

METADATA PATENTS

Background

Patents are a key measure of innovation output, as patent indicators reflect the inventive performance of countries, regions, technologies, firms, etc. The contents of patent documents are a rich source of information (on the applicant, inventor, technology category, claims, etc.) and cover a broad range of technologies on which there are sometimes few other sources of data. The OECD's patent indicators presented here are designed to reflect activities around fisheries and aquaculture technologies development.

Patent data, however, should be interpreted with caution. For instance, country coverage is an important piece of information to assess patenting trends in the world. Although coverage of OECD countries is generally complete, some gaps exist¹, and particularly so with respect to developing countries for whom the coverage varies most.

Abstract

The OECD FISH Unit, in collaboration with the Environment Directorate and the Directorate for Science, Technology and Innovation, has developed patent-based innovation indicators that are suitable for tracking developments in fisheries-related technologies.

The search strategy for fisheries and aquaculture related technologies adopts a mixed solution with a definition of the technical field of interest in fisheries and aquaculture innovation complemented by keywords, e.g. by looking for keywords in the International Patent Classification (IPC) codes and checking manually the relevance of the results in the text of patents (in the title, the abstract, etc.). Technology domains are detailed in Annex attached below.

The indicators allow the assessment of countries' and firms' innovative performance as well as the design of governments' fisheries, aquaculture and innovation policies.

For more information on patent data and other work on patent statistics at the OECD, see:

- [Measuring environmental innovation using patent data](#)
- [The use of patent statistics for international comparisons and analysis of narrow technological fields](#)
- *Measuring Patent Quality - Indicators of Technological and Economic Value*
- [Fisheries and aquaculture innovation portal](#)

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Data source(s) used

¹ Notably for Japan, France (with missing coverage on the country of residence of inventors in some years), Chile (1980-2004 and 2009 are not covered at all, 2005 and 2008 only partly) and developing countries

The patent statistics presented here are constructed using data extracted from the *Worldwide Patent Statistical Database* (PATSTAT) of the European Patent Office (EPO) using algorithms developed by the OECD. Statistics have been compiled according to the methodology presented on the *OECD Patent Statistics Manual* (<http://www.oecd.org/sti/inno/oecdpatentsstatisticsmanual.htm>).

The data are downloaded on a weekly basis from EPO website (epoline® database), and they are loaded into the OECD database system at least twice a year. Data here have been extracted in April 2015.

Indicator of technology development

Variables collected

The dataset **Indicator of technology development** provides the number of inventions (*simple patent families*) developed by country's inventors, independent of the jurisdictions where patent protection is sought (*i.e.* all known patent families worldwide are considered).

The indicator is disaggregated by:

- **Inventor country** - country of residence of the inventor(s), fractional counted; *e.g.* for a patent listing inventors from two different countries, each country will obtain a count of 0.5, to avoid double-counting of inventions;
- **Family size** – the number of countries where the patent application has been filed, including the first patent application and all the subsequent patents applications filed in order to extend the geographical coverage of protection. Family size "1 and greater" means that the invention is protected in at least one country and as such this category includes all patents, many of them protecting low-value inventions, for which data are available worldwide. Indeed, it is interesting to notice that the protected size of a patent family has been found to be correlated with the value of the invention. Studies in this field exploit the fact that it is expensive to holders to maintain patent protection in additional countries. Hence it is hypothesised that the value of expanding it the coverage geographically is associated with the economic importance of the invention. Family size "2 and greater" will count inventions that have sought patent protection in at least two countries, and so on.
- **Technology domain** – the three main areas of innovation in fisheries and aquaculture, related to technology development. In detail:
 1. **Harvesting technology** such as more effective ways to find or harvest fish and which are typically associated with improvements in catch per unit of effort (*e.g.* type/size of vessels and their methods of propulsion, search technologies, method of catching or harvesting fish and bringing them on board);
 2. **Aquaculture technology** such as methods to more effectively grow fish in captivity (innovation in feeds, improving the health of aquaculture animals, etc.);
 3. **New products and markets** such as the development of new fish products and markets (food technologies/processing such as the development of surimi as a crabmeat substitute) and the improvement of market access (secure or enlarge markets for fish products) that provides important incentives for green growth (*e.g.* eco-certification with fishers adopting by-catch saving technologies or modifying fishing practices and/or territorial user rights in fisheries).

Note that the total count for aggregate technological domains is provided separately to avoid double-counting of inventions. For example, the count of "selected fisheries-related technologies" is less or equal to the sum of its sub-components (*Harvesting technology, Aquaculture technology and New products and markets*). This is because patents are commonly classified in more than one

technology class. Therefore each patent (invention) is counted only once when aggregating across technological domains.

Key statistical concept

The patent statistics presented here are constructed using data extracted from the *Worldwide Patent Statistical Database* (PATSTAT) of the European Patent Office (EPO) using algorithms developed by the OECD. Statistics have been compiled according to the methodology presented on the *OECD Patent Statistics Manual* (<http://www.oecd.org/sti/inno/oecdpatentstatisticsmanual.htm>).

Consistent with other patent statistics provided in OECD.Stat, only published applications for *patents of invention* are considered (*i.e.* excluding utility models, petty patents, *etc.*).

The relevant patent documents are identified using search strategies for fisheries-related technologies based on the methodology developed by the Environment Directorate. They allow identifying technologies relevant to the following three domains: *Harvesting or fishing technologies*, *Aquaculture technologies* and *New products and markets*.

The development and global diffusion of fisheries-related technologies is key for cost-efficient achievement of sustainable policy objectives. Consequently the statistics presented here are based on the concept of a *patent family* which is defined as all patent applications filed in different countries and protecting the same invention (or *priority* as defined by the Paris Convention). They are also referred to as *simple patent family* (For further details, see Martinez 2010, *Insight into different types of patent families*, <http://www.oecd.org/sti/inno/44604939.pdf>).

At its most basic, the family comprises a priority patent application, which is the first application filed to protect the invention, generally in the inventor's country, and all subsequent patent applications that relate to it. Subsequent patent applications are filed in other countries one year after the priority patent application in order to extend the geographical coverage of protection.

If in the subsequent patent applications, the priority filing date is kept, we refer to them as *equivalent patents*; if instead in each subsequent patent application the application date is preferred, then we talk about *simple patent families*.

A patent can be attributed to the applicant (the patentee at the date of application) or the inventor or the country where it has been filed first (priority application).

Regarding the attribution of dates, a patent has several of them: the priority filing date (*i.e.* first patent application worldwide, normally done in the inventor's country), the date of application in a given country (*i.e.* subsequent patent applications, to extend the coverage of protection), the date of publication, or the date of grant. Depending on the selection made, the resulting indicators will give substantially different results. The statistics presented here are based on the priority filing date, which is the first filing date worldwide (under the Paris Convention) and it is considered to be the closest to the actual date of invention.

Indicator of technology diffusion

Variables collected

The dataset **Indicator of technology diffusion** provides the number of inventions that seek patent protection through national, regional or international routes (equivalents of the priority application, pertaining to the same *simple patent family*) in a given jurisdiction. It shows the extent to which firms and individuals seek to "protect" the relevant markets for their inventions (including both domestic and foreign inventions). The indicator is disaggregated by:

- **Patent office** - integer counts of patent applications deposited in different geographic jurisdictions (national and regional application authorities);
- **Coverage** – this is estimated as the proportion of months in a year with the evidence of at least one patent document deposited at the patent office, based on the bibliographic information provided by the EPO concerning the contents of the master database from which PATSTAT is drawn; it allows displaying statistics based on all available data ("full dataset, with no restriction on coverage") or only for offices with data availability above a certain threshold (90%) in a given year ("conservative coverage"). While for most OECD countries data availability is complete, this distinction might be important particularly for some non-OECD countries; low coverage might underestimate actual performance. The geographical scope of protection, as reflected in international patent grants for a given invention, reflects the market coverage of an invention: the higher the number of countries in which protection has been sought, the greater the potential for commercialisation and profit. However, it does potentially compromise our ability to identify inventions that have sought protection only in one jurisdiction (singletons) with incomplete coverage, or duplicate applications of foreign patents (duplicates) registered in jurisdictions with incomplete coverage. While country coverage is an important piece of information to assess patenting trends in general, it is particularly so with respect to developing countries for whom the coverage varies most.
- **Technology domain** – the three main areas of innovation in fisheries and aquaculture, related to technology development. In detail:
 1. **Harvesting technology** such as more effective ways to find or harvest fish and which are typically associated with improvements in catch per unit of effort (e.g. type/size of vessels and their methods of propulsion, search technologies, method of catching or harvesting fish and bringing them on board);
 2. **Aquaculture technology** such as methods to more effectively grow fish in captivity (innovation in feeds, improving the health of aquaculture animals, etc.);
 3. **New products and markets** such as the development of new fish products and markets (food technologies/processing such as the development of surimi as a crabmeat substitute) and the improvement of market access (secure or enlarge markets for fish products) that provides important incentives for green growth (e.g. eco-certification with fishers adopting by-catch saving technologies or modifying fishing practices and/or territorial user rights in fisheries).

Note that the total count for aggregate technological domains is provided separately to avoid double-counting of inventions. For example, the count of "selected fisheries-related technologies" is less or equal to the sum of its sub-components (*Harvesting technology*, *Aquaculture technology* and *New products and markets*). This is because patents are commonly classified in more than one technology class. Therefore each patent (invention) is counted only once when aggregating across technological domains.

Key statistical concept

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The relevant patent documents are identified using search strategies for fisheries-related technologies based on the methodology developed by the Environment Directorate. They allow identifying technologies relevant to the following three domains: *Harvesting or fishing technologies*, *Aquaculture technologies* and *New products and markets*.

The development and global diffusion of fisheries-related technologies is key for cost-efficient achievement of sustainable policy objectives. Consequently the statistics presented here are based on the concept of a *patent family* which is defined as all patent applications filed in different countries and protecting the same invention (or *priority* as defined by the Paris Convention). They are also

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A patent can be attributed to the applicant (the patentee at the date of application) or the inventor or the country where it has been filed first (priority application).

Regarding the attribution of dates, a patent has several of them: the priority filing date (*i.e.* first patent application worldwide, normally done in the inventor's country), the date of application in a given country (*i.e.* subsequent patent applications, to extend the coverage of protection), the date of publication, or the date of grant. Depending on the selection made, the resulting indicators will give substantially different results. The statistics presented here are based on the application date, *i.e.* the date of patent application filing with a given patent office.

Indicator of international collaboration in technology development (bilateral)

Variables collected

The dataset provides Indicator of international collaboration in technology development (bilateral) the number of co-inventions (*simple patent families*) developed jointly by at least two inventors. This indicator is disaggregated by:

- Country - country of residence of the inventor(s), integral counted; in cases when inventors from more than two countries collaborate, this is translated into distinct bilateral relationships between country pairs. For example, if inventors from 3 countries collaborate (e.g. USA, DEU, JPN) then a unit count is assigned to 3 country pairs (USA-DEU, DEU-JPN, JPN-USA); in this case a country generally coordinate the project and the others are partners.
- Partner – country of residence of the inventor(s) who collaborate to the patent.
- Technology domain – the three main areas of innovation in fisheries and aquaculture, related to technology development. In detail:
 1. Harvesting technology such as more effective ways to find or harvest fish and which are typically associated with improvements in catch per unit of effort (*e.g.* type/size of vessels and their methods of propulsion, search technologies, method of catching or harvesting fish and bringing them on board);
 2. Aquaculture technology such as methods to more effectively grow fish in captivity (innovation in feeds, improving the health of aquaculture animals, etc.);
 3. New products and markets such as the development of new fish products and markets (food technologies/processing such as the development of surimi as a crabmeat substitute) and the improvement of market access (secure or enlarge markets for fish products) that provides important incentives for green growth (*e.g.* eco-certification with fishers adopting by-catch saving technologies or modifying fishing practices and/or territorial user rights in

fisheries).

Key statistical concept

The patent statistics presented here are constructed using data extracted from the *Worldwide Patent Statistical Database (PATSTAT)* of the European Patent Office (EPO) using algorithms developed by the OECD. Statistics have been compiled according to the methodology presented on the *OECD Patent Statistics Manual* (<http://www.oecd.org/sti/inno/oecdpatentstatisticsmanual.htm>).

Consistent with other patent statistics provided in OECD.Stat, only published applications for *patents of invention* are considered (*i.e.* excluding utility models, petty patents, *etc.*).

The relevant patent documents are identified using search strategies for fisheries-related technologies based on the methodology developed by the Environment Directorate. They allow identifying technologies relevant to the following three domains: *Harvesting or fishing technologies*, *Aquaculture technologies* and *New products and markets*.

The development and global diffusion of fisheries-related technologies is key for cost-efficient achievement of sustainable policy objectives. Consequently the statistics presented here are based on the concept of a *patent family* which is defined as all patent applications filed in different countries and protecting the same invention (or *priority* as defined by the Paris Convention). They are also referred to as *simple patent family* (For further details, see Martinez 2010, *Insight into different types of patent families*, <http://www.oecd.org/sti/inno/44604939.pdf>).

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Indicator of international collaboration in technology development (rates)

Variables collected

The dataset Indicator of international collaboration in technology development (rates) provides the number of co-inventions (*simple patent families*) developed jointly by at least two inventors:

This indicator is disaggregated by:

- Country - country of residence of the inventor(s), integral counted;

• Variables – the total number of co-inventions, and the percentage of co-inventions developed within-country (all inventors from the same country), with foreign inventors, with inventors only from OECD countries, and with at least one inventor from BRICS countries.

• Technology domain – the three main areas of innovation in fisheries and aquaculture, related to technology development. In detail:

1. Harvesting technology such as more effective ways to find or harvest fish and which are typically associated with improvements in catch per unit of effort (e.g. type/size of vessels and their methods of propulsion, search technologies, method of catching or harvesting fish and bringing them on board);
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Key statistical concept

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The development and global diffusion of fisheries-related technologies is key for cost-efficient achievement of sustainable policy objectives. Consequently the statistics presented here are based on the concept of a *patent family* which is defined as all patent applications filed in different countries and protecting the same invention (or *priority* as defined by the Paris Convention). They are also referred to as *simple patent family* (For further details, see Martinez 2010, *Insight into different types of patent families*, <http://www.oecd.org/sti/inno/44604939.pdf>).

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Annexe:

AQUACULTURE TECHNOLOGY

- A01K61/00 Culture of fish, mussels, crayfish, lobsters, sponges, pearls or the like
- A01K63/00 Receptacles for live fish, e.g. aquaria
- A01K67/00 Rearing or breeding animals, not otherwise provided for; New breeds of animals
- A23K1/00 Animal feeding-stuffs for aquatic animals, e.g. fish, crustaceans, molluscs

HARVESTING TECHNOLOGY

- A01K65/00 Fish stringers; Pisciculture
- A01K69/00 Stationary catching devices
- A01K71/00 Floating nets
- A01K73/00 Drawn nets
- A01K74/00 Other catching nets or the like
- A01K75/00 Accessories for nets; Details of nets, e.g. structure
- A01K77/00 Landing-nets; Landing-spoons
- A01K79/00 Methods or means of catching fish in bulk not provided for in groups A01K69/00 to A01K77/00, e.g. fish pumps; Detection of fish; Whale fishery
- A01K80/00 Harvesting oysters, mussels, sponges or the like, e.g. drags, clam diggers, marine life collectors
- A01K81/00 Fishing with projectiles
- A01K83/00 Fish-hooks
- A01K85/00 Artificial baits
- A01K87/00 Rods [2013-01]D
- A01K89/00 Reels
- A01K91/00 Lines
- A01K93/00 Floats for angling, with or without signalling devices
- A01K95/00 Sinkers for angling
- A01K97/00 Accessories for angling
- A01K99/00 Methods or apparatus for fishing not provided for in groups A01K69/00 to A01K97/00
- G01S 15/00 Systems using the reflection or reradiation of acoustic waves, e.g. sonar systems
- B63B 35/00 Vessels or like floating structures adapted for special purposes

NEW PRODUCTS AND MARKETS (food technology/processing)

- A22C25/00** Processing fish; Curing of fish; Stunning of fish by electric current; Investigating fish by optical means
- A22C29/00** Processing shellfish or bivalves, e.g. oysters, lobsters; Devices therefor, e.g. claw locks, claw crushers, grading devices; Processing lines
- A23J1/00** Obtaining protein compositions for foodstuffs; Bulk opening of eggs and separation of yolks from whites
- A23L1/00** Foods or foodstuffs; Their preparation or treatment
- C05F 1/00** Fertilisers made from animal corpses, or parts thereof from fish or from fish-wastes