

# Commentary on the research and socio-economic return of Portugal's participation in GBIF

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Date and place: Lisbon, September 5, 2023.

## Background

The Global Biodiversity Information System (GBIF) – is an international network and data infrastructure funded by the world's governments and aimed at providing anyone, anywhere with open access to data about all types of life on Earth. As of August 2022, GBIF has provided open access to more than 2.2 billion species occurrence records.

Data published through GBIF has been used in more than 7,500 peer-reviewed articles in areas related to climate change, invasive species and impacts on human health. It has played an essential role in assessing the risk of extinction of thousands of species

## Indicators of access to scientific data and results

The 2022 activity report for Portugal produced by the GBIF International Secretariat offers a good general picture of the national community's participation. It can be consulted at [https://www.gbif.org/sites/default/files/gbif\\_analytics/country/PT/GBIF\\_CountryReport\\_PT.pdf](https://www.gbif.org/sites/default/files/gbif_analytics/country/PT/GBIF_CountryReport_PT.pdf).

Additionally, some common indicators of scientific activity are reported. It is worth highlighting the **more than 5000 citations** of data published by Portuguese institutions.

| Indicator (period 2013-2022)  | Value        |
|---|--------------|
| Peer-reviewed scientific articles published by authors affiliated with Portuguese institutions.                                 | 275          |
| Citation in peer-reviewed scientific articles of the use of data published by Portuguese institutions through GBIF              | 5720         |
| Total data downloads made by users based in Portugal  | 13451        |
| Total species occurrence records published for Portugal (includes autonomous regions and maritime area) (in Sep 2023)           | 20 million   |
| Total species occurrence records published by Portuguese institutions (includes autonomous regions and maritime area)           | 18.9 million |
| Number of capacity building projects financed by GBIF with the participation of GBIF Portuguese Node or Portuguese institutions | 9            |

# GBIF Socio-Economic Impact Assessment

The GBIF Governing Board recently requested a socio-economic impact assessment. This was carried out by the independent entity Deloitte Access Economics, having published a report that concludes that **for every euro invested in GBIF there is a direct return of three euros in direct benefits for users and 12 euros for society** <sup>1</sup>.

This result is based on the evaluation through the following components:

- **Investment value (15.4 million euros / year)** – direct expenditure carried out by GBIF and national nodes. This value was estimated at an annual value of 15.4 million euros, with 4.5 million invested by the International Secretariat, whose financing results mainly from the contribution of member countries, and 10.9 million invested in national nodes by the respective countries.
- **Access Value (13 million euros / year)** – value that GBIF users attribute to the possibility of accessing data and analytical tools through GBIF.
- **Efficiency Value (35 million euros / year)** – value that represents the time savings that GBIF represents for users, if they had to carry out the same work without the existence of GBIF. Improving data quality is also relevant in this item.
- **Research Impact Value (185 million euros / year)** – value that the greater quality and availability of data generates through the results of scientific research, policy creation and commercial decision-making. GBIF-mediated data has been used by organizations to combat the impacts of climate change, improve agricultural productivity and food security, and provide new ways to understand and promote biodiversity.

Reading the report in full allows you to understand the *rationale* associated with determining these values, including the limitations of the study.

## Socio-economic impact of GBIF for Portugal

Based on the results obtained in the analysis of the global socio-economic impact of GBIF, it is possible to translate these values into the impact in Portugal, measuring the levels of participation and use of GBIF by the Portuguese community (average for the period 2018-2022). This translation assumes that the values and assumptions used for the global community are representative for the national community.

- **Investment Value (42 thousand euros/year)** – this value includes the average annual value of the international quota paid by FCT (31,800 €) and 20% of an FTE researcher contract, paid by ISA (10,400 €).
- **Access Value (90 thousand euros / year)** – The access value is determined taking into account the average number of data downloads for the period 2018-2022 (1751 downloads) and the

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<sup>1</sup> <https://www2.deloitte.com/au/en/pages/economics/articles/total-economic-value-open-access-database-living-world.html>

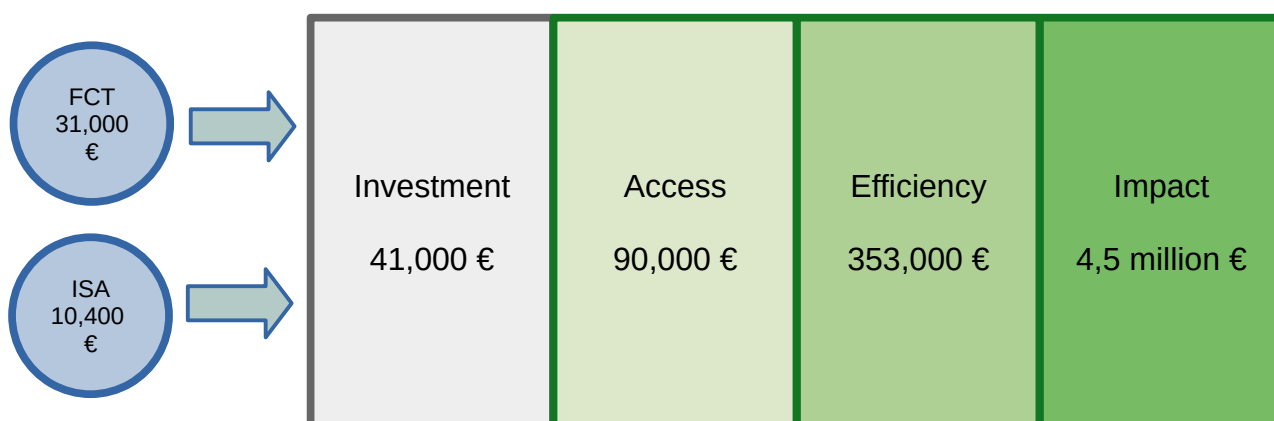
amount that each user would be willing to pay for each download data (51 €). This value was determined through a user survey, in the report mentioned above. Multiplying both factors results in an access value of 90,000 € per year.

- **Efficiency Value (353 thousand euros / year)** – The efficiency value reflects the time saved by a user when carrying out a job, due to the existence of GBIF. The time saved is estimated (based on a survey carried out among users), and this time is translated into a value based on the FTE costs reported by users. The determined value is (1130 € / user / year). Considering that on average, per year, there are 313 users from the national community who use GBIF (who download data), the efficiency value can be determined by multiplying the two factors, which results in a value of 353,000 € / year.

Together, the Access Value and the Efficiency Value are direct benefits for users in the national scientific community. The sum of the two in the national context is 443 thousand euros/year, which represents 10 times the amount invested by the country in GBIF. In relation to the estimated value for the global network (3 euros for every euro invested), there is a greater return (10x) for the national community. However, it is important to highlight that there has been underfunding of GBIF by Portugal, as no investment is made in the national node, in addition to partial support from the node coordinator contract.

- **Research Impact Value (4.5 million euros / year)** – To calculate this parameter for the national context, the number of publications was adopted as a proxy for the impact value. The number of peer-reviewed articles published by authors with Portuguese affiliation represents 3.8% of the total number of articles published that use data published through GBIF. In this way, it is possible to determine what fraction of the impact on society results from the activity of the national community, by multiplying the estimated global value (118 million / year) by that percentage.

The following schema summarizes the annual socio-economic impact of GBIF for Portugal for the period 2018-2022.



# Other non-tangible impacts of GBIF activity for Portugal

## Publication of open data and provision of infrastructure

1. The **Institute for the Conservation of Nature and Forests (ICNF)** became a publisher of open access biodiversity data, thus facilitating access to data by society. This fact is very relevant, as this is, for example, the national entity responsible for managing protected areas and the entity with responsibility for national representation at the COP of the Convention for Biological Diversity (CBD), or for preparing national reports for European Directives related to Nature conservation.

In addition to the above, ICNF developed two very relevant initiatives to promote data accessibility:

- established the Darwin Core data standard profile recommended for publication and archiving, internally and externally, based on the Darwin Core data standard used by GBIF;
- included in the specifications of recent red list projects - mammals, freshwater and migratory fish, invertebrates and plants - the need to organize data in the Darwin Core format, and its publication through GBIF. This requirement aims to facilitate and accelerate the availability of data to society.

2. **EDP - Energias de Portugal**, a private company, is one of the largest publishers of open access data through GBIF, demonstrating that this is also an interesting activity for the business sector. This step was pioneering within the GBIF network. The company uses the GBIF Portugal data infrastructure as a reference repository for mandatory data access.

3. Technicians from the **Regional Government of the Azores** use the Azores Biodiversity Portal as a reference platform for biodiversity data, which is part of the PORBIOTA research infrastructure. The technological platform used to provide and analyse species occurrence data is the Portuguese Biodiversity Data Portal. This was implemented by the GBIF Portuguese Node, based on the Living Atlases platform, a GBIF initiative to facilitate and support the implementation of national data portals based on the Atlas of Living Australia technology. This open source platform was developed by the Australian research infrastructure of the same name, with an investment of more than 5 million Australian dollars, and has benefited more than 15 countries that have already adopted it to support the national data portal.

4. The **Integrated Publishing Toolkit (IPT)** platform was created in open source by GBIF to facilitate data publication by institutions. The Portuguese Node maintains the <http://ipt.gbif.pt> installation, which is used by national institutions to publish their datasets. This installation is accredited by GBIF as a [Data Hosting Center](#), fulfilling a set of requirements for service availability, platform administration, data security and support. The service is based on the IT infrastructure of the Instituto Superior de Agronomia, and currently hosts 299 sets of data published by institutions in Portugal, Angola and São Tomé and Príncipe, totalling more than 9 million records.

## International cooperation

1. Angola became the twentieth African country member of the GBIF network. Portugal facilitated this process, through GBIF's Portuguese Node, in supporting the Ministry of Science and Technology of

Angola in the components of knowledge acquisition, training and structuring of the accession process and national organization <sup>2</sup>.

2. Training activities in information technology for biodiversity have been carried out in CPLP countries, namely in Angola, Brazil <sup>3</sup>and Cape Verde <sup>4</sup>. Furthermore, through mentoring activities and content translation, there were relevant voluntary contributions to GBIF's capacity building programs, namely the Biodiversity Information for Development (BID) program, including participation in training workshops in South Africa (Cape Town) and Cameroon (Yaounde).

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<sup>2</sup> <https://www.gbif.pt/node/470?language=pt-pt>

<sup>3</sup> <https://www.gbif.pt/cursoSpecify>

<sup>4</sup> <https://www.gbif.pt/cursoCV?language=pt-pt>