SIMCelt

Supporting
Implementation of
Maritime Spatial
Planning in the
Celtic Seas

Component 1.2.1

Spatial Demands and Scenarios for Maritime Sectors and Marine Conservation

Deliverable 2

Sectoral briefing notes

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Aquaculture

Maritime Sector Briefing Note

This briefing note summarises the current status of aquaculture in the SIMCelt project area. It looks at the current policy environment and ambitions for aquaculture development in the future, alongside the implications for expansion of the sector in relation to Maritime Spatial Planning.

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About SIMCelt: SIMCelt is a cross-border project involving partners from the UK Ireland and France. It aims to support cooperation between Member States on the implementation of the Maritime Spatial Planning Directive in the Celtic Seas. The SIMCelt project is aimed specifically at the OSPAR Region III Celtic Seas area in accordance with a proposed extension of this region.

http://www.simcelt.eu/about/celtic-seas-area/

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KEY POINTS

- With consumption of fish and seafood products growing worldwide, aquaculture is a rapidly growing sector. Aquaculture products have benefits in terms of being rich in proteins and healthy oils.
- The aquaculture sector in Europe has been described as 'stagnating', due to its lack of growth compared to the aquaculture sector globally. Therefore it has become a priority sector for the European Union's Blue Growth agenda, with concerted efforts to stimulate development.
- Within the SIMCelt project area, the main aquaculture species include Altantic Salmon, which is the main product of Scottish aquaculture, mussels, with Ireland, Wales and France (Brittany) key producers and oysters.
- Under reforms to the Common Fisheries Policy, all European Member States are required to produce Multiannual National Plans for sustainable aquaculture development. These plans are based around the themes of simplifying administrative procedures for aquaculture development, enhancing competitiveness of the sector, coordinated spatial planning and promoting a level playing field for EU producers through exploiting their competitive advantages.
- Processes for the authorisation of new aquaculture sites vary across the administrations within the SIMCelt area; however all involve obtaining licences and permissions from more than one body, for example relating to the health of species and biosecurity, rights to use the foreshore/sea bed and permissions for related infrastructure or access to sites.
- The main environmental impacts of aquaculture production relate to the biosecurity of aquaculture production and increased levels of nutrients and organic compounds in the marine environment. In future, the effects of climate change may impact upon certain species or changes to the water environment.
- Drivers of change in the aquaculture sector include continued financial support from the European Union to support sustainable aquaculture, increasing consumer demand through promotion of aquaculture products, increasing use of multitrophic systems that support several species and the potential for the development of multi-use platforms with sectors such as offshore wind energy
- A critical issue for the development of aquaculture is the availability of suitable sites and the potential for conflict with other marine users. Early stakeholder engagement in maritime spatial planning processes to determine future spatial requirements for the sector and to minimise potential conflicts will be essential.

DISTRIBUTION OF ACTIVITY

United Kingdom

In **Northern Ireland** there are currently 32 licenced Finfish farms, 2 of which are marine based and 46 licenced Shellfish farms (45 of those marine) covering 54 licenced sites. Most shellfish sites are located within Northern Ireland's sea Loughs at Larne, Belfast, Strangford, Carlingford and Dundrum Bay whilst marine finfish sites are located along the Antrim coast. In 2016 the aquaculture sector produced 3,438 tonnes of shellfish valued at £4,300,539 and 1069 tonnes of finfish valued at £4,162,999.

The majority of **Scotland's** marine aquaculture sites are located on the north and western coasts. In 2015, marine production was undertaken by 16 businesses farming 254 active sites. Atlantic Salmon dominates finfish production, with 171,722 tonnes produced, compared to 4,678 tonnes of marine produced rainbow trout (Marine Scotland Science, 2016a). Mussels, oysters and scallops are the main shellfish species cultivated, with 7,270 tonnes of mussels produced in 2015 and over 5 million Pacific Oyster shells produced for on-growing (Marine Scotland Science, 2016b).

Aquaculture activity in **Wales** is comprised of (freshwater) finfish production, shellfish and crustaceans. The commercial shellfish aquaculture sector in Wales produces the highest annual tonnage of shellfish of all the UK devolved administrations, with 8996 tonnes of mussel produced in 2012, compared to 5966 in England, 6277 in Scotland and 4783 in Northern Ireland (ABPmer, 2015). The key sites for shellfish aquaculture are located around the Menai Straits in North Wales, plus Swansea Bay and Camarthen Bay in South Wales.

Within **England** (the SIMCelt project area) key shellfish aquaculture sites are located in the north west along the Cumbria coast (oyster and mussels)and in the south west mainly along the south Cornwall and Devon coasts (oysters, mussels and scallops). There are no marine (saltwater) species farmed in these areas (Hambrey and Evans, 2016)

France

Aquaculture is a long-established activity in **France**, with the region of Brittany leading in the production of aquaculture products (approximately 29,200 tons of shellfish was produced in northern Brittany in 2014, with a value of €85.3 million). The main aquaculture products from this region are farmed fish (salmon, bar, turbot, sea bream and sea trout) and shellfish, with mussels being the dominant shellfish species cultivated in north Brittany (oyster cultivation is dominant in the south of the region, whilst, clams and other species are also grown). There is also an increasing demand for seaweed production (*algoculture*) for food consumption and added value products such as health foods and cosmetics, with kombu (kelp) being the main species harvested.

Ireland

In **Ireland** the main marine aquaculture species in terms of production volume are mussels, oysters, Atlantic salmon and trout. Nearly 10,000 tonnes of rope-grown mussels and 6,000 tonnes of seabed cultured mussels were produced in 2016. Galway and Cork were the largest producers of rope mussel whilst Kerry, Louth and Wexford were the largest producers of seabed mussel. 16,300 tonnes of salmon were produced in the same period, largely on the west coast of Ireland in counties such as Cork, Donegal, Mayo and Kerry. Production of oyster occurs at sites all around the coast of Ireland, including Waterford, Donegal and Cork[1].

[1] Figures from Bord Iascaigh Mhara (2017)

INTERNATIONAL/EUROPEAN POLICY

Aquaculture has been described by the Food and Agriculture Organization of the United Nations (UN-FAO) as probably the fastest growing food-producing sector in the world[2]. Fisheries and seafood products are recognised as providing high nutritional value in terms of proteins, fatty acids vitamins and minerals, whilst aquatic plants can provide nutritional benefits, biofuels and cosmetic products. Per capita fish consumption is estimated to have reached about 20 kg in 2014, with aquaculture overtaking capture fisheries as the main source of fish for human consumption for the first time (OECD-UNFAO, 2015). Under different scenarios explored by UN-FAO up to 2022 (UNFAO, 2014), aquaculture production in Europe is likely to grow by between 10% (as a base line) and 28% (being the most optimistic scenario), with consumption per capita also likely to increase by between 8% to 17%.

Blue Growth

Aquaculture forms one of the five pillars of the European Commission's Blue Growth Strategy. Acknowledging that European aquaculture is 'stagnant' relative to the performance of the sector in other parts of the world, the Strategy outlines potential for growth in the sector, by providing more quality merchandise to consumers willing to choose fresh, trustworthy products, increasingly including those that are sustainably or organically produced. This would boost aquaculture businesses, the majority being SMEs, and help coastal communities to diversify their own economies whilst supporting sustainable fisheries. The Strategy notes the lack of space for aquaculture activity as a barrier to development, and proposes that colocation of aquaculture production with other maritime activities such as energy production as an approach that would be beneficial for other users of sea space.

Strategic Guidelines for Aquaculture Development

In 2013 the European Commission published *Strategic Guidelines for the sustainable development of EU aquaculture*. Under reforms to the Common Fisheries Policy, aquaculture is to be promoted through an open method of coordination - a voluntary process for cooperation based on Strategic Guidelines and Multiannual national strategic plans identifying, common objectives and, where possible, indicators to measure progress towards these goals. The Strategic Guidelines concentrate on four priority areas to help unlock the potential of European aquaculture. These are:

- Simplifying administrative procedures;
- Securing sustainable development and growth of aquaculture through; coordinated spatial planning
- Enhancing the competitiveness of EU aquaculture, and;
- Promoting a level playing field for EU operators by exploiting their competitive advantages.

[2] http://www.fao.org/fishery/aquaculture/en

Under the priority of *simplifying administrative procedures,* it is noted that licensing and authorisations for aquaculture development are often lengthy processes and disproportionately burden small enterprises. To reduce the time taken the Commission proposes to work with Member States to map administrative procedures so that bottlenecks, best practices and areas for improvement can be identified.

With regards to *securing sustainable development and growth of aquaculture through coordinated spatial planning,* the Guidelines note the challenge of making space for aquaculture in increasingly congested coastal and marine spaces and the need to comply with existing environmental legislation such as the Marine Strategy Framework Directive, Habitats and Birds Directives. Member States (in anticipation of the MSP Directive) were called upon to develop coordinated spatial planning, including MSP at sea basin level, to ensure that aquaculture's potential and needs are taken into account and to secure an adequate allocation of space in waters and land for sustainable aquaculture development.

Aquaculture Advisory Council

In the framework of the Common Fisheries Policy, an Aquaculture Advisory Council (AAC) was established in 2016. The Council is composed of representatives from industry and other stakeholders. Its purpose will be to provide recommendations and advice to Member States and other European Institutions on issues related to the sustainable development of the aquaculture sector. The AAC has a General Assembly and three Working Groups on finfish, shellfish, and horizontal matters. The Council receives financial assistance from the EU as a body pursuing an aim of general European interest.

Atlantic Strategy and Atlantic Action Plan

The Atlantic Strategy, published in 2011, notes the potential of aquaculture to provide healthy and sustainably produced fish over and above the level of capture fisheries, but that this requires overcoming the challenge of lack of space – by either moving further offshore, or, in future, sharing infrastructure with other sectors such as wind energy. The promotion of MSP is critical to achieving this.

The Atlantic Action Plan emphasises the revitalisation of aquaculture and improving competitiveness of the sector, which is characterised by the prevalence of small to medium sized firms, through a number of approaches. These include:

- Improving skills and education, enabling firms to specialise, innovate and adapt to new technologies;
- Carrying out research to improve the growth, productivity, competitiveness and environmental sustainability of aquaculture (including offshore aquaculture) and the industry's ability to respond to market needs;
- improving the market position of EU-sourced fisheries and aquaculture products by improving processing, labelling, traceability and certification.

NATIONAL POLICY

UK

In line with the requirements of the Common Fisheries Policy, the UK government has set out how it will encourage growth in the aquaculture sector in its Multiannual National Plan for the Development of Sustainable Aquaculture (MANP) which was published in 2015. The MANP responds to the four strategic priority areas in the Commission's *Strategic Guidelines for the sustainable development of EU aquaculture* in the following ways:

- *Simplifying administrative procedures* – for each administration a range of consents relating to the establishment of aquaculture sites, food safety, biosecurity and checks to ensure compliance with EU regulations area required. Each administration will have its own approach to tackling administrative burdens, for example in England the Smarter Environmental Regulation Review aims to eradicate the duplication of regulation by considering problems from a user perspective, presenting all the relevant information and guidance needed to set up an aquaculture business in once place;

- *Securing sustainable development and growth of aquaculture through coordinated spatial planning* – the UK's Marine Policy Statement sets the framework for marine spatial planning in the UK and supports the UK's High Level Marine Objectives (including the promotion of sustainable economic development). At the current time each administration is preparing its own marine plans and are actively incorporating aquaculture production areas within them;

- *Enhancing the competitiveness of EU aquaculture* – through innovation and partnerships to help develop the industry. These will largely be based on existing organisations and networks, such as the Centre for Environment, Fisheries and Aquaculture Science (CEFAS), Marine Alliance for Science and Technology for Scotland (MASTS), the Centre for Sustainable Aquatic Research (CSAR), Seafish and the Ministerial Group for Sustainable Aquaculture plus other scientific, governmental and industry representative groups;

- *Promoting a level playing field for EU operators by exploiting their competitive advantages* – by raising the profile and improving the image of aquaculture through eco-labelling such as Marine Stewardship Council certification, consumers can make informed choices about the sustainability of aquaculture products.

SEVERAL AND REGULATING ORDERS

To encourage the setting up and management of shell fisheries, legal instruments known as Regulating and Several Orders may be used. These Orders apply in England, Wales and Scotland, whilst separate arrangements apply in Northern Ireland

- Several Orders are granted for the setting up or improving of private shellfisheries. They allow legal ownership of certain named species in a private shell fishery, e.g. oysters, mussels and others. General fishing practices may be restricted in areas with Several Orders to prevent disturbance to the farmed species;

- Regulating Orders give the right to manage exploitation of a natural shell fishery. Holders of Regulating Orders can issue licences to others to take shellfish from the designated area, set conditions for licensees and manage the shellfishery.

Several and Regulating Orders are usually time limited to 10-20 years or 20-30 years respectively but can be made for up to 60 years.

THE CROWN ESTATE AND THE CROWN ESTATE SCOTLAND

Seaweed harvesting in areas of Crown foreshore or seabed requires a licence from The Crown Estate (for England, Wales and NI) or The Crown Estate Scotland.

SEAFISH

The Sea Fish Industry Authority (Seafish) is a non-departmental public body established by the 1981 Fisheries Act and sponsored by the four Fisheries Administrations of the UK (Department for Environment, Food and Rural Affairs (Defra), Marine Scotland, Department for Agriculture, Environment and Rural Affairs Northern Ireland (DAERA) and the Welsh Government) to improve efficiency and raise standards across the UK fisheries industry. The work of Seafish is aligned against three high level objectives – promote consumption, enhance reputation and inform decisions.

The activities of Seafish include:

- Research and development;
- Providing advice;
- Promoting marketing and consumption of seafood in the UK and its export;
- providing training or assisting in the provision of training.

THE CENTRE FOR ENVIRONMENT, FISHERIES AND AQUACULTURE SCIENCE (CEFAS)

Cefas is the UK's leading centre for applied marine and freshwater science and has been advising the UK government on marine matters for over 100 years. Cefas is an executive agency sponsored by the Department for Environment, Fisheries and Rural Affairs (Defra). Cefas advises Defra, as well as other public and private sector customers, on issues connected to the aquatic environment, including:

- marine planning and environmental licensing;
- the impacts of climate change and the UK's ability to adapt to it;
- sustainable fisheries management;
- marine biodiversity and habitats;
- fish and shellfish health and hygiene;
- emergency response.

England

To set up an aquaculture production site, consent must be granted by the Fish Health Inspectorate. FHI will ensure that appropriate biosecurity measures are in place. A licence must also be obtained from the Marine Management Organisation. Cefas (the Centre for Environment, Fisheries and Aquaculture Science) and Local Planning Authorities must also be consulted for any new aquaculture site. For seaweed harvesting, a foreshore or seabed licence is required from The Crown Estate.

In 2012 England Aquaculture Plan Consultation group, on behalf of Defra launched a consultation on Planning for sustainable growth in the English Aquaculture Industry.

This consultation document set out a number of recommendations to support the sustainable development of the English aquaculture industry including increased access to finance, developing a strategic framework for aquaculture research relevant to English requirements, streamlining assessment and consenting procedures for coastal and marine aquaculture and ensuring that aquaculture is adequately integrated into the marine planning process to ensure goals for expansion of the sector are taken into account. The results of this consultation were intended to feed into an English Aquaculture Plan, however this has yet to be developed.

Northern Ireland

The Marine and Fisheries division of the Department of Agriculture, Environment and Rural Affairs (DAERA) is responsible for the licensing of fish farms in Northern Ireland under the Fisheries Act (Northern Ireland) 1966. This includes the granting of Fish Culture Licences, Shellfish Fishery Licences and Marine Fish Fishery Licences. Like Several Orders that apply in other administrations of the UK, a Shellfish Fishery Licence grants the holder the exclusive right to cultivate a particular species of shellfish in the licenced area.

In April 2013, the Northern Ireland Agri-Food Strategy Board published the 'Going for Growth' Strategy. The Strategy is aimed at accelerating the growth of farming, fishing/aquaculture and food and drink processing to 2020 and beyond. In terms of aquaculture and fisheries, the Strategy notes that approximately £10 million of aquaculture products were landed in Northern Ireland in 2010. The ambition for the sector (including fisheries and processing) up to 2020, is to grow turnover by 34% to £90 million. To achieve this, the Strategy sets out recommendations including:

- Facilitating access to offshore and coastal sites and fostering opportunities for sustainable aquaculture e.g. by providing access to seed and grow mussels and oysters, and to maximise the opportunities presented by the harvesting of seaweed;
- Identifying EU funding sources that can be used to support the aquaculture sector;
- Recognising aquaculture as an agricultural rather than industrial activity, as this has implications for the planning process and decision making.

Scotland

Fish or seaweed farming requires a Crown Estate Scotland lease, however CES has not statutory functions in relation to fish farming. Planning consent for fish farms is granted by local authorities. Fish farming in marine waters may also require a licence from Marine Scotland and authorisation under the Water Environment (Controlled Activities) (Scotland) Regulations 2005 from the Scottish Environmental Protection Agency.

In 2009 the Scottish Government published A Fresh Start: the Renewed Strategic Framework for Scottish Aquaculture. This set out five key themes for the aquaculture industry, including:

- Healthier fish and shellfish;
- Improved systems for licensing and aquaculture developments;
- Improved containment;
- Better marketing and improved image, and;
- Improved access to finance.

The Aquaculture and Fisheries Act (Scotland) 2013 aims to ensure that farmed and wild fisheries - and their interactions with each other - continue to be managed effectively, maximising their combined contribution to supporting sustainable economic growth with due regard to the wider marine environment. This includes making provisions for controlling the movement of commercially damaging species.

A Scottish Ministerial Group for Sustainable Aquaculture (MGSA) was established in 2013 to support a sustainable industry and help it achieve growth targets. The MGSA is chaired by the Minister of Environment, Climate Change and Land Reform with representation from industry, wild fish interests, environment NGOs, Local Authority Planners, the enterprise network, The Crown Estate and regulatory bodies; and progressed through time-limited project-based working groups, for example on technical standards for finfish aquaculture, defining an aquaculture research strategy and farmed fish health and welfare.

Scotland's National Marine Plan sets out ambitious objectives for the sector to become *an aquaculture industry that is sustainable, diverse, competitive economically viable and which contributes to food security whilst minimising environmental impact.* The Marine Plan also *provides support for the industry's target to grow marine finfish (including farmed Atlantic salmon) production sustainably to 210,000 tonnes; and shellfish, particularly mussels, to 13,000 tonnes sustainably by 2020.*

Policies to achieve this include:

- Identifying appropriate locations for future aquaculture development and use, taking carrying capacity of the environment into account;
- Identification of areas by terrestrial and marine planners that may be sensitive and unsuitable for development.

In addition, National Marine Plan policies support the diversification of farmed species (subject to other conditions and policies being met) and the need for Government, aquaculture companies and Local Authorities to work together to maximise benefit to communities from aquaculture.

Wales

The regulation of aquaculture is a devolved matter to the Welsh Government, who have delegated the operation of marine licensing to Natural Resources Wales through the Marine Licensing (Delegation of Functions) (Wales) Order 2013. Authorisation is required from the Fish Health Inspectorate to set up a fish, shellfish or crustacean farm and a seabed lease from The Crown Estate may also be needed. Natural Resources Wales regulate development of any associated infrastructure.

In 2013 the Welsh Government published the Wales Marine and Fisheries Strategic Action Plan. This set out the Government's commitment to grow the aquaculture sector's output from 1,000 to 2,000 tonnes of finfish and 8,000 to 16,000 tonnes of shellfish by 2020. Initiatives contained within the Plan to support marine and fisheries management included:

- Drawing down funding from the European Marine and Fisheries Fund (EMFF) to support 'Smart Green' aquaculture. i.e. developing practices that are less damaging to the environment and help build resilience to external factors such as disease of marine species;
- Simplifying and harmonising regulation for cockle, crustacean and sea Bass fisheries;

- Developing capacity building, innovation and partnerships between operators and scientific bodies to support sustainable aquaculture.

In 2015 the Welsh Government commissioned ABPmer to undertake a Spatial Assessment of the Potential for Aquaculture in Welsh Waters. This report gave an analysis of the opportunities and threats faced by the aquaculture industry in Wales. The report found that:

- There is potential for expansion of shellfish aquaculture, though this may be constrained within inshore areas. Opportunities further offshore may depend on the feasibility of using existing rope growing techniques in more exposed conditions;
- Macroalgal production is possible, but further investigation into demand for this type of product is required if demand for it;
- Potential sites for crustacean aquaculture were identified, but major constraints relate to the viability of hatchery production and containing stock within a given area;
- Large areas have potential for finfish aquaculture, however competition from Scottish salmon farming suggests that alternative species should be cultivated. This would require further detailed investigation of environmental conditions before any production takes place.

This report also fed into the identification of Strategic Resource Areas for aquaculture in the Draft Welsh National Marine Plan (2017). The Draft Plan reinforces the Welsh Government's commitment to double aquaculture production by 2020, and calls on organisations such as the Welsh Government, The Crown Estate, industry and Natural Resources Wales to collaborate to support opportunities to develop the sector, including utilising resources away from less sensitive areas. Aquaculture proposals are particularly encouraged where they can demonstrate that they are within Strategic Resource Areas, or make use of existing or planned fixed structures such as renewable energy developments, thereby optimising use of marine space.

France

In France the Directorate of Marine Fisheries and Aquaculture (DPMA), part of the Ministry of Agriculture and Food is responsible for developing and implementing policy relating to marine fisheries, seafood and aquaculture and the control and regulation of these sectors. The DPMA is also responsible for overseeing the monitoring and supervision of aquaculture and fisheries activities and oversees the work of Agrimer, France's national agriculture and sea products organisation, which provides a place for exchange between industry and public authorities. Many of DPMA's services have been decentralised to the Interregional Departments of the Sea (DIRM).

The establishment of aquaculture activities in the maritime public domain requires a *concession*. Applications must be addressed to the Departmental Directions of Territories and Sea (*Directions Départementales des Territories et de la Mer*), which are local authorities attached to the Ministry of Ecological and Solidarity Transition. Depending on the cost, size or location of the project, the procedure may involve a public enquiry. Consultation may take place with relevant local authorities. The final opinion is given by the local Commission for Marine Aquaculture (*Commission des cultures marines*), which is vested with administrative and regulatory powers. The concession is then issued by the Préfet of the Department and commissioner of the Republic of the relevant department (FAO, 2014). In some cases, additional permissions may be required for the operation of vessels servicing larger aquaculture sites. The duration of a concession must not exceed thirty-five years and may be renewed, amended, transferred, suspended or revoked.

Marine Fisheries and Aquaculture Committees are part of the National Committee for Marine Fisheries and Marine Farming (CNPMEM), governed by Article 88 of the Modernisation of Agriculture and Fisheries Act. CNPMEM's role involves the promotion of sustainable fisheries, environmental protection, implementing public policy, and representing its members from the fisheries sector. Marine Fisheries and Aquaculture Committees are organised at national, regional and sometimes (inter-) departmental level.

The *Comité Nationale de la Conchyliculture* (National Committee for Shellfish Farming), governed by Article L.912-6 of the Code rural and Fisheries has a number of responsibilities that are carried out through its Regional Committees. There are seven regional committees around the coast of France, with the Bretagne Nord Committee covering the SIMCelt project area. Neighbouring committees are Normandie Mer du Nord to the north east and Bretagne Sud. Regional Committees undertake work including:

- Study and making recommendations on methods of aquaculture production;
- Adaptation of products to the needs of the market and promotion of shellfish products;
- Enabling collective actions to promote the practice of shellfish farming and improving productivity such as marking, access and channel maintenance, control of disease;
- Protecting and improving shellfish waters;
- Taking a consultative role with public authorities in matters of fisheries management and regulation;
- Measures to improve training and employment in the sector.

The Modernisation of Agriculture and Fisheries Act of 2010 makes provision for regional aquaculture development schemes (SDRAM), in order to identify existing and new sites for the development of the sector. Areas identified as 'conducive to the development of aquaculture' should be discussed in consultation with local stakeholders, fisheries committees and the Interregional Directorate of the Sea (for the part of France within the SIMCelt project area, this is *la Direction Interrégionale de la Mer Nord Atlantique – Manche Ouest (DIRM-NAMO).* This process has been highlighted as a 'best practice' in aquaculture that has been incorporated into the Multiannual National Plan.

France's Multiannual National Plan for the Development of Sustainable Aquaculture (2014-2020) sets ambitious national growth objectives for aquaculture, with the ambition to increase volume of production from 218,000 tonnes to 265,000 tonnes in 2020. However this is dependent on external factors such as oyster mortality, which was badly affected by viral infection during 2008-2014 with regards to fish farming, the Plan seeks to increase marine fish farming by 233% in volume during the same period. Simplifying administrative procedures, coordinated spatial planning, enhanced competitiveness through added value products, improved traceability, and increasing the attractiveness of employment in the aquaculture sector are all proposed to develop the sector.

The French Stratégie Nationale Mer et Littoral (national strategy for the marine and coast) published in 2017 makes particular mention of aquaculture with regards to :

- Priority Action 14 for sustainable resource management, and supporting a reduction of dependency on food imports;
- The creation of maritime spatial plans that provide favourable conditions for the development of aquaculture;

- Future developments in blue biotechnology, with seaweed and algae being important contributors to new pharmaceutical and cosmetic products;
- Identifying new synergies between tourism, fisheries and the aquaculture sectors to develop more sustainable tourism- the subject of ongoing study.

Ireland

Aquaculture licensing is administered through the Aquaculture and Foreshore Management Division of the Department of Agriculture, Food and the Marine. The Division also processes companion foreshore licences required for coastal aquaculture operations.

Bord Iascaigh Mhara is Ireland's seafood development agency. Its mission is to grow a thriving Irish seafood industry; expand the raw material base, add value and develop efficient supply chains that deliver on the Government's Food Harvest 2020 targets for seafood and create sustainable jobs.

The Marine Institute is Ireland's State agency responsible for marine science. The Institute provides a range of scientific advice services to the Department of Agriculture, Food and the Marine concerning aquaculture.

The Food Harvest 2020 (FH2020) Strategy was published by the then Department of Agriculture, Fisheries and Food in July 2010. This strategy, which was primarily industry-led, set the direction of agri-food, forestry and seafood for the next decade. Recommendations for aquaculture sector related to competitiveness, marketing and management issues, including:

- Resolving perceived problems related to environmental protection, to allow licences to be processed in a more timely manner;
- Cooperation between the Marine Institute and Bord Iscaigh Mhara to develop inshore and offshore aquaculture and alternative species on a commercial scale;
- The industry should continue to adopt sustainable production methods.

Following on from Food Harvest 2020 DAFM published Food Wise 2025, the Report of the 2025 Agri Food Strategy Committee. This noted that rising global demand for seafood and the high dependence of European countries on seafood imports. Within Ireland, challenges facing the sector include:

- Capacity limits in aquaculture production;
- Scale, fragmentation, leadership and management skills deficits within seafood processing;
- Emphasis on commodity product rather than value added product.

Key recommendations included:

- The commissioning of an independent review of the aquaculture licensing system to identify the shortcomings and bottlenecks and to implement necessary changes to the aquaculture licensing system as a matter of priority;
- Develop a strategy to expand shellfish and aquaculture production taking account of the carrying capacity of bays.

These challenges are addressed in Ireland's National Strategic Plan for Sustainable Aquaculture Development (Multi-Annual National Plan), which was published in 2015. This Plan targeted volume growth of 45,000 by 2023 (=122%) and listed a series of actions to bolster the aquaculture sector including:

- Review of the Aquaculture licensing process and associated legal framework;
- Optimisation of existing licenced capacity for aquaculture, by identifying underutilised sites and exploring opportunities to re-sell or sub-let to other operators;
- Apply 'Guiding Principles' for the sustainable development of aquaculture that have been recommended by the Marine Institute (responsible planning, ecosystem protection, a science based approach, openness, transparency and accountability and industry best practice) and scale limits ad phasing for offshore salmon farms;
- Support through the EMFF Operational Programme 2014-2020 funded by the Exchequer and EMFF to build capacity and scale, scientific and organisational knowledge in aquaculture farms and enhance the skills base;
- Development of new aquaculture species and improved products.

In addition to these actions, the Strategy recognises the need to have aquaculture that is "incorporated into an effective and equitable marine spatial planning system" (p84). To do this, aquaculture's future spatial needs must be taken into consideration in marine plans. The strategy proposes to undertake an opportunities and constraints mapping exercise to understand the economic, social and environmental constraints that may influence the location and type of future aquaculture activities.

On 31 May 2017, the report of an Independent Review of the Aquaculture Licensing Process and Associated Legal Framework was published by the Department of Agriculture Food and Marine, with a number of recommendations, including:

- Revision of the legal framework;
- Introduction of a formalised pre-application process;
- Extensive use of information technology and web-based systems;
- Additional technical expertise, streaming of processes, and additional guidelines.

Isle of Man

Aquaculture is regulated under the Isle of Man Fisheries Act 2012. For anyone wishing to undertake aquaculture on the foreshore, sea bed or in the sea must apply to the Department of Infrastructure for a licence. At present there are no licenced marine aquaculture sites on the Isle of Man.

INTERACTIONS WITH OTHER SECTORS AND THE ENVIRONMENT

As Europe seeks to increase aquaculture production, this will bring with it a number of benefits to the sector itself along with a range of wider socio-economic and environmental impacts. These include:

- Contribution to security of food supplies;
- Providing economic and social benefits to local communities through increased employment and associated value chains such as processing, distribution and maintenance of equipment (e.g. boats);
- Increase in aquaculture production and supply of products can lead to lower prices which benefit consumers;
- Increasing demand for fishmeal to support the farming of larger fish species requires more intensive fishing and use of smaller fish species. By-products of aquaculture and fisheries processing for human consumption are increasingly being recycled for use as feed (Gamble, 2012).

Environmental impacts (both positive and negative) of aquaculture may include:

- Farming of certain species reduces pressure on wild populations;
- Overstocking (e.g. of bivalve species) may lead to local food shortages (Department of Agriculture, Food and the Marine, 2015);
- Introduction of non-native species;
- Disease may spread quickly through dense populations of farmed species, impacting on local wild fish populations. Conversely, the proximity of wild fish to aquaculture may introduce disease to farmed areas (Gamble, 2012);
- Changes in water quality, such as increased inputs of antibiotics, nutrients and organic material. These have the potential to build up around fish cages and cause algal blooms (Gamble, 2012);
- Physical loss of habitats where cages, poles, ropes and other equipment are used.

The compatibility of aquaculture with other sectors may also bring new opportunities and benefits. For example:

- Potential for marine tourism opportunities and increasing public knowledge of sustainable seafood, e.g. seafood festivals and organised tours of mussel and salmon farms;
- Restocking of certain species may provide a boost to recreational angling.

Additional opportunities for developing synergies between aquaculture and other sectors are considered as Drivers for Change in the section below.

DRIVERS FOR CHANGE

The following have been identified as potential drivers of change in the marine aquaculture sector.

SOCIO-POLITICAL

- More efficient licensing processes to enable faster establishment of aquaculture sites;
- Demographic changes and out-migration of younger people from coastal communities may threaten the continuity of aquaculture production in some places;
- Lack of suitable sites for aquaculture in some areas may act as a barrier to growth. Moving aquaculture to sites further offshore could offer a solution to this but these require further investment in infrastructure and technology, plus there is an increased risk associated with operating in more exposed conditions.

ECONOMIC

- Pre-selection of aquaculture areas (e.g. through sectoral plans or marine plans) can reduce cost for companies in terms of site identification, Environmental Impact Assessments etc. This can lead to increased investments in sites;
- Continued financial support from the European Union and other institutions will help to deliver new operations or help established businesses adapt to new markets and technologies;
- Increasing consumer demand for high quality seafood products.

ENVIRONMENTAL

- Improvement of water quality through successful implementation of the Water Framework Directive and Marine Strategy Framework Directive to support production of the highest quality shellfish (Agri-Food Strategy Board, 2013); [3]
- The Welsh National Marine Plan Initial Draft (Welsh Government, 2015) identifies potential impacts of climate change on aquaculture, including changes to the general conditions under which aquaculture species grow, such as seawater temperature, plus changes in rainfall and run-off leading to increased turbidity and nutrient loading;
- Threats to aquaculture species such as disease, parasites and algal blooms.

TECHNOLOGICAL

- Development of integrated multi-trophic aquaculture (IMTA), or polyculture, where different species such as shellfish, seaweed and fish are cultivated together to enable the recycling of nutrients through the food chain (Science for Environment Policy, 2015);
- Development of Multi-Use Platforms (MUPS) that allow co-location of aquaculture and offshore energy generation.

[3] Agri-Food Strategy Board (2013) *Going for Growth*, p64

KEY MSP AND TRANSBOUNDARY ISSUES

At this stage in aquaculture development most sites operate within a relatively small strip of the coastal zone which do not have significant implications for transboundary governance and cooperation. However, as the sector continues to grow the following issues may arise:

- As aquaculture grows, more space will need to be allocated to sites that are suitable for aquaculture production. This may lead to conflict with other coastal users and potentially also zones for conservation such as Natura 2000 sites, SPAs and SACs. Moving sites further offshore and activities associated with this (e.g. more boating to reach cages, installation of partially equipment) may lead to conflicts with different users. Early stakeholder engagement in planning for new aquaculture sites will be necessary to reduce conflict;
- Ensuring biosecurity of aquaculture species in situ and during movement of species from sites such as hatcheries and cages will continue to be an important feature of aquaculture regulation.

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