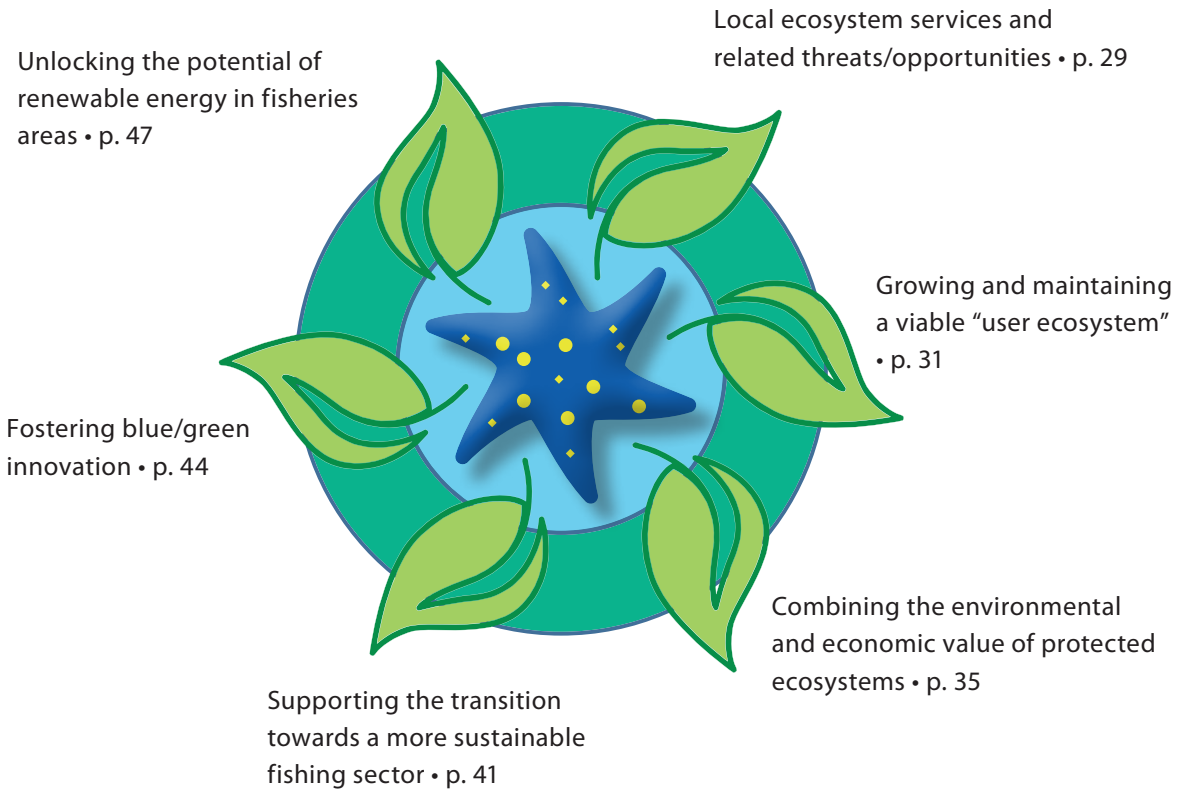
mean more to practitioners than conceptual frameworks. Still, part B and C are important in terms of helping the reader to understand some of the underlying concepts, and to fully grasp the opportunities for local development linked to the environment. We have, therefore, ensured that cross references to key concepts presented earlier in the document are included in part D, and we encourage the reader to navigate this document using these conceptual anchors. At the end of each section, we have also summed up the key points presented.

Figure 1 *– How the different sections of the guide are connected with each other*

Chapter B: The environment in European fisheries areas

Chapter C: The environment as basis of economic development

Chapter D: Paths to Green Growth



B. The environment in European fisheries areas

B.1 FLAGs: catalysts of green growth in Europe

There is no universal definition for green growth. For the purpose of this guide, we therefore propose to look at green growth in the way it relates to the Europe 2020 objectives (see Info Box 1 for more info on Europe 2020). We will consider green growth as a smart, inclusive and sustainable growth, which mostly capitalises on the environment for its development.

In the situation where old solutions are failing to provide answers to the social and economic challenges facing Europe, a new "relationship" between the economy and the environment needs to be fostered. Environmental industries are hugely important to the EU's economy. Ms. Connie Hedegaard, European Commissioner for Climate Action[5], has indicated that these industries directly employ around 3.4 million people, and account for around 2.2% of Europe's Gross Domestic Product (GDP). This represents more jobs than the pharmaceutical or aerospace industries.

As outlined in the European Commission communication, "*Towards a job-rich recovery*": "*Job growth in the green economy has been positive throughout the recession and is forecasted to remain quite strong. Only the energy efficiency and renewable energy sectors could create 5 million jobs by 2020*"[6]. It is also estimated that each direct job in Europe's environmental industries can create between 1.3 and 1.9 indirect jobs.

Coastal communities in Europe include small rural villages, but also large and thriving cities. They can be hotspots of innovation in the fisheries economy or off-the-map towns with a strong heritage and culinary traditions that could spawn the food trends of tomorrow. In the context of the EU2020 strategy, the potential of fisheries areas is considerable. It is in these areas that solutions and success stories could emerge that help lead Europe into its green, smart and sustainable future.

Because of the variety of contexts, coastal areas present a diversity of test beds for social and economic innovation. However, just as in a chemical reaction, a substrate, reactives and a catalyst are needed to produce the expected result.

> **The environment, as a substrate,** holds the capital and potential which, through its services, can define and sustains different development pathways.

> **Socioeconomic stakeholders,** SMEs, fisheries, aquaculture and other primary sector bodies are the reactives of an area, each with their own unique set of competencies, but very often with a different vision of the area and its environment.

[5] *http://ec.europa.eu/commission_2010-2014/hedegaard/headlines/news/2010-05-20_01_en.htm*

[6] "Toward a job-rich recovery": *http://ec.europa.eu/news/employment/120419_en.htm*

> **FLAGs**, by bringing together the strengths and visions present in an area, can play a **catalysing** role, creating the conditions for new solutions to emerge. Through their strategies, and through the bridges they create, they can become "drivers of green growth" and enrich, qualitatively and quantitatively, the "stakeholder ecosystem".

In this guide, we examine and review how the environment and natural resources can contribute to local development. Through analysis and project examples, we will look at the role FLAGs can play in mobilising local actors and in exploiting the environmental potential of their area to sustain smart, sustainable and inclusive growth.

B.2 Environmental challenges in water based ecosystems

As outlined by the European Commission in its *Roadmap for Maritime Spatial Planning*[7], the challenges we face today on our coasts, and in our seas and waterways, are bound to increase as the intensity and multiplicity of pressures continue to grow.

Pressures from the competing use of limited resources are acute in water based ecosystems, which provide a variety of environmental services to many different stakeholders (see part C1 for a definition of environmental services). In many coastal and inland areas, fish stocks are the resource under most pressure, with about 30% of global fish stocks estimated to be overexploited and another 50% fully exploited[8]. This leaves very limited room for expansion in terms of increasing catches.

Water is another resource under enormous pressure, from many different uses such as fish/shellfish farming, power generation, irrigation, and the growing demand for domestic water supplies along the coast.

Costal and water based environments also suffer from issues linked to housing development, which can lead to the degradation of habitats, pollution, loss of biodiversity and coastal erosion.

Other marine or water based activities, be they industrial, such as shipping, dredging, oil exploration or energy generation; or recreational, such as tourism, sailing, angling or diving, are all potential sources of pollution or disturbance to ecosystems and their productivity.

Among the many environmental challenges affecting coastal and water based ecosystems, the issue of climate change deserves special attention. This is indeed a global environmental challenge, which affects all local communities, regardless of the type of area, and can severely jeopardise local economies.

Through the increasing incidence of heat waves, floods, storms and forest fires, Europeans are starting to experience the tangible impacts of climate change first hand. The EU currently has a target of limiting global warming to no more than two degrees Celsius above the pre-industrial global temperature by 2050. This is an ambitious target, as it implies reducing carbon dioxide emissions by 80 to 95% in developed countries[9].

[7] *http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM: 2008: 0791: FIN: EN: PDF*

[8] FAO, 2010, The State of World Fisheries and Aquaculture

[9] *http://ec.europa.eu/clima/policies/roadmap/index_en.htm*

Climate change is likely to exacerbate the impact of anthropic pressures in decades to come, affecting several types of environmental services on which human populations rely (see more information on ecosystem services in C1 of this guide). Rising sea levels will primarily affect coastal and intertidal habitats; with coastal flooding and erosion likely to increase with the more frequent occurrence of extreme weather events.

Climate change is a global issue, but its effects are most evident in the changes and impacts suffered by local communities. Such a challenge can only be addressed through a combination of global policies and local action, both in mitigating the negative impacts of human activity, and in adapting to the changes that are already taking place.

FLAGs can use Axis 4 to help to mitigate, but also to adapt to the changes affecting the environment of coastal and fisheries communities. In local development strategies, efforts can be made to integrate specific objectives such as fuel efficiency, sustainable mobility planning (by favouring transport means which require less energy, for example), resource efficiency, waste management and the promotion of local supply chains. Initiatives in these areas are increasingly common, both within and outside of Axis 4 (see the examples of an alternative fuel for boats, developed by the **ITSASOA** project, or the Axis 4 project, **Huelva aquaculture**[10], presented in part D4).

FLAGs can also tap into an increasing knowledge bank on climate change good practices, which are being demonstrated worldwide and designed to maximise their transfer to every level of governance. The Economics of Ecosystem and Biodiversity (TEEB) report for Local and Regional Policy Makers (2010)[11], for example, outlines the priorities which should be taken onboard in local development strategies to address environmental challenges and facilitate ecosystem services management (see Info Box 4 for more information on TEEB).

Additionally, the EU LIFE programme has already supported the development of an extensive set of tools for tackling climate change in everyday policies at local level (see Info Box 2 for more information on LIFE supported initiatives related to climate change)[12].

[10] link to magazine#6 – *http://tinyurl.com/atj64tz* – and best practice #018-ES08 – *http://tinyurl.com/av8aevb*

[11] *http://www.teebweb.org/publications/teeb-study-reports/local-and-regional/*

[12] *http://www.localmanagement.eu/index.php/cdp: local_authorities http://ec.europa.eu/environment/life/project/Projects/index.cfm?%20fuseaction=search.dspPage&n_proj_id=3245&docType=pdf*

Info Box 2 • LIFE Environment: capacity building and local responses to climate change – the CHAMP project

Within the scope of their normal responsibilities, and through the promotion of citizen involvement, local and regional authorities are well placed to contribute to the fight against climate change, by developing, implementing and connecting integrated climate strategies.

To facilitate this, the CHAMP project will establish and implement a competence development package (the so called **Integrated Management Systems** (IMS)), enabling local actors to contribute to EU environmental and climate change commitments. For instance, IMS will help local, regional and national authorities to adopt the Eco-Management and Audit Scheme (EMAS[13]) in their daily activities. It will also enable these authorities to demonstrate and build up a resource of low-carbon footprint project management practices at different governance levels.

The main aims of the CHAMP project are:

> To support local and sub-regional authorities to fulfill the EU's Kyoto Protocol commitments;

> To improve the implementation of existing EU environment legislation at the local and sub-regional level;

> To establish national IMS capacity building hubs.

[13] The EU Eco-Management and Audit Scheme (EMAS) is a management tool for companies and other organisations to evaluate, report and improve their environmental performance *http://ec.europa.eu/environment/emas/index_en.htm*

As local partnerships with action plans for their areas, FLAGs have the potential to apply the principles of sustainable development in an integrated manner in order to combat climate change. They can make a difference by:

> adopting project selection criteria that place specific attention on initiatives promoting resource and energy efficiency;

> taking stock of existing guidelines, tools and good practices in local governance to strengthen the capacity of local authorities in developing coordinated policies. This would ensure that multi-level dialogue is taking place and that proper follow-up mechanisms, such as EMAS (see Info Box 2 for more information), are set in place to assess the efficiency of operations and projects aiming to lower their areas' climate footprint and vulnerability.

B.3 FLAGs and fisheries communities in the context of the reform of the Common Fisheries Policy (CFP) and its environmental objectives

The year 2013 is a crossroad for European fisheries policy: the European Commission proposal for CFP reform has entered the co-decision procedure with the European Parliament and the Council and will be intensely discussed and reviewed before its planned entry into force on 1 January 2014. The proposal sets ambitious environmental targets, which are in tune with the objectives of the Marine Strategy Framework Directive and its provisions related to achieving Good Environmental Status in the marine environment.

The principle behind the environmental objectives of the reform is to ensure the sustainability of fishing activities. The first objective is to ensure that fish stocks are maintained at the level of their maximum sustainable yield (MSY) by 2015. This level, defined as the level where "*the highest catch can be taken year after year and which maintains the fish population size at maximum productivity*"[14], would allow for a major improvement in the productivity of fish stocks and, in turn, an increase in catches, revenues and the profitability of the fishing fleet.

Another important environmental objective is the elimination of discards, or unwanted fish that are thrown back overboard. The basic regulation foresees the obligation to land all catch of regulated species.

A multi-annual management plan will also allow for better planning of fishing efforts and stock sustainability, while the measuring of fish stocks would not be done in isolation anymore but within the framework of multi stock management plans.

Clearly, the environmental targets of the reform are ambitious and likely to have a strong impact on local fishing communities. Importantly, however, most of the negative impacts associated with these measures are likely to be felt in the short term, with the ultimate goal to ensure the long term viability of fish stocks and the fishing communities that depend on them. To allow for fish stocks to reach MSY, some fisheries will have to reduce their fishing efforts in the short term, but with a view to ensuring long term gains. The transition to a no discard fleet will also require gear and technique adaptations to reduce unwanted catch, the implementation of catch plans to avoid areas and seasons where bycatch is more likely, and the development of solutions for unwanted fish brought back to shore.

To help offset the impact of these measures in the short to medium term, the financial instrument of the CFP, the European Fisheries Fund (and its likely successor, the European Maritime and Fisheries Fund, EMMF) will continue to offer possibilities to local communities. An increased role for fishermen's organisations and regional institutions such as the Advisory Councils and Producer Organisations is foreseen in the new CFP, while support for the sustainable development of fisheries communities is also likely to be increased. In this context, FLAGs can help to generate innovative solutions that contribute to the adaption of fishing communities to the objectives of the new CFP.

In this sense, the CFP reform, and the expanding role of the local and regional levels in the management of fisheries and the economies of fisheries communities, follows a worldwide trend, as outlined by the recent UNEP report, *Green Economy in a Blue World*[15] (see Info Box 3).

[14] COM(2011) 417 Final; Communication from the Commission on the Reform of the Common Fisheries Policy

[15] UNEP et al. 2012, Green Economy in a Blue World *www.unep.org/greeneconomy* and *www.unep.org/regionalseas*

Info Box 3 • The Green Economy in a Blue World, a UNEP report.

Strengthening regional fisheries bodies, national fisheries management agencies, fishing community and fishworker's organisations, and private sector associations is critical to the sustainable and equitable use of marine resources. *A strong international legislative and policy framework for fisheries is already in place with the FAO Code of Conduct for Responsible Fisheries, and its related international agreements and plans of action. The challenge is to provide incentives and adequate resources to implement this framework at the local, regional and national levels.*

Fishermen and fish farmers should, given the dependence of their businesses and livelihoods on ecosystem services, be stewards of the marine environment. Greening the fisheries and aquaculture sectors requires an overall recognition of their wider societal roles *– in particular that of small-scale operations for local economic growth, poverty reduction and food security – through a comprehensive governance framework, managing externalities from and to the sector, implementing an ecosystem approach to fisheries and aquaculture, with fair and responsible tenure systems that foster stewardship and greater social inclusiveness, and integrating fisheries and aquaculture into watershed and coastal area management, including through spatial planning.*

The transition from resistance to environmental resilience

In his reality novel, "*The log from the Sea of Cortez*[16]", John Steinbeck illustrated the difficulties encountered when attempting to charter a sardine fishing boat in order to lead a marine biodiversity exploration in the gulf of California in 1940:

"In fact, although the fishing season was finished, no captain showed any interest in renting us their boat for our research purpose, as none of them showed any interest in the terrestrial reality of roads, industries or house building. It was not a question of ignorance, but a question of strength. Their thoughts, their emotions, were entirely devoted to sardine fishery. And nothing else."

Although romantic, and slightly exaggerated, this description leads us to think that the characteristic strength of fisheries communities can be turned into a powerful driving force. It is up to the FLAGs, which are in a pivotal position to use it, to turn this force, these emotions and strengths into drivers of transition, towards a smart, sustainable and inclusive growth.

[16] ISBN13: 9780141186078

Section highlights

> Green growth can form the basis of new development in EU fisheries areas.

> Water based ecosystems are under pressure from competing uses of limited resources and changes in the environmental balance.

> Tools already exist for local communities to tackle environmental issues at local level, including climate change.

> The CFP reform proposal sets ambitious environmental targets, which will impact on fishing communities in the short term, but help to ensure their long-term viability.

> FLAGs can help fishing communities to adapt to the objectives of the reformed CFP.

> The characteristic strengths of fishing communities can be turned into a powerful driving force.

C. The environment as the basis of economic development

The complexity of the environment, the current pressures it is experiencing (from competing use to the modifications induced by climate change or other disturbances), the expectations we have as to its capacity to sustain future blue/green growth – all these elements call for an increased understanding of the dynamics at play behind the use of environmental resources.

Economic activities, defined as all activities linked to the production, consumption and exchange of goods and services performed by humans to satisfy their needs[17], all rely to one degree or another on the environment. Fishing obviously cannot exist without fish, but even computers and the most advanced technologies that underpin the success of many industries, rely on nature for their components. Beyond the simple provision of goods or raw materials, the environment also provides the necessary space and conditions for the development of many other economic activities.

The different goods and services that nature provides to mankind are known as ecosystem services. These services, which are wide-ranging, help to explain the linkages between economic activities and the environment and will be highlighted and explained in the following section. We will also look at the reasons for trying to value these services and some of the valuation methods that currently exist.

[17] As a result, economic activities do not only relate to business activities but also to activities that humans perform in their private life to fulfill needs or improve their quality of life, be it in the household or during leisure time.

C.1 The environment as a service provider in local areas[18]

The environment, in general, is made up of a variety of ecosystems, which can be defined as *"dynamic mosaics composed of microorganisms, plants, animals and physical environmental features which interact, influence and impact on one another"*[19]. As mentioned previously, these ecosystems provide a variety of goods and services to society.

Ecosystem services can be classified into several types[20], according to the types of goods and services provided. The classification below is based on the classification developed by the **Economics of Ecosystem and Biodiversity (**TEEB) initiative (see Info Box 4 for more information on the TEEB initiative)

[18] The major sources of information for this part of the document are the Millennium Ecosystem Assessment (MEA) and "The Economics of Ecosystem and Biodiversity" (TEEB) study.

[19] Millennium Ecosystem Assessment (MEA), Opportunities and Challenges for Business and Industry.

[20] This classification is based on the TEEB classification, see TEEB (2010) A Quick Guide to The Economics of Ecosystems and Biodiversity for Local and Regional Policy Makers for more information.

> **Provisioning services**: these are all services related to the provision of goods or materials that ecosystems produce (food, water, raw materials,…). These goods or materials are used directly, either as food sources, or to form the basis of more complex products in the form of raw materials. All extractive activities, such as fishing, are considered to belong to this category of ecosystem services.

> **Regulating services**: here the ecosystem is seen as a regulator of the environment and as a provider of associated services (climate, water quality, preventing extreme weather events,…). These are services that support/enable the development of most other activities and hence play a crucial economic role. As the benefits of these services are mostly indirect, they are often overlooked.

> **Habitat services**: this is where the ecosystem provides necessary living space to various life forms. Habitat services are the supporting services per excellence. They are complex and made up of a variety of benefits that enable life to develop.

> **Cultural services** are the non material benefits associated with ecosystems and include recreational, spiritual or aesthetic experiences. The benefits derived from these services are not associated with any tangible aspects but mostly rely on people's experience from their interaction with the environment.

It is important to note that ecosystems are by nature extremely complex systems and, while the classification of the services they provide may help to ease understanding, it cannot reflect perfectly the complexity of the interactions at work. Indeed, all the different ecosystem services are closely interlinked, which implies that the various categories are not mutually exclusive and may overlap.

The degree of importance of each service will vary from one ecosystem to another. Some ecosystems will supply strong provisioning services, while others will be more important in terms of habitat provisioning or climate regulation. Coastal ecosystems are particularly rich, in the sense that they provide a very high level of most of these services. Table 1 below shows the variety and importance of each of the services provided by different sub parts of coastal and water based ecosystems. This graph illustrates the level of diversity in terms of services provided, while also highlighting the specificity of each ecosystem in terms of the magnitude of the type of services supplied.

Ecosystem services are increasingly taken into account in EU development strategies and Member States policies. The EU biodiversity strategy, for example, outlines issues that will need to be addressed to take into account the economic potential of ecosystem services (see Info Box 4).

Table 1 *– The most important ecosystem services in coastal and inland areas and their magnitude*

Coastal and inland areas		
Services	**Examples of service**	**Examples of Axis 4 projects with positive impact on service *(non-Axis 4 in italic)***
PROVISIONING		
Food	Production of commercial animal biomass	Fish from the boat – Germany
Fiber, timber, fuel	Production of commercial vegetal biomass	*Crops and by products, ITSASOA, France*
Biochemical products	Extraction of material from biota	Components extracted from crustaceans for biomedicine, Portugal
REGULATING		
Climate regulation	Regulation of green house gases and climate, sustaining proper living conditions for societies	Fishmeal from fish waste – Spain; «Km 0» brand for local sourcing – Portugal
Pollution control and detoxification	Retention recovery and removal of excess nutrients and pollutants	Cooperation between shellfish farmers and farmers to monitor and mitigate water pollution, CAP2000, France
Natural hazards	Flood control, storm and erosion protection	Project idea -Studies on local coastal erosion, Sweden
CULTURAL		
Spiritual and inspirational	Personal feelings and well being	Heritage restoration for historical and productive value, DE BOET, Netherlands
Recreational	Opportunities for tourism	Training for fishermen, Finland Developing a recreation area Estonia
HABITAT		
Biodiversity	Habitat for species, with commercial value or not	Involving fishermen in the management of an MPA – FR
Example of project (Axis 4)	All the projects listed in this table are available with further information on this page – *http://tinyurl.com/aa4dj6l*	

Source: adapted from Millennium Ecosystem Assessment, 2005. Ecosystems and Human Well-being: Wetlands and Water Synthesis.

Rivers, ponds	Estuaries, marshes	lagoons, salt marshes	intertidal flats, beaches, dunes	Inshore waters, reefs, seagrasses
+++	++	++	+	+++
+++	+++	+		
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Info Box 4 • The EU biodiversity strategy and The Economics of Ecosystem and Biodiversity (TEEB) study.

Ecosystems services: Action 5 of the *EU biodiversity strategy*

'Member States, with the assistance of the Commission, will map and assess the state of ecosystems and their services in their national territory by 2014, assess the economic value of such services, and promote the integration of these values into accounting and reporting systems at EU and national level by 2020'.

The Economics of Ecosystem and Biodiversity (TEEB) study is an initiative financed by the UNEP and the European Commission, among others, and consists of a series of reports providing tools to help put ecosystem services on the agenda of local or regional policies for different stakeholder levels.

Elements of the local and regional policy report (TEEB D2), and also of the citizens and businesses reports (TEEB-D3 & D4), provide valuable information and tools that could be useful for FLAGs and project holders. These reports give, for instance, practical guidance on ways to face the challenge of biodiversity loss at local and regional level, as well as information on techniques for valuing environmental services (see part C2 below).

FLAGs should be aware of the different services the environment provides in their areas. Going even further, they should look at how the wealth and quality of life of the area depend on these services, and identify any potential threats that exist. In parallel, some ecosystem services might also be underused and present new opportunities for growth. Importantly, however, FLAGs should always bear in mind that the possibility of benefitting from these services should imply a sense of responsibility, meaning that the development of an activity on the basis of an ecosystem service should ensure the sustainability of the activity and the associated ecosystem. There may, therefore, be a need to include an assessment of any negative impacts of the development on ecosystem services, and the requirement for related mitigation measures.

Indeed, the corollary to the richness of coastal ecosystems is that they attract a lot of attention and interest. Coastal environments are subjected to a wide variety of uses that can lead to tensions and conflicts among competing stakeholders. Managing uses and conflicts, while also maximising benefits to society, are among the challenges that local development actors in fisheries areas have to face. This will be developed in Part D2 below. Having identified the different types of services the environment provides, understanding the value of these services can help communities to make informed choices. The next chapter will be devoted to this topic.

C.2 Assessing environmental capital: measuring the economic value of the environment

Why place a value on the environment?

From what we have seen above, it is clear that the environment provides a variety of crucial services to inhabitants of ecosystems. However, even if everybody agrees, for example, that it is important to be able to breathe clean air or live in an environmentally safe area, it is often difficult to put a value on these kinds of services.

In many cases, policy decisions are taken on the basis of environmental, social and economic trade offs, in order to try to maximise the use of resources for the greater societal benefit. Option A is compared to option B and C and even though economic considerations are not the only parameter influencing the decision making process, they clearly remain at its heart. Hence the importance of being able to place a value on the services the environment provides.

Some people are opposed to trying to put a value on the environment at all. Indeed as the environment is at the basis of all life on earth and hence at the basis of any activity, its value should, in theory, be considered infinite. In economic terms, however, the infinite value of the environment is impossible to translate and risks, therefore, simply not being incorporated into the equation.

By placing an economic value on the services the environment provides, one can ensure that their value is actively incorporated into the decision making process and not overlooked as "just being there".

In addition, as we have seen in the previous sections, the environment is subjected to a wide variety of different uses. However, the possibilities for using a resource for various purposes are not infinite. This is because the use of a resource by one activity often reduces the availability of that same resource for another, and because the development of one kind of activity can also impact negatively on the development of other activities. In economic terms, this negative relationship is called a negative externality.

Commercial fishing, for example, leaves less fish for recreational fishermen or divers, hence impacting negatively on the tourist trade that these activities can generate. From another perspective, the set up of marine reserves, which are likely to attract more divers because of the greater abundance of fish, can also reduce commercial fish catches (at least in the short term, please see part D3 on protected areas), thereby impacting on the profitability of the fishing fleet.

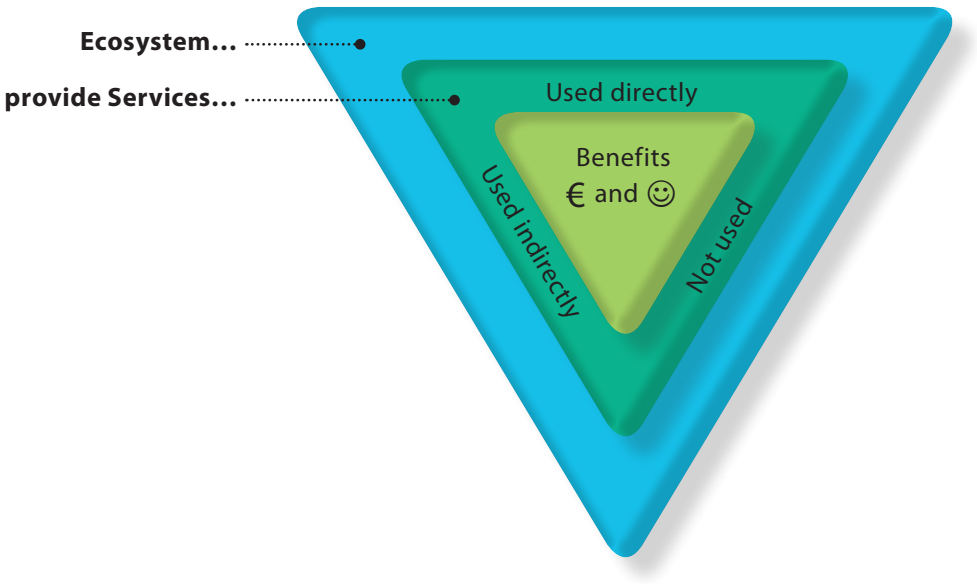
Valuation enables an analysis of this situation and allows for reflection on the uses being made of the environment. One can then compare options and the consequences of changing options. By recognising the economic value of environmental services, and the possible diminution in the provision of such services due to the development of a new or alternate activity, one can recognise the real cost/benefit to society.

Types of values

Economic values of environmental services can be derived from the type of use they are submitted to. Indeed, different environmental services (see part C1 above) can be used by different people/activities in different ways, hence submitted to different types of use and acquiring corresponding use values. The three main types of use values attached to environmental services are direct use values, indirect use values and non use values[21].

[21] The economic literature actually identifies more types and subtypes of economic values. However, for the sake of simplification, the authors have made the choice to only focus on direct, indirect and non use values. For those interested in reading more about different value types please refer to: *http://www.teebweb.org/resources/ecosystem-services/#tabbed_box_1*

Figure 2 *– Linkages between ecosystem services and economic values*



The direct use value of a service is derived from the actual direct use of this service by humans. This direct use of the resource can be consumptive, i.e. where the goods provided are consumed (such as fish as food), or non consumptive, i.e. where the good/services provided is merely enjoyed (such as fish enjoyed through diving activities). This type of environmental value is mostly associated with provisioning type services (for consumptive use) and cultural services (for non consumptive use) (see Table 2 for a summary of the linkages between the types of ecosystem services and their associated values).

Indirect use values are values that stem either from the service the environment provides to support the direct use activities, or to allow for the indirect enjoyment of environmental services. Indirect use values are mostly attached to habitat, cultural and regulatory services. A mussel farmer, for example, depends on the shelter of the bay to protect his mussel beds from heavy storms, while one can also enjoy the benefits of nature indirectly by watching a documentary on fishing in Scandinavia.

Non use values are values derived from the existence itself of the environment. Indeed, for some people the sole existence of an emblematic animal (blue fin tuna, for example) has a value in itself. This type of environment value is related to cultural services.

The different types of values and how they relate to the different ecosystem services are summed up in the table below.

Table 2 *– Type of ecosystem services and the importance of their associated use values*

	Provisioning services	**Regulating services**	**Habitat services**	**Cultural services**
Direct Use Value	+++ (e.g. value of goods produced/consumed (fish, sand, drinking water, etc..) also referred to as consumptive use)	Not applicable (all use of regulating services are indirect)	Not applicable (all use of habitat services are indirect)	+++ (e.g. value of coastal tourism and recreational activities (angling, diving,…), also referred to as non consumptive use)
Indirect Use Value	Not applicable (all provisioning services are used directly)	+++ (e.g. use of shelter offered by bay to fish farmer, value of protection offered by beach against floods)	+++ (e.g. value of habitat for species, value of nursery area for juvenile fish)	Not applicable (all uses of cultural services are direct or non use)
Non Use Value	Not applicable (all provisioning services are used directly)	Not applicable (all uses of regulatory services are indirect)	Not applicable (all uses of habitat services are indirect)	+++ (e.g. the value of the knowledge of the existence of an iconic species such as the bluefin tuna or the blue whale)

Source: adapted from TEEB study: The Ecological and Economic Foundations

The Total Economic Value (TEV) of an environmental resource or service is made up of the combination of the different use and non use values, which correspond to economic benefits both in terms of income (€) and/or quality of life/public goods (☺).

Direct use values are usually favoured by local actors, as this is the easiest way to generate direct economic benefits, in the form of income, for example. However, it is important to note that this type of use is very often exclusive, in the sense that the resource or service used might no longer be available for other uses. Thus, , while the direct economic value of this use may be high and hence appealing to local actors, the local community could risk loosing out on the other components of the TEV, such as the indirect and non use values. These latter values can sometimes be far superior to the income that can be derived from the direct exploitation of the same environmental resource.

The pressure to opt for the direct use of an environmental resource over preserving indirect or non use values is also linked to the time frame in which the benefit can be realised. Direct use can usually generate economic benefits in a relatively short time frame, while indirect or non use benefits tend to accrue over longer periods of time or in a more diffuse manner. For example, the benefits of costal protection against extreme weather events or improvements in quality of life may only materialise in the longer term. The challenge here is to assess what type of use or combination of uses of an ecosystem service can generate the greatest TEV for the local community, and this is where valuation techniques are important.

Different types of valuation methods

Different methods exist to value different uses, and hence, different services that the environment provides to society. Most methods look at the willingness of the user to pay for the different services provided.

When the goods used directly by people are traded on the market, people are required to pay for these goods. The value of the goods provided can, therefore, be easily derived from the price paid by the different users. The direct use value of the provision of fish by the ecosystem, for example, is reflected in the price paid for the fish.

More complex methods can also be used for more complex types of direct uses of goods or services. In the case of tourist services, for example, the value of a natural park can be derived from the total spending of tourists during a stay in the park. This would include the entrance fee, if it existed, as well as transport costs, food and hotel expenditure, if any, as well as the opportunity cost[22] due, for example, to the time not spend at work and hence lost income.

Things get more complicated when people do not have to pay for the goods or services they are using. This is mostly the case for the use of regulating and habitat services, but also for some of the cultural and provisioning services. Indeed, these services usually provide what are called, "public goods", meaning goods that can be used by all for no direct cost[23]. The market, in this case, fails to recognise the value of such services as the consumer does not have to pay for their use. This is an economic phenomenon known as a market failure.

In the absence of a market price, specific methods have to be used to establish what people would be ready to pay to continue to use these services. In the case of a public beach, for example, one could survey beach users to ask them how much they would be ready to pay to keep on using the beach. The average price that users would be willing to pay could then be multiplied by the average number of yearly visitors to derive an annual value for the beach.

Other techniques involve using proxies, such as the price of properties in an area, to derive a value for environmental services, such as air quality or a healthy environment. For example, one could compare the prices of similar size properties in areas with notable differences in terms of the quality of the environmental. The difference between the prices of houses from one area to another can then give an idea of the amount of money people are willing to pay to live in a cleaner environment or in an area of outstanding natural beauty. This difference can then be used as a proxy to estimate the value of the service provided by the environment.

[22] The opportunity cost in economics relies on the principle that any economic activity is done at the expense of another. The cost of an activity can therefore be derived by including the value of the activity foregone.

[23] In pure economic terms, a public good is defined as «a good or a service that has the features of non rivalry and non excludability", meaning that the consumption of this good by a consumer does not reduce the availability of the same good for others and no one can be excluded from using the good. Pure public goods are, in practice, very few. More common are common goods, from which no one can be excluded but which consumption by one economic agent reduces availability for another agent.

There are many different methods for valuing environmental services and the idea here is not to provide an exhaustive list, but to inform the reader of the many possibilities that exist, even if these services are not traded on the market.

It is important to note, however, that many valuation methods are open to certain biases, which have to be taken into consideration when carrying out valuation studies. In the case of the willingness to pay (WTP) method, for example, declaring a certain WTP does not cost the respondent anything in reality, which can lead to overstatements in some cases. Also, the level of WTP will be strongly linked to the personal attributes of the respondent (e.g. their socioeconomic profile or personal sensibility to particular issues, notably linked to the environment). This highlights the fact that these valuation techniques have to be used carefully and with the assistance of professionals who can try to make allowances for these biases in the design of the study.

For those who would like to further explore possible valuation methods, some recommended reading can be found on the TEEB website[24] (see as well Info Box 4).

As an example, Table 3 and figure 3 attempt to illustrate some of the different services an ecosystem can provide, with, in parallel, the different uses (and their associated use values) the ecosystem can be submitted too. The possible valuation method one could use is also highlighted.

[24] *http://ec.europa.eu/environment/nature/biodiversity/economics/pdf/d1_summary.pdf*

Table 3 *– Example of the various services and associated values an environmental asset can provide*

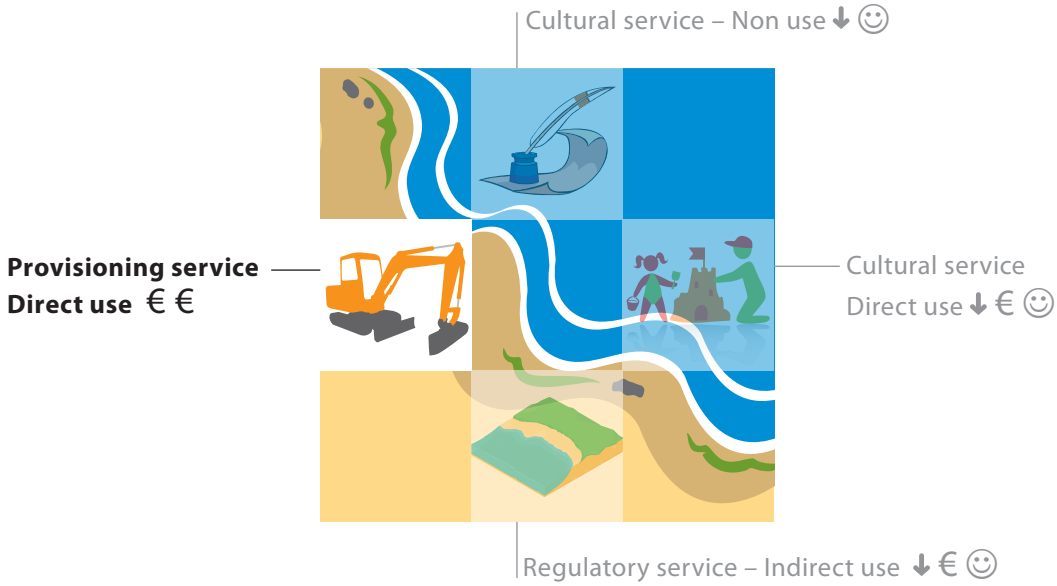
Environmental asset: Beach	**Type of ecosystem service**	**Type of value**	**Valuation method**
Beach as sand supplier Sand extraction	Provisioning service	Direct use value (consumptive)	Market price, e.g. the price of sand on the market
Beach as fun Using the beach as a leisure area	Cultural service	Direct use value (non consumptive)	Willingness to pay, e.g. the amount of money people would be ready to pay to continue using the beach
Beach as beautiful	Cultural service	Non use value	Willingness to pay, e.g. the amount of money people would be willing to pay to ensure the existence of the beautiful beach
Beach as a protection Beach act as natural barrier against flooding	Regulatory service	Indirect use value	Replacement cost, e.g. cost of possible destruction caused by the absence of the beach, the cost of the construction and maintenance of a dyke to provide the same level of protection

One can see that a beach can be used for many different types of activities. As all these activities are essentially using the same ecosystem, it is, therefore, necessary to look at all the different types of uses to assess the likely impact of one on another. In this case, for example, sand extraction is the activity that can generate income in the most direct way. However, by doing so, one has to be aware that this activity is likely to preclude the use of the beach by visitors (with the loss of the money they might have spent locally), while it can also destroy the natural protection the beach provides against flooding. So the option to allow sand extraction should take into consideration the associated costs and benefits, as the benefits linked to sand extraction could be outweighed by the negative impacts this activity will have on other potential uses of the beach. FLAGs have to integrate this type of analysis into their decision making process.

Figure 3 *– TEV: the Total Environmental Value of a resource sums up its different use values, adding direct use € and non/indirect use ☺ benefits*

Local development choice: the "sand crane" scenario

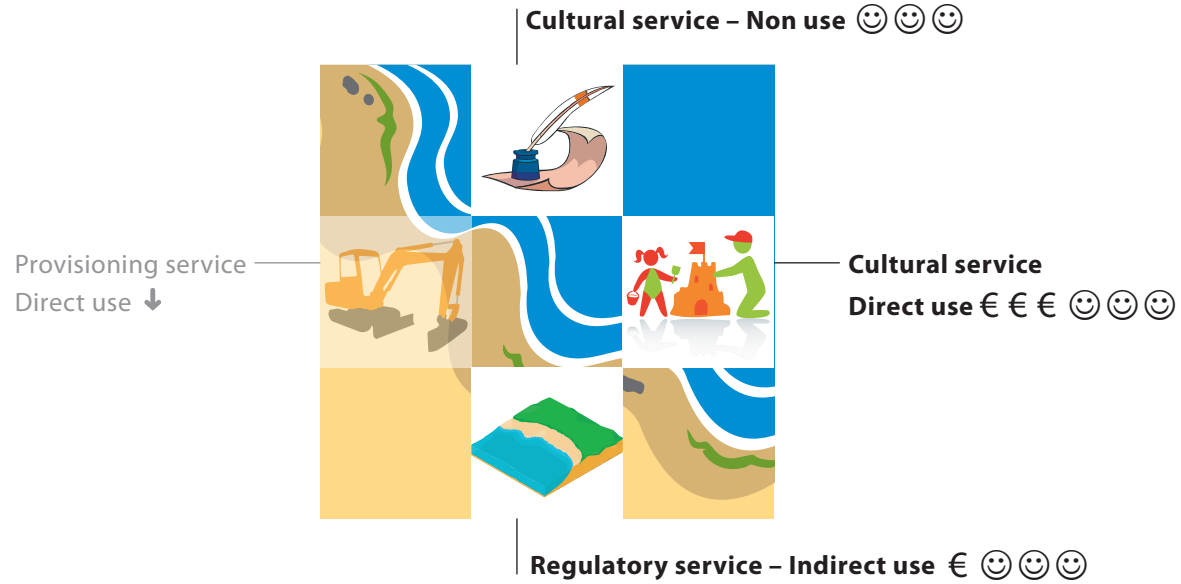
Choosing one development option can impact negatively on the use/non use value of the other services…



TEV score = 7 points (€ € € € ☺ ☺ ☺)

Local development choice: the "sand castle" scenario

… while picking another solution might enable other uses of services to fit in and increase total value of the asset.



TEV score = 13 points (€ € € € ☺ ☺ ☺ ☺ ☺ ☺ ☺ ☺ ☺)

FLAGs can use environmental valuation for many different purposes.

> Valuation can be used to assess different development scenario (looking at the value of one option against another, as highlighted in the beach case above, for example) or to convince certain interest groups of the value of environmental actions. It can also be used to seek recognition at regional/national level of the value of the services provided and, therefore, the need for adequate support to ensure the management of these services.

> Valuation can also be used as a basis for project selection criteria – both for projects carried out by third parties and for soft projects carried out by the FLAG itself (studies, training, and so on.)

It is important to remember, however, that valuation does not try to assess the complete value of the environment, which is infinite. It should, rather, be considered as a tool to assist decision makers in considering the different alternatives, with its ultimate use depending on the objectives of the FLAG.

Section highlights

> The environment is at the basis of all economic activities. This can be analysed by looking at the various services ecosystems provide.

> The different ecosystem services the environment provides can be valued. This can help to ensure their economic visibility and provide a basis for informed decision-making.

> Ecosystem services provide different types of values, which can be calculated by different methods.

> FLAGs can use their environmental capital in different ways but decisions have to take account of the impacts on the various ecosystem services provided.

D. Different paths towards green growth

In this section, FLAGs will find a series of options/possibilities they might want to consider when looking at making the most of their environmental capital. These options range from ensuring better planning of actions to the development of new fields of activities, but all imply a strategic choice by the FLAG, which should be in line with the possibilities of the territory.

FLAGs have a great advantage over many local organisations in that they can use a combination of tools, across a wide range of fields, and over a number of years, in order to achieve the strategic goals they have identified for their areas.

They can, for example, design "packages" of soft activities like research, training and advice to prepare the ground for larger scale, hard investments further down stream. They can also provide grants and support investments in small scale infrastructure, buildings and machinery, as well as in quality control, marketing and promotion. The challenge for FLAGs is to design and implement these packages in a way that reinforces some of the strategic environmental alternatives outlined below.

D.1 Local ecosystem services and related threats/opportunities

As mentioned in part C1 of this guide, the environment provides a wide range of services. The type and amplitude of these services varies according to the area concerned. FLAGs, as multi sectoral bodies, aiming to gather together various interests for the benefit of the territory, are well placed to identify the different ecosystem services provided by their local environment.

Identifying these different services, and highlighting their importance, either through valuation techniques or simply through raising awareness about their benefits, is a first step to help stakeholders realise their value and the need to take them into consideration in their daily activities.

Beyond the simple identification of the services provided by the environment, FLAGs should also look at the dependence of different economic sectors on these different services. Some parts of the economy, such as fisheries or aquaculture, rely more than others on the availability of the goods and services provided by the environment, and are, therefore, more vulnerable to disruptions. However, all economic activities rely to one degree or another on the services provided by the environment. The next step, therefore, is to identify possible threats to the provision of these goods and services and, hence, to the local economy, and to develop adequate mitigation measures.

In the evaluation of potential projects, the variety of ecosystem services affected should also be taken into consideration. As mentioned earlier in this guide (see part C2), the development of a certain activity can have an adverse impact, directly or indirectly, on ecosystem services and hence on the activities they support. This is of particular relevance to environmental services that provide public goods, as these are goods enjoyed by everyone but not recognised as such, which means they are often sacrificed for short term gains. Environmental and other impact assessments, or cost benefit analyses are tools that use valuation techniques and can be used to make informed strategic choices about the development of an area.

A FLAG's view: FLAG Auray (France) – water quality as a key environmental service

The Pays d'Auray, a coastal territory covering 630 km^2, is composed of a series of rich ecological and hydrological systems: estuaries, bays, gulfs and islands; hotspots of environmental attractiveness, sought after by nature enthusiasts but also used on a day to day basis by primary producers.

The area's image has always been strongly linked to the quality of its environment and the associated quality of life. This is used by a variety of stakeholders and producers, who have developed activities and products that link their own savoir-faire to the general image of the area.

Fishing and shellfish production are an important sector in terms of value added and employment in the territory. These activities are, however, struggling to legitimise their place on an increasingly busy and coveted coastline.

Agriculture, fishing, shellfish farming, water sports, spas, second residences,… different sectors for different purposes and different users, but the sustainability of which is subject to the maintenance of a quality environment, and specifically, to a key component of this environment: water.

Recognising the importance of this ecosystem service, the Auray FLAG has placed water quality at the heart of its local development strategy (see Figure 4). In concrete terms, two projects have already been selected that are linked to this theme. The first is a consultation platform (named CAP 2000, see FARNET Good practice #16[25]), aimed at bringing together the different users of the water resource to find solutions to water pollution issues, and to inform stakeholders about the importance of maintaining high standards of water quality. The second is the creation of a "water observatory", to monitor water quality and identify possible negative impacts of different uses of this shared resource.

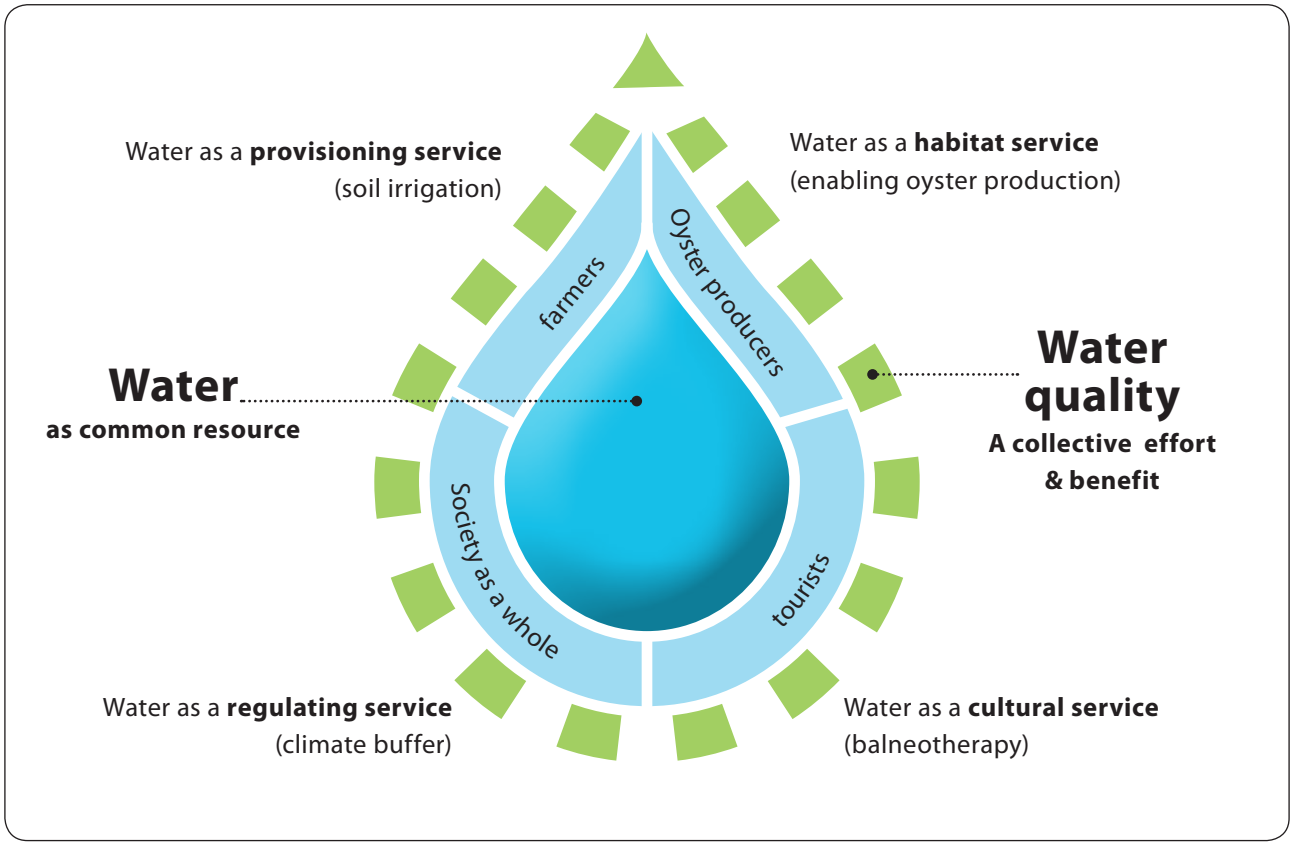
[25] *https://webgate.ec.europa.eu/fpfis/cms/farnet/sites/default/files/documents/FARNET_GP_016-FR04-EN_Cap2000.pdf.pdf*

Section highlights

> Identify, highlight and raise awareness about the scale and importance of ecosystem services for the local economy.

> Identify key ecosystem services and related threats and develop adequate mitigation measures.

Figure 4 *– Water as a key environmental asset*



D.2 Growing and maintaining a viable "user ecosystem"

The variety of users sharing an interest in a resource can be termed a "user ecosystems"; a complex and dynamic set of relationships developing within a set of natural, economic and legal constraints. Working with a "user ecosystem approach", although seemingly challenging, is not only desirable, but in certain cases it is essential in order to deliver sustainable management practices. Bottom-up, cross-sectoral and ecosystem-based approaches that consider the variety of users, in terms of presence, priorities and trade-offs between different ecosystem services, have the potential to more accurately ensure sustainable development than many existing sectoral and top down approaches.

Indeed, since the first Rio conference on sustainable development in 1992, key coherence principles, recognising and matching the diversity of users and the territorial boundaries of their supporting environments, have been ratified by the *European Community*. First and most notably with the *Water Framework Directive* (2000/60/EC), which requires Member States to put in place integrated watershed management measures to ensure the good ecological status of water bodies by 2015. This has required moving away from "administrative" boundaries, which are poorly adapted to addressing issues related to ecosystems that extend across local and regional jurisdictions.

This has strongly inspired the more recent Marine Strategy Framework Directive (MSFD – 2008/56/EC), which will apply related principles to coastal and marine environments.

FLAGs, as entities representing the diversity of interests and competences of a defined geographical area, can become a decisive tool for better inclusion, understanding and structuring of existing or emerging economic activities. With their unique position, as a link between various sectors, they are well placed to recognise the different threats and opportunities stemming from legislative changes related to environmental policies, and to ensure that the voice of fisheries areas is heard in decision making circles.

Multi-stakeholder partnership as a tool in territorial and resource management

As outlined in the study by Gutierrez *et al*.[26] (2011), successful resource management policies are proven to be positively influenced by actively involving fisheries communities in the governance and management aspects.

This logic deserves to be applied, not only to the fisheries resource but also to the environment and ecosystem services providing and supporting the resource itself.

Across a FLAG's operations, from defining the strategy, to its animation and awareness raising role, an important goal should be to strive towards a shared understanding of the many issues faced by the area's stakeholders. Collating knowledge, bridging initiatives of individual FLAG members, and steering isolated projects introduced to the FLAG in a direction that maximises interconnections with other initiatives, are some of the key elements involved in transforming this approach into added value for the area, and in ensuring the best use of local environmental resources.

Axis 4: a tool to implement Integrated Coastal Zone Management (ICZM) objectives, while placing fisheries communities at their core

Wherever applicable, FLAGs should take stock and integrate ICZM methodologies and experiences currently emerging in their areas (see Info Box 5 for more information about ICZM policies in the EU). In ICZM, as in Axis 4, the added value resides in the way in which projects are put in place, and how various stakeholders are connected to achieve results greater than the sum of their individual efforts. Axis 4 is not only a powerful tool to promote or implement existing ICZM strategies and programmes, it is also a way to add value to these approaches by enhancing the inclusion of the local socio-economic dimension in ICZM policies; policies which are frequently applied at a larger scale than the FLAG area.

[26] Nicolás L. Gutiérrez, Ray Hilborn & Omar Defeo. Leadership, social capital and incentives promote successful fisheries *in* Nature 470, 386–389

Info Box 5 • ICZM: a set of recommendations to maximise stakeholder involvement in coastal areas

In 2002, the European Parliament and the Council adopted a *Recommendation* on Integrated Coastal Zone Management (ICZM), which defines the principles of sustainable coastal planning and management. These include the need to base planning on sound and shared knowledge, the need to take a long-term and cross-sectoral perspective, to pro-actively involve stakeholders, and to take account of both the terrestrial and the marine components of the coastal zone.

In many respects, the objectives of ICZM are consistent with the goals of Axis 4, which should be addressed by FLAGs in the development of their areas. For instance, it is recommended that ICZM policies should take a strategic approach to the management of their coastal zones, based on:

> the appropriate and ecologically responsible coastal protection measures, including the protection of coastal settlements and their cultural heritage;

> sustainable economic opportunities and employment options;

> a functioning social and cultural system in local communities.

For an overview of ICZM funding opportunities, please refer to *http://ec.europa.eu/environment/iczm/pdf/ICZM%20-%20%20EU%20Funding%20opportunities.pdf*

For examples of ICZM projects funded through the LIFE programme, please refer to the "LIFE and Coastal Management" guide available on line at this link:

http://ec.europa.eu/environment/life/publications/lifepublications/lifefocus/documents/coastal.pdf

A FLAG's view: FLAG Sotavento Algarve (Portugal) – finding synergies between separate bodies

In Olhão, Portugal, the Ria Formosa is a Natura 2000 area which was recently selected as one of the seven natural marvels of Portugal. Classified as a Natural Park since 1987, and designated in 1999 as a Special Protection Area within the framework of the Birds Directive (79/409/CEE*(1)*) (see Info Box 7 on Natura 2000 below), it is also an area that is subject to heavy pressures linked to the development of tourism and water based activities. Between 2003 and 2005, the Portuguese Institute for the Conservation of Nature developed a National ICZM strategy and, through several working groups, strategies for spatial planning and regional development for coastal areas in Portugal. To implement this strategy in the Ria Formosa, the public-owned company, "Polis Litoral Ria Formosa ltd."[27] was established. This was as a first step in terms of applying an integrated approach to the

[27] *http://www.polislitoralriaformosa.pt/programa.php*

redevelopment and enhancement of the shoreline. With a budget of approximately €87 million (financed via the European Regional Development Fund (ERDF) and national contributions), the company (majority owned by the State, with minority stakes held by four local municipalities) is leading an ambitious ICZM programme of urban planning and management, focusing as a priority on the restoration of coastal ecosystems and reducing human pressure.

In this context, the FLAG is building on the existing ICZM experience. Through the local development strategy, and the members that make up the partnership, the FLAG has developed linkages, in terms of priorities and contacts, with the existing Polis Litoral structure. The added value of the FLAG can be seen here in the reinforcement of the socio economic aspects of the ICZM policy intervention.

Section highlights

> FLAGs are well placed to manage an "ecosystem of users", by considering the variety of users, and the different priorities and trade offs in the use of ecosystem services.

> Successful resource management policies are positively influenced by the active inclusion of local communities.

> Axis 4 can help in promoting and/or implementing ICZM initiatives, while ensuring a strong emphasis on the socio-economic dimension of ICZM related policies.

D.3 Combining the environmental and economic value of protected ecosystems

Protected areas are hugely varied but have a common goal to establish a set of rules to promote environmental protection. Historically, the place of human activities within these protected environments has been neglected, if not simply negated. This has had a series of negative consequences, ranging from sometimes violent conflicts between conservationists and users, to a plain non respect for rules and major difficulties of enforcement. This has often led to the failure of environmental protection initiatives, as well as to socio economic damage to local communities.

There is an increasing recognition, however, that protected environments cannot be established in isolation of the communities that live within or use these areas, be it for professional or leisure purposes. This, in turn, has led to calls for greater acknowledgement of the importance of local actors in advancing the protection agenda, and of the necessity of ensuring adequate socio economic conditions for these actors. However, a greater recognition of the role of local actors also entails the need for a change of perspective in the way local communities relate to nature, and for a greater sense of responsibility as regards the stewardship of environmental resources. Recognising the variety of services the environment provides, beyond the direct use one makes of environmental resources (see part C1 on ecosystem services), is a step in this direction.

As mentioned, nature has always been at the heart of the establishment of protected areas. FLAGs can be instrumental in bringing local communities closer to this heart.

Marine Protected Areas

Many definitions exist for Marine Protected Areas (MPA) but most share the objective of seeking to protect natural and/or cultural resources, the existence of some form of management via legal or other means, and a focus on the marine (including tidal) environment[28].

What varies from one MPA to the other is the degree of protection afforded and, consequently, the restrictions imposed on human activities. This ranges from fully protected zones, where not only all human activities are forbidden but where people are even forbidden from entering the area, to zones where human activities are tolerated but submitted to certain rules and restrictions. The World Conservation Union (IUCN) classifies protected areas into six different categories according to their objectives and the degree of protection they offer (please see Info Box 6 for more details).

[28] For a formal definition of MPA, the following IUCN definition is widely accepted: "a clearly defined geographical space, recognized, dedicated, and managed through legal or other effective means, to achieve the long term conservation of nature with associated ecosystem services and cultural values"

Info Box 6 • IUCN classification of Marine Protected Areas, with associated objectives[29]:

Category Ia – **Strict Nature Reserve**, a protected area managed mainly for science;

Category Ib – **Wilderness Area**, a protected area managed mainly for wilderness protection;

Category II – **National Park**, a protected area managed mainly for ecosystem conservation and recreation;

Category III – **Natural Monument**, a protected area managed mainly for conservation of specific natural features;

Category IV – **Habitat/Species Management Area**, a protected area managed mainly for conservation through management intervention;

Category V – **Protected Landscape/Seascape**, a protected area managed mainly for landscape/seascape conservation and recreation;

Category VI – Managed Resource Protected Area, a protected area managed mainly for the sustainable use of natural ecosystems.

[29] See the IUCN guidelines on MPAs for more information *http://data.iucn.org/dbtw-wpd/edocs/PAPS-016.pdf*

Many different policy imperatives drive the set up of MPAs in the European Union, with the result that these instruments are increasingly present in the life of fisheries communities. The current Marine Strategy Framework Directive (MSFD) states, for example, that Member States must develop and implement protection measures to maintain marine biodiversity. This includes the establishment of a network of Marine Protected Areas. The Birds and Habitats Directives (and the related Natura 2000 network, see Info Box 7) are two other major policy instruments at EU level calling for the designation of protected areas.

These are only a few of the many policy instruments pushing for the establishment of MPA's in the EU[30], which suggests that the trend towards the creation of MPA's will be a lasting one, and one that local communities should be better prepared for, and seek to benefit from. This can clearly be done with the help of FLAGs.

[30] To cite only a few of the other policy instruments calling for the establishment of MPA's in one form or another in EU waters: the Convention on Biological Diversity, the Ramsar Convention (wetlands protection), the OSPAR Convention, the Helsinki Convention (HELCOM), the ICZM Recommendation, etc. For a summary of these policy instruments please refer to *http://www.theseusproject.eu/wiki/Marine_Protected_Areas_in_Europe#_note-IUCN94*

Info Box 7 • The Natura 2000 network and fisheries related measures

Natura 2000 is a network of protected areas designated under two different Directives: the Birds Directive (79/409/EEC) and the Habitats Directive (92/43/EEC). The former helps establish 'Special Protection Areas' (SPAs), while the latter proposes the designation of 'Special Areas of Conservation" (SACs) on the basis of "Sites of Community Importance" (SCI). Together, SPAs and SACs form the Natura 2000 network. The goal of these instruments is to ensure the long term survival of Europe's most valuable and threatened species and habitats.

While the designation of marine sites has been slow, it is now picking up pace, largely due to pressure from the EU Biodiversity Action Plan. Therefore, Natura 2000 is, and will be, increasingly present in fisheries areas. A special document has been developed by DG Environment and DG MARE to clarify the linkages between Natura 2000 sites and fisheries management measures. This document advises on the rules to follow when the set up of a Natura 2000 site envisages the implementation of fisheries related measures (e.g. the need for a sound scientific basis, consultation with DG MARE and fisheries related stakeholders, etc…).

For more information on Natura 2000 and fisheries related measures, please see the following guidance document: *http://ec.europa.eu/environment/nature/natura2000/marine/docs/fish_measures.pdf*

Looking at MPAs from a local community perspective, these areas offer a variety of benefits stemming from the different ecosystem services they provide (please refer to part C for more information about ecosystem services).

The most obvious benefits are associated with the provisioning and cultural services provided by MPA's. Indeed, by protecting special zones such as nursery areas for juvenile fish or breeding grounds, the production of fish biomass is likely to increase and, through a spill over effect[31], this can lead to improved catches for fishermen operating in the zones surrounding these reserves. In parallel, the enhanced biodiversity, both onshore and offshore, can act as a stimulus for ecotourism, as well as for recreational diving or pleasure boating.

In addition to these services that provide direct benefits to people, either in the form of fish or enjoyment, MPAs can also, potentially, provide insurance against the loss of biodiversity and protect against extraordinary weather related events or climate change. The impact of heavy storms and associated flooding can be limited by special natural defenses, such as dunes, wetlands, marshes and flood plains. And even though individuals do not benefit on a day to day basis from cash endowments stemming from these services, the consequences of non protection could have serious financial implications for individuals and communities.

Protected marine zones can also provide other benefits to local areas, such as helping to regulate climate (rainfall), absorbing carbon dioxide emissions, and all sorts of other regulating services that work much better when delivered by a well preserved ecosystem.

[31] The spillover effect is the effect of fish or other living organisms leaving the confinement of the protected zone due to overcrowding (not enough space/food) or in search of mates for reproduction purposes. This usually requires some time to happen as the biomass of the protected area needs to have reached a certain level.

Table 4 *– examples of benefits associated with ecosystem services stemming from MPA's*

Type of services	Some associated benefits for local communities
Provisioning services	Increased fish/crustacean catches in adjacent areas through spillover effects,…
Habitat services	Nursery grounds for marine species, sanctuaries for endangered species,…
Regulating services	Protection against storms, floods, erosion, climate change,…
Cultural services	Ecotourism, nature based activities, the protection of historic sites (e.g. traditional buildings or wrecks),…

The variety of services and associated benefits MPAs can provide implies that they should be considered as a key feature of an area's economy. Through cooperation and forward planning, local communities and their FLAG can combine protection measures and public goods services with activities to promote direct economic benefits for their area.

A FLAG view: Marennes Oléron FLAG (France) – ensuring fishermen's involvement in the design of an MPA[32]

As outlined in the 2011 study by Gutierrez et al.[33], MPAs can, if they allow for a significant local management component, and facilitate the involvement of fisheries communities, be a powerful tool in ensuring the coexistence of sustainable fisheries and ecosystem preservation. Axis 4, through community involvement projects, can promote greater inclusion of fishermen in MPA design and management, as highlighted in the following project from the FLAG Marennes Oleron, in France.

The design process of the Marine National Park (MNP) of the Gironde Estuary and Charentais Straits followed on from the area's designation as a Site of Community Importance (see Info Box 7 on Natura 2000). Between October 2009 and December 2010, 30 working groups, involving 150 people representing the various stakeholders, industries and associations active in the area and concerned by the MNP, were held to define stakeholder positions and present them to the "Comité de Concertation" (Participative Committee). This process aimed to define a management strategy for a 6500 km^2 marine park, which was to become the largest marine protected area in metropolitan France. The area hosts some of the most active fishing ports in France, as well as significant recreational and industrial activities.

The fisheries stakeholders, represented by the three Regional Maritime Fisheries and Aquaculture Committees ("CRPMEM") present in the area, were actively involved in the consultation process, and were keen to ensure the inclusion of their views and the continuity of their professional activity. However, due to the time consuming nature of the process, and in order to ensure a permanent presence at the various meetings, as well as to ensure that fisheries voices were not only heard but also understood by non-fisheries stakeholders (scientists, NGOs, society representatives), the CRPMEM of Poitou Charentes introduced an Axis 4 project to recruit a coordinator for a one year renewable contract.

The task of the coordinator, who had both scientific knowledge and field experience in the fisheries sector, was to represent the local fisheries interests in all Participative Committee meetings when binding decisions were to be taken. Her task was also to proactively inform the key stakeholders, on an ongoing basis, about the process, summarising any technical information arising from the meetings (scientific analysis and non-fisheries stakeholders' perspectives) and communicating it to the fishing organisations and interested individuals.

[32] See FARNET good practice #004 *https://webgate.ec.europa.eu/fpfis/cms/farnet/sites/default/files/documents/GP_004-FR05-EN_Marine-Protected-Area.pdf.pdf*

[33] Gutierrez, N.L., R. Hilborn, and O. Defeo. 2011. Leadership, social capital and incentives promote successful fisheries. Nature 470: 385-388.

Building on this positive experience, in 2012, the Regional Fisheries and Aquaculture Committee of Poitou Charentes decided to capitalise on the dynamic triggered by Axis 4 and proposed a new project to the FLAG. Based on previous feasibility studies, which demonstrated a clear demand and enthusiasm from the sector and coastal stakeholders, the Regional Fisheries and Aquaculture Committee proposed a project aimed at testing the effects of artificial reefs on a 25ha site. Although the technical implementation and production of deliverables is being delegated to a third party[34], as the main project holder, the Fisheries Committee will still play an active role in combining environmental protection and sustainable resource use, adapted to the local fisheries specificities in terms of gear, species and seasonality.

Protected areas and inland waters

Inland waters also host a rich diversity of ecosystems (rivers, wetlands, deltas, ponds, lakes…) but are even more closely integrated with human activities than the marine environment. Indeed, while a large portion of the marine environment is off limits to the majority of the population, inland waters are, by default, surrounded by human populations, which can lead to even more acute pressure on these ecosystems. Pollution from industrial, agricultural and domestic sources, water use for irrigation, the draining of wetland areas or the redesign of waterways for economic activities or property development are all major threats to inland water-based ecosystems. However, as for marine ecosystems, inland water-based ecosystems are similarly very important suppliers of ecosystem services (the provision of water for domestic and agriculture uses, recreational space, key habitats for wildlife,…), which underlines the need to recognise their importance and ensure adequate protection.

Fishing and fish farming in inland waters are traditional activities in most parts of Europe, even though certain practices such as commercial fishing and extensive fish farming tend to be on the decline. An interesting feature of some of these now declining activities is that they have evolved with the environment on which they were based, to the extent that they are now very much interdependent. In the case of traditional carp farming, for example, the fish rely on the water for their living space and food source, but at the same time, they also help to maintain the ecosystem in its functioning form. Indeed, carp, a mostly vegetarian fish, prevent the proliferation of algae or weeds that would otherwise quickly lead to eutrophication[35] of the water and/or the gradual choking of the watercourse. So in this example, traditional carp production helps to maintain the functionality of pond ecosystems and their associated services (see Table 5).

[34] CREAA: Centre Régional d'Expérimentation et d'Application Aquacole

[35] Eutrophication is a biological process by which a proliferation of nutrients in the water leads to an explosion of phytoplankton that consumes all oxygen, rendering all underwater life impossible.

Table 5 *– Ecosystem services provided by traditional carp farming and associated ponds*

Provisioning services	Supply of fish
Habitat services	Crucial habitats for birds and plants (including endangered species)
Regulating services	Water retention and water quality (protection against floods, reservoir of water for drought period, cleansing function)
Cultural services	Nature based tourism opportunities (bird watching, walkers, anglers,…), educational opportunities, maintenance of cultural heritage,…

This is the reason why most of the area covered by the Polish "Dolina Karpia" FLAG is made up of Natura 2000 sites, and the FLAG capitalises on this recognition as a zone of special environmental interest for its activities. The FLAG has, for example, developed special products aimed at the niche market for ornithological tourism. It also promotes other forms of green tourism by maintaining a network of cycle and walking paths, and by supporting local fish farmers in restoring the productive capacity of the ponds, while maintaining the integrity of the traditional landscape as habitats for wildlife.

Section highlights

> The policy push for protected areas is very strong, suggesting that these instruments will increasingly impact on fishing communities.

> Many different types of protected areas exist, with varying degrees of environmental protection and constraints/opportunities.

> Protected areas help to maintain key ecosystem services and can become key features of the local economy.

> FLAGs can help local actors to take on a greater role in the set-up of protected areas, but this also implies greater responsibilities for these actors.

D.4 Supporting the transition towards a more sustainable fisheries sector

The pressure on the fisheries sector to move towards more sustainable fishing practices has been increasing over the years. The transition towards a new CFP has accelerated this trend (see part B3 for more information on the CFP reform) and it is now clear that the future of the industry is dependent on its success in adopting a green agenda.

In many instances, the path to sustainability is not necessarily a difficult one. Very often, only a change of perspective is required to open the door to improved working practices. Indeed, many parts of the fleet already employ fishing techniques and practices that could, with limited adjustment, qualify as being sustainable.

FLAGs have an important role to play in helping the local fishing industry to look at the way it operates, and in supporting the transition to sustainability. Beyond the fisheries sector itself, FLAGs can also help to mobilise fishing communities as a whole, to accompany their local fisheries sector in this transition.

Local communities can support their fisheries sector by, for example, increasing their consumption of locally sourced fish (see the example of the community supported fisheries scheme in the FARNET guide #3, on adding value to local fisheries products [36]), or by highlighting the efforts of the local fleet to reach sustainable standards in the area's wider promotional activities.

Local communities can also support their fisheries sector in the process of obtaining environmental certification for their catch. Eco certification provides an assurance to customers that the product they purchase has been produced in an environmentally responsible way. Several different certification schemes exist but most imply a certain cost to the producer. In the path towards building sustainable communities, it may be appropriate that the cost of the certification process is shared across the community.

The FLAG can also be a link to research and development networks seeking technical solutions to guide more sustainable fishing practices. It can help in identifying other communities facing similar issues and work with them to find solutions.

A more sustainable local fishing industry will benefit everybody:

> fishermen,

  through an improved catch in the medium term and the securing of their livelihoods in the long term (thanks to the stabilisation of the resource and an overall improvement in the image of the sector, and hence their relationship with other stakeholders);

> the wider community,

  through ensuring the future of a renewable resource that provides a variety of environmental services, through the supply of a high quality product, and by enhancing the image of a responsible territory, taking its future in its own hands.

This can yield political benefits for the local area with regional, national and European actors, who are trying to foster green growth in the EU. It can also help in attracting new residents, new tourists or new businesses that are drawn to an area that associates economic dynamism with a high quality environment.

It is only natural, therefore, that the responsibility for ensuring sustainable fisheries is shared by all actors from the territory. In this sense, we present below a project that embodies many characteristics relevant to an Axis 4 project (multisectoral, partnership approach, focus on innovation) but which, on this occasion, was supported through Axis 2 of the EFF.

[36] *https://webgate.ec.europa.eu/fpfis/cms/farnet/farnet-guide-3-adding-value*

ITSASOA: improving the local fisheries sector's sustainability and integration

ITSASOA, meaning "sea" in Basque, is also a French acronym conveying the objective of the project: to preserve the ocean by supporting artisanal SME's and technological innovation in both the agricultural and fisheries sectors.

In practical terms, the project has developed a local biofuels supply chain, which is used to power two, small-scale local fishing boats. The biofuels are produced locally using waste from sunflower production. The engines of the two fishing boats have been modified to run on this new fuel. The project offers an alternative for both local sunflower producers, by developing a new market for their production, and to local fishermen, in terms of fuel supply. In doing so, it contributes to improving the sustainability of both the fisheries sector and the local agriculture sector, while also reinforcing the link between two of the territory's primary production activities. An additional benefit arises from the substitution of traditional fossil fuel energy sources with locally produced biofuels.

While the project was not supported by Axis 4, a FLAG could envisage supporting the local producers involved in this project in capitalising on their vision of turning this idea into a commercial venture, hence multiplying the economic and environmental benefits. The ITSASOA initiative was developed by three lead partners: Itsas Gazteria, a local fisheries organisation, the IFHVP (French Institute for Pure Vegetal Oil), and Atelier Lan Berry, an SME development company, along with five co-working organisations.

Adding value to local fisheries products

Local should not mean basic. There is a strong rationale for trying to foster added value creation at local level. This ensures that most of the value generated by or associated with production is retained at local level, helping to create or maintain local jobs. Making the most of local production also means that less raw material is required for the same amount of added value, which helps to make the exploitation of the resource more sustainable. As the adding value theme has already been the focus of a specific guide published by FARNET[37], we will not go into the details of the various paths one can follow to increase local added value. We will, instead, limit ourselves to the presentation of a new project that has been developed by the Huelva FLAG (Andalusia, Spain), and which aims to generate value from fish waste from the local fish auction.

[37] *https://webgate.ec.europa.eu/fpfis/cms/farnet/farnet-guide-3-adding-value*

A FLAG view: FLAG Huelva (Spain) – improving resource efficiency using local fish waste[38]

The aquaculture company, Salinas del Astur, which breeds and commercialises sea bass and guilthead, saw a business opportunity in exploiting the discards and fish waste produced by the local fish auction. Previous to this, fish waste not only had no economic value, local producers actually had to pay to have it incinerated.

With support from Axis 4, Salinas del Astur was able to invest in machinery that allows it to produce its own, high quality fishmeal from this local fish waste. With the new machinery, and by combining fish waste with bread crumbs (also stemming from bread waste collected locally), the project has turned waste into a valuable resource, while also having positive side effects for the environment. Through this process, the company now produces 50% of the fishmeal consumed by its aquaculture activities. At a later stage, the company foresees scaling up the production of fishmeal by also collecting discards from a neighbouring fish auction (Isla Cristina), as well as other types of fish and seafood waste from the local canning industry.

Having only started in September 2011, the project has already created one job and helped the company to reduce its fishmeal costs by 50% (i.e. a saving of €20 000 per year). It has also created a new use for the local auction's fish waste, as well as for local bread waste. Last but not least, it has brought the company into contact with experts from different sectors and regions of Spain in its pursuit of new methods to refine its production processes. This will help to increase the specialised knowledge available in the area.

[38] See FARNET good practice #018*https://webgate.ec.europa.eu/fpfis/cms/farnet/sites/default/files/documents/FARNET_GP_018-ES08-EN_Fishmeal-from-fish-waste.pdf*

Section highlights

> The pressure for more sustainable fishing practices is increasing.

> The responsibility for ensuring sustainable local fisheries should be shared by all actors of the territory, as a strong and sustainable fishing sector will benefit the whole community.

> FLAGs can help to mobilise the local community to support their fishing sector in its transition towards sustainability.

D.5 Fostering blue green innovation

Info Box 8 • The blue green economy

It is now 20 years since the first Rio conference, where an agreement on the concept of "sustainable development" was reached, based on the Bruntland report. While some good work has been done during this time, including in the area of policy development, much remains to be done on the ground.

As outlined in the European Council conclusion's, "Rio+20: Pathways to a Sustainable Future", an inclusive and green economy is needed to achieve sustainable development globally. Greening the economy is essential to promoting long term equitable growth, green jobs, resource efficiency and sustainable consumption and production, as well as human health and well being. This is the opportunity to create a positive, inspiring new global model of growth that not only reverses negative environmental trends but also drives future development and jobs. In this context, the Council recognises the need to consider the concept of the "blue economy", which extends the principles of the green economy, inter alia, to the conservation and sustainable use of marine resources.

http://www.consilium.europa.eu/uedocs/cms_data/docs/pressdata/en/envir/128881.pdf

"Human activity at sea and in coastal zones is essential to our economic stability. Industries that depend on the sea, such as shipbuilding, fisheries and tourism, contribute billions of euros to the European economy. Emerging sectors such as offshore wind energy and blue biotechnology will play a key role in the future. "Blue Growth" can be one of the EU's primary ambitions for the coming years." European Environment Commissioner, Janez Potočnik.

As outlined in the different parts of this guide, issues linked to the environment, be they related to climate change, conflicting uses or increased pressure on scarce resources, are shared by all coastal and water based environments on a global level. It is, however, very often at the local level, and through the generation of new and innovative initiatives, that solutions emerge.

Speaking at the FARNET conference on "Sustainable Futures for European Fisheries Areas", in November 2011, Mr Ernesto Penas Lado, Director in the Directorate General for Maritime Affaires and Fisheries (DG MARE) of the European Commission, said that FLAGs were strategically very well placed to steer the future of their areas:

"this is perhaps very genuinely an important value of Axis 4 around Europe, which is that it allows experimentation, it allows people to test out things, to innovate. If that innovation had to start at a much larger scale it would probably never happen."

FLAGs, with their unique multisectoral composition, are ideally placed to foster innovation. Indeed, by looking beyond the traditional boundaries between the various sectors active at local level (fishing, tourism, farming, energy generation,…), FLAGs can help in finding new solutions to existing problems, as well as in creating new dynamics between sectors. By creating linkages between sectors, and by bringing together different ideas and expertise that do not often have the opportunity to interact, new collaborations and innovations will emerge.

To transform this potential into benefits for their areas, FLAGs must have a clear view of their areas' potential for blue/green innovation (see Info Box 8 for more information on the blue/green economy), in terms of both existing activities (i.e. by helping existing activities to develop more sustainable models of exploitation) and new niche opportunities (by focusing on overlooked environmental assets, for example). As outlined in point D1 of this section, the identification of the various ecosystem services at play in their areas can help FLAGs to identify opportunities for blue/green growth.

The following examples show some of the solutions that have been designed, tested and implemented locally, which demonstrate both the green and blue growth potential of fisheries areas.

A FLAG view: FLAG Small islands and FLAG Bornholm (Denmark) – integrated production of seaweed from Danish islands[39]

Driven by the growing demand for healthy food, the development of the new Nordic cuisine, and the demand for sushi type food, the consumption of seaweed is increasing in many parts of Europe. However, most of the seaweed being used comes from outside the EU. Recognising this situation, two FLAGs in Denmark have assessed the possibilities of producing seaweed in the clear waters around the Danish islands. The FLAGs have teamed up to develop a new value chain, based on the production of edible seaweed. A remarkable feature of this project is that not only is it market led, but it is also integrated, in the sense that it looks at all the different parts of the value chain, from primary production to the various adding value and marketing possibilities.

This has been facilitated by a collaboration involving a variety of different local actors, which all bring their specific expertise to the project: local mussel farmers take care of production, while local entrepreneurs (nature based R&D specialist, a bread maker, ice cream producer, oil producer, restaurateurs, artists, etc) look at the adding value and product development side of the project. This has led to the creation of a vibrant new value chain in some small and remote Danish islands, where new business and employment opportunities are scarce, while also linking these remote areas with larger centres of activity. Indeed some of the seaweed based products are now being sold in Copenhagen, while the seaweed ice cream produced in the small island of Skarø has even been served on some long haul flights of an international airline carrier.

[39] See FARNET good practice #009 *https://webgate.ec.europa.eu/fpfis/cms/farnet/sites/default/files/documents/GP_009-DK13-14-EN_SeaweedProduction.pdf* and video *http://www.youtube.com/watch?v=SfR8yJf29Zo*

A FLAG view: FLAG Oeste (Portugal) – the swimming crab or pilado: an overlooked local resource[40]

In Portugal, the "caranguejo pilado", or Henslow's swimming crab, is an abundant species, commonly caught in the nets of seine fishermen but subsequently discarded as it holds no commercial value. And yet, this species is believed to be a source of some valuable biological compounds, such as chitin and astaxantin. The biological and medicinal properties of these substances have been known for several years and they are currently used by the pharmaceutical and bio-medical industries as nutritional additives, as well as in water treatment and tissue regeneration.

Recognising this potential, and with the support of the Oeste FLAG, the Polytechnic Institute of Leiria has set up a pilot study to assess the potential of Henslow's swimming crab as a source of these compounds. The study, which will be undertaken in partnership with fishermen, bio-medical companies (CERAMED/ALTAK-ITIN) and other research institutes will help to define the extraction processes and the distribution circuits that would need to be set up in order to take advantage of this overlooked resource. If successful, the project could be a source of green and blue growth for the FLAG area, capitalising on an overlooked resource from the local environment.

[40] See FARNET good practice #019 *https://webgate.ec.europa.eu/fpfis/cms/farnet/sites/default/files/documents/FARNET_GP_019-PT04-EN_crab-for-biomedicine.pdf*

Section highlights

> Environmental threats are very often of a global nature, but innovative solutions can emerge at the local level.

> FLAGs can help to create new dynamics between sectors and stakeholders that may not otherwise have much opportunity to interact. This can lead to new collaborations, innovations and ideas.

> FLAGs should assess their areas' potential for blue/green innovation, notably through the identification of the various ecosystem services.

D.6 Unlocking the potential of renewable energy in fisheries areas

One of the five headline targets of the Europe 2020 strategy is to source 20% of the EU's energy needs from renewable sources by the end of the decade (see Info Box 1 for more information on the EU 2020 strategy). Countries such as Sweden, Finland, Latvia and Austria are already well above this target and coastal areas are prime locations for the development of some of these sources of energy, such as wind, wave and tidal power.

The renewable energy sector, and its associated industries are, therefore, likely to be increasingly present in the lives of coastal communities. FLAGs can act on various levels to help these communities to benefit from this development. They can act as catalysts for the development of these industries in their areas by supporting interested stakeholders and businesses and by helping them to source the necessary financial and technological assistance.

However, given that many renewable energy projects are of a very large scale, often too large to be tackled by local communities themselves, the role of the FLAG can also be to ensure the involvement of the local community in larger scale projects, which are driven from outside the area. This can ensure that the local community is not negatively impacted by the project and, where possible, that it derives real benefits from such larger scale projects.

Local communities as producers of renewable energy

As mentioned above, many renewable energy projects are large in scale, but this does not always have to be the case. As shown in the example below, across the EU, communities have managed to develop locally based renewable energy projects.

It is true, however, that the minimum investment level for these projects is usually out of the reach of the budget of most FLAGs, but they can help to secure funding from other available sources (see Info Box 9 for more information on EU sources of funding for renewable energy projects). The FLAG, as a multistakeholder partnership, is well placed to be the driver of such community based projects. Indeed the common denominator of most successful, locally-based renewable energy projects is that they manage to involve the whole community.

As outlined by several studies (Bolinger, 2001[41]; Soerensen et al. 2002[42]), information about the development of the project, inclusion in the decision-making processes, and financial involvement of the community are three positive factors that increase public confidence and trust in such projects. Very often,

[41] Bolinger, M., 2001. Community wind power ownership schemes in Europe and their relevance to the United States. Lawrence Berkeley National Laboratory, May 2001.

[42] Soerensen, H. C.; Hansen, L. K.; Hammarlund, K. and Larsen, J. H., 2002. Experience with and strategies for public involvement in offshore wind, in: International Journal of Environment and Sustainable Development (IJESD), Vol. 1, No. 4.

cooperatives between citizens and public authorities are developed, and members of the community, in addition to being involved from the very start of the project, have the opportunity to invest financially. Such initiatives help to increase local acceptance of renewable energy projects and contribute to overcoming resistance linked to impacts such as noise or visual nuisance.

The Danish island of Samsø, for example, has managed to become 100% self-sufficient in terms of its energy use, through the development of a combination of different renewable energy sources (wind, solar and waste). The island previously relied heavily on the flow of tourists in the peak summer months, while traditional occupations such a fishing and farming were on the decline. The community saw an opportunity for a new future with the launch of a competition by the Danish government, to select "renewable energies" communities. It took less than 10 years for this island of 4 000 inhabitants to become energy self-sufficient, which it did in 2006.

This has transformed the local economy, with most businesses and citizens benefiting from important savings in terms of energy costs, as well as from the expansion of existing businesses (construction, electricians,…) and the creation of new ones based around renewable energy production. It has also helped to put Samsø on the map, as one of the first EU communities to be self-sufficient in renewable energy, thereby attracting the attention of politicians, scientists and tourists. The Renewable Energy Island project is now one of the main tourist attractions on the island. The multiplier effect of the renewable energy strategy has, therefore, been felt throughout the local economy.

The island of Samsø is now not only 100% self sufficient in terms of energy production but it has also started to export energy, thereby generating dividends for the more than 450 inhabitants of the island who are shareholders in the different energy production enterprises.

Beyond the direct economic benefits associated with the renewable energy strategy, the quality of the air, water and terrestrial environment has also been improved, with significant reductions in emissions of green house gases and airborne particles, which has in turn benefited the provision of ecosystem services.

More information on the renewable energy community of Samsø can be found on the following websites.

http://energiakademiet.dk/en/om-energiakademiet/

http://energiakademiet.dk/wp-content/uploads/samso-renewable-energy-island.pdf

Info Box 9 • EU support for renewable energy in coastal areas

Fisheries areas can draw on a wide range of supports put in place by the European Union for both research on, and implementation of renewable energy projects. All technological research initiatives are fostered by the EU Seventh Framework Programme for Research (FP7), under the measure for "renewable electricity generation"[43]. Soft investments, needed to investigate and evaluate projects, such as feasibility studies, energy audits and preparatory works, can be partially funded by the European Investment Bank's ELENA[44] facility. In addition, the Intelligent Energy Europe programme[45] supports market research, the testing of new technologies and the raising of public awareness in the field of energy efficiency and renewable energy.

At national level, Member States have put in place specific initiatives to foster the development of the renewable energy sector through their own national legislation[46], very often with the support of the European Regional Development Fund (ERDF).

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[43] FP7, about renewable energy generation: *http://cordis.europa.eu/fp7/energy/about-electric_en.html*

[44] The ELENA facility: *http://www.eib.org/products/elena/index*

[45] Intelligent Energy Europe: *http://ec.europa.eu/energy/intelligent/*

[46] *http://www.res-legal.de/index.php?id=1&L=1*

The potential of some of the main renewable energy sources in EU fisheries areas

Wind energy

According to the European Wind Energy Association, offshore wind turbines produce almost 5% of the EU's electricity[47]. In 2010, the offshore wind energy sector was a €2.6 billion industry. The association also reports that onshore wind energy potential is mostly concentrated in agricultural and industrial areas in North Western Europe, whereas the greatest potential for offshore wind energy production is located in the Baltic, North Sea and within the Atlantic lower depths.

However, the planning of wind farms (inland and offshore) can come up against a series of hurdles relating to conflicts with pre-existing uses (fisheries, aquaculture), leisure and tourism activities, as well as the fear of landscape degradation. And, although many people are increasingly aware of the need to develop renewable energy sources, local wind farm projects frequently suffer from the NIMBY, "Not In My Backyard" syndrome, formed by pre conceived ideas about potential nuisance. A role for the FLAG here, as mentioned in the previous section, could be to ensure and facilitate community involvement as a basis for overcoming these potential conflicts.

Conflicts with environmental protection objectives are also possible. As outlined in the recent European Environmental Agency (EEA) report on Europe's onshore and offshore wind energy potential[48], it is estimated that Natura 2000 and other onshore areas imposing environmental constraints on wind energy production only reduce the technical potential by 13.7%. On the other hand, environmental constraints offshore have a much larger impact.

[47] European Wind Energy Association, *2010 European Statistics: http://www.ewea.org/fileadmin/ewea_documents/documents/statistics/EWEA_Annual_Statistics_2010.pdf*

[48] European Environment Agency, *Europe's onshore and offshore wind energy potential*. 2009: *http://www.energy.eu/publications/a07.pdf*

Wave and tidal energy

The EEA estimate[49] that the installed capacity of wave, tidal and ocean energy production in Europe in 2010 was still very marginal compared to that of other marine based renewable energy sources, such as offshore wind, but that it was likely to experience strong growth by 2020.

The use of these renewable energy sources is, and will continue to be, unevenly distributed among Member States, mainly due to the specific geographical and meteorological conditions they require. In fact, it is expected[50] that by 2020, the UK alone will be responsible for 61% of the total EU production, followed distantly by France (18%), the Netherlands (8%) and Portugal (7%). Some minor investments will also be made in Malta, Spain and Ireland.

Tidal energy can be harnessed by two different means: tidal impoundments (a sea water impoundment behind a barrage or lagoon that generates power when water is let in or out) and tidal streams (designed to generate energy from fast flowing water in tidal streams).

Even though the technology for tidal impoundment plants is mature, these installations require very specific geographical conditions to make them profitable, and they need considerable investment. In addition, the flooding caused by the plants can have adverse environmental effects on the ecosystems of the estuary/bay where they are installed. The largest existing tidal power station in the world is found in the Rance estuary, in northern France. This plant was built in 1966 and generates 240 MW per year.

Contrarily, tidal stream systems are more versatile and can be developed on a large or small scale. In addition, they have a lower environmental impact and the technology available is evolving very fast. These factors are the main reasons why projects using this approach are preferred by public authorities, private companies and coastal communities.

In the case of wave energy, this is still in its infancy and is not yet economically feasible. In fact, most of the tests to date have had significant public financial support. Environmental impacts are limited, however, only presenting conflicts with other activities in sensitive locations.

[49] *http://www.eea.europa.eu/highlights/massive-renewable-energy-growth-this*

[50] *http://www.eea.europa.eu/data-and-maps/figures/national-renewable-energy-action-plans*

Ensuring local communities benefit from large scale renewable energy investments

In some cases, renewable energy projects are too big to be initiated at local level and are, therefore, managed and operated from the outside by national or large scale private energy companies.

FLAGs situated in areas with high potential for renewable energy production should analyse how such developments could impact negatively or positively on their areas and what is the possible fit with their local strategy.

These large scale projects can entail the installation of systems and infrastructure at sea (in shallow or deeper waters) that can generate potential conflicts with fishing, aquaculture and even tourism activities. In addition, they can also have environmental impacts that have to be assessed in order to minimise adverse effects on the provision of certain ecosystem services (impacts on marine currents, migratory routes for birds or fish, etc…). However, an array of ancillary activities are needed to develop such large scale projects, which presents opportunities for local SMEs and other stakeholders.

FLAGs are in a privileged position to facilitate discussion with the project promoters and to forge a common position among the different FLAG stakeholders, a position which can then be presented and defended at the appropriate level to maximise the benefits for the local community.

In FLAG areas where wind farm projects exist, attempts should be made to develop and strengthen communication between the wind farm operators, fishermen and aquaculture producers, as well as with representatives of maritime spatial planning initiatives. As outlined in the Info Box 10, wind farm operators often disregard the possibility for fishing or fish farming activities within their sites, but there is increasing evidence that these activities can coexist.

Info Box 10 • ILVO study: a place for passive gear systems and shellfish production in wind farm zones

"Unknown, unloved": offshore wind farm operators tend to treat fishing and mariculture as threats, rather than opportunities, and the reverse observation can also be made. Yet, these activities can co-exist and possibly even have a synergetic effect.

In Belgium, the Flemish marine fishery is facing many different threats. In addition to rising fuel prices, the economic crises and ecological challenges, the intensive use of the sea and the designation of protected areas are also reducing the size of the traditional fishing grounds.

A recent study by the Flemish Institute for Fisheries and Agriculture Research (ILVO) shows that, under certain legal and technical conditions, passive fishing methods and several aquaculture techniques could be allowed in wind farm zones. Indeed, many fish and crustacean populations are expected to thrive in these zones (e.g. sea bass, crab and lobster) due to the so called "reef effect", which has already been observed and assessed by several studies[51]. These are species that can be caught in a sustainable way by small-scale operators, without the risk of impacting on the energy producing installations.

The risks associated with fisheries activities within wind farms greatly depend on vessel capacity and size. As outlined by the report, "small, light vessels such as those used for passive fishing (usually < 150 GT) form no threat whatsoever to the wind farms in case of collision. As soon as vessels exceed 1 000 GT, the risk goes up."

http://www.ilvo.vlaanderen.be/NL/Onderzoek/Visserij/Technischvisserijonderzoek/Maripas/tabid/5348/language/nl-BE/Default.aspx (in Dutch)

[51] Petersen, J. K. and Malm, T., 2006. 'Offshore Windmill Farms: Threats to or Possibilities for the Marine Environment'. *Ambio* 35(2): 75–80.

Section highlights

> FLAGs can help empower local communities to become energy producers.

> Successful local energy projects have all managed to involve the local community in their initiatives.

> Different technologies are available, which require different conditions to operate and which can lead to different kinds of conflicts.

> FLAGs can help local communities to defend or promote their interests vis à vis external promoters of large-scale projects.

E. Conclusions

Looking beyond the constraints associated with conservation and protection, the environment can be a source of growth and opportunities. Growth that not only capitalises on renewable resources but that ensures and values the maintenance of a healthy environment and its related ecosystem services.

The value of the environment should not only be measured in terms of the hard cash generated by direct economic use, but should also take account of the often overlooked ecosystem services, which condition the sustainability and existence of all economic activities.

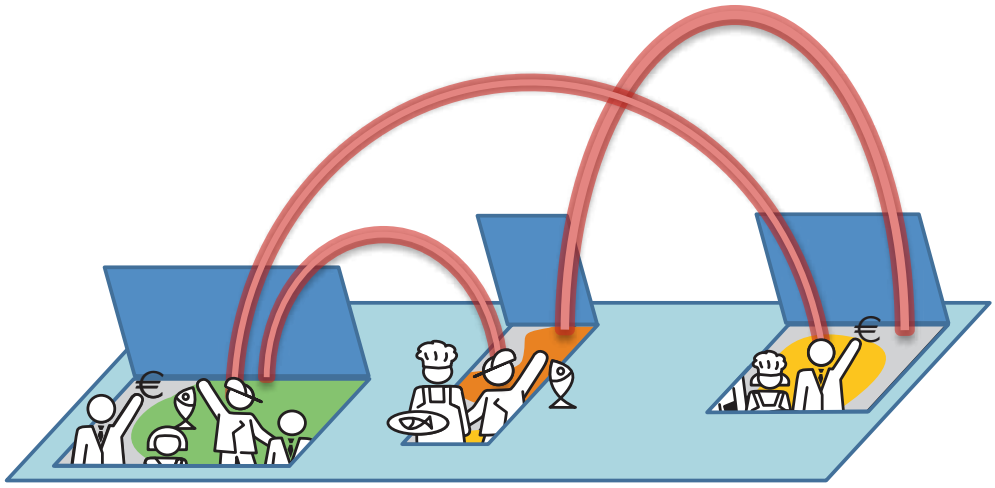
Recognising this offers both opportunities and responsibilities: opportunities in terms of the new pathways it opens up to maximise the returns from local environmental capital; and responsibilities in terms of ensuring the sustainability of environmental resources, while promoting green growth.

Once we acknowledge the fact that the environment provides the building blocks for all local economic activities, we can then turn towards putting environmental capital to the best potential use for the local area.

FLAGs, as versatile bodies empowered with certain decision-making capabilities, are ideally placed to generate a new dynamic and to promote green growth at local level. Various pathways, as well as tools and examples, have been highlighted throughout this publication. Ultimately, however, it is up to the FLAGs to find their own way towards a smart, inclusive and sustainable growth, based on the wise use and protection of their own environmental capital.

Figure 5 *– The role of FLAGs in optimizing resource use*

FLAGs as connectors within the **stakeholder ecosystem:**
Opening/strenghtening windows of cooperation between isolated "resources/users/needs"



FLAGs can act on several levels

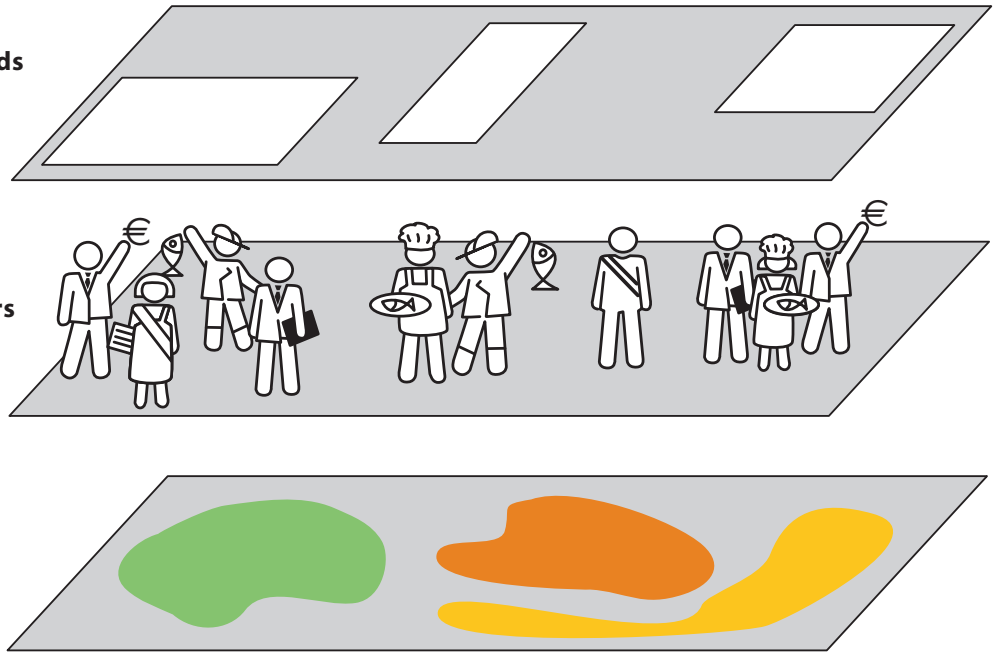
Mapping the **needs**

+

Mapping the **users**

+

Mapping
the **resources**



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