Collecting economic data on the biostimulants sector is challenging at this stage. The sector is still emerging and being defined. The very lack of a regulatory framework therefore makes it difficult to collect reliable statistics as the definition of biostimulant products currently varies from one country to another, if there is even official recognition of the product category. It is a classic chicken-and-egg situation. In addition, the European Biostimulants Industry Consortium (EBIC) was only formed 5 months ago. It is therefore early days both for convening the sector and for developing a robust statistical methodology for tracking biostimulant products.

In order to begin to composing a picture of the sector, EBIC circulated a questionnaire to its members and external stakeholders. At this stage, the data are qualitative rather than statistical, so all of the figures reported below should be taken as indicative not definitive. They provide a useful, if incomplete, picture of how the biostimulants sector is shaping up.

The biostimulants market is growing quickly, driven by economic and socio-political factors

Information provided by respondents to EBIC’s informal survey indicates that more than 5.5 million hectares are treated with biostimulants in Europe (defined as the European Economic Area) every year. However, these companies only account for a portion of the entire market, so the total area is likely to be much higher. At the same time, multiple applications to the same hectare are counted separately in these figures.

Based on the submissions received by EBIC, the market is growing steadily at 10% or more per year\(^1\), with future growth predicted at the same levels for the foreseeable future.

Another sign of market growth is the number of new users. We asked respondents to indicate how many of their recently acquired farmer customers are new users of biostimulants. Just over half appear to be using biostimulants for the first time. Other customers may be switching from another supplier, but many are also expanding their use of biostimulants (in terms of area treated, range of products and/or types of crops being treated). Because biostimulants have not been widely used in the past, many farmers adopt them on a trial basis on a limited area for one or two growing seasons before scaling up their use. Growth rates between customer numbers and area treated/sales are therefore not related in a linear fashion.

The factors driving this continued growth are multiple:

1. Biostimulant use is spreading from some pioneer countries to a wider number, both within Europe and the rest of the world.
2. The biostimulants sector has developed new innovative products targeting specific agronomic needs, thus attracting new customers.

\(^1\) We calculated compound growth rates on the basis of sales and hectares treated. Most growth rates ranged between 10% and 31% for companies that have been in the biostimulants business for at least the past decade. To avoid distorting our analysis, we excluded growth rates of very young companies, which show an abnormally high rate due in part to the low base at start-up and well as two companies that had a significantly lower annual growth rate over the past decade due to a very strong starting position in 2000.
3. Biostimulant products were initially used primarily in organic production and on high-value fruit and vegetable crops. They are increasingly being introduced in conventional crop production to respond to economic and sustainability imperatives.

4. Recent high and volatile prices for inputs like fertilisers have created incentives for farmers to optimise the efficiency of input use.

5. In response to consumer demands for healthy food products with minimal environmental impacts (and related policies) farmers are looking for ways to use synthetic chemicals and mineral fertilisers more efficiently and effectively. Biostimulants are therefore increasingly seen as a way farmers can improve the return on their investment in other inputs and as a way to respond to consumer demands for “softer” agricultural practices.

**Biostimulant use is quickly becoming generalised**

Historically, biostimulants were applied to high-value crops: mainly protected cultivars in greenhouses, orchards (grapes, citrus, stone fruits, apples, pears) open-field vegetables (tomatoes, salads, etc.) and horticultural products (flowers and ornamentals). In recent years agricultural markets have been undergoing significant changes: high-value crop production in Europe faces lower prices, squeezed between powerful food distribution chains and competition from countries in other regions.

Conversely, the volatility in prices for broadfield crops has transformed low-value crops into high-value crops. Reductions in centralised subsidies mean that European farmers are increasingly operating in a free market. They benefit from the ability to choose which crops to grow but must carefully monitor and manage the return on investment (ROI) for each input they apply. As a result, the market for biostimulants is quickly expanding, even if Europe is only at the beginning of this transformation.

Annex I gives an overview of the diversity of crops to which biostimulants are currently applied in Europe. This includes field crops as well as greenhouse and orchard crops.

**The full economic impact of biostimulants can only be calculated by considering the efficiency gains they provide**

Statistics are too patchy and definitions too variable to accurately estimate the value or volume of the European biostimulants market. We have seen estimates that range from EUR 200 million to EUR 400 million. This range seems consistent with the responses to EBIC’s informal survey, with the sector’s rapid annual growth suggesting that the latter is more accurate. The difference between the two ends of the range might also depend on whether the figure includes only sales to end-users or distributors, or both these sales and the sale of biostimulant substances that could be directly applied but are incorporated into more complex product formulations.

With regard to employment, it is difficult to estimate the total number of jobs until much more exhaustive data can be gathered, because the vast major of biostimulant companies are small and medium enterprises (SMEs). Most of the respondents to EBIC’s questionnaire indicate that they have fewer than 100 employees,

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2 Respondents reported only 20-30 large (>250 employees) companies, with the rest of the sector being SMEs. Some 200 companies have been reported in Europe thus far.
and certainly fewer than 250 FTEs\(^3\) working on biostimulants. Furthermore, a high proportion\(^4\) of biostimulant companies are located outside of dominant economic centres, thus providing a welcome source of knowledge-intensive jobs in rural areas and small cities.

While market value and employment are important figures for determining the economic impact of a sector, two other important criteria must be taken into account in the case of biostimulants: increased efficiency of other agricultural inputs and enhanced quality of output.

Among other beneficial effects, biostimulants can increase nutrient use efficiency so that farmers receive a better return on their investment in fertilisers. This also reduces nutrient losses and the related environmental impacts (and thus the cost of clean-up).

Biostimulants boost general plant vigour so that plants require fewer treatments of plant protection products and respond better to their use.

EBIC members also report that their products raise yields and improve water use efficiency.

All of these benefits have been widely tested and documented in field trials.

It is difficult to generalise because the exact level of the impacts depends on the crop in question, the original state of the soil, how well managed crops already are and a number other factors. However, there is a broad documentation of the effects below:

- Minimum yield increases related to biostimulant use are being reported at 5-10%. When viewed in the light of the overproduction that occurred in Europe in the not-too-distant past, the need for increased productivity may not seem obvious. But the global agricultural situation changed radically in 2008, when markets entered a period of high volatility. The *OECD-FAO Agricultural Outlook: 2001-2020* stresses the need to rebuild stocks to reduce volatility, but also points out that high prices “are a positive signal to a sector that has been experiencing declines in prices expressed in real terms for many decades and are likely to stimulate the investments in improved productivity and increased output needed to meet the rising demands for food” (p.14, emphasis added). There is an increasingly strong consensus that improving agricultural sustainability depends on optimising output on the best arable land and reducing pressure on land that would be better used for other things, including conservation. In the same report, OECD/FAO say that “Land available for agriculture is increasingly constrained...Substantial further investments into productivity enhancements are needed to ensure the sector can meet the rising demands of the future” (p.14, emphasis added). This sustainable intensification is dependent on efficient use of inputs such as nutrients, water and plant protection products, which are fostered by biostimulants use.

- Fertiliser use efficiency is being documented to increase by 5% at a minimum (and may go as high as 25% or more) when biostimulants are applied. Higher efficiency rates generally occur where fertilisers and biostimulants are delivered through precision irrigation (a practice often called fertigation). If the conservative figure (5%) were generalised to the entire EU, it would mean a savings of some 517,000 tonnes of nitrogen fertiliser in a single year.\(^6\)

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\(^3\) FTE = full-time equivalent

\(^4\) According to current information: about 75% of the sector.


\(^6\) Calculated using Ifadata statistics from the International Fertilizer Industry Association.
- Pesticides savings related to biostimulant use have been reported to range between 10 and 15%.
- Quality characteristics such as fruit setting, homogenous colour and increased size are enhanced in some cases by as much as 15% when biostimulants are used. Increased quality has downstream benefits as well: farmers may be able to garner higher prices for their produce, and produce is likely to be more tolerant of storage and handling.

The biostimulants sector is investing significantly in research to meet the needs of this rapidly expanding market

Most of the respondents to EBIC’s questionnaire invest between 3% and 10% of their annual turnover in research and development, with 7-12% of staff involved in R&D. In addition, respondents report almost 150 R&D partnerships with universities and other public research institutes. While most of these are in Europe, they also include partners in Australia, Brazil, Canada, Chile, Ghana, Mexico, New Zealand, Turkey and the United States.

It generally takes 2-5 years to bring new products to market, a significant investment considering how little protection there is to prevent copies/reverse engineering of biostimulant products. Several companies report that 0-10% of their products are patentable. A handful of others report that 60% or more of their products contain some patented element, although this does not mean the product as a whole is protected by patent. In many cases, it is a specific aspect of the production process that is patented. Furthermore, the disclosure requirements of patents can actually make it easier for unscrupulous actors to copy product formulations and processes.
Annex I: Indicative list of some of the crops to which biostimulants are currently applied in Europe

<table>
<thead>
<tr>
<th>Tree &amp; vine crops</th>
<th>Vegetables and other fruits</th>
<th>Cereals, légumes, etc.</th>
<th>Other horticultural crops</th>
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<tbody>
<tr>
<td>Citrus</td>
<td>Broccoli</td>
<td>Onions</td>
<td>Barley</td>
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<td>Pome fruits</td>
<td>Cabbage</td>
<td>Peppers</td>
<td>Maize</td>
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<td>Stone fruits</td>
<td>Carrots</td>
<td>Potato</td>
<td>Rice</td>
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<td>Grapes (table)</td>
<td>Cauliflower</td>
<td>Salad</td>
<td>Wheat</td>
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<td>Grapes (wine)</td>
<td>Cucumber</td>
<td>Squash</td>
<td>Oilseed rape</td>
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<td>Eggplant</td>
<td>Strawberry</td>
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<td>Flowers &amp; ornamentals</td>
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