

EXTRA-SMEs A1.2: Analysis of new products and processes'  
potential to improve EXTRA-SMEs internationalization and  
extraversion

# Report on regional conditions and trends for new product development

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## Executive summary

This document is the final output of EXTRA-SMEs Activity 1.2 “Identifying new products and processes’ potential to improve EXTRA-SMEs internationalisation and extraversion”. The purpose of this activity is to identify a) opportunities for developing new products and processes for businesses active in EXTRA-SMEs’ territories aquaculture sector, as well as b) their potential to improve their internationalisation and extraversion.

The main source of data for this activity was a questionnaire survey, conducted by using two structured questionnaires addressed to respondents belonging to two distinct categories: representatives of aquaculture SMEs and institutional stakeholders. The survey data provide insights on experience-based views with regards to aquaculture SMEs’ expansion areas.

The key findings and conclusions drawn from the survey conducted with aquaculture SMEs and institutional stakeholder representatives include the following:

- Results have underlined the recognition of the existence of new expansion opportunities in their industry by the majority of SME respondents.
- The expansion areas identified during the initial desk research appear to correspond to the needs of the entire aquaculture value chain.
- There is a need for synergies within the aquaculture sector and between the sector’s enterprises and other stakeholders. Such synergies would improve the industry’s growth thus boosting its extraversion.
- Finally, it has been pointed out that measures regarding the administrative procedures pertaining to aquaculture are imperative for boosting the sector’s growth and consequently its extraversion.

## 1 About the EXTRA SMEs Project

The EXTRA-SMEs project primarily aims to achieve the expansion of rural and coastal aquaculture SMEs in wider markets for the promotion of their products, through simpler and improved administrative processes, and innovative technologies, by supporting public authorities and assist them to join forces and exchange experiences in order to a) simplify administration, b) expand in new markets, c) introduce innovative value-added product solutions, d) up-skill personnel and e) contribute to resolving conflicts between stakeholder groups.

### 1.1 Project objectives

EXTRA-SMEs project's overall goal is to improve the implementation of participating regions' policy instruments related to the SME competitiveness across the value chain of coastal and rural regional economies with a strong aquaculture component. The project aims to identify and promote experiences and practices for simpler, improved administrative processes, internationalisation and expansion to broader markets, as well as engaging in innovation processes that will act as drivers for the creation of jobs.

EXTRA SMEs aims at:

- Increasing the capacity of regional authorities to effectively implement policies on SMEs entrepreneurial development, internationalisation, and extraversion;
- Identifying innovation pathways and raising awareness on the benefits of modernisation of the aquaculture SMEs value chain; and
- Incentivising investments, outwards-looking entrepreneurship, addressing limited access to finance, lack of knowledge, and inability to expand in wider markets.

### 1.2 Project partners

The EXTRA SMEs consortium brings together the following 9 partners from 8 regions in 7 different EU countries.

Table 1: Project partners

N°	Country	Partner
1	 GR	Region of Peloponnese (REGPEL)
2	 IT	Liguria Region (LIGURIA)
3	 PL	Northern Chamber of Commerce in Szczecin (NCC)
4	 RO	Bucharest-Ilfov Regional Development Agency (ADR-BI)
5	 FI	Lapland University of Applied Sciences (Lapland UAS)
6	 GR	University of Patras (UPAT)
7	 IE	Western Development Commission (WDC)
8	 IT	Liguria Cluster for Marine Technologies (DLTM)
9	 LT	Public institution National regions development agency (NRDA)

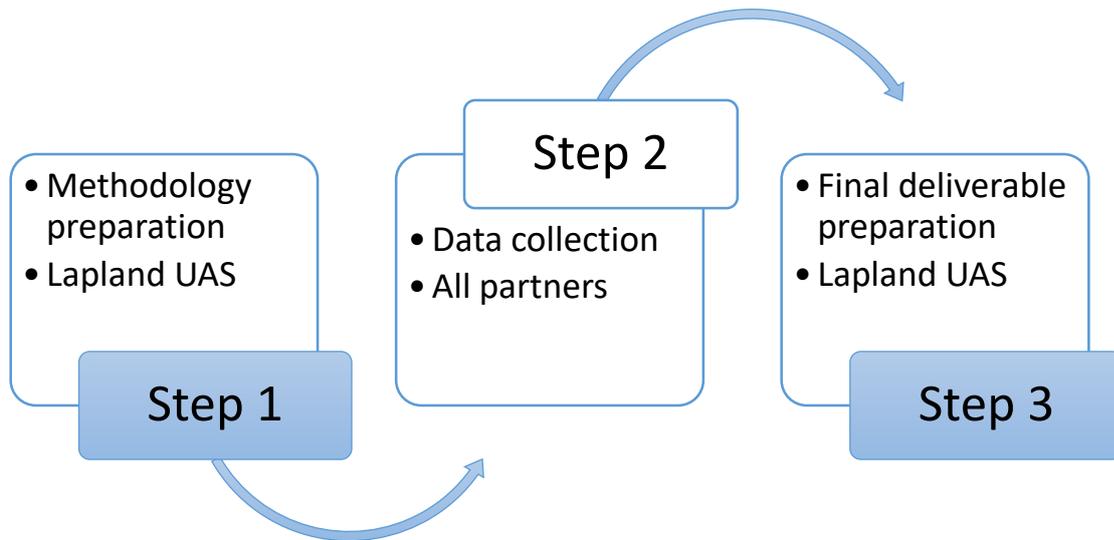
### 1.3 Project Activity A1.2

The EXTRA SMEs Activity 1.2 “Identifying new products and processes’ potential to improve EXTRA-SMEs internationalisation and extraversion” entails the identification of new SMEs expansion areas, taking into account regional conditions, attributes and priorities of the EXTRA SMEs partners’ territories. Indicative areas of expansion include a) the development of new product forms; b) the integration of standardised production procedures; and c) the identification of new markets.

As leader of the EXTRA SMEs A1.2, Lapland University of Applied Sciences, upon providing guidelines and methodological tools for the identification of new expansion areas, has coordinated, gathered, and examined partners’ contributions, alongside project results and carried out a synthesis and analysis on new opportunities and areas for expansion in new products and processes in the

aquaculture sector in the EXTRA SMEs regions which will correspondingly feed the development of the action plans.

Figure 1: Activity A1.2 Work plan



The results of activity A1.2 will be integrated into policy briefs on lessons learned (in activity A4.2) and will be further capitalised by adding to an input paper for the facilitation of planning a number of experience exchange visits (in activity A3.5).

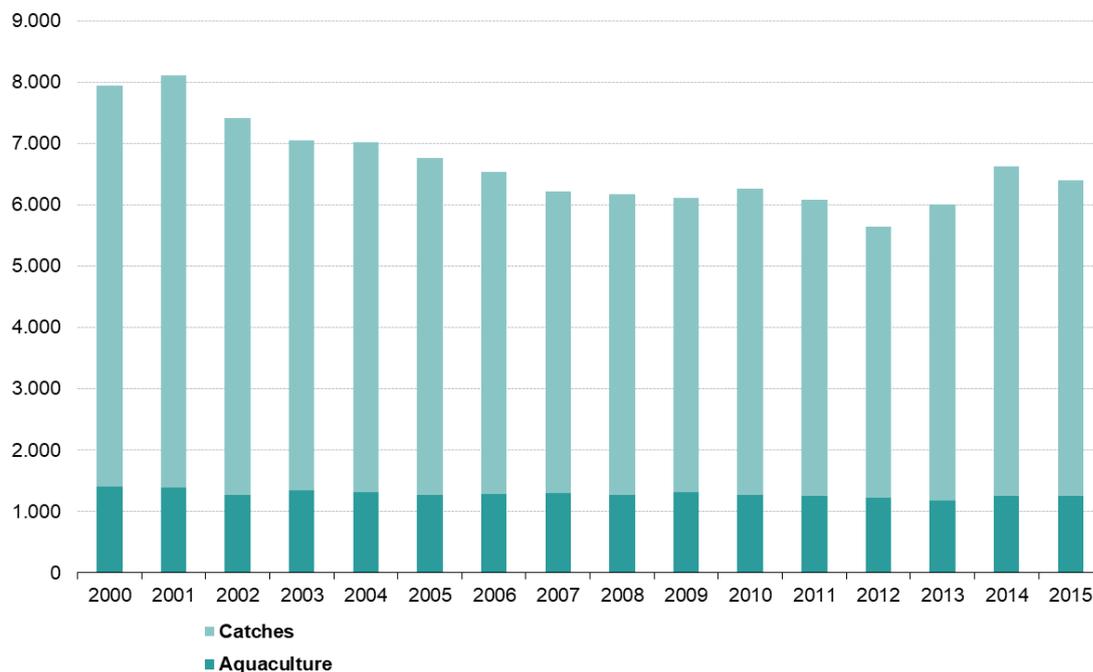
## 2 Background Information and Key Concepts

Worldwide, aquaculture is growing rapidly, and is expected to overtake capture fishing just as animal husbandry once replaced hunting. This strong trend presents a significant opportunity for development, and a challenge for increasing competitiveness in an environmentally and economically sustainable way.

### 2.1 An Overview of the EU Aquaculture Production

The aquaculture production in EU28 has increased by 15% since the 1990's. After 2000 the EU's aquaculture sector appears to have reached a plateau (see Figure 2), yet, as the EU capture fisheries production has been decreasing, aquaculture has increased its share over the seafood market (STECF, 2016). The European Maritime and Fisheries Fund (EMFF) considers sustainable aquaculture development as one of its main priorities of and for the 2014-2020 period, roughly 20% of its funding is planned to be invested in the aquaculture sector<sup>1</sup>.

Figure 2: Evolution of total production of fishery products, EU-28, 2000-2015<sup>2</sup>



Source: Eurostat<sup>3</sup>

<sup>1</sup> See [https://ec.europa.eu/fisheries/cfp/aquaculture/funding\\_en](https://ec.europa.eu/fisheries/cfp/aquaculture/funding_en)

<sup>2</sup> (1 000 tonnes live weight)

<sup>3</sup> (fish\_ca\_main), (fish\_aq\_q) and (fish\_aq2a)

In 2015 EU aquaculture represented 1.2% of the worldwide aquaculture production. In 2015 the value of aquaculture production amounted to EUR 4 billion and its volume was estimated at 1.3 million tonnes<sup>4</sup>. Five countries<sup>5</sup> were responsible for nearly three quarters of the EU28 aquaculture production in both volume and value during the same year. Italy and Greece were among the major producers representing 11.8 % and 8.4 % of the EU aquaculture production in terms of volume and 10.6 % and 11.2 % in terms of economic value correspondingly.<sup>6</sup>

**Table 2: Aquaculture production by weight and by value, 2015**

Country	Aquaculture production weight (TLW)	Share of aquaculture in total fisheries (%)	Aquaculture production value (EUR million)
 EU 28	1.259.833	19,7	4.128,4
 GR	105.934	62,2	463,4
 IT	148.139	43,6	437,2
 IE	37.581	13,8	136,5
 PL	33.560	15,2	86,6
 FI	14.879	8,8	49,4
 RO	11.016	69,5	21,8
 LT	4.083	5,3	9,3

Source: Eurostat<sup>7</sup>

Aquaculture is the rearing of aquatic (freshwater or saltwater) animals or the cultivation of aquatic (freshwater or saltwater) plants under controlled conditions. According to Regulation (EC) No

<sup>4</sup> See: [https://ec.europa.eu/eurostat/statistics-explained/index.php/Aquaculture\\_statistics](https://ec.europa.eu/eurostat/statistics-explained/index.php/Aquaculture_statistics)

<sup>5</sup> Spain, the United Kingdom, France, Greece and Italy.

<sup>6</sup> See: [https://ec.europa.eu/eurostat/statistics-explained/index.php/Aquaculture\\_statistics](https://ec.europa.eu/eurostat/statistics-explained/index.php/Aquaculture_statistics)

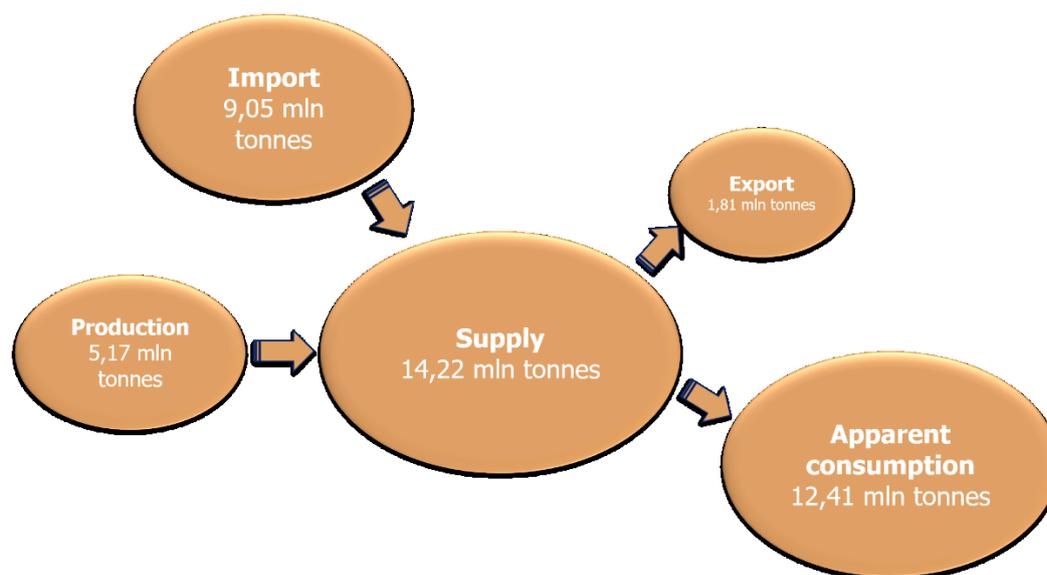
<sup>7</sup> (fish\_ca\_main), (fish\_aq\_q) and (fish\_aq2a)

762/2008, aquaculture production refers to the output from aquaculture at first sale intended for human consumption, thus non-commercial aquaculture, aquaculture production of aquarium and ornamental species and production for industrial, functional or research purposes are excluded and not accounted for. In 2014, finfish and molluscs constituted 98.2 % of the EU aquaculture production (by weight) while the production of crustaceans, algae and other organisms remained small. Over 130 species were farmed in the EU in 2014, yet the 10 most common species made up 90 % of production and 87 % of value of the aquaculture sector. <sup>8</sup>

## 2.2 Overview Imports, Exports and Consumption at the EU level

According to the European Market Observatory for Fisheries and Aquaculture Products (EUMOFA), based on 2016 data, the EU is a significant market for fish and seafood on a global level as its apparent consumption reached 12,41 million tonnes, corresponding to approximately 24 kg per capita, yet consumption varies greatly across the EU, from 57,0 kg per capita in Portugal to 5,2 kg per capita in Hungary. <sup>9</sup>

Figure 3: EU fish and seafood supply, production, imports, exports and apparent consumption (2016)



Source: EUMOFA<sup>10</sup>

Overall fish consumption in the EU has grown significantly over the years, yet this increase is mainly based on imports as the production by capture and aquaculture remains stable or declines (Bostock

<sup>8</sup> See: [https://ec.europa.eu/eurostat/statistics-explained/index.php/Aquaculture\\_statistics](https://ec.europa.eu/eurostat/statistics-explained/index.php/Aquaculture_statistics)

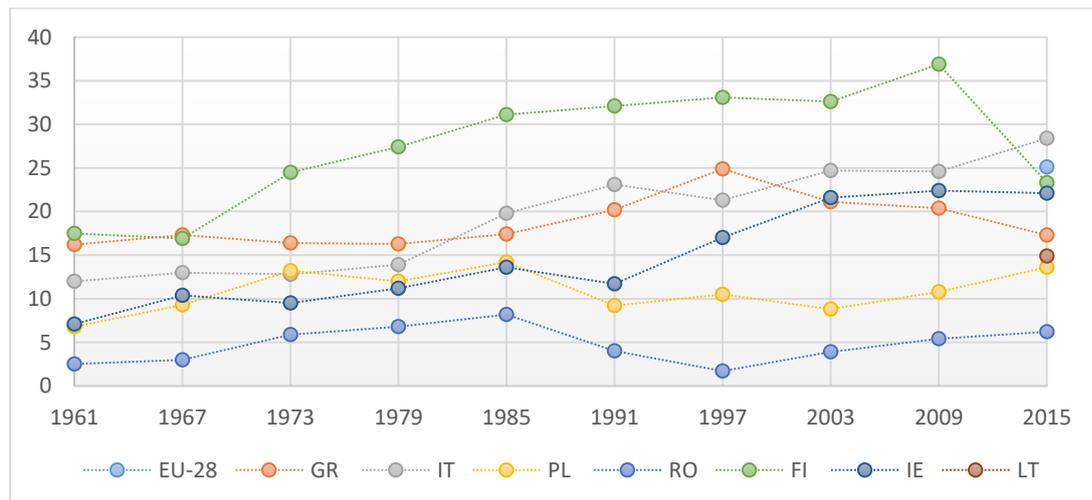
<sup>9</sup> See: <http://www.eumofa.eu/the-eu-market#euFishMarket>

<sup>10</sup> The Graph is available at: <http://www.eumofa.eu/the-eu-market#euFishMarket>

et al., 2009)<sup>11</sup>. During 2016 imports exceeded 9 million tonnes, constituting approximately 60% of the EU total supply. Exports on the other hand reached 1,81 million tonnes.

With regards to the consumers' views on fishery and aquaculture products 34 % of the EU consumers prefer wild products, 8 % prefer farmed products, and 31 % have no preference, while 11 % say it depends on the type of product. Sea water products appear to be more popular than fresh water products, with 39 % and 7 % of favourable opinions correspondingly, yet 35 % of the respondents claimed they have no preference, while 11 % stated it depends on the type of product. Some of the factors influencing consumers purchase decisions include Product's appearance (58 %), cost (55 %), origin of the product (42 %), brand or quality label (24 %), being easy and quick to prepare (21 %) and environmental, social or ethical impact (15%).<sup>12</sup>

Figure 4: Development of consumption of fisheries and aquaculture products in selected EU countries in kg/inhabitant/year



Source:

FAO, Eurostat and EUMOFA<sup>13</sup>

### 2.3 SMEs in the aquaculture sector

Small and medium-sized enterprises (SMEs) are considered the backbone of Europe's economy as they represent 99% of all businesses across the EU. The European Commission considers SMEs and

<sup>11</sup> See also Directorate-General for Internal Policies of the Union, 2016 and Figures 2-4.

<sup>12</sup> See: [https://ec.europa.eu/fisheries/sites/fisheries/files/docs/publications/2017-fishery-and-aquaculture-products-overview-consumer-habits\\_en.pdf](https://ec.europa.eu/fisheries/sites/fisheries/files/docs/publications/2017-fishery-and-aquaculture-products-overview-consumer-habits_en.pdf)

<sup>13</sup> Available at:

[https://ec.europa.eu/maritimeaffairs/atlas/maritime\\_atlas/#lang=EN;p=w;bkgd=5;theme=34:0.8;c=2462182.7607192323,5447091.007273452;z=3](https://ec.europa.eu/maritimeaffairs/atlas/maritime_atlas/#lang=EN;p=w;bkgd=5;theme=34:0.8;c=2462182.7607192323,5447091.007273452;z=3) (1961-2009) & [https://ec.europa.eu/fisheries/6-consumption\\_en](https://ec.europa.eu/fisheries/6-consumption_en) (2015).

entrepreneurship as key to ensuring economic growth, innovation, job creation, and social integration in the EU<sup>14</sup>.

Small and medium-sized enterprises (SMEs) are defined in the EU recommendation 2003/361. The main factors determining whether an enterprise is an SME are a) the staff headcount and b) either the turnover or balance sheet total. According to the European Commission, the category of small and medium-sized enterprises (SMEs) is made up of enterprises, which employ fewer than 250 persons and which have an annual turnover not exceeding EUR 50 million, and/or an annual balance sheet total not exceeding EUR 43 million. Within the SME division, a small enterprise is defined as an enterprise, which employs fewer than 50 persons and whose annual turnover and/or annual balance sheet total does not exceed EUR 10 million. Respectively, a micro enterprise is defined as an enterprise, which employs fewer than 10 persons and whose annual turnover and/or annual balance sheet total does not exceed EUR 2 million. Ceilings apply to the figures for individual firms only. A firm that is part of a larger group include staff headcount/turnover/balance sheet data from that group too.

**Table 3: SMEs categorisation**

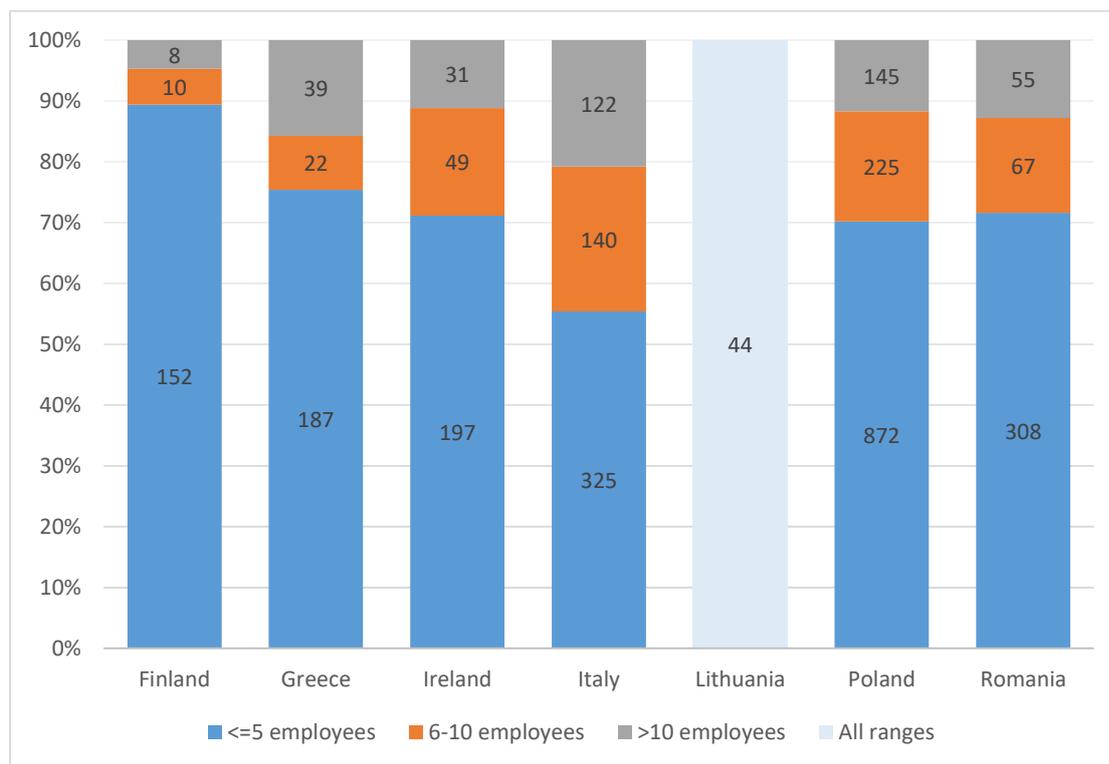
<b>Company category</b>	<b>Staff headcount</b>	<b>Turnover</b>	<b>Balance sheet total</b>
Medium-sized	< 250	≤ € 50 m	≤ € 43 m
Small	< 50	≤ € 10 m	≤ € 10 m
Micro	< 10	≤ € 2 m	≤ € 2 m

The Scientific, Technical and Economic Committee for Fisheries (STECF, 2016) estimates there are between 14,000 and 15,000 aquaculture enterprises in the EU28 and their vast majority (almost 90%) are micro-enterprises, employing less than 10 employees. The number of aquaculture enterprises by range of employees in EXTRA SMEs Countries is presented in Figure 5<sup>15</sup>.

<sup>14</sup> See: [http://ec.europa.eu/growth/smes/business-friendly-environment/sme-definition\\_en](http://ec.europa.eu/growth/smes/business-friendly-environment/sme-definition_en)

<sup>15</sup> With the exception of Lithuania where the range of employees is not specified.

Figure 5: Aquaculture Enterprises<sup>16</sup> in EXTRA SMEs Countries by Range of Employees, 2014



Source: EU Member States DCF data submission<sup>17</sup>

## 2.4 Aquaculture value chain

The aquaculture value chain<sup>18</sup>, as presented in Figure 6, is formed by five classes of businesses offering both products and services.

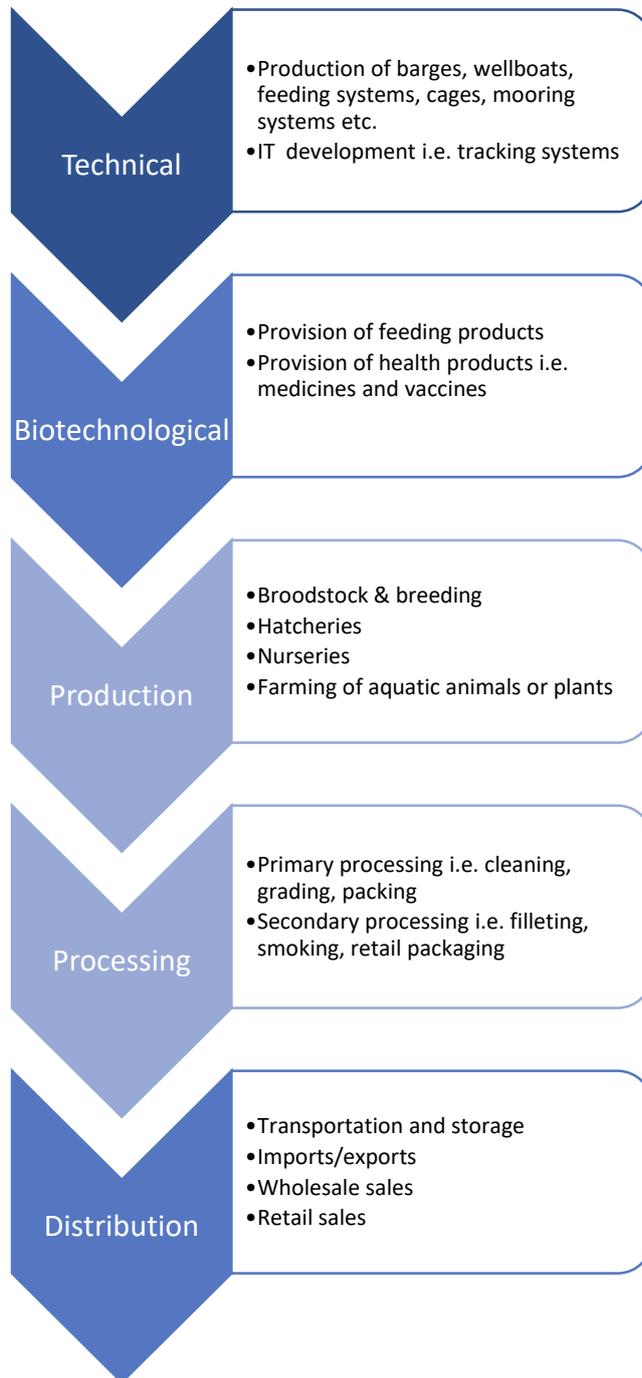
The aquaculture enterprises, whose primary activity is the operation of fish hatcheries and fish farms, are positioned in the middle of the value chain. Enterprises offering technical or biotechnological products and services such as the production and maintenance of feeding systems or cages, the development of tracking systems as well as the provision of feeding and health products and businesses involved in the processing and distribution of aquaculture products are also an integral part of the value chain.

<sup>16</sup> The population refers to enterprises whose primary activity is defined according to the EUROSTAT definition under NACE Code 05.02: Operation of fish hatcheries and fish farms.

<sup>17</sup> In STECF, 2016.

<sup>18</sup> For instance see: [https://www.ey.com/Publication/vwLUAssets/EY\\_-\\_The\\_Norwegian\\_Aquaculture\\_Analysis\\_2017/\\$FILE/EY-Norwegian-Aquaculture-Analysis-2017.pdf](https://www.ey.com/Publication/vwLUAssets/EY_-_The_Norwegian_Aquaculture_Analysis_2017/$FILE/EY-Norwegian-Aquaculture-Analysis-2017.pdf)

Figure 6: The aquaculture value chain



### 3 Areas of Expansion

Improving competitiveness and extraversion in the aquaculture sector requires support and planning throughout the value chain, as many actors are involved in relevant economic activities at regional level. Furthermore, EU SMEs face international competition from world's regions where industry is subject to lower regulatory requirements. On the other hand, such requirements are at the heart of high-quality production of EU aquaculture and can be the basis of a competitive advantage.

#### 3.1 Approaches for the Internationalisation of SMEs

SMEs' internationalization has been an object of research from various viewpoint. Admittedly "there is not one single path to internationalization". Yener et al. (2014) identify two major approaches explain how firms internationalize: gradual internationalization of firms, mainly represented by the Uppsala models, and rapid internationalization of firms, mainly represented by the Born Global model. The two models present differences with regards to the size of the internationalising businesses, their ways of entry into new markets and the strategies employed over the internationalisation process. Gradual internationalisation is clearly more pertinent in the context of EXTRA-SMEs project.

The initial Uppsala model was developed as a response to previous studies not taking into consideration cultural differences between home and target markets, lack of knowledge on the desires and processes, valid legal issues, and other market specific information of the target markets, and the internal capabilities a firm needs in order to handle its business profitably in the international markets, such as human resources, organizational and financial resources (Yener et al., 2014). The model was considered "the pioneer model in the interpretation of the internationalizing phenomenon as a process of gradual development over time" emphasising on the progressive nature of knowledge obtained through a sequence of steps which mirror a growing commitment to foreign markets (Rialp & Rialp, 2015).

Both Uppsala models regard internationalisation as a gradual step by step process where the internationalising business seeks risk management. The initial Uppsala model offers an internal view of the capabilities and progressive steps of a business towards internationalisation, receiving criticism for ignoring external factors. The revised Uppsala model (Johanson & Vahlne, 2009) offers a network view, focusing on external aspects. The '77 model viewed the lack of foreign market knowledge as a

major constrain for rapid business internationalisation while the '09 model introduced the significance of networking amongst businesses for the internationalisation process (Yener et al., 2014).

Rialp and Rialp (2015) outline the theoretical evolution in this field of internationalisation as encompassing: (1) the analysis of transaction cost and structural market imperfections in the context of FDI; (2) the examination of managerial learning and organizational commitment in the process of international expansion; (3) the consideration of multiple forms of foreign market entry available to the firm; and (4) a more recent approach that recognizes the potential influence of formal and informal networks relationships on internationalization. The authors suggest that by further interrelating the above approaches an integrated, holistic view of the business internationalisation process emerges.

Similarly, Rask (2014) claims that a firm's internationalisation goes hand in hand with business model innovation, which, according to Markides (2006 in Rask, 2014) "is the discovery of a fundamentally different business model in an existing business". Business model innovation is not understood as merely technological innovation but as a "reinvention, of the business itself". Gkypali and Tsekouras (2015) argue that productive performance of innovative firms and their decision to export are endogenously related "due to self-selection" resulting to a dichotomisation of firms into "exporters" and "non-exporters" while the role of innovation patterns is a basis in determining their productive performance and export decision-making. This endogeneity in the decision making process perplexes the relationship between a firm's productive performance and decision to export.

The key components, or building blocks, of a business model identified by the relevant literature (Osterwalder et al. 2005)<sup>19</sup> are:

- **Value proposition** or Product, offering an overall view of the business' products and services.
- **Customer Interface**, including Target Customers, Customer Interface Relationships as well as Distribution Channels.
- **Infrastructure Management**, including Partner Networks which are to be understood as networks of cooperative agreements with other companies necessary to efficiently offer and commercialize value.
- **Financial Aspects**, including Cost Structure and Revenue Model.

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<sup>19</sup> See also Taran et al. 2015.

Thus, a business aiming to internationalise its activities should focus on the innovation of its business model by addressing global competition through the innovation of the products and services offered but also through the development of new distribution channels and partner networks.

### 3.2 Access to information on expansion opportunities

The entrepreneurial process is a complex sequential process that consists of three stages: conception, business establishment and evaluation. The first stage entails the activities leading the entrepreneur to distinguish an existing or new economic opportunity, the second stage involves the decision to realise the opportunity distinguished during the first stage and the actual realisation while during the last stage business performance is evaluated based on the entrepreneur's individual targets and objectives. The success of this endeavour depends on the entrepreneur's characteristics as well as the characteristics of the environment where the endeavour takes place (Stathopoulou et al., 2004).

Opportunity is a central concept within the entrepreneurship field, yet the definition and nature of opportunities are still unclear (Short et al., 2009). Some suggest that entrepreneurs use their cognitive frameworks, developed by experience, to distinguish links between seemingly unrelated developments (e.g. in technological developments, policy changes, market trends) (Baron, 2006). Others consider alertness, "consisting of three distinct elements: scanning and searching for information, connecting previously-disparate information, and making evaluations on the existence of profitable business opportunities" as key in identifying opportunities (Tang et al., 2012).

Based on the above, access to knowledge and information is vital for the development of opportunities. Both formal and informal sources of information can support entrepreneurs identify new opportunities. Sources of information may include mentors, informal industry networks and participation in professional forums (Ozgen & Baron, 2007).

### 3.3 Products and processes as drivers for expansion

Based on the preliminary desk research, there are various areas where aquaculture SMEs can expand in terms of products and processes in order to achieve the internationalization and extraversion of their products<sup>20</sup>. The main areas identified are:

1. **Improvement of the production process** of existing species to reduce production costs or increase production volume or quality;
2. **Diversification** through the breeding of new species, taking into consideration the trends and needs of the market;
3. Development of new processes of raw material **processing and maintenance**,
4. Development of new technologies, processes and practices for the **quality assurance and traceability of products**;
5. Participation in **special production schemes**, such as organic<sup>21</sup> or environmentally and socially responsible<sup>22</sup> production, adhering by the relevant standards and receiving the corresponding certifications;
6. Development of **marketing and branding strategies** by, for instance, creating or participating in, or promoting a regional brand name or highlighting the product's nutritional value. The term marketing should be understood as the actions undertaken in order to differentiate a product offered in the market from other similar products offered by the competition. Product differentiation is a strategy widely used by agro-food firms.

**Example 1:** In the mid '90s, oversupply caused dramatic declines in the wholesale market price of both wild-caught and farmed salmon, and the industries were under considerable pressure to create changes in the traditional ways that they had marketed salmon to the public. At the time, salmon was considered a high-end product, difficult to prepare at home. Consumers' view changed dramatically when boneless, skinless salmon fillets from Chile were introduced into the U.S. marketplace. Thus, through a combination of the product's **processing and marketing**, consumers started viewing salmon as easy to prepare and affordable thus doubling consumption between 1990 and 1997.

Source: Morrissey & DeWitt, 2013

<sup>20</sup> For instance see: Morrissey and DeWitt (2013) on value-added seafood products and Varadi et al. (2001).

<sup>21</sup> See [https://ec.europa.eu/agriculture/organic/eu-policy/eu-rules-on-production/seaweed-and-aquaculture\\_en](https://ec.europa.eu/agriculture/organic/eu-policy/eu-rules-on-production/seaweed-and-aquaculture_en).

<sup>22</sup> See <https://www.asc-aqua.org/>.

7. Extension of **distribution channels**.
8. Development of **partner networks**.

The fact that, despite its increasing importance, the aquaculture sector remains a rather small segment of the world agro-food industry, restricts investments for research and technological development for the sector. For example, the development of a poultry vaccine would reasonably be expected to return a much higher profit than a salmonid or a sea bass vaccine (Bostock, 2011).

The competitiveness of the aquaculture industry is inextricably linked with investment in research and innovation that will lead to new differentiated products, improved production, packaging, distribution or consumption processes. These new products must be still more competitive, by, for instance, being of high nutritional value or of low cost to compete with products from third countries.

The cost of the above ventures could be considerable for SMEs, especially for micro enterprises that appear to form the majority of the aquaculture sector in the EXTRA-SMEs regions. This, however, can be redressed by the formation of synergies, for instance through the formation of producer cooperatives (Bostock et al., 2009).

While acknowledging the potentials of innovation synergies, the fact that such cooperation may result in either a positive or a negative innovation performance should also be acknowledged. It has been argued that the benefits of gaining access to knowledge from diverse external sources may be overshadowed by the costs linked to accessing increasingly diverse knowledge through collaboration and a “negative network effect on firms' internal innovation efforts” (Gkypali et al, 2017). A firm’s absorptive capacity, defined by Cohen and Levinthal (1990) as “the ability of a firm to recognize the value of new, external information, assimilate it, and apply it to commercial ends” has a positive correlation to its innovation and exporting performance (Gkypali et al, 2018). This calls for policy measures to facilitate the diversification of types of R&D collaborators by reducing the associated cost, addressing the needs of firms exhibiting low absorptive capacity.

**Example 2:** The Trote and Salmerino del Trentino are registered as products of Protected Geographical Indication (PGI) since 2013, thus achieving **product differentiation**.

The products’ expansion of sales was favored by participation and visibility at Expo 2015, where the producers accomplished contacts with wholesalers for the markets of Lombardy, Piedmont and Switzerland and, above all, agreements for the presence of the products in Eataly stores, the chain of Italian products in the world, and in large retail chains, thus expanding their **distribution channels**.

**Source:**

<http://ec.europa.eu/agriculture/quality/door/registerName.html?denominationId=5662>,  
<http://ec.europa.eu/agriculture/quality/door/registerName.html?denominationId=5601> and  
<https://www.agrisi.it/en/news/trote-e-salmerini-del-trentino-igp-patrimonio-da-15-milioni/>

## 4 Methodological approach

The main source of data selected for the purposes of activity A1.2 was a questionnaire survey. The survey was conducted using two structured questionnaires addressed to respondents belonging to two distinct categories: representatives of aquaculture SMEs and institutional stakeholders. The survey data provide insights on experience-based views with regards to aquaculture SMEs' expansion areas.

### 4.1 Research questions

The research aimed at answering the following research questions, which were defined upon relevant thematic research:

- What are the key expansion areas identified for aquaculture SMEs in the EXTRA-SMEs regions?
- Which expansion areas are considered more effective in boosting extraversion and internationalisation?
- How do aquaculture SMEs active in the EXTRA-SMEs regions become aware of expansion opportunities?

### 4.2 Sample selection and questionnaire administration

During the data collection all EXTRA SMEs partners used their contacts to ensure the participation in the survey of stakeholders from the entire spectrum of the aquaculture industry. Potential respondents were distinguished in two broad categories:

- **SMEs representatives**, including decision-makers, owners, administrative managers, marketing managers, operations managers, sales administration managers or other staff of aquaculture SMEs with industry knowledge and experience, and
- **Institutional stakeholders**, including representatives of regional or local public authorities, professional bodies, chambers of commerce, innovation centres, higher education and research institutions.

The target respondents were selected through purposive sampling which is a non-probability form of sampling aiming at selecting participants in a strategic way, tailored to the research questions being posed (Bryman, 2012).

### 4.3 Data collection tool (questionnaires)

The two questionnaires used for the data collection have been created based on the research questions at hand and relevant thematic research and they are available in Annexes 1 and 2. A number of precautions have been taken, in order to guarantee that the collected data remain unbiased and relevant while the project partners had the opportunity to provide feedback on the methodology and the questionnaire before the beginning of the data collection.

The main themes covered by both questionnaires include:

- Profile of participating entities (SMEs and institutional stakeholders)
- Extraversion of aquaculture SMEs.
- Introduction of new products and processes by aquaculture SMEs.
- Assessment of the expansion areas identified through the desk research and suggestion of any additional areas of expansion that can contribute to the extraversion of the aquaculture SMEs.

In addition, the SMEs questionnaire examines SMEs awareness of expansion opportunities in their industry as well as their relationship with other actors.

The questionnaire comprised the following types of questions:

- **Single-answer and multiple answer multiple-choice questions:** Since multiple-choice questions do not require interpretation, participants' answers were analysed based purely on their selections, thereby creating a lower likelihood of bias in the results.
- **Rating scale questions:** Rating scales were used to measure the direction and intensity of attitudes of different types of participants.
- **Open-ended questions:** Open questions were included to prompt participants to describe in more detail and depth their experience. These questions are ideal for collecting data about qualitative, in-depth aspects of a particular topic or issue.

## 5 Data processing and analysis approach

Upon the completion of the survey, the collected data was validated and consolidated, based on the criteria defined in the methodology. Data validation refers to the process of determining whether information gathered during the process of data collection is complete and accurate.

To consolidate data, all the information was merged by combining the large amount of data into two single, persistent data sources (e.g. large worksheets) that reflect all collected input from survey respondents of each category (SMEs and institutional stakeholders). To this end, Microsoft Excel pivot tables were used to facilitate the process of grouping data in a concise, tabular format, which allowed for easier reporting and analysis.

Statistical computations and analyses assume that the variables have a specific level of measurement and are properly defined. For the purposes of this survey and following the questionnaires structure, variables were defined as nominal or interval to avoid nonsensical results.

**Table 4: Types of variables**

Variable type	Description	Questionnaire items
<b>Nominal variables</b>	Nominal variables are based on mutually exclusive but not ranked or ordered categories. Yes / no, multiple choice or demographic questions (e.g. country, job profile etc.) are common examples of nominal variables.	<u>SMEs Questionnaire:</u> Country, Region, City/town, Q1, Q3, Q4, Q5, Q7.1, Q7.2, Q8.1, Q9.1, Q10, Q11, Q12, Q13.1, Q13.2, Q14.1, Q15.1, Q15.2 <u>Institutional Stakeholders Questionnaire:</u> Country, Region, City/town, Type of organisation, Q3, Q4.1
<b>Interval variables</b>	An interval variable has two or more categories, which can be ordered or ranked from high to low. In contrast to ordinal variables, the intervals between the values of the interval variable are equal. For example a question with rating scales from 1 to 5.	<u>SMEs Questionnaire:</u> Q16.1 <u>Institutional Stakeholders Questionnaire:</u> Q5.1

Questionnaire sections that do not allow quantitative processing such as open-ended questions or “other” choices, were not included in the analysis process, unless they could be categorised into specific variables. In case of “select all that apply” questions, the coding of answers was executed using a COUNTIF function in Excel so that answers could be categorized as yes or no variables facilitating quantitative processing. In order to investigate possible relations between variables, more than one field was combined.

The Microsoft Excel program was used to process collected data for survey analysis. A pivot table data summarization tool was used to automatically sort and combine data and return descriptive statistics and frequencies of the predefined data fields.

Basic tools of descriptive statistics like counts, averages, and percentages were employed (where appropriate) to extract information and conclusions from the replies of SMEs’ and institutional stakeholders’ representatives.

The data were exported and further processed in separate spreadsheets, summing up and visualising results. Visualised results include pie charts and bar graphs. Exported results were compared to imported data for any inconsistencies and data processing was repeated when required. Finally, exported results were listed in tables, visualised in graphs and included in the analysis report.

## 6 Analysis results

The population of the survey included stakeholders (i.e. aquaculture SMEs' representatives and institutional stakeholders) from 7 EU countries (Finland, Greece, Ireland, Italy, Lithuania, Poland and Romania). In total, 68 questionnaires were filled, either online (by e-mail or using the online form) or manually, using a printed form.

It is, thus, evident that very few project partners have managed to collect a sufficient number of questionnaires so as to satisfy or almost satisfy the quantitative criteria set in the methodology.

**Table 5: Responses per country/region**

Country/region	Number of SME responses	Number of institutional stakeholder responses
<b>Finland</b>	3	4
<b>Greece – Peloponnese</b>	4	5
<b>Greece – Western Greece</b>	7	5
<b>Ireland</b>	1	1
<b>Italy – Liguria</b>	4	6
<b>Lithuania</b>	10	5
<b>Poland</b>	10	2
<b>Romania</b>	1	-
<b>Total</b>	<b>40</b>	<b>28</b>
<b>Methodology KPIs</b>	10	5

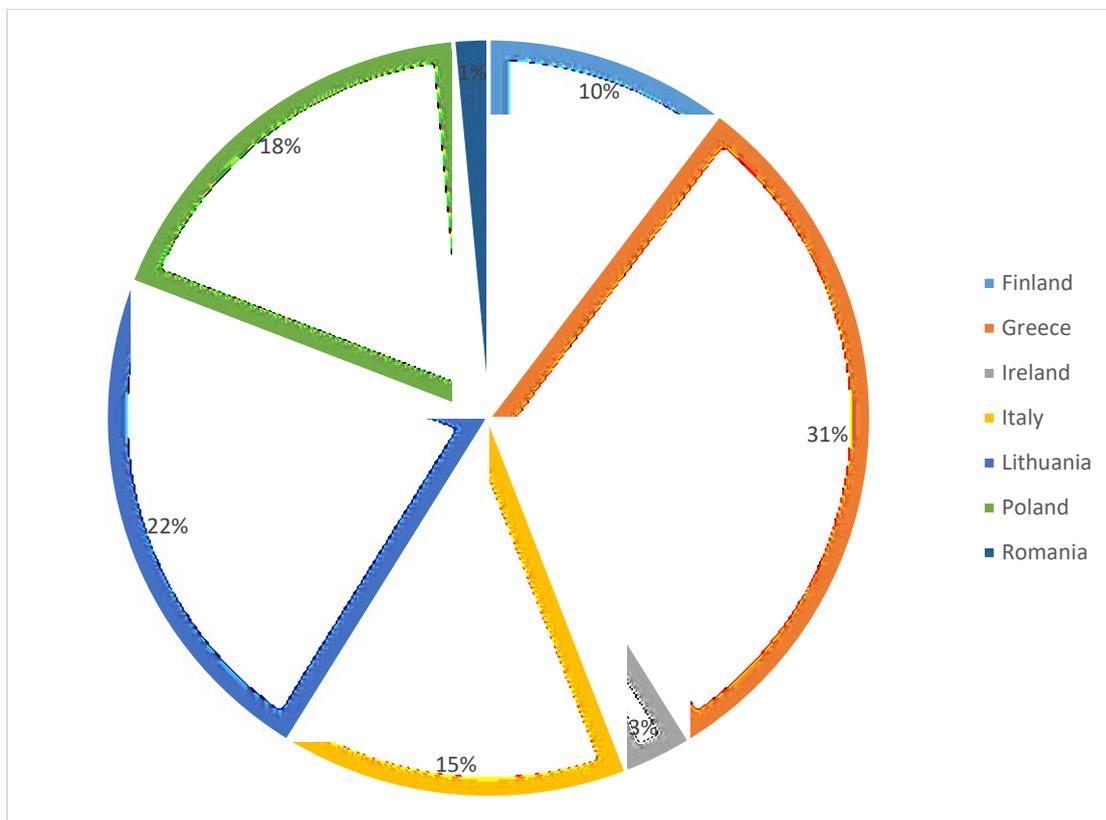
Source: EXTRA-SMEs A1.2 Survey Results

## 6.1 The profile of participating entities

Representatives of aquaculture SMEs and institutional stakeholders from 7 countries of the EXTRA-SMEs project consortium (Finland, Greece, Ireland, Italy, Lithuania Poland and Romania) participated and responded to the survey.

Regarding the sample distribution per country, Greece appears to participate with the highest rate, accounting to 31% of the respondents, 18% from the region of Western Greece and 13% from the Region of Peloponnese. Lithuania, Poland and Italy follow with 22%, 18% and 15% participation rate correspondingly, whereas Finland, Ireland and Romania account for 10%, 3% and 1% of the responses respectively.

Figure 7: Sample distribution (replies) per country



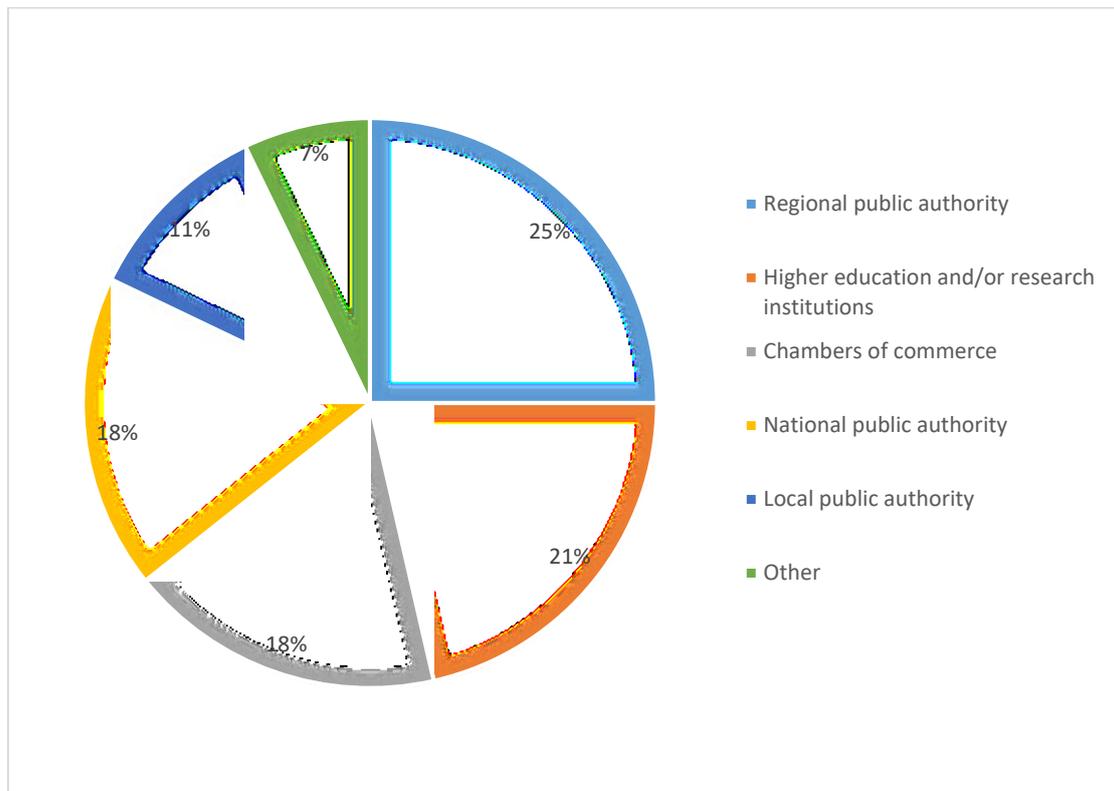
Source: EXTRA-SMEs A1.2 Survey Results

The following sections will outline the main characteristics of the institutional stakeholders and the SMEs' representatives that responded to the activity's questionnaires.

### 6.1.1 Institutional stakeholders

As depicted in Figure 8, the institutional stakeholder respondents came from a variety of fields and were able to contribute, each from their own perspective. Their knowledge of the aquaculture industry, their activities relevant to the industry and their contacts with aquaculture SMEs varies correspondingly as some (mainly public authorities) may be in contact with a significant number or even all the aquaculture SMEs active in their region while others may be in contact with just a handful or even none.

Figure 8: Institutional Stakeholder respondents by type of organisation



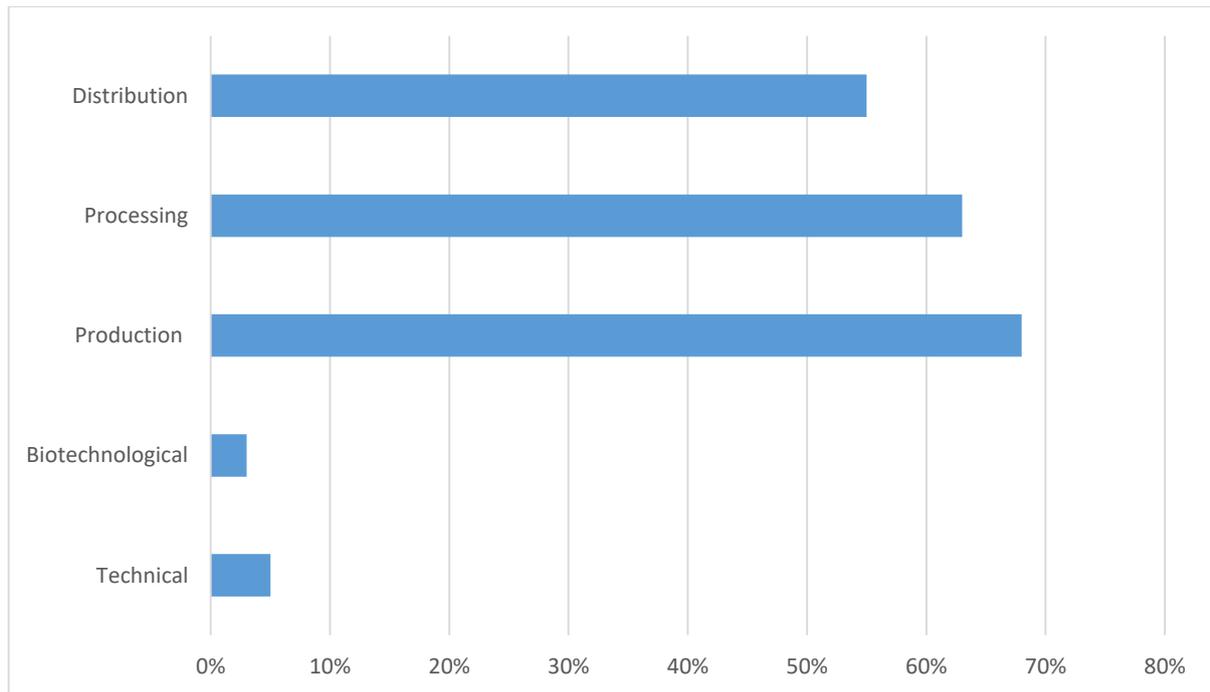
Source: EXTRA-SMEs A1.2 Survey Results

### 6.1.2 Aquaculture SMEs

The SMEs represented in the sample also presents a range in terms of both their positions in the aquaculture value chain and their sizes.

Figure 9 illustrates the SMEs respondents’ selections with regards to the category or categories that best describe their business. The available answers included the categories of the aquaculture value chain, elaborated in Figure 6, and multiple answers were possible.

**Figure 9: SMEs’ responses to the question: “Which of the listed categories best describes your business?”**

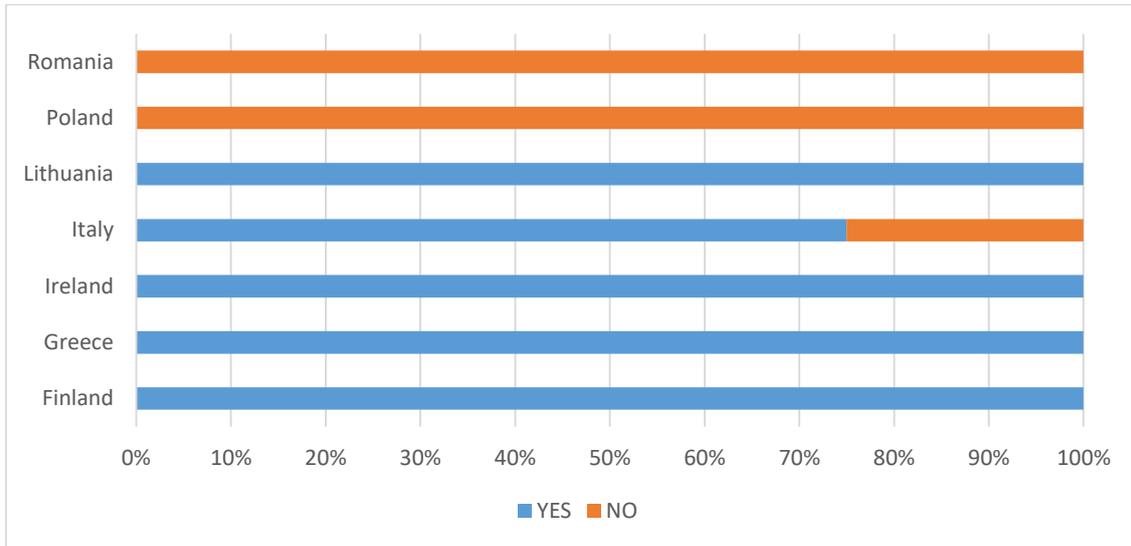


Source: EXTRA-SMEs A1.2 Survey Results

The majority of SME respondents states that their business belongs to the Production (68%), Processing (63%) and Distribution (55%) categories while significantly lower percentages position themselves in the technical (5%) and biotechnological (3%) categories.

Aquaculture is the main source of income for more than half (68%) of the businesses participating in the study. However, as illustrated in Figure 10, the positive and negative responses to the relevant question were not evenly distributed among the countries examined.

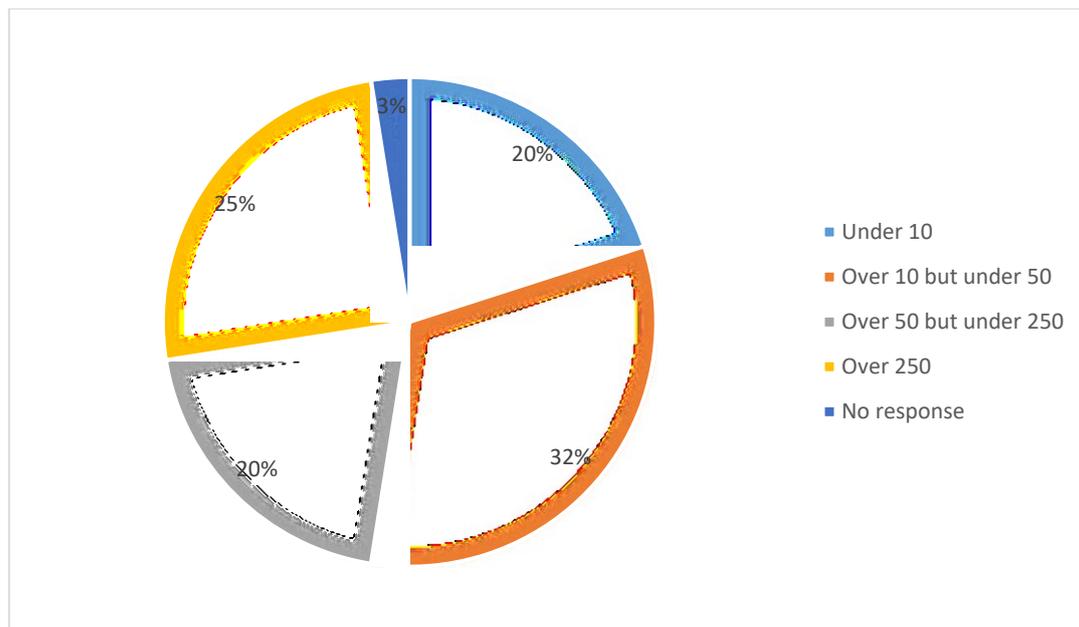
Figure 10: Geographical distribution of SMEs' positive and negative responses to the question: "Is aquaculture your business' main source of income?"



Source: EXTRA-SMEs A1.2 Survey Results

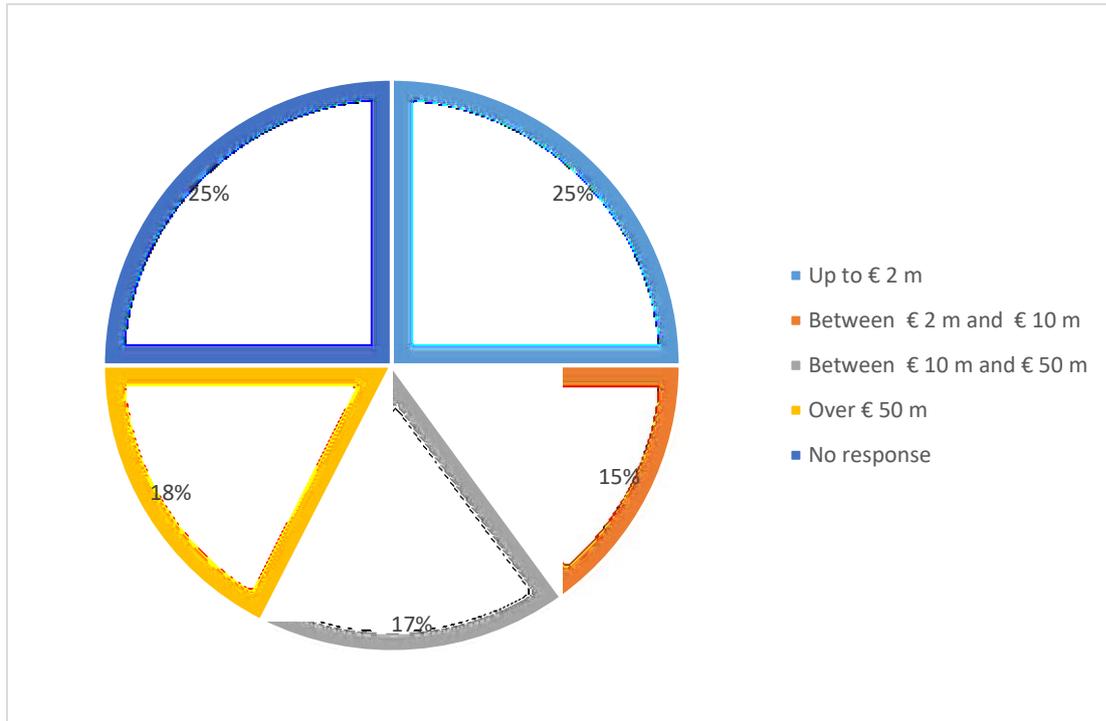
With regards to their size, as exhibited in Figure 11, the majority of the businesses (32%) that have participated in the research by responding to the questionnaire are small firms, as they have more than 10 but less than 50 employees. Micro-enterprises and medium-sized enterprises are equally represented in the sample (20% each), however, 25% of the respondents do not actually qualify as SMEs as they employ more than 250 persons while a fraction of them (18% of all SME respondents) has an annual revenue of over 50 million euros (Figure 12).

Figure 11: SME respondents by number of employees (in annual full time equivalent labour units)



Source: EXTRA-SMEs A1.2 Survey Results

Figure 12: SME respondents by annual revenue

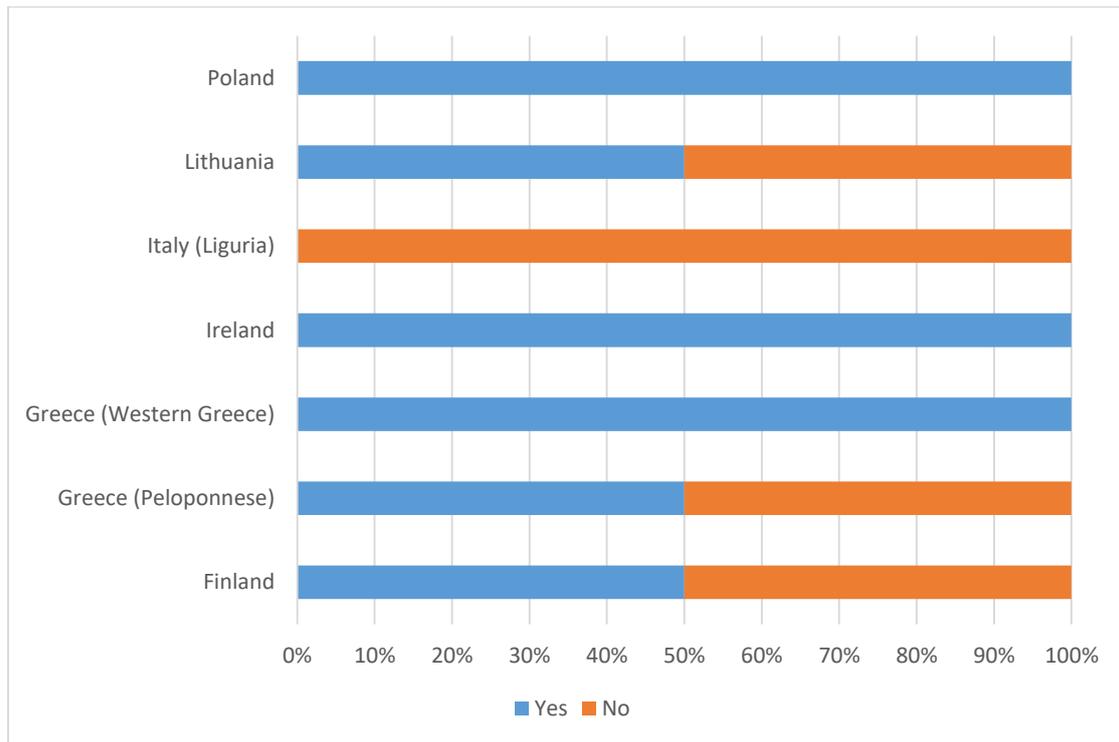


Source: EXTRA-SMEs A1.2 Survey Results

## 6.2 The extraversion of aquaculture SMEs

The majority of the institutional stakeholders participating in the EXTRA-SMEs A1.2 survey claimed that aquaculture SMEs in their region do perform exports (57% of responses), however, some variation can be observed among the different countries and regions covered by the project, as displayed in Figure 13.

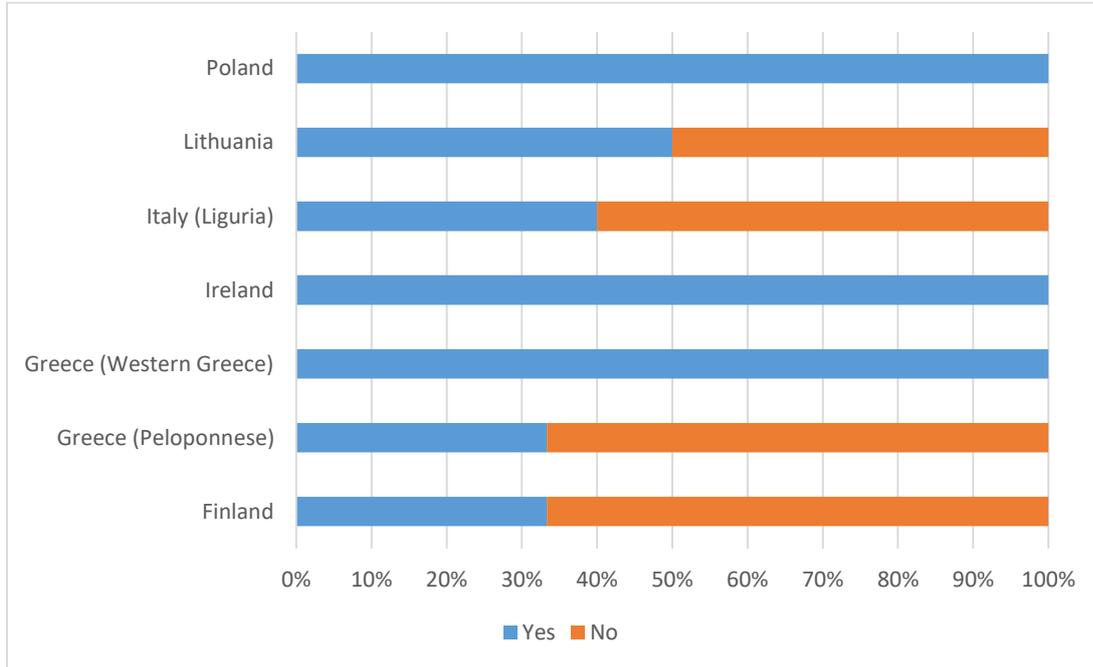
**Figure 13: Institutional stakeholders' responses to the question: "How would you describe your region's aquaculture SMEs with regards to their extraversion? Do they perform exports?"**



Source: EXTRA-SMEs A1.2 Survey Results

At the same time, the majority of institutional stakeholders (59%) consider exports to be among the strategic priorities of aquaculture SME's in their region. Extraversion appears to be the norm for the region of Western Greece, Ireland and Poland, while this is not the case for Finland, Lithuania, the region of Liguria, in Italy and the region of Peloponnese, in Greece.

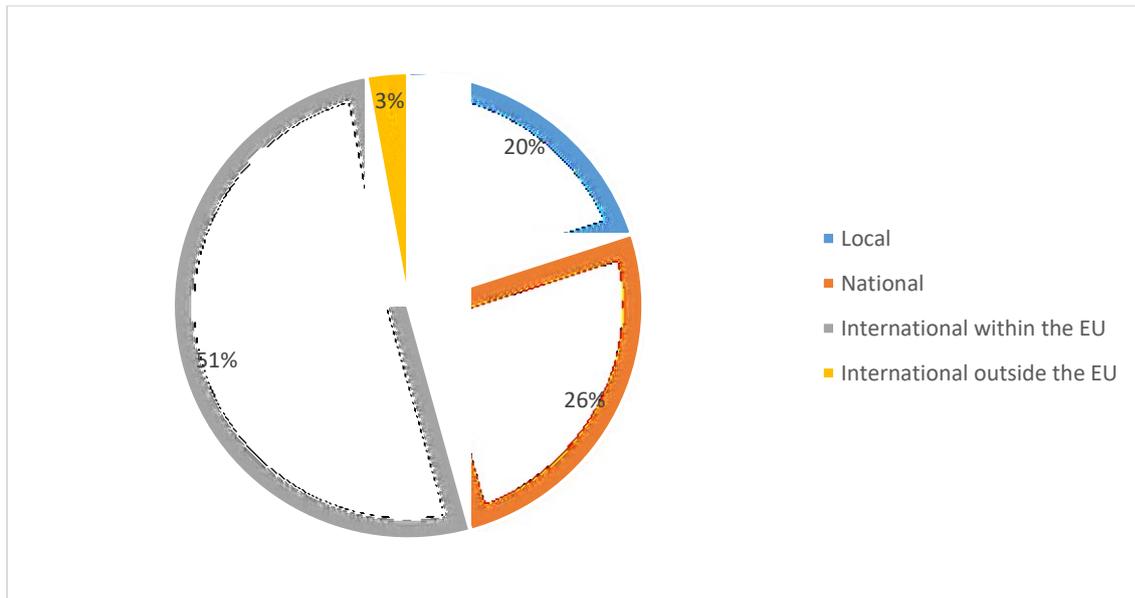
Figure 14: Responses to the question: “How would you describe your region’s aquaculture SMEs with regards to their extraversion? Are exports among their strategic priorities?”



Source: EXTRA-SMEs A1.2 Survey Results

More than half of the SME respondents (51%) claim that their main market consists of other countries within the EU, followed by those who responded that their main market is their national market (26%). Finally, 20% stated that their main market is their local market and 3% claimed that their main market consists of countries outside the EU.

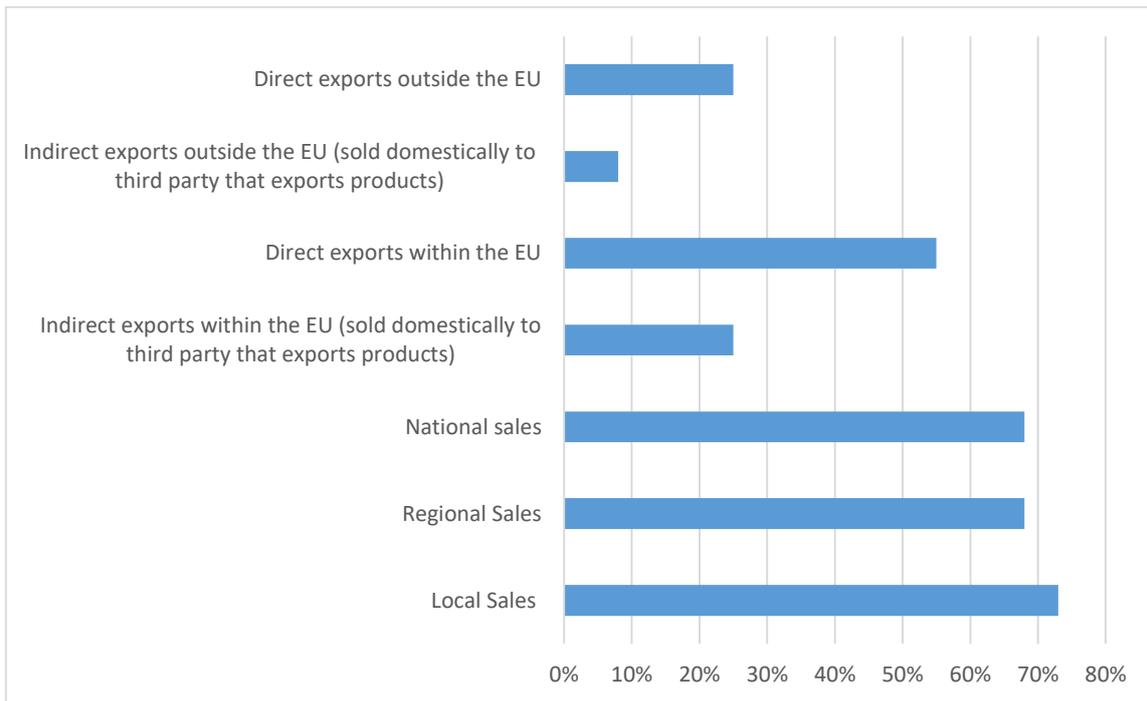
Figure 15: SMEs responses to the question: “Which of the following is your business’ main market?”



Source: EXTRA-SMEs A1.2 Survey Results

When asked to identify the types of sales they have performed during the past three years, the majority of the SME respondents (73%) stated that they have performed local sales, followed by regional sales and national sales (68%), and direct exports within the EU (55%). In addition, 25% of the respondents claimed they have performed direct exports outside the EU and the same percentage stated that they have performed indirect exports within the EU while 8% have performed indirect exports outside the EU.

Figure 16: SMEs responses to the question: “During the last three years did your business make any of the following?”



Source: EXTRA-SMEs A1.2 Survey Results

Almost half of the SME respondents (48%) claimed that they are planning to address new markets in the foreseeable future. Positive responses to the relevant question (SMEs questionnaire-Q10) reach their pick rates (100%) in Romania and Finland.

Some of the respondents specified the markets they intend to address, which included both neighbouring European countries, such as France, Spain and Hungary, but also other markets outside the EU including Russia, China, Canada, Abu Dabi, Dubai and Bahrain.

At this point, it should be noted that 35% of the SME respondents stated that their business has been awarded at least one internationally-recognized certification including ISO<sup>23</sup>, European Organic Aquaculture Certification, ASC<sup>24</sup> and Global GAP<sup>25</sup>.

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<sup>23</sup> See: <https://www.iso.org/>.

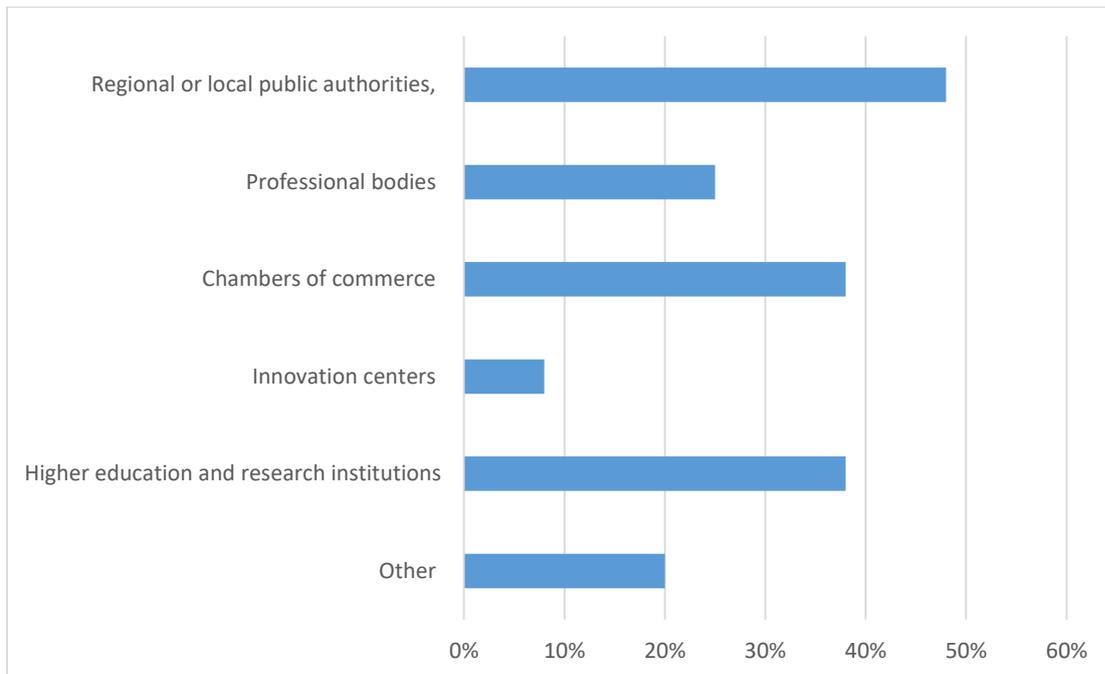
<sup>24</sup> See: <https://www.asc-aqua.org/>.

<sup>25</sup> See: [https://www.globalgap.org/uk\\_en/](https://www.globalgap.org/uk_en/).

### 6.3 Introduction of new products and processes by aquaculture SMEs

Most SME respondents (78%) are aware of new expansion opportunities in their industry. The respondents from Finland, Poland and Romania exhibited the highest rates of awareness of new opportunities with 100% positive responses while positive responses from Lithuania and the regions of Western Greece, Peloponnese and Liguria reached 80%, 86%, 50% and 25% correspondingly. Their sources of information with regards to expansion opportunities vary greatly and range from official state sources and research by academic institutions and institutes to business associates or even instinct. Furthermore, when asked to identify which stakeholders they collaborate with, most SME respondents identified regional or local authorities (48%), followed by chambers of commerce and higher education and research institutions (38%), professional bodies (25%) and innovation centres (8%).

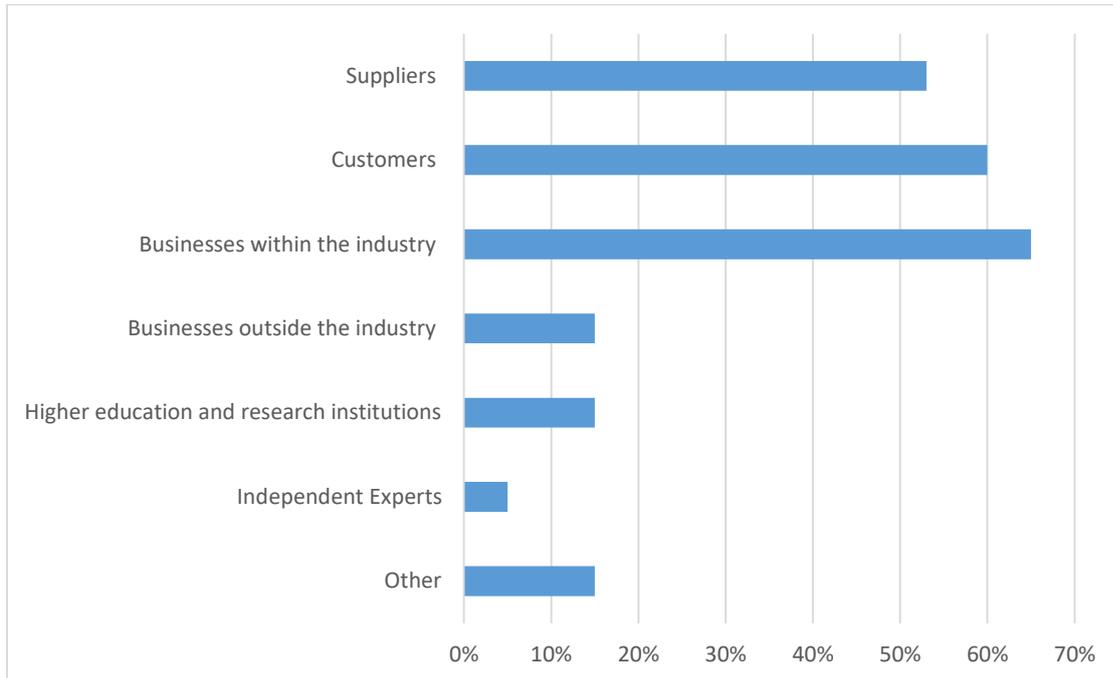
Figure 17: SMEs responses to the question: “Do you collaborate with any of the following stakeholders in your region?”



Source: EXTRA-SMEs A1.2 Survey Results

A significant percentage of the SME respondents (65%) claim their business has developed innovation synergies with other businesses within their industry. Other innovation synergy partners identified included their customers (60%), their suppliers (53%), higher education and research institutions and businesses outside their industry (15%) as well as independent experts (5%).

Figure 18: SMEs responses to the question: “Has your business developed innovation synergies with any of the following?”



Source: EXTRA-SMEs A1.2 Survey Results

It should also be noted that 40% of the SME respondents’ businesses have invested on research and development activities (either in-house or external), excluding market research surveys, during the last three years and 20% has invested in conducting market research activities (either in-house or external).

The majority of the SME respondents (63%) state that their businesses have introduced new products and/or processes during the past three years. As illustrated in Table 6, most respondents (55%) specified that their business has developed new technologies, processes or practices for the quality assurance and traceability of products, followed by the development of new processes of processing and/or maintenance (43%) and the development of marketing and branding strategies (40%).

At the same time, institutional stakeholders paint a different picture with regards to the products and processes recently adopted by SMEs in their respective regions (see Table 6). This discordance may be explained by the fact that SME respondents cover the full range of the aquaculture value chain while institutional stakeholders appear to have responded with a focus on the value chain’s “middle part”, namely the production.

Table 6: Products and processes recently adopted by aquaculture businesses

Products and processes	% of SME respondents claiming they have adopted the product/process	% of institutional stakeholder respondents claiming the products/processes have been adopted by SMEs in their area
a. Improvement of the production process of existing species.	30%	71%
b. Diversification through the breeding of new species, taking into consideration the trends and needs of the market.	13%	54%
c. Development of new processes of processing and/or maintenance.	43%	25%
d. Development of new technologies, processes and practices for the quality assurance and traceability of products.	55%	39%
e. Participation in special production schemes.	20%	21%
f. Development of marketing and branding strategies.	40%	25%
g. Extension of distribution channels.	38%	32%
h. Development of partner networks with other businesses.	25%	14%

Source: EXTRA-SMEs A1.2 Survey Results

#### 6.4 Assessment of the effectiveness of expansion areas in improving the extraversion of aquaculture SMEs

Overall, the expansion areas that have emerged through the desk research have been well received by both aquaculture SMEs and institutional stakeholders and were assessed as quite or moderately effective. The perceived effectiveness of each expansion area depends largely on the position of each business within the aquaculture value chain and the particularities of their products which are inherently linked to their geographic location.

**Table 7: Assessment of expansion areas' effectiveness in improving extraversion (SMEs questionnaire-Q16.1 & Institutional Stakeholders questionnaire-Q5.1)**

Expansion areas	SME responses (average)	Institutional Stakeholder responses (average)
a. Improvement of the production process of existing species.	Quite effective	Moderately effective
b. Diversification through the breeding of new species, taking into consideration the trends and needs of the market.	Moderately effective	Moderately effective
c. Development of new processes of processing and/or maintenance.	Quite effective	Moderately effective
d. Development of new technologies, processes and practices for the quality assurance and traceability of products.	Quite effective	Moderately effective
e. Participation in special production schemes.	Moderately effective	Moderately effective
f. Development of marketing and branding strategies.	Quite effective	Moderately effective
g. Extension of distribution channels.	Quite effective	Moderately effective
h. Development of partner networks with other businesses.	Quite effective	Moderately effective

Source: EXTRA-SMEs A1.2 Survey Results

When asked to assess the expansion areas (products and processes) that emerged through the relevant desk research with regards to their effectiveness in improving the extraversion of aquaculture businesses, on average, all of the identified expansion areas were assessed as moderately effective by institutional stakeholders and as quite or moderately effective by SME respondents (Table 7).

Table 8 illustrates both respondent groups' average assessment of expansion areas' effectiveness in improving extraversion by country/region. As expected, respondents from different regions have assessed the proposed expansion areas based on their particular needs. For instance, SME respondents from Liguria assessed the development of new processes of processing and/or maintenance as very effective whereas institutional stakeholders from the same area assessed it as moderately effective, hence leading to an overall assessment as quite effective. This can be easily explained by the fact that that their majority is occupied in shellfish farming which implies greater needs for systems of product preservation. Similarly, "improvement of the production process of existing species to reduce production costs or increase production volume or quality" is the highest assessed expansion area for Finnish respondents, which is in line with the sector's pressing need to increase the production volume.

Institutional stakeholders' responses regarding additional areas of expansion that can contribute to the extraversion of the aquaculture SMEs in their region (Institutional Stakeholders questionnaire - Q6) included:

- Increased cooperation with foreign aquaculture companies to acquire information about new technologies, trends, customer preferences, sales markets etc.
- Seminars on foreign markets, rules, conditions and marketing and individual professional consultations.
- Well defined education for small companies on feeding procedures, production processes and other fields.
- Simplification of licensing processes which could lead to expansion prospects by reducing cost and attracting new investors.

SMEs representatives' responses on the same question (SMEs questionnaire - Q17) included innovation and experimentation on health management and disease control as well as feed administration, expansion of environmental and sustainable practices and mainly the development of promotional activities. Hence, the expansion areas identified by both groups of respondents are in line with the areas that emerged through the relevant desk research.

Table 8: Assessment of expansion areas' effectiveness in improving extraversion by country/region (SMEs questionnaire-Q16.1 & Institutional Stakeholders questionnaire-Q5.1)

Expansion areas	Finland	Greece (Peloponnese)	Greece (Western Greece)	Ireland	Italy (Liguria)	Lithuania	Poland	Romania
<b>a. Improvement of the production process of existing species.</b>	Quite effective	Quite effective	Quite effective	Quite effective	Quite effective	Moderately effective	Moderately effective	Quite effective
<b>b. Diversification through the breeding of new species, taking into consideration the trends and needs of the market.</b>	Not at all effective	Not at all effective	Quite effective	Moderately effective	Quite effective	Moderately effective	Moderately effective	Moderately effective
<b>c. Development of new processes of processing and/or maintenance.</b>	Not at all effective	Quite effective	Moderately effective	Very effective	Quite effective	Moderately effective	Quite effective	Moderately effective
<b>d. Development of new technologies, processes and practices for the quality assurance and traceability of products.</b>	Moderately effective	Quite effective	Quite effective	Quite effective	Quite effective	Moderately effective	Quite effective	Quite effective
<b>e. Participation in special production schemes.</b>	Not at all effective	Quite effective	Moderately effective	Very effective	Quite effective	Not at all effective	Moderately effective	Quite effective
<b>f. Development of marketing and branding strategies.</b>	Moderately effective	Quite effective	Quite effective	Very effective	Quite effective	Moderately effective	Quite effective	Very effective
<b>g. Extension of distribution channels.</b>	Moderately effective	Quite effective	Moderately effective	Very effective	Quite effective	Quite effective	Very effective	Very effective
<b>h. Development of partner networks with other businesses.</b>	Moderately effective	Moderately effective	Moderately effective	Very effective	Quite effective	Quite effective	Quite effective	Very effective

Source: EXTRA-SMEs A1.2 Survey Results

## 6.5 Main findings by country/region

### 6.5.1 Finland

While there has been a steady growth in fish consumption in Finland, most of the fish currently consumed in the country is imported<sup>26</sup>. Aquaculture SMEs have faced difficulties implementing the legislative requirements concerning the licensing conditions and the fish processing requirements. Aquaculture producers are actively seeking new species and greener farming practices, thus whitefish has become an important species for food fish production and its production is growing (Paisley et al., 2010).

The key objectives for the development of the country's aquaculture industry include an increase in sustainable production growth that will reflect in the country's self-sufficiency in fish products, and strengthen the global position of Finnish expertise in aquaculture technology and of Finnish aquaculture producers.<sup>27</sup>

Both SME and institutional stakeholder survey respondents point out that growth, in terms of production volume, is a prerequisite for the industry's extraversion. Furthermore, the respondents pointed out that policy changes with regards to licensing and zoning are necessary for increasing the production volume.



<sup>26</sup> [https://www.kalankasvatus.fi/wp-content/uploads/2017/08/Fish\\_farming.pdf](https://www.kalankasvatus.fi/wp-content/uploads/2017/08/Fish_farming.pdf)

<sup>27</sup> [https://ec.europa.eu/fisheries/sites/fisheries/files/docs/body/op-finland-fact-sheet\\_en.pdf](https://ec.europa.eu/fisheries/sites/fisheries/files/docs/body/op-finland-fact-sheet_en.pdf)

## 6.5.2 Greece

Aquaculture has been the fastest-growing fishery sub-sector in Greece and is considered one of the major activities with hope for the recovery of the national economy. Aquaculture production exceeded wild catch since the beginning of the new millennium. The aquaculture sector in Greece provides direct and indirect employment to thousands of people, often in remote rural areas offering scarce employment opportunities. A high percentage of the Greek aquaculture production is exported, mainly to Italy and Spain. The average size of aquaculture companies has increased during the 2000s due to merging or acquisitions by large companies (FAO, 2007).

Based on the country's strategic plan, aquaculture is expected to be a leading primary sector, providing a high level of environmental protection and a significant contribution to high-quality food supply, employment and economic growth<sup>28</sup>.

Survey respondents underline that the simplification of licensing processes could lead to cost reductions and attract new investors leading to expansion opportunities.

# GREECE



### AQUACULTURE PRODUCTION 2017

Volume:  
125,639 tonnes of live weight  
Value:  
€ 545 million



Marine aquaculture is the largest aquaculture sector in terms of both production volume and value. Freshwater aquaculture consists mainly of small family enterprises, producing mostly trout in tanks.

### MAIN SPECIES 2013

Sea bass & sea bream 81.5%  
Mussels 16.7%  
Trout 1.8%



### GROWTH OBJECTIVES 2014-2020

Rise of production volume

### CONSUMPTION 2015

17.3 kg/inhabitant/year



<sup>28</sup> [https://ec.europa.eu/fisheries/sites/fisheries/files/docs/body/op-greece-fact-sheet\\_en.pdf](https://ec.europa.eu/fisheries/sites/fisheries/files/docs/body/op-greece-fact-sheet_en.pdf)

### 6.5.3 Ireland

The Irish aquaculture sector ranks fifth in value and seventh in volume in the EU, representing, with its value of production of around EUR 36 million, 4% of total EU production in 2013. Aquaculture activities are situated all around the country's coast, offering employment opportunities and contributing to local coastal economies.

The Irish national strategic plan on aquaculture foresees a sharp increase in the country's production, which is expected to more than double, contributing to food supply, exports and employment. Resolving the persisting administrative problems concerning licensing of aquaculture farms operating in or near designated Natura 2000 areas would contribute to achieving this target.<sup>29</sup>

## IRELAND



### AQUACULTURE PRODUCTION 2017

Volume:  
43,247 tonnes of live weight  
Value:  
€ 185 million



**IRISH AQUACULTURE IS MAINLY MARINE INSHORE**

### MAIN SPECIES 2013

Mussels 45.1%  
Salmon 26.8%  
Oysters 25.4%



### GROWTH OBJECTIVES 2014-2023

Rise of production volume and value.

### CONSUMPTION 2015

22.1 kg/inhabitant/year



<sup>29</sup> [https://ec.europa.eu/fisheries/sites/fisheries/files/docs/body/op-ireland-fact-sheet\\_en.pdf](https://ec.europa.eu/fisheries/sites/fisheries/files/docs/body/op-ireland-fact-sheet_en.pdf)

#### 6.5.4 Italy

After a phase of a sharp increase in production until the late 1990s, the Italian aquaculture industry is currently stabilising. The need for additional efficiency in the productivity system and new technologies is high due to high competition and decreased prices and margins. Furthermore, the sector is pressured by additional costs associated with the enforcement of environmental legislation. The Italian aquaculture industry is, thus confronted with various challenges including the intense competition from producers in other countries such as Greece and, to some extent, Turkey, the increasing market competition with low priced products produced in developing countries as well as the lack of a close relationship with the public research sector, which could play a key role to the sector's innovation. (FAO, 2014)

Shellfish is the most significant segment of Italian aquaculture in terms of total volume and value, thus, based on the EXTRA-SMEs survey responses, efforts should be placed on transportation and processing, in order to boost exports.

## ITALY



### AQUACULTURE PRODUCTION 2017

Volume:  
156,307 tonnes of live weight  
Value:  
€ 542 million



### FRESHWATER & MARINE FARMS

### MAIN SPECIES 2013

Mussels 45.5%  
Trout 26.1%  
Clams 17.5%



### GROWTH OBJECTIVES 2013-2025

Rise of production volume and value.

### CONSUMPTION 2015

28.4 kg/inhabitant/year

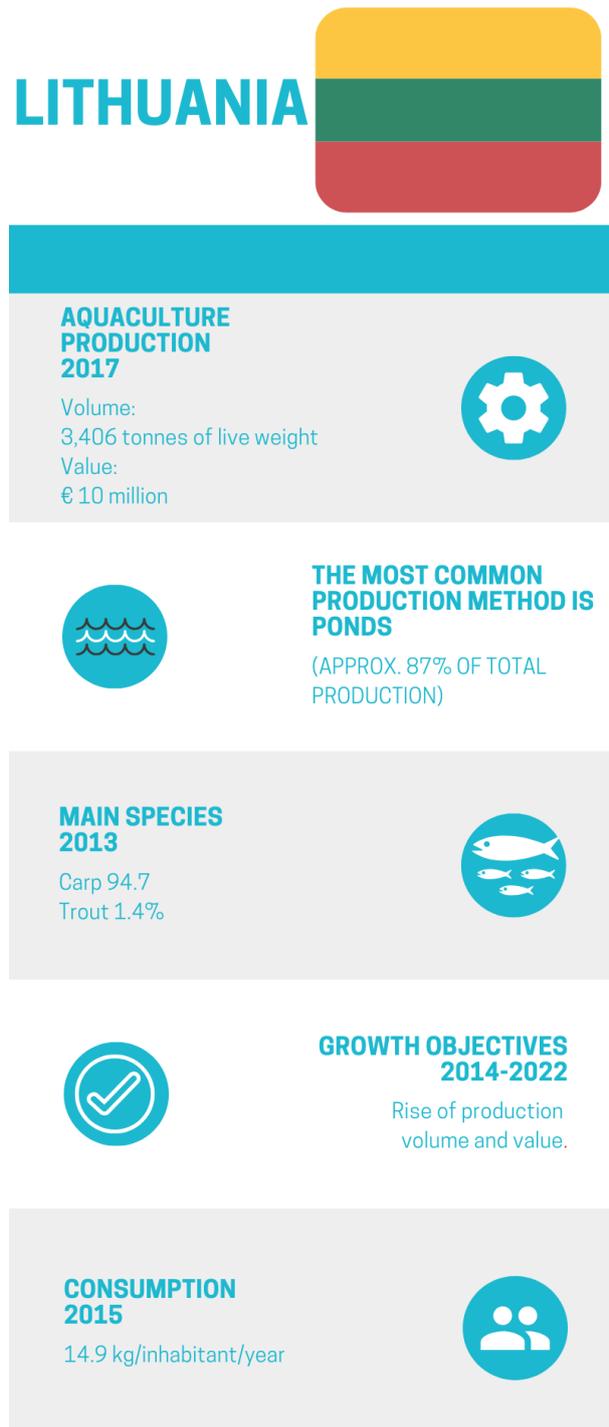


### 6.5.5 Lithuania

There is no marine aquaculture in Lithuania, the most common method of production is ponds, accounting for approximately 87% of total production. In 2017, 26% of total production was certified as organic. During the same year, 79% of the country's total aquaculture production was sold on the domestic market. The main export markets for the country's fish farming production were Poland and Latvia, accounting for 51% and 41% of total exports correspondingly.<sup>30</sup>

The Lithuanian operational plan for aquaculture foresees increasing energy efficiency and renewable energy use in pond aquaculture and closed recirculation systems, developing the aquaculture of species that can open new markets and fetch higher prices and preserving traditional extensive aquaculture and organic production while delivering aquatic-environmental services.<sup>31</sup>

Some of Lithuania's stakeholder participants point out that most of the country's companies are too small to develop exports and are in need of financial support and consultation in various fields.



<sup>30</sup> <https://www.eurofish.dk/member-countries/lithuania>

<sup>31</sup> [https://ec.europa.eu/fisheries/sites/fisheries/files/docs/body/op-lithuania-fact-sheet\\_en.pdf](https://ec.europa.eu/fisheries/sites/fisheries/files/docs/body/op-lithuania-fact-sheet_en.pdf)

### 6.5.6 Poland

Poland has a long history of aquaculture as the activity was first recorded in the 12<sup>th</sup> century. The oldest fish farms are located on the territories of Osiek, Zator, Przygodzie and Lyszkowice, they are at least 8 to 10 centuries old but remain functional. Fish farming is represented mainly by freshwater farms and is carried out in traditional earth ponds in a 3-year cycle, a system also found in other Central and Eastern European countries. The Polish processing sector has gone through a considerable transformation over the past decade and is currently one of the largest in Europe. It plays a major role in supplying European countries with processed fish products such as smoked fish, mainly salmon and trout, canned herring, mackerel, and sprat, and ready-to-eat fish products like salads and fish in marinades.<sup>32</sup>

SME survey respondents, representing mainly the processing and distribution segments of the value chain, underlined that efforts should be made for the promotion of Polish products through various activities, including participation in various fairs and other events.

## POLAND



### AQUACULTURE PRODUCTION 2017

Volume:  
36,506 tonnes of live weight  
Value:  
€ 105 million



### EMPLOYMENT

Aquaculture:  
4,400 employees (2015)  
Processing:  
12,300 employees (2014)



### MAIN SPECIES 2013

Carp 60.3%  
Trout 39.7%



### GROWTH OBJECTIVES 2014-2020

Rise of production volume  
Initiation of Marine fish farming  
and Mollusc farming



### CONSUMPTION 2015

13.6 kg/inhabitant/year



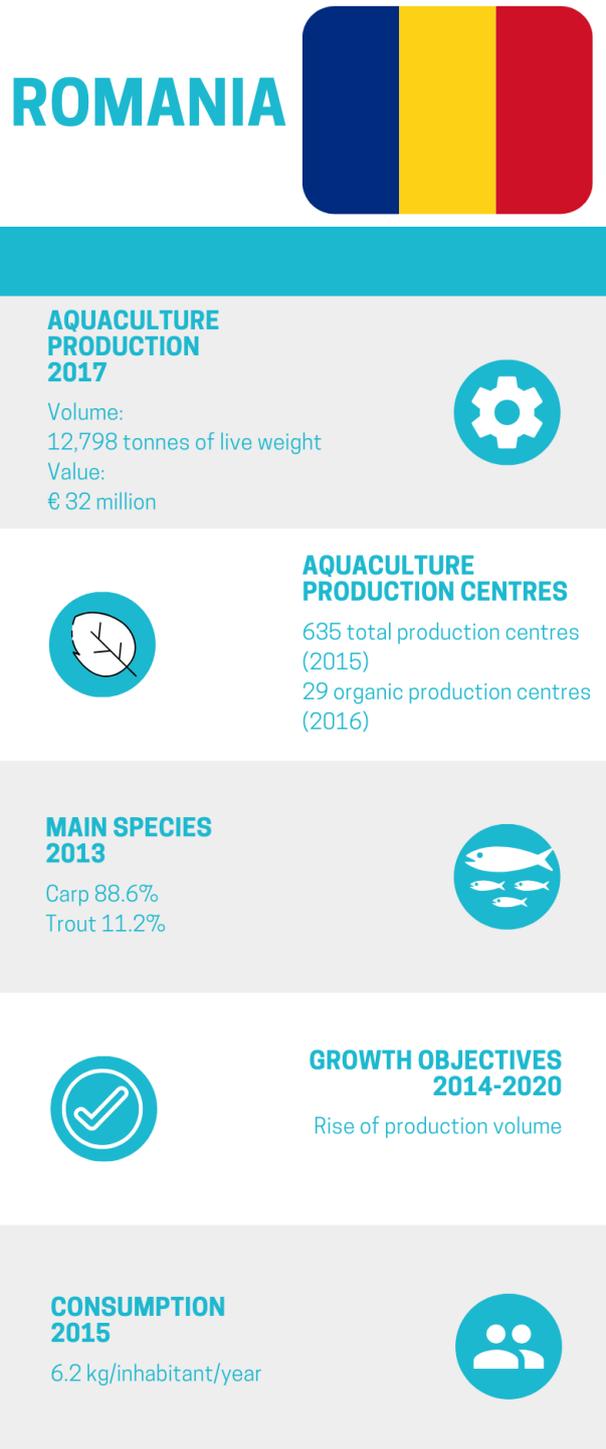
<sup>32</sup> <https://www.eurofish.dk/member-countries/poland>

### 6.5.7 Romania

Romania's land resources and availability of inland waters provide exceptional conditions for aquaculture. The growth of aquaculture production can be attributed to the expanded production of common carp in polyculture, extensively or semi-intensively.

In 2015 there were approximately 635 production facilities in the country and nearly all produced freshwater fish. In addition, 29 farms produced organic common carp in 2016. The production of new species, such as sturgeon, is still low. Furthermore, there is a trend to diversify and increase the current range of aquaculture activities.

Recently, extensive fish farms have become multifunctional, providing opportunities for ecotourism, educational activities related to the protection of aquatic biodiversity or recreational fishing.<sup>33</sup>



<sup>33</sup> <https://www.eurofish.dk/romania>

## 7 Key Findings and recommendations

### 7.1 Key findings

This section presents the main findings and conclusions drawn from the survey conducted.

#### Current state of extraversion

The majority of the institutional stakeholders participating in the survey claimed that aquaculture SMEs in their region do perform exports and they consider exports to be among their strategic priorities; however, some variation can be observed among the different countries and regions covered by the project. Furthermore, more than half of the SME respondents claim that their main market consists of other countries within the EU. Extraversion appears to be the norm for the region of Western Greece, Ireland and Poland, while this is not the case for the region of Liguria, in Italy, the region of Peloponnese, in Greece, and Finland. At the same time, the survey findings have underlined the recognition of the existence of new expansion opportunities in their industry by the majority of SME respondents.

#### Expansion areas

During the early stages of this research activity, 8 main areas where aquaculture SMEs can expand in terms of products and processes in order to achieve the internationalization and extraversion of their products were identified, namely:

1. **Improvement of the production process** of existing species to reduce production costs or increase production volume or quality.
2. **Diversification** through the breeding of new species, taking into consideration the trends and needs of the market.
3. Development of new processes of raw material **processing and maintenance**.
4. Development of new technologies, processes and practices for the **quality assurance and traceability of products**.
5. Participation in **special production schemes**.
6. Development of **marketing and branding strategies**.
7. Extension of **distribution channels**.
8. Development of **partner networks**.

Based on the survey findings, the expansion areas identified during the initial desk research appear to correspond to the needs of the entire aquaculture value chain. Unsurprisingly, the suggested areas do

not form any type of one-size-fits-all guide for SMEs or policy makers, they merely signify general directions aquaculture SMEs may decide to embark upon based on their individual needs.

#### Development of synergies

Another key finding emerging from the research conducted is the greater need for synergies within the aquaculture sector and between the sector's enterprises and other stakeholders. The development of synergies can enable SMEs to exchange knowledge in various fields, including foreign markets' conditions and rules, and to combine resources to be invested in research and development activities. Hence, such synergies would improve the industry's growth and competitiveness thus boosting its extraversion.

#### Administrative issues as constraints and barriers to growth and extraversion

Finally, several SME and institutional stakeholder representatives pointed out that measures regarding the administrative procedures pertaining to aquaculture, mainly licensing and zoning, are imperative for boosting the sector's growth and consequently its extraversion. The fact that administrative issues are far more important to solve than the technical ones has been pointed out for years by the majority of experts (STECF, 2016).

## 7.2 Recommendations

The key recommendations towards policy makers, institutional stakeholders as well as SMEs emerging from the research are the following:

- SMEs should always consider various factors when exploring new expansion opportunities, these factors may include:
  - o Their main product and its strengths and weaknesses, their products competitive advantages and the barriers to its export.
  - o Their company's strengths and weaknesses in terms of knowledge, skills and specialization etc.
- Access to information is vital to exploring new expansion opportunities. Institutional stakeholders can and should play a central role in the diffusion and exchange of information.
- The development of synergies can facilitate access to new knowledge, skills and specialization as well as resources not available within one company. SMEs as well as other actors (e.g. higher education and research institutions) should be encouraged to participate in such schemes.
- Policies to promote the competitiveness, innovation, and internationalisation of aquaculture value chains should not be limited to offering funding, they should include other supportive measures such training and consultation, international networking or information for third market access.
- Measures regarding the administrative procedures pertaining to aquaculture, mainly licensing and zoning, are imperative for boosting the sector's growth and consequently its extraversion.

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## Annex 1: EXTRA-SMEs A1.2 - SMEs Questionnaire

# EXTRA-SMEs

## AQUACULTURE SMEs & AREAS OF EXPANSION



“Improving policies to boost SME competitiveness and extraversion in EU coastal and rural areas where aquaculture is a driver of the regional economy” (EXTRA-SMEs) is an Interreg Europe project bringing together 8 regions from 7 countries, to achieve the expansion of rural and coastal SMEs in wider markets for the promotion of their products, through simpler and improved administrative

processes, and innovative technologies. The project aims to identify and promote experiences and practices for simpler, improved administrative processes, internationalisation and expansion to broader markets, as well as engaging in innovation processes that will act as drivers for the creation of jobs.

This form is addressed to aquaculture SMEs and other businesses directly involved in the aquaculture value chain in EXTRA-SMEs territories. The survey aims at identifying new products and processes’ potential to improve internationalisation and extraversion among aquaculture SMEs in the EXTRA-SMEs regions. The analysis and synthesis of the collected data will enable regional stakeholders and administration personnel identify new growth opportunities for SMEs in the aquaculture sector.

**Country**

Choose an item.

**Region**

**City/Town**

**Q1.1** Which of the listed categories best describe your business?  
(Please check all that apply)

- Technical
- Biotechnological
- Production
- Processing
- Distribution

**Q2** Please describe your business’ main activities and products below.

**Q3** Is aquaculture your business’ main source of income?

Choose an item.

**Q4** How many employees does your business have in annual full time equivalent labour units?

Choose an item.

<b>Q5</b>	What is your business' annual revenue?	Choose an item.
<b>Q6</b>	In what year was your business established?	
<b>Q7.1</b>	Does your business have any internationally-recognized certification?	Choose an item.
<b>Q7.2</b>	If yes, what type of certification?	Choose an item.
<b>Q8.1</b>	Which of the following is your business' main market?	Choose an item.
<b>Q8.2</b>	In average, what percentage of your business' turnover is generated by sales in foreign markets?	%
<b>Q9.1</b>	During the last three years did your business make any of the following? (Please check all that apply)	
	<input type="checkbox"/> Local Sales	
	<input type="checkbox"/> Regional Sales	
	<input type="checkbox"/> National sales	
	<input type="checkbox"/> Indirect exports within the EU (sold domestically to third party that exports products)	
	<input type="checkbox"/> Direct exports within the EU	
	<input type="checkbox"/> Indirect exports outside the EU (sold domestically to third party that exports products)	
	<input type="checkbox"/> Direct exports outside the EU	
<b>Q9.2</b>	For how many years has your business been undertaking exporting activities?	
<b>Q10</b>	Are you planning to address new markets in the foreseeable future? If yes, please elaborate below.	Choose an item.
<b>Q11</b>	During the last three years, did your business invest on research and development activities, either in-house or by hiring external expertise, excluding market research surveys? If yes, please elaborate below.	Choose an item.
<b>Q12</b>	During the last three years, did this establishment spend on market research, either in-house or contracted with other companies? If yes, please elaborate below.	Choose an item.
<b>Q13.1</b>	During the last three years, has your business introduced any new products and/or processes? If yes, please proceed to questions 13.2 & 13.3.	Choose an item.

---

**Q13.2** Have any of the following been performed by your business during the past three years?

If yes please check the appropriate box.

---

a.  **Improvement of the production process** of existing species to reduce production costs or increase production volume or quality.

---

b.  **Diversification** through the breeding of new species, taking into consideration the trends and needs of the market.

---

c.  Development of new processes of **processing and/or maintenance**.

---

d.  Development of new technologies, processes and practices for the **quality assurance and traceability of products**.

---

e.  Participation in **special production schemes**, such as organic or environmentally and socially responsible production, adhering by the relevant standards and receiving the corresponding certifications.

---

f.  Development of **marketing and branding strategies** by, for instance, creating or participating in, or promoting a regional brand name or highlighting the product's nutritional value.

---

g.  Extension of **distribution channels**.

---

h.  Development of **partner networks** with other businesses.

---

**Q13.3** Please provide examples for your positive responses in the previous questions (Q13.1 & Q13.2)

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**Q14.1** Are you aware of new expansion opportunities in your industry? Choose an item.

---

**Q14.2** If yes, what are your main sources of information?

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---

**Q15.1** Do you collaborate with any of the following stakeholders in your region?

- 
- Regional or local public authorities,
  - Professional bodies,
  - Chambers of commerce,
  - Innovation centers,
-

- 
- Higher education and research institutions
  - Other (please specify)
- 

**Q15.2** Has your business developed innovation synergies with any of the following?

---

- Suppliers,
  - Customers,
  - Businesses within the industry,
  - Businesses outside the industry,
  - Higher education and research institutions,
  - Independent Experts,
  - Other (please specify)
- 

**Q16.1** How would you assess the effectiveness of the following expansion areas with regards to improving the extraversion of your business based on your experience and your general knowledge of the industry?

---

- a. Improvement of the production process** of existing species to reduce production costs or increase production volume or quality. Choose an item.

---

  - b. Diversification** through the breeding of new species, taking into consideration the trends and needs of the market. Choose an item.

---

  - c. Development of new processes of raw material processing and/or maintenance.** Choose an item.

---

  - d. Development of new technologies, processes and practices for the quality assurance and traceability of products.** Choose an item.

---

  - e. Participation in special production schemes,** such as organic or environmentally and socially responsible production, adhering by the relevant standards and receiving the corresponding certifications. Choose an item.

---

  - e. Development of marketing and branding strategies by,** for instance, creating or participating in, or promoting a Choose an item.
-

---

regional brand name or highlighting the product's nutritional value.

---

**f.** Extension of **distribution channels**. Choose an item.

---

**g.** Development of **partner networks** with other businesses. Choose an item.

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**Q16.2** Could you briefly explain your assessment below?

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**Q17** Please suggest any additional areas of expansion that can contribute to the extraversion of the aquaculture SMEs in your region.

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## Annex 2: EXTRA-SMEs A1.2 – Institutional Stakeholders Questionnaire

# EXTRA-SMEs

## AQUACULTURE SMEs & AREAS OF EXPANSION



“Improving policies to boost SME competitiveness and extraversion in EU coastal and rural areas where aquaculture is a driver of the regional economy” (EXTRA-SMEs) is an Interreg Europe project bringing together 8 regions from 7 countries, to achieve the expansion of rural and coastal SMEs in wider markets for the promotion of their products, through simpler and improved administrative

processes, and innovative technologies. The project aims to identify and promote experiences and practices for simpler, improved administrative processes, internationalisation and expansion to broader markets, as well as engaging in innovation processes that will act as drivers for the creation of jobs.

This form is addressed to representatives of organisations relevant to the aquaculture, including representatives of regional or local public authorities, professional bodies, chambers of commerce, innovation centres, higher education and research institutions, in EXTRA-SMEs territories. The survey aims at identifying new products and processes’ potential to improve internationalisation and extraversion among aquaculture SMEs in the EXTRA-SMEs regions. The analysis and synthesis of the collected data will enable regional stakeholders and administration personnel identify new growth opportunities for SMEs in the aquaculture sector.

**Country** Choose an item.

**Region**

**City/town**

**As a representative of which of the following types of organisations/groups would you describe yourself?** Choose an item.

**Please describe the main activities of your organisation relevant to the aquaculture sector below.**

**Q1** How many aquaculture SMEs are active in your region?

**Q2** How many aquaculture SMEs active in your region have sought your services/support?

**Q3** How would you describe your region’s aquaculture SMEs with regards to their extraversion?

a. Do they perform exports? Choose an item.

b. If yes, have there been any recent changes with regards to their exports? Choose an item.

c. Are exports among their strategic priorities? Choose an item.

**Q4.1** Have any of the following been performed by SMEs in your region recently?  
(If yes please check the appropriate box)

a.  **Improvement of the production process** of existing species to reduce production costs or increase production volume or quality.

b.  **Diversification** through the breeding of new species, taking into consideration the trends and needs of the market.

c.  Development of new processes of raw material **processing and/or maintenance**.

d.  Development of new technologies, processes and practices for the **quality assurance and traceability of products**.

e.  Participation in **special production schemes**, such as organic or environmentally and socially responsible production, adhering by the relevant standards and receiving the corresponding certifications.

f.  Development of **marketing and branding strategies** by, for instance, creating or participating in, or promoting a regional brand name or highlighting the product's nutritional value.

g.  Extension of **distribution channels**.

h.  Development of **partner networks** with other businesses.

**Q4.2** Please provide examples for your positive responses in the previous question (Q4.1)

**Q5.1** How would you assess the effectiveness of the following expansion areas with regards to improving the extraversion of your region's aquaculture SMEs?

a. **Improvement of the production process** of existing species to reduce production costs or increase production volume or quality. Choose an item.

b. **Diversification** through the breeding of new species, taking into consideration the trends and needs of the market. Choose an item.

- 
- c.** Development of new processes of raw material **processing and/or maintenance.** Choose an item.
- 
- d.** Development of new technologies, processes and practices for the **quality assurance and traceability of products.** Choose an item.
- 
- e.** Participation in **special production schemes**, such as organic or environmentally and socially responsible production, adhering by the relevant standards and receiving the corresponding certifications. Choose an item.
- 
- e.** Development of **marketing and branding strategies** by, for instance, creating or participating in, or promoting a regional brand name or highlighting the product's nutritional value. Choose an item.
- 
- f.** Extension of **distribution channels.** Choose an item.
- 
- g.** Development of **partner networks** with other businesses. Choose an item.

---

**Q5.2 Could you briefly explain your assessment below?**

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**Q6 Please suggest any additional areas of expansion that can contribute to the extraversion of the aquaculture SMEs in your region.**

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