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Environment & Agriculture
Key Figures – 2018 Edition

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Contents

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Contributor

SP

Sandrine **Parisse**

Project manager
agriculture and sylviculture

sandrine.parisse@developpement-durable.gouv.fr

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Foreword

Based on the existing framework of indicators, both European (Eurostat) and international (OECD, FAO), this publication will present a panorama to facilitate improved understanding of the issues pertaining to French agriculture and its interaction with the environment.
This document is the fruit of a partnership between the Data and Statistical Studies Department and the other services and general directorates of the ministries responsible for the Environment, Agriculture (SSP) and Health. Other organisations: Ademe, Agence Bio, Standing Committee of Chambers of Agriculture, Idele and Ineris also contributed to the drafting of the report.

— Sylvain Moreau
DEPARTMENT HEAD of SERVICE DE LA DONNÉE ET DES ÉTUDES STATISTIQUES (SDES)/DATA AND STATISTICAL STUDIES

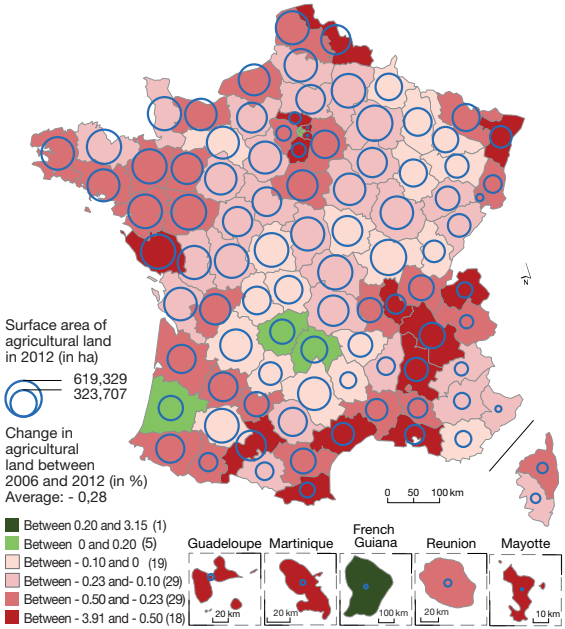
Part 1

Contextual data

— In a context in which the area of agricultural land is decreasing in favour of artificialisation, the number of farms is decreasing and the average area per farm continues to rise. Areas of arable land are increasing at the expense of permanent grazing land.
Despite increasing agricultural production, the added value share of agricultural products is shrinking, with a higher proportion of intermediary consumption.
The view held by the French public of the agricultural world is generally positive, except for the risks linked to pesticides and air pollution.

Loss of agricultural land

LOSS OF AGRICULTURAL LAND BY DEPARTMENT BETWEEN 2006 AND 2012



Note: for French Guiana, only 10% of the territory was studied by CORINE Land Cover (CLC).
***Source:** UE–SDES, CORINE Land Cover 2006, 2006 revised and 2012.*
Statistical Processing: SDES, 2017

Analysis

In 2012, according to the CORINE Land Cover database, nearly 60% of the surface area of metropolitan France was being used for agriculture (33 million hectares – Mha), 34% for forests and semi-natural environments (19 Mha), while just under 6% corresponded to artificialised land (3 Mha).

The vast majority (78%) of changes in land occupation posts observed between 2006 and 2012 concerned agricultural land, which most often gave way to artificialised land. Of these changes, 47% affected arable land, while permanent crops represented only 3%. In all, 97,483 ha of agricultural land changed in function between 2006 and 2012.

Regarding reallocations within agricultural land over the same period, the conversion of prairies into arable land (10,860 ha) was the primary change.

The loss of agricultural land can be attributed to a variety of factors: population growth, attractiveness to tourists, increased urbanisation and the abandonment of agricultural land.

Between 2006 and 2012, 50% of the loss of agricultural land was concentrated within 22 departments for a total of 72,311 ha. Only four departments experienced a slight increase (Corrèze, Cantal and Landes), or a considerable increase (French Guiana), in their agricultural land. This can be attributed to compensating for the loss of agricultural land by encroaching upon forest land (1,500 ha for French Guiana), or more rarely upon artificialised land.

In Europe

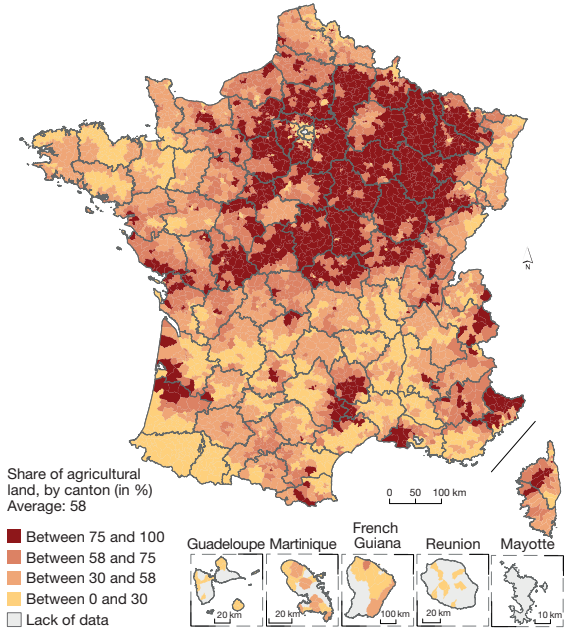
As an absolute value, the loss of agricultural land over all 28 countries of the EU was 114 000 ha/year between 1990 and 2000, 102 000 ha/year between 2000 and 2006, and 98 500 ha/year between 2006 and 2012 (source: CLC 1990, 2000, 2006 et 2012).

To find out more

- *Atlas régional de l'occupation des sols en France (CLC)*, CGDD/SOeS, *Datalab*, October 2016, 168 p.
- *L'occupation des sols en France : progression plus modérée de l'artificialisation entre 2006 et 2012*, CGDD/SOeS, *Le point sur*, n° 219, December 2015, 4 p.

Size of farms

SHARE OF AGRICULTURAL AREAS OF FARMS COMPRISING 100 HA OR MORE PER MUNICIPALITY IN 2010



Source: *Agreste, agricultural survey 2010. Statistical Processing: SDES, 2017*

Analysis

In 2013 in metropolitan France, the agriculture industry comprised 452 000 farms for a utilised agricultural area (UAA) of 28.7 million hectares (ha), i.e. half of the total surface area of the territory.

Since 1988, while the number of farms declined by more than half, the UAA decreased by 9%. A portion of this reduction is therefore accompanied by an increase in size of the remaining farms. In 2013, farms in metropolitan France utilised 61 ha on average (compared with 28 ha in 1988).

At the same time, the total number of agricultural full-time equivalent (FTE) jobs declined by nearly half within metropolitan France. In 2014, 722 000 agricultural FTEs were counted.

The Central, Parisian Basin, and Eastern France regions contain the largest farms by surface area. The average UAA per farm in Île-de-France, Lorraine, and Picardie is greater than 100 ha. On the other hand, that of Languedoc-Roussillon and of the Provence-Alpes-Côte d'Azur region is around 37 ha per farm.

Within the overseas territories (Antilles, Reunion and French Guiana), which contain 24 000 farms, 32 000 FTEs farmed 123 000 ha of UAA in 2013. The farms have a total surface area of between 4 and 8 ha on average, depending on the department.

In Europe

There were 10.8 million farms across all 28 EU Member States in 2013. The average size of a European farm was 16 ha. It stood at 4 ha in Romania and 92 ha in the United Kingdom.

To find out more

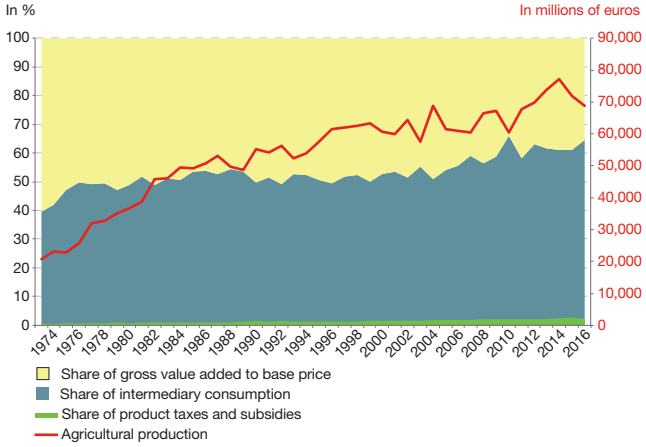
- Data and Statistical Studies Department

L'essentiel sur > Agriculture

- Graphagri2017

Value added in agriculture

CHANGE IN AGRICULTURAL PRODUCTION AND ITS COMPONENT PARTS BETWEEN 1973 AND 2016



Scope: All of France.
Source: *Eurostat, Comptes économiques de l'agriculture – valeurs aux prix de l'année précédente. Statistical Processing: SDES, 2017*

Analysis

The value of agricultural production, recorded in the Agricultural Economic Accounts, includes those of plant production, animal production and agricultural services. It reflects both product volume and the cost of agricultural production.

This value has been increasing continuously since 1973 at an average rate of around 5% per year, with a period of relative stagnation between 1996 and 2010. This change is characterised by more services and lower animal production: between 1990 and 2016, services – which represent 6.5% of the total – grew by 160%, animal production by 14% and plant production by 25%.

Agricultural production consists of the gross value added, intermediary consumption, and taxes and subsidies (the proportion of which has been constant over 40 years, varying between 2 and 3%).

Between 1990 and 2016, the gross value added to the base price fell by 12%. Intermediate consumption, representing the value of goods and services consumed over the course of the production process, increased by 63% over the same period.

The share of intermediate consumption in agricultural production, including all farm types, increased significantly from 41% in 1973 to 50% in 1992, reaching 66% in 2016. The distribution of intermediate consumption has remained stable since 1980. Animal feed represents one third of intermediate consumption. The categories "fertilisers and soil additives", "energy and lubricants" and "crop protection products" represent 9%, 8% and 7% respectively of intermediate consumption.

To find out more

- Eurostat

Agricultural production, price indices and agricultural income

- Graphagri2017

Supply costs

CHANGE IN AVERAGE SUMS OF CERTAIN EXPENSES PER FARM AND PER HECTARE

In €/ha

Note: the scope of observation of the farm accountancy data network (FADN) includes land farmed by farmers who keep accounts and possess a certain level of economic means. These farms should cover more than 95% of the country's agricultural economic potential. In practice, these are farms in which the standard gross production is at least 25,000 euros in metropolitan France.
Scope: metropolitan France.
***Source:** Agreste, FADN. Statistical Processing: SDES, 2017*

Analysis

In 2015, each farm within metropolitan France that was observed by the farm accountancy data network (FADN) spent an average of 2 220 euros in costs per hectare (€/ha). For the past 30 years, this sum – 1 610 €/ha in 1988 – has been constantly on the rise, with 2015 displaying a slight drop compared with the two previous years.

Of the supply costs (45 billion euros excluding VAT, i.e. €77,150 on average per farm), animal feed represented over one third of expenses, an average of €28,000 per farm. Next, in descending order and on average per farm, were fertilisers (€13,530), crop protection products (€10,780), seeds and plants (€8,430), fuels and lubricants (€5,680), and veterinary expenses (€3,180).

For farms specialising in the production of grains, oil seeds and protein crops, the supply costs are essentially linked to crop management: the purchase of fertilisers and soil additives, as well as crop protection products, represents 70% of these costs at €47,000 per farm.

For farms specialising in dairy cows, half of the supply costs go towards feeding the livestock, with an average of €38,000 per farm. These costs increased by 58% between 2010 and 2015 due to changes in grain prices.

Similarly, an upward trend in fuel and lubricant spending is observed, in line with the price of petrol.

To find out more

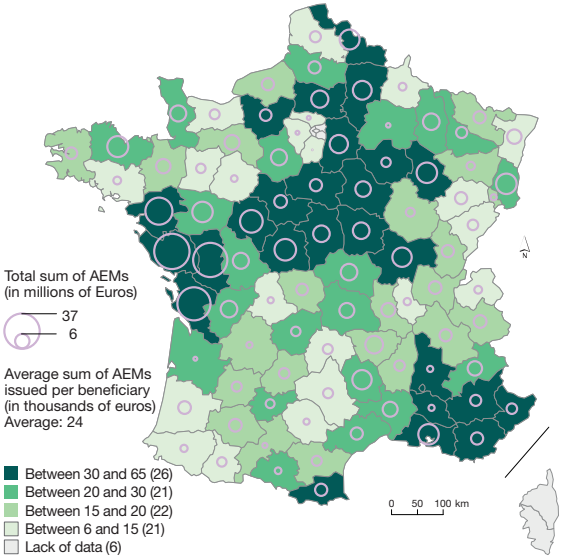
- Agreste

Farm Accountancy Data Network (FADN)

- Graphagri2017
- *The agricultural forecast accounts for 2015*, Insee, *Insee Première*, n° 1577, December 2015

Agri-Environmental Measures (AEMs)

SUMS ALLOCATED UNDER LOCALISED AEMS WITHIN THE PDRH BY DEPARTMENT BETWEEN 2007 AND 2013



Notes: LAEM = localised agri-environment measure; PDRH = Development Programme for Rural France.
***Sources:** Payment services agency (PSA); Observatory of Rural Development (ORD). Statistical Processing: ORD, 2016; SDES, 2018*

Analysis

The Common Agricultural Policy (CAP) implemented on an EU-wide scale since 1962 is founded upon two pillars. The first concerns support for production and the organisation of the market, while the second pertains to rural development. In metropolitan France, during the 2007-2013 period, this policy was implemented through the Development Programme for Metropolitan France (PDRH), comprising a national initiative as well as regional elements. The primary regional tool used in this programme is composed of agri-environment measures (AEMs) aimed at encouraging participating farmers to protect and promote the environment.

During the 2007-2013 period, AEMs (national initiative and regional elements) mobilised 2.5 billion euros, of which 58% were European funds. Among these AEMs, localised AEMs have been created with regionally targeted specifications so as to respond to two priority challenges:

- the “Biodiversity” challenge within Natura 2000 sites, representing 51% of contracted areas;
- the “Water” challenge in priority basins under the Water Framework Directive (WFD), representing 37% of areas.

9% of the remaining surfaces concern other challenges: biodiversity (outside of Natura 2000 sites), erosion, fire defence, and landscapes.

Between 2007 and 2013, 23 522 farms (4.8%) signed a 5-year localised AEM contract for funding amounting to a total of 567 million euros, an average sum of 24 000 euros per beneficiary. This sum varied from 6 000 euros in Essonne to 65 000 in Seine-et-Marne.

In the programme that followed, the localised AEMs were replaced by agri-environment-climate measures (AECMs), which introduced measures that were applicable on the farming system-wide scale.

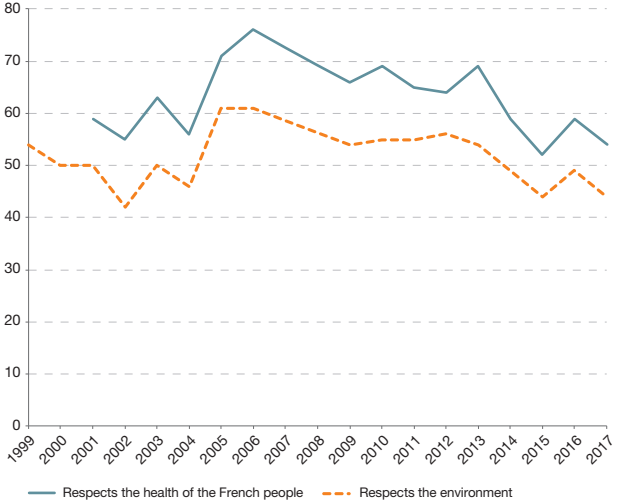
To find out more

- Graphagri2017

Opinion of French people towards agriculture

PERCEPTION OF FARMERS BY THE FRENCH PEOPLE

Proportion of surveyed population (in %)



Notes: The question was: "Please tell me how representative each of the following qualifying statements is of your view of farmers". The curves in the graph indicate the evolution in the "Very representative" response; sample representative of the French population: 1 000 individuals aged 18 or over in metropolitan France.
***Sources:** IFOP (French Institute of Public Opinion) for Western France: barometer of views on farmers. Statistical Processing: SDES, 2017*

Analysis

Over the course of the past fifteen years, the opinion of the French people towards the farming sector has proven to be largely positive. On average, 63% of respondents considered farmers to be respectful of the health of French people, and 76% believed that consumers could trust them. Regarding the impact of farming activities on our natural surroundings, opinions were more divided: On average, 52% of those asked over the 1999-2016 period believed that farmers respected the environment.

After falling 12 points between 2012 and 2015, the proportion of French people who believed the agricultural sector respected the environment briefly rose in 2016 before dropping again the following year. From this point on, fewer than one in two respondents believed that farmers were considerate of the environment, while 61% of French people had held this opinion in 2006.

This deterioration in the view taken of farmers goes hand in hand with the trend observed in the annual barometer carried out by the French Institute of Nuclear Protection and Safety (IRSN) over the 2010-2014 period. 65% of respondents in this survey considered pesticides to be a source of increased risk for the population. Among the environmental hazards listed in this barometer, the use of these products was a top-ranking concern, at the same level as air pollution.

In Europe

In 2016, the two countries in which public opinion was most convinced that "protecting the environment" was one of the "main responsibilities of farmers in our society" were Denmark (44%) and France (40%).
The Europe-wide average was 30% (source: Eurobarometer).

To find out more

- IFOP barometer on the image of farmers
- IRSN barometer on the perception of hazards and safety by French people
- Eurobarometer n° 440 on Europeans and agriculture

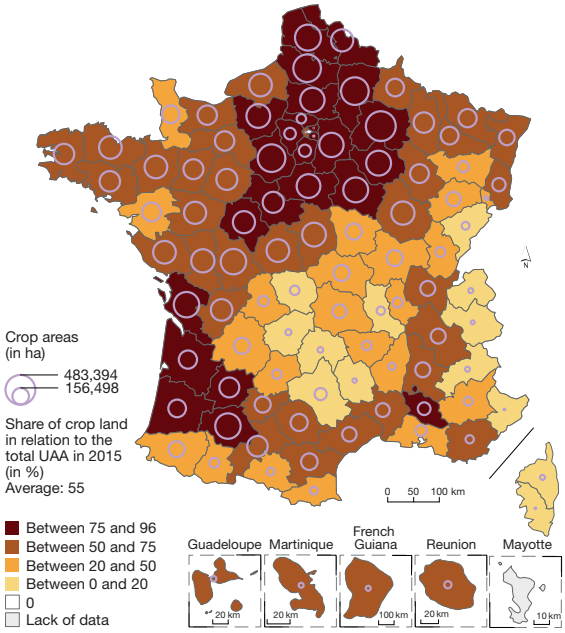
Part 2

Agriculture: which environmental pressures?

— Over recent decades, the surface area of cultivated land has been increasing at the expense of permanent grazing land.
The cultivation of GMO crops is prohibited on French territory, but new mutagenesis and cell fusion techniques are not affected by this ban.
Water abstraction for agricultural use has remained stable since 2000 and is primarily used in the irrigation of 5% of the utilised agricultural area (UAA), particularly maize cultivation.
The nitrogen balance continues to present a high surplus, while the phosphorus balance has improved drastically over the past 15 years.
Western France possesses the highest number of intensive livestock farms, and only 20% of the UAA is treated with the spreading of livestock effluents.
Despite a plan to reduce the use of pesticides, the upward trend continues. France has implemented a system for the collection and treatment of agricultural waste, which makes it possible to recycle 92% of waste collected.

Farmed areas

CULTIVATED LAND BY DEPARTMENT IN 2015



Note: cultivated land = arable land + permanent crops excluding permanent grazing land – excluding fallow land – excluding artificial and temporary prairies.
***Source:** 2015 annual agricultural statistics, 2010 agricultural survey (for Martinique and French Guiana). Statistical Processing: SDES, 2016*

Analysis

Since 1950, while the utilised agricultural area (UAA) has been declining in France (-17%), the area of field crops is increasing (+11%). In 2015, cultivated land (84% composed of field crops) represented 15.6 million hectares within France, equating to 58.2% of the total UAA, compared with 56.6% in 2010.

Cultivated land surfaces have increased by 2.1% during the same period, up to 20% in Haute-Vienne. They declined predominantly in south-eastern France. In France's overseas departments, these areas remained relatively stable.

Independently of the global trends that characterise French agriculture (decrease in UAA, increase in field crops, particularly grains, at the expense of prairies), the distribution of cultivated land remains linked above all to the type of soil, particularly soil depth. Very deep soils (> 100m) located in loamy formations within the Artois-Picardie, Parisian, and Aquitaine basins are the best suited to agriculture, and therefore coincide with the most heavily cultivated areas. The same is true of the deeps soils in the ancient crystalline massifs (Armorican massif), as well as in Champagne.

Conversely, the least represented portion of cultivated land can be found in the mountainous regions, where the soils are shallower, often sloping, and subject to a cooler, wetter climate (Massif central, Vosges, Jura, Corsica).

In the Var, and in the Mediterranean rim in general, fruit crops are well suited to the soils, which are rich in organic matter, while vines are found in soil that is less fertile and higher in limestone content.

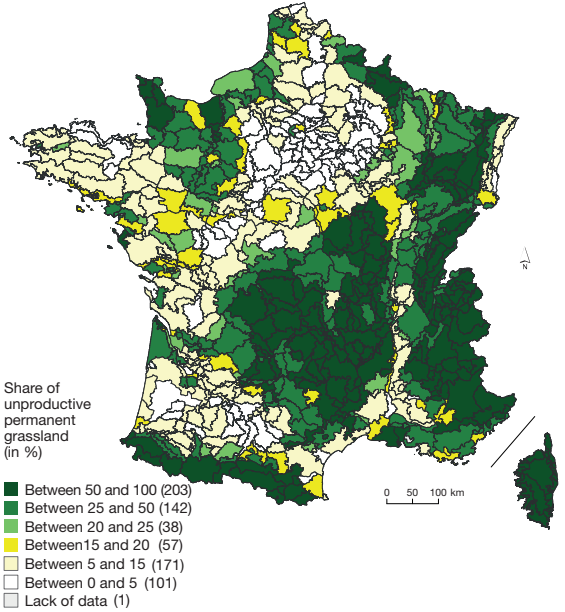
There is also a link between lower carbon stocks and intensive cultivation zones, and between higher carbon stocks and mountainous and forest zones.

To find out more

- Graphagri2017
- GIS SOL – Soils depth in metropolitan France
- *Report on soil conditions in France*, Soil scientific interest group, November 2011, 192 p.

Location of “expansive permanent grazing zones”

SHARE OF UNPRODUCTIVE PERMANENT GRASSLAND IN SMALL AGRICULTURAL REGIONS IN 2010



Note: permanent prairies within farms are counted, as are collective surfaces.
***Source:** French Ministry of Agriculture, agricultural survey 2010. Statistical Processing: SDES, 2016*

Analysis

Unproductive permanent grassland (UPG) is any area that has been naturally or artificially sown to grassland for at least 5 years. They provide various economic and ecological services: animal fodder, carbon storage, water purification, prevention of erosion, biodiversity, and landscape quality.

In 2010 in metropolitan France, UPG (including collective grazing zones) amounted to 8.4 million hectares, equal to 30% of the utilised agricultural area (UAA).

Between 2000 and 2010, UPG decreased from 9.1 to 8.4 million hectares, a 7.5% decline in 10 years. Over the same period, the UAA decreased by 3.1%. Prairies are disappearing at an annual rate that is 2.5 times greater than that of the UAA. This phenomenon of decreasing prairies has existed since the 1950s.

It is imperative that a sufficient portion of UPG be preserved within the countryside, so that the biodiversity associated with these surroundings can be maintained. A collective investigation led by the French National Institute of Agronomic Research (INRA) established that the correct functioning of prairies depends upon a minimum amount of UPG within the UAA of a territory (at least 20%). These territories, represented in green on the map, are known as “expansive permanent grazing zones”. They are essentially located in high- and medium-elevation mountainous regions, as well as in Normandy. The UPG of small agricultural regions, in which at least 20% of their UAA is composed of UPG, has declined in by 7.9% in metropolitan France between 2000 and 2010.

In Europe

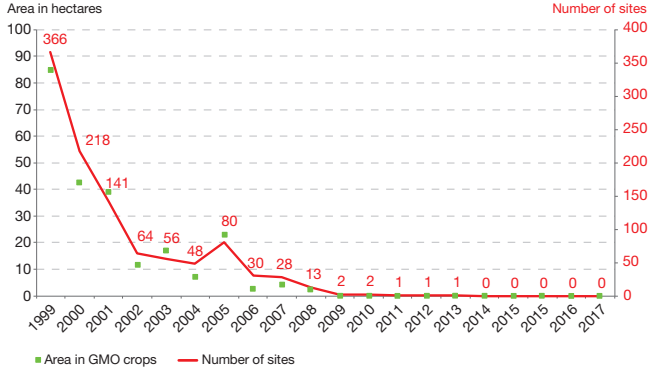
The 28 EU member states comprised 59 million hectares in 2013 for 34% of European UAA. The United Kingdom contained the most UPG (10.8 million ha) at 63% of its UAA. France was in second place for number of hectares of UPG, followed by Spain.

To find out more

- French National Observatory on Biodiversity
- Eurostat database

Genetically modified organism crops

CHANGES IN GMO CROP TRIALS



Note: according to Directive 2001/18, a GMO is an "organism, with the exception of human beings, in which the genetic material has been altered in a way that does not occur naturally by mating and/or natural recombination". The European legislator excluded products of mutagenesis from the application of European directive 2001/18 on GMOs, while recognising their status as a GMO. The European Commission established a team of experts in 2008 to adjudicate on all of new techniques. Their deliberation is ongoing.
Scope: all of France.
***Source:** Ministry of Agriculture, directorate general for food, 2016.*
Statistical Processing: SDES, 2017

In Europe

Five countries in the European Union are growing GMOs (MON810 maize): Spain, Portugal, the Czech Republic, Romania and Slovakia.

Analysis

The year 1996 marked the beginning of the commercialisation of biotechnological crops, also known as "transgenic crops" or "genetically modified crops".

In order to achieve resistance to harmful insects or make plants tolerant to specific herbicides, various biotechnologies can be used to genetically modify an organism. In France, the only crop that has been subject to commercial cultivation is maize. In 2007, the area of MON810 maize represented 21 150 ha, i.e. 1.4% of the area planted to grain maize.

Since 2008, genetically modified grain crops for commercial uses have been prohibited in France as a result of legislative and regulatory provisions. In 2015, France, alongside 19 EU member states, achieved the exclusion of all or part of its territory from the geographical scope of the authorisation of existing or future cultivation.

This ban applies only to certain techniques (transgenesis) for producing GMOs within the scope of application of the 2001/18 directive. As a result, the techniques for mutagenesis and cell fusion, used to produce the seeds of herbicide tolerant crops (HTCs), are excluded from this ban. In 2016, HTCs represented 158 000 ha or 27% of areas planted to sunflowers (compared with 144 000 ha and 22% in 2015), and 37 000 or 2.6% of the total area planted to rapeseed in France (compared with 17 000 ha and 1.2% in 2015). According to the 2014 survey on crop protection practices for field crops, the average number of treatments and treatment frequency index (TFI) of HT sunflower plots were equivalent to those of non-HT plots (2.8 treatments on average and an average TFI of 2.8).

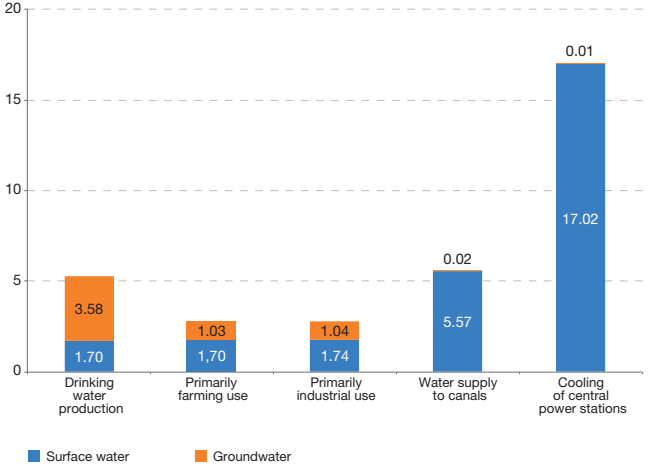
According to the 2016 barometer conducted by the French Institute of Nuclear Protection and Safety (IRSN), more than one of every two French people (56%) believes that "we are not being told the truth about the dangers that GMOs pose to the population".

To find out more

- ISAAA
- European Commission : Plants/Genetically modified/GMO Autorisation/ Cultivation
- IRSN barometer on the perception of hazards and safety by French people
- Eurobarometer n° 440 on Europeans and agriculture

Uses of water abstraction

WATER ABSTRACTION IN 2013
In billions of m^3



Scope: metropolitan France.
***Source:** French Agency for Biodiversity, National Bank of Quantitative Water Abstraction (BNPE). Statistical Processing: SDES, 2016*

Analysis

Water is a resource that is essential for life and human activities such as agriculture, energy production, industry and domestic use. Although it is renewable, this essential element is not inalterable (pollution, modification of climate conditions).

The volume of soft water abstracted in France was estimated at 33.5 billion m^3 for 2013. Water is abstracted at the surface (rivers, lakes, etc.) at 83%, but also underground (groundwater). Half of all abstractions are destined for cooling power stations. Almost all abstractions, as well as those that serve to maintain navigability and water circulation in canals, are returned to the natural environment.

Abstractions for the production of drinking water, agriculture, and other, primarily industrial uses, represented 11 billion m^3 in 2013. Those primarily destined for agricultural use amounted to 2.7 billion m^3, of which 37% originated from groundwater. Abstraction for agricultural use was equivalent to that used for primarily industrial purposes.

In Europe

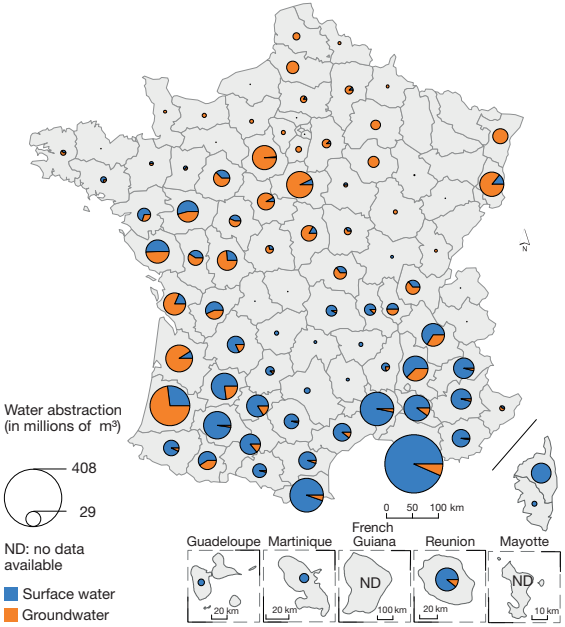
In Spain, the country with most irrigation by volume of soft water and surface water in 2012, irrigated surface areas used an average of 68% of all water consumed, with 25 billion m^3 dedicated to agriculture.

To find out more

- *Les prélèvements en eau douce en France : les grands usages en 2013 et leur évolution depuis 20 ans*, CGDD/SOeS, *Datalab*, January 2017, 26 p.
- Water portal

Water abstraction for agriculture

WATER ABSTRACTION FOR AGRICULTURE BY DEPARTMENT IN 2013



Source: *water agencies. Statistical Processing: SDES, 2017*

Analysis

80% of water abstractions for agriculture are destined for irrigation, although this is practiced on only 5% of the national utilised agricultural surface. The other primary uses, carried out in part through the public drinking water network, include water for animals and the cleaning of buildings and materials.

In 2013, the volumes of water destined for agricultural uses amounted to 2.7 billion m^3, i.e. 1 700 m^3/ha irrigated. Abstraction has remained stable since 2000. On average, the majority of these volumes are drawn from surface waters (63% in 2013).

Nonetheless, this distribution displays a particular contrast between the southern and northern regions of the territory. Nine departments do not irrigate at all, particularly in eastern France (Lorraine and Doubs regions). Eleven departments use more than half of all water abstracted in France for agricultural use: Bouches-du-Rhône, Landes, Pyrénées-Orientales, Gard, Gers, Gironde, Loiret, Lot-et-Garonne, Vaucluse, Drôme and Haut-Rhin. The departments situated next to the Atlantic Ocean (Gironde, Landes and Charente-Maritime), the Parisian Basin, and Alsace, use more groundwater. Seven departments in southern France - Bouches-du-Rhône, Pyrénées-Orientales, Gard, Gers, Lot-et-Garonne, Vaucluse and Drôme - contribute more than one third of abstractions (35.3%) and abstract mostly surface water, as is the case in overseas departments.

In Europe

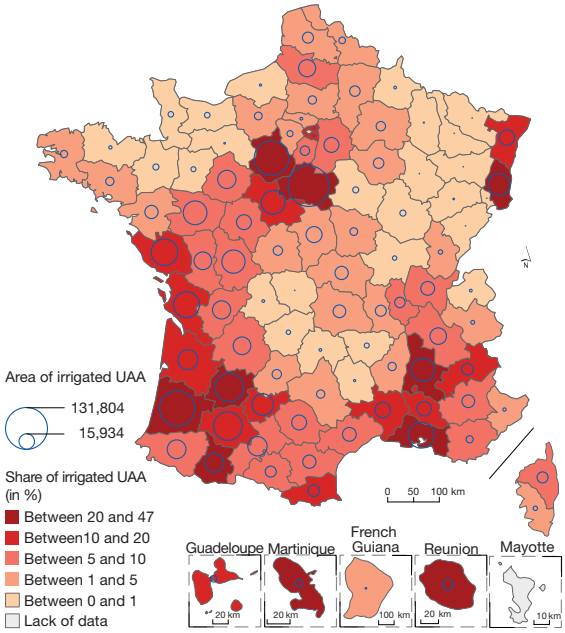
The 28 EU member states consume nearly 40 billion m^3 of water for irrigation (nearly 4 000 m^3/ha irrigated), of which 70% were abstracted by Spain (41% - 5 470 m^3/ha irrigated) and Italy (29% - 4 800 m^3/ha irrigated) in 2010.

To find out more

- *Les prélèvements en eau douce en France : les grands usages en 2013 et leur évolution depuis 20 ans*, CGDD/SOeS, *Datalab*, January 2017, 26 p.
- Graphagri2017

Irrigated agricultural area

UTILISED AGRICULTURAL AREA UNDER IRRIGATION BY DEPARTMENT IN 2010



Notes: UAA = utilised agricultural area; departmental data is available only for the years 2000 and 2010. However, on a national level, more recent data is available (2013).
Source: *Agreste, agricultural censuses of 2000 and 2010. Statistical Processing: SDES, 2016*

Analysis

The utilised agricultural area (UAA) irrigated in 2013 was 1.4 million hectares (ha) for 134 620 farms. Between 1970 and 2000, irrigated surfaces tripled, increasing from 0.54 million ha to 1.57 million ha. Since 2000, this change has eased and the volume of irrigated surfaces has remained stable.

In France, the proportion of irrigated surfaces in relation to the UAA is moderate (5% in 2013) with regard to the European average, but presents great spatial disparity.

Overall, irrigated surfaces have been declining in the south of France and increasing in the Parisian Basin (Beauce acquifer) and in Alsace. The Southeast, which represented half of all irrigated land in 1970, represented only 18% in 2010. This is a result of climate conditions, types of crop, irrigation methods and hydraulic equipment.

Maize, potatoes, soy, fruit crops and vegetables are the crops that need the most irrigation. Grain maize is the crop for which the average provision is the highest, at approximately 154 mm of water versus 57 mm for common wheat (source: Agreste survey, growing practices – 2011). Still, the area planted to irrigated grain maize is trending downwards, decreasing from 50% in 2000 to 36% of irrigated surfaces in 2013.

Surfaces equipped for irrigation, or "irrigable surfaces" appeared to stabilise at around 10% of UAA in 2013.

In Europe

Within the 28 EU member states, 11.3% of the UAA is irrigable (18 million ha) and 6.2% is actually irrigated (10 million ha) in 2013.

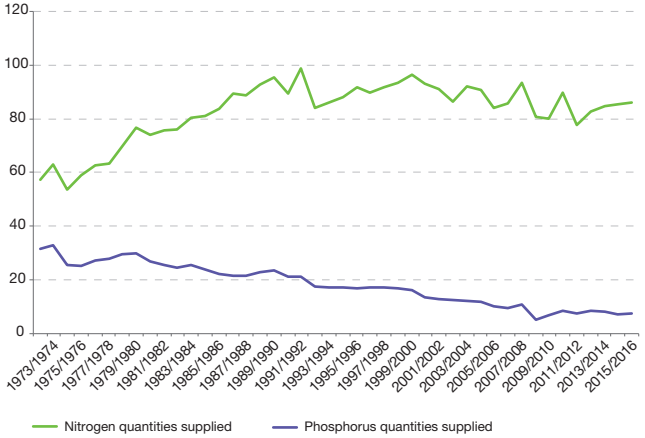
To find out more

- Graphagri2017
- *Irrigable surfaces declining from 2000*, *Agreste Primeur*, n° 292, November 2012, 4 p.

Mineral fertilisation

CHANGE IN THE QUANTITIES OF NITROGEN AND PHOSPHORUS SOLD BETWEEN 1972 AND 2015

In kg per fertilisable ha



Note: fertilisable surface area corresponds to arable land, permanent grazing land excluding pathways and pastures, perennial crops, market gardening and flower crops, family gardens and plant nurseries. It excludes agronomic fallow land.
Scope: metropolitan France.
***Source:** Union of industries in fertilisation (Unifa). Statistical Processing: SDES, 2017*

In Europe

In 2015, within the 27 EU member states, nitrogen sales amounted to 11 million tonnes. France was the top consumer, representing 20% of these sales ahead of Germany (15%).

Analysis

The presence of nutritive elements in agricultural plots is essential for the growth of the crops. This is most often provided through the regular provision of organic or mineral fertilisers. These can also contribute in certain cases to the conservation or improvement of the physico-chemical characteristics of soils.

There are two broad categories of fertilisers:

- organic fertilisers composed of nutritive elements of plant or animal origin. These can be livestock effluents (slurry, droppings and manure rich in nitrogen and phosphorus) or industrial by-products (horn or leather powder, residual beet-wash, grape marc, algae, press cakes, etc.);
- mineral fertilisers: primarily nitrogen, phosphorus and potassium. These are chemically processed from minerals extracted from under the ground (phosphate, potassium), or manufactured from nitrogen in the air. They facilitate increases to the growth and yield of cultures, but do not improve the fertility of the soil in the long term.

According to the observatory for mineral and organic fertilisation, in 2015, 18 million tonnes of mineral and organic fertilisers were released to the market in metropolitan France: 12 million tonnes (Mt) of mineral origin and 6 Mt of organic origin.

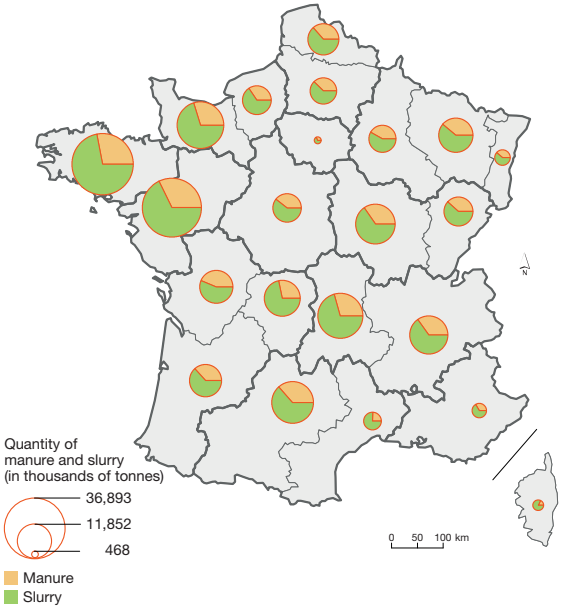
Between 1972 and 2015, the quantities of mineral nitrogen supplied increased by one third, rising from 1.6 Mt to 2.2 Mt, while fertilisable surfaces declined by 11% (25.8 million in 2015). Around 85 kg of nitrogen was sold per fertilisable hectare. At the same time, phosphorus supplies fell by nearly 80% with around 440 000 tonnes in 2015, i.e. 7.5 kg of phosphorus sold per fertilisable hectare.

To find out more

- Data and Statistical Studies Department
- Unifa
- ANPEA

Organic fertilisation

QUANTITY OF MANURE AND SLURRY PRODUCED BY REGION IN 2013



Source: *FranceAgrimer, National Observatory for Biomass Resources (ONRB), 2015. Statistical Processing: SDES, 2016*

Analysis

Organic manuring was in place, primarily in the form of livestock effluents, but also to a lesser extent of vinasse, industrial sludge or sewage sludge.

In 2013, according to the National Observatory of Biomass Resources, around 260 million tonnes of livestock effluents were produced in metropolitan France, including manure and slurry. Brittany, Pays de la Loire, and Basse-Normandie were the regions with the highest production, with over one third of national production. Slurry represented two thirds of total production.

20% of the utilised agricultural area (UAA) was spread with livestock effluents. Silage maize crops were most affected by this spreading, since 80% of their surface areas received organic manure, either alone or combined with mineral nitrogen. As for common wheat and barley crops, these were fertilised at 12% and 15% respectively with organic nitrogen, either alone or coupled with mineral nitrogen.

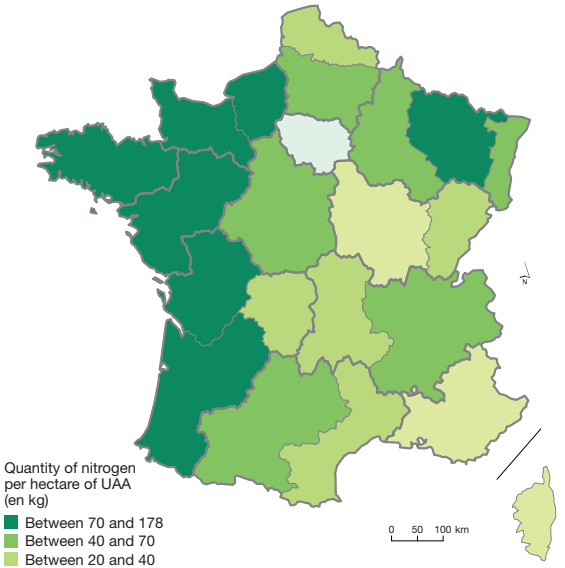
Sewage sludge represented 990 000 tonnes of dry material, 40% of which was destined for agricultural spreading. This affected 2-3% of the UAA and was regulated due to the potential presence of metals, organic micropollutants, pathogenic microorganisms and emerging pollutants.

To find out more

- Agreste/Inquiry on cultivation practices
- *The national observatory of biomass resources – evaluation of the resources available in France*, FranceAgriMer, December 2016, 126 p.

Nitrogen balance

REGIONAL NITROGEN BALANCE IN 2015



Note: UAA = utilised agricultural area.
Sources: *Agreste; Citepa; Unifa; Comifer, 2015. Statistical Processing: SDES, 2018*

Analysis

Nitrogen is one of the elements that are indispensable for plant nutrition. However, excessive nitrogen supplies compared with the needs of crops, also known as a surplus, contributes to the pollution of waterways and water tables. In conjunction with phosphorus, it is also responsible for the phenomenon of eutrophication.

This nutritive element can be supplied primarily in organic form and in mineral form. In 2015, the organic supply amounted to 62 kg per ha, while the mineral supply was in the region of 77 kg per ha. The two types of supply have fallen since 1990, as a result of both the decrease in livestock numbers in France and modifications to growing practices.

In metropolitan France, between 1990 and 2015, the nitrogen surplus displayed a downward trend. The average surplus for the ten-year period between 1996 and 2005 stood at 55 kg per ha of utilised agricultural area (UAA), while that of the following ten-year period 2006-2015 was 45 kg per ha of UAA.

In 2015, Brittany and Pays de la Loire displayed the highest nitrogen surpluses, with more than 100 kg per ha of nitrogen surplus.

The regions closest to a nitrogen balance were the Corse (Corsica), the Bourgogne (Burgundy) and the Provence-Alpes-Côte d'Azur regions, while Île-de-France displayed a negative balance.

In Europe

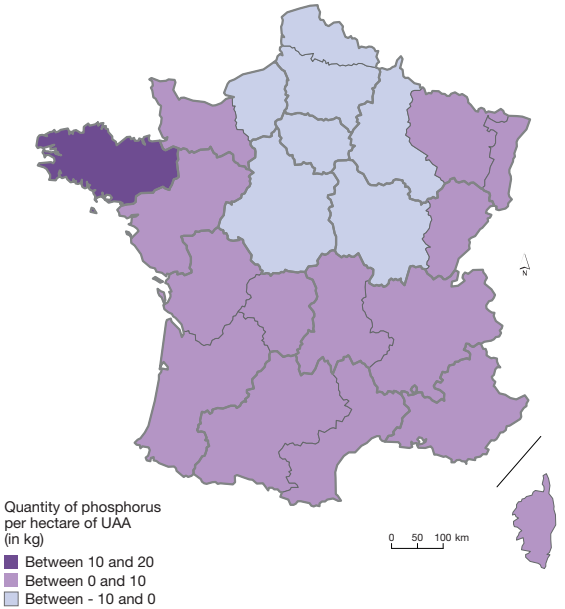
In 2014, within the 28 EU member states, the gross nutritive nitrogen balance was estimated at 47 kg per ha of UAA, while that of France stood at 45 kg per ha of UAA. This balance was negative in Romania (-1 kg per ha of UAA), while in the Netherlands it amounted to 160 kg per ha of UAA.

To find out more

- Graphagri2017
- Eurostat/gross nutritive balance

Phosphorus balance

REGIONAL PHOSPHORUS BALANCE IN 2015



Note: UAA = utilised agricultural area.
Sources: *Agreste; Citepa; Unifa; Comifer, 2015. Statistical Processing: SDES, 2018*

Analysis

During the 1970s and 1980s, phosphorus water pollution occurred due to agricultural activity and, for the majority, to urban activity. The 1991 directive on urban waste water led to a reduction in phosphorus waste arising from purification plants in the surrounding area (improvement of treatments and progressive abandonment of phosphates in the detergents). Consequently, agricultural waste became the primary source.

Phosphorus is one of the elements that are indispensable for plant nutrition. It can be provided through organic or mineral fertilisers. In 2015, in Brittany, the surplus stood at 20 kg/ha. In fact, in intensive pig and poultry farming zones, total phosphorus supplies (mineral and organic) are often too high in relation to the needs of the crops.

Seven former regions in the centre and north of France demonstrate a negative balance with phosphorus-demanding crops such as rapeseed, beetroot, alfalfa and potatoes.

From 2000 to 2015 in metropolitan France, the phosphorus surplus went from 9 kg/ha of utilised agricultural area to 0 kg/ha. This reduction is primarily linked with the decrease in mineral fertiliser supply. Since 2009, the balance is close to stable.

Phosphorus, which is primarily present in the form of phosphates, is less soluble than nitrogen. It is carried in part by sediments in the surface water, and is frequently found in rivers and streams. The abundance of phosphorus associated with nitrates can be a cause of the eutrophication of bodies of water, rivers and coastal regions.

In Europe

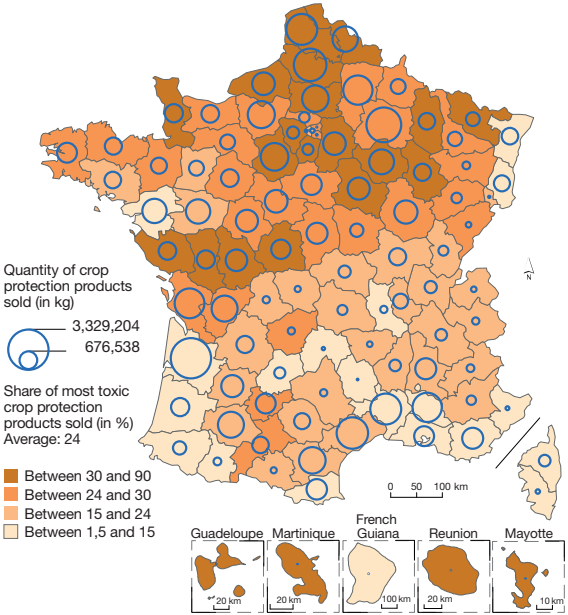
In 2014, within the 28 EU member states, the gross nutritive phosphorus balance was estimated at 1 kg/ha of UAA, as in France, the Netherlands and Poland. This balance was negative in Bulgaria (-6 kg per ha of UAA), while it amounted to 8 kg per ha of UAA in Croatia.

To find out more

- Graphagri2017
- Eurostat/gross nutritive balance

Sales of crop protection products

SALES OF CROP PROTECTION PRODUCTS BY DEPARTMENT IN 2016



Note: the most toxic crop protection products = substances classed as T (toxic), T+ (highly toxic) and CMR (carcinogen, mutagen, reprotoxic). Only sales by professional distributors are accounted for using the postal code of the purchasers.
***Source:** National data bank of sales by distributors of crop protection products (BNV-D), extracted on 20 March 2018. Statistical Processing: SDES, 2018*

Analysis

In 2016, sales by distributors of crop protection products amounted to 73 thousand tonnes, for 2 882 different products. Eleven departments totalled one third of total sales counted by purchaser's postal code. With more than 3 thousand tonnes, Gironde registered the highest quantity of crop protection products sold. Next came Marne and Somme.

Between 2009 and 2016, the utilised agricultural area decreased by 0.9%. During this period, the trend in crop protection product sales was generally positive, with annual variations, particularly as a result of variations in pressures caused by pests and weeds, linked with climate conditions. Only sales of non-agricultural crop protection products declined steadily (5.8% annual decrease). In 2016, sales of crop protection products for agricultural use stood at 68 thousand tonnes, while those for non-agricultural uses reached nearly 5 thousand tonnes, i.e. 7%.

The quantity of fungicides and bactericides sold increased between 2011 and 2014, before returning in 2016 to a quantity equivalent to 2013. The quantity of insecticides and acaricides sold increased over the 2009-2016 period, crossing the 3 000-tonne threshold in 2016. The amount of herbicides sold increased between 2009 and 2014 before changing direction in 2015 and 2016.

The most toxic substances represented 24% of total pesticide sales. This percentage passed 30% in 24 departments, led by Guadeloupe (90%), Martinique (66%), Reunion (65%), Manche (43%) and Nord (39%), compared with less than 10% in 8 departments such as Alpes-Maritimes (7%) and French Guiana (2%).

The sales data does not allow a perfect connection to be made between the place and quantity of products sold, and the localisation or quantity of application of these products. There are also "transboundary" sales effects, either between departments or between France and neighbouring countries.

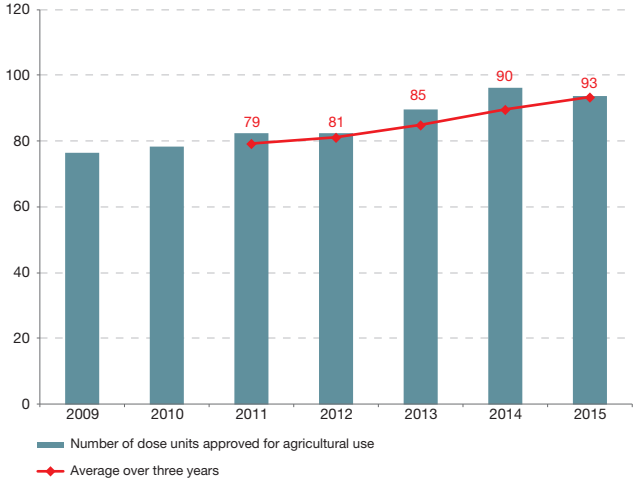
To find out more

• *Pesticides: évolution des ventes, des usages et de la présence dans les cours d'eau depuis 2009*, CGDD/SOeS, *Datalab Essentiel*, March 2017, 4 p.

Indicator “number of unit doses” (Nodu in French)

CHANGE IN THE NUMBER OF UNIT DOSES (NODU) FOR AGRICULTURAL USE

In number of dose units



Notes: agricultural use: excludes seed treatments and products on the “green biocontrol” list; this graphic shows the number of doses of crop protection products sold for use in agriculture in millions of hectares, as well as the mobile average over 3 years of the NODU (2011 point = average of the years 2009-2010 and 2011). Revised series taking into account real-time modifications to the BNV-D (new declarations, withdrawals or modifications to declarations, post-control corrections).
Scope: all of France.
***Source:** Ministry of Agriculture, General Directorate for Food (DGAL), according to the National Bank of Distributor Sales (BNV-D) as of 28 October 2016. Statistical Processing: SDES, 2017*

Analysis

The primary goal of the Écophyto plan is to reduce the use of crop protection products. The first version of this plan, published in 2008, envisaged a reduction of this use by half by 2018.

The Écophyto plan is equipped with an ad hoc tool, the Nodu (number of unit doses) indicator, to monitor this objective. This indicator, calculated on a national level based on the purchase of crop protection products, translates the intensity of the recourse to crop protection products, linking the quantity sold of each active substance to a "unit dose" unique to the substance, thus excluding possible substitutions by active substances in smaller doses.

Regarding agricultural uses, between the years 2009 and 2015, the indicator varied upward or downward depending on the year, with a general upward trend. This can be explained in part by weather hazards, as well as by changes to regulations (particularly the rate of charge applied to the crop protection products sold). In order to ease this effect, the change in Nodu is analysed as a sliding average over three years. Calculated thus, the indicator increased by 17.8% as a three-year average between the periods 2009-2011 and 2013-2015.

These trends demonstrate an increase in the quantities of crop protection products sold, after five years of implementation of the Écophyto plan. The analysis of this evolution and the demands of European Directive 2009/128 on the use of sustainable use of pesticides have led to a revision of the Écophyto plan and of its objectives.

To find out more

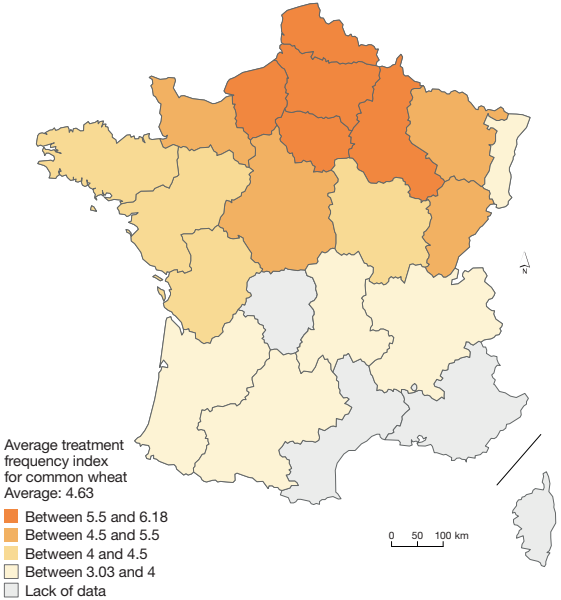
- Data and Statistical Studies Department

L'essentiel sur > Agriculture > Pesticides

- Ministry of Agriculture and Food/ Écophyto

Average treatment frequency index (TFI) for common wheat

AVERAGE TFI FOR COMMON WHEAT, INCLUDING SEED TREATMENT, BY REGION IN 2014



Notes: treatment frequency index (TFI): for crop protection treatments, this is the ratio between the dose used and the reference dose, weighted against the proportion of the surface area being treated. Untreated plots are included in the calculation; the data includes seed treatment.
Source: *SSP, Agreste, Inquiry into crop protection practices for field crops 2014. Statistical Processing: SDES, 2018*

Analysis

The crop protection product treatment frequency index (TFI) is an indicator for monitoring the use of pesticides on the level of a farm or a group of farms.

The TFI allows the intensity of use of crop protection products to be observed on a per-crop basis. It measures the average number of standardised doses per hectare of crop over the course of one year. For the application of a product over a given crop, the standardised dose takes into account the treatment target. This indicator can be calculated for a set of plots or crops, a farm or a territory.

For farmers, the TFI makes it possible to situate their practices within those of the territory, to identify possible improvements and to evaluate their progress in terms of reducing pesticide use. The TFI is also used to support the implementation of public policies, such as agri-environment measures or the Écophyto plan.

According to the "growing practices" survey, in 2014, the average TFIs were staggered between 2.4 and 6.5 for field crops, excluding potatoes. The TFIs for herbicides ranged from 1.2 to 2.9 depending on the crop, and insecticide TFIs were between 0 and 2.0. Excluding potatoes, fungicide TFIs ranged from 0 to 1.7. For potatoes, the TFI for all treatments stood at 18.9 with a fungicide TFI of 14.4.

For common wheat, France's primary crop, the average TFI for all treatments, including seeds, stood at 4.93 but varied by region. It is 3.03 in the Rhône-Alpes region, and 6.18 in the Nord-Pas-de-Calais region. The main discrepancies can be explained by a differentiated recourse to fungicides and insecticides, in line with pedoclimatic contexts, sanitary pressures and yield potentials.

The regional disparities are small in the case of beetroot crop, due to the homogenous use of herbicides and a rather limited cultivation area.

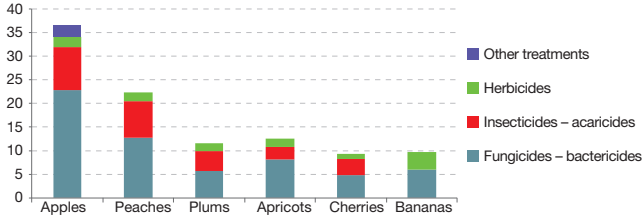
To find out more

- Data and Statistical Studies Department
- Agreste/enquêtes pratiques culturales

Number of crop protection treatments in fruit crops

AVERAGE NUMBER OF CROP PROTECTION TREATMENTS BY FRUIT SPECIES IN 2015

In number of treatments

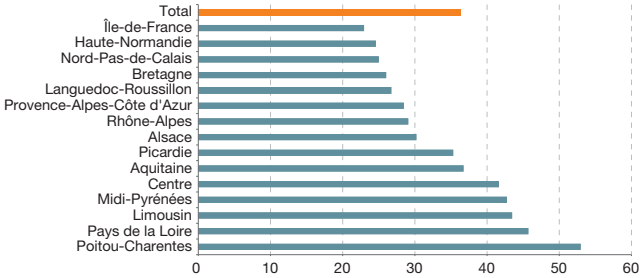


Note: a crop protection treatment corresponds to the application of a specific product over one pass.

Source: *Agreste, Inquiry into crop protection treatments on fruits, 2015*
Statistical Processing: SDES, 2017

AVERAGE NUMBER OF CROP PROTECTION TREATMENTS ON APPLES BY REGION IN 2015

In number of treatments



Source: *Agreste, Inquiry into crop protection treatments on fruits 2015. Statistical Processing: SDES, 2017*

Analysis

The 2013 orchard inventory provides evidence of the continued reduction in areas devoted to fruit crops since 2000, which decreased below the 200 000 hectare threshold in 2013.

Apples are the primary fruit crop, with almost 20% of the area. They are also the most treated fruit, with approximately 36 treatments in 2015, 22 of which concern fungicides and bactericides. Peaches received 22 treatments, with more than 6 insecticides and acaricides. Plums, and particularly cherries, received fewer annual treatments; however, it appears that there are more inter-annual variations connected with climate conditions.

A new pest originating from Asia, *Drosophila suzukii*, detected in Corsica in 2009, has since (particularly in 2011) caused significant damage to orchards of various species throughout the entire southern half of France, inciting an increase in insecticide use.

In the Antilles (Guadeloupe and Martinique), the number of treatments on bananas is 8.3: essentially fungicides and bactericides.

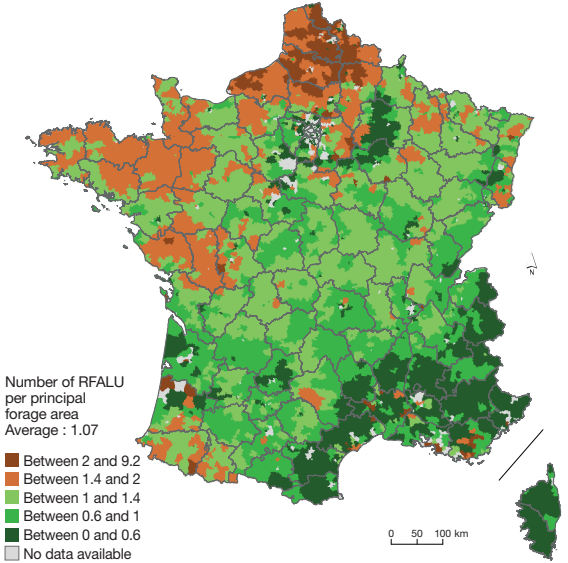
The number of treatments on fruit crops depends, as for field crops, on the varieties being cultivated, their density, production method, irrigation method, and climate conditions. The Centre-West and South-West regions are the production basins with the highest number of treatments, with over 40 treatments per year on apples.

To find out more

- *Pesticides: changes in sales, uses and presence in waterways since 2009*, CGDD/SOeS, *Datalab Essentiel*, March 2017, 4 p.
- *Pratiques culturales en arboriculture 2015*, Agreste, *Chiffres et Données*, Série Agriculture, n° 245, December 2017

Herbivore rearing

NUMBER OF ROUGH-FEED ADULT LIVESTOCK UNITS PER HECTARE OF PRINCIPAL FORAGE AREA BY CANTON IN 2010



Notes: ALU = adult livestock unit, a unit used to compare or aggregate animal individuals of different species or categories, and defined by equivalences based on the feeding needs of these animals. By definition: a 600-kg cow producing 3 000 litres of milk per annum = 1 ALU; a calf for slaughter = 0.5 ALU; a ewe = 0.15 ALU; a sow = 0.5 ALU, for example. The all-feed adult livestock unit (AFALU) compares animals according to their total consumption, including grass, forage and concentrates.
RFALU = rough feed adult livestock unit, corresponding to herbivorous livestock.
***Source:** Agreste, agricultural survey 2010. Statistical Processing: SDES, 2017*

Analysis

During the most recent agricultural survey in 2010, there were 332 000 farms cultivating 12.5 million hectares of principal forage area (PFA) in metropolitan France. These surfaces are composed of forage crops, artificial prairies (leguminous fodder crops), temporary prairies, and permanent grazing land.

Over 300 500 farms, French livestock represents 26.6 million all-feed adult livestock units (AFALUs), a unit that makes it possible to aggregate individual animals by different species or categories. 14.5 million of these individuals, i.e. 55%, are rough-feed ALUs (RFALUs), represented by herbivorous livestock (cows, sheep, goats, horses and rabbits), as opposed to poultry and porcine livestock.

The number of RFALUs per hectare of PFA, known as the "stocking density", makes it possible to measure the intensity of pressure on the land. It is estimated that a stocking density under 1.4 ALU/ha of PFA corresponds to a more favourable farming system from an environmental standpoint. The most intensive livestock systems pose the problem of effluent management. As a counterpart, these livestock have for several years benefited from building modernisation projects.

The average throughout metropolitan French territory stands at 1 RFALU/ha of PFA. Mountainous and viticultural regions, as well as those in southeastern France, are the ones with the lowest stocking density. The highest stocking density is found in the North, as well as in Brittany and Normandy.

In Europe

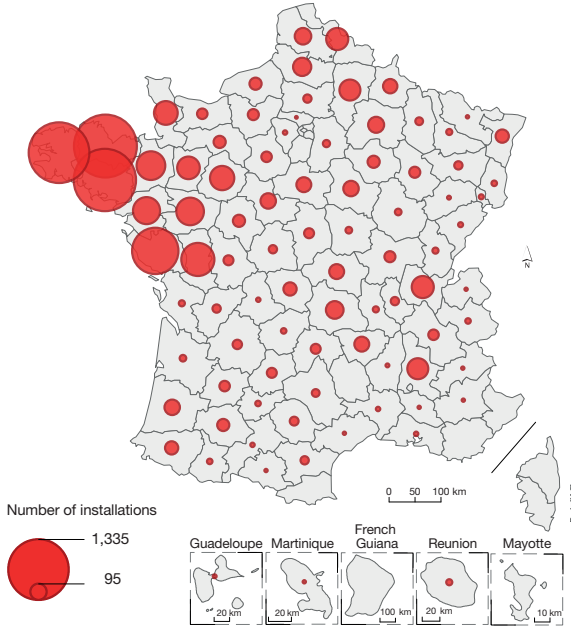
In 2013, within the 28 EU member states, the total livestock density stood at 0.7 AFALU per hectare of utilised agricultural area (UAA). The highest total livestock density (3.6 AFALU per ha of UAA) was observed in the Netherlands, while it stood at 0.2 in Bulgaria.

To find out more

- Eurostat/total livestock density
- Eurostat/livestock farming models

Livestock farms subject to regulation of environmentally classified facilities

LIVESTOCK FARMS SUBJECT TO AUTHORISATION BY DEPARTMENT IN 2017



Source: *Ministry of the Environment, base of classified facilities, extracted on 21 August 2017. Statistical Processing: SDES, 2018*

Analysis

The regulations surrounding environmentally classified facilities concern various domains including livestock facilities. Establishments with livestock subject to authorisation or registration represent approximately one third of all establishments with facilities subject to the same rules. They are classified according to their activity, and to the nature and quantity of products stocked or implemented.

In livestock, the number of animals or animal stations determines whether or not the farm passes from a departmental health regulation regime to a classified facility regime.

The classified facilities regime covered 19 742 livestock farms in 2017, i.e. less than 10% of livestock farms in France. Of these farms, 52% were subject to registration and 48% to authorisation. Of the 9 474 cattle, pig and poultry farms subject to authorisation, only the pig and poultry farms with the highest numbers of individuals (more than 40 000 stations for poultry, more than 2 000 stations for pigs and more than 750 stations for sows) were subject to the directive on industrial emissions, known as the "IED directive". These farms are required to implement a European reference document, named BREF, describing the best available techniques, allowing them to reduce nuisances and pollutions from these farms.

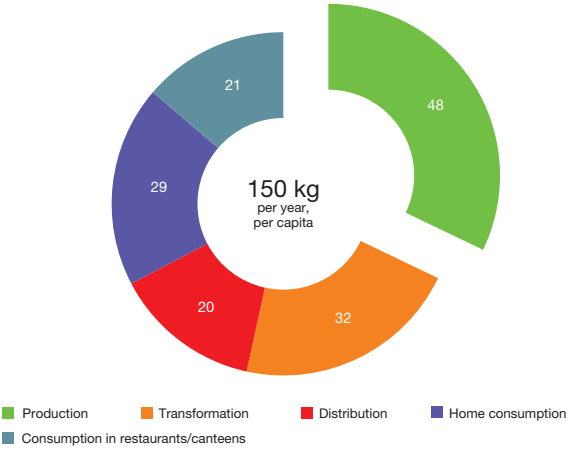
The livestock subject to authorisation are primarily located in the western region of France: Côtes-d'Armor, Finistère and Morbihan contain the most with 1 000 each. Paris and its inner suburbs, Pyrénées-Orientales, Var and Guyane have none.

To find out more

- Inspection of classified facilities
- Eurostat/livestock farming models

Loss and waste in agricultural production

LOSS AND WASTE IN AGRICULTURAL PRODUCTION
In kg/year per capita



*Note: according to the Food and Agriculture Organization of the United Nations, the term "loss" means "*a change in the availability, edibility or quality of a food product that makes it unfit for human consumption*" and the term "waste" means "*the act of deliberately or consciously sorting and scrapping a food resource, despite its being perfectly edible*". The distinction between these two notions is more complex than it appears.*
Source: *Ademe,* Pertes et gaspillages alimentaires : l'état des lieux et leur gestion par étapes de la chaîne alimentaire*, 2016. Statistical Processing: SDES, 2016*

Analysis

In France, the French Environment and Energy Management Agency (ADEME) estimates all food loss and food waste to amount to 10 million tonnes per annum, from farm to table. These lost or wasted products are responsible for the emission of 15 million tonnes of CO_2 equivalent per annum, or 5% of annual national emissions.

Around 32% of food loss and food waste (equivalent to 48 kg per capita per annum) takes place during the agricultural production phase. This includes non-harvesting due to unfavourable harvesting costs in relation to market prices, as well as post-harvest losses as a result of specifications entailing grade-outs, poor storage or transportation conditions, lack of value circuits and sanitary issues.

This loss and waste has negative environmental impacts, including unnecessarily mobilised resources (arable land cultivated, volume of water abstracted, inputs or energy consumed) and the associated pollutant emissions (particularly greenhouse gases).

In order to combat waste throughout the food supply chain, in 2013 France drew up the National Pact to Combat Food Waste, with the objective of cutting food waste in half by 2025.

To find out more

- *Pertes et gaspillages alimentaires : l'état des lieux et leur gestion par étapes de la chaîne alimentaire*, Ademe, *study report*, May 2016, 165 p.
- FAO (Food and Agriculture Organization of the United Nations)

Themes > Food loss and food waste

- Ministry of Agriculture and Food

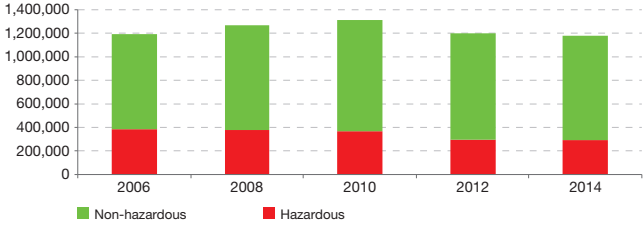
Alimentation theme > Anti Waste

- The National Pact to combat food waste

Agricultural waste

ANNUAL QUANTITY OF AGRICULTURAL WASTE EMITTED

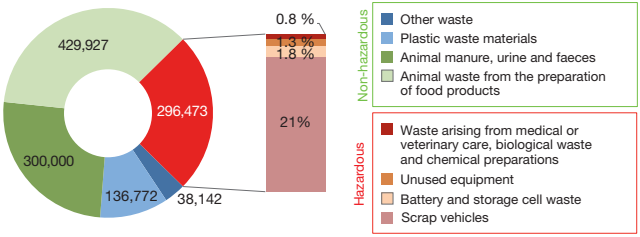
In tonnes



Source: *Statistical waste regulation, 2016. Statistical Processing: SDES, 2017*

DISTRIBUTION OF HAZARDOUS AND NON-HAZARDOUS AGRICULTURAL WASTE IN 2012

In tonnes



Note: other waste = waste from chemical preparations, metallic waste, animal and plant waste (excluding food preparation, food products, and livestock effluents), paper and cardboard waste, household waste and similar, glass waste.
Source: *Statistical waste regulation, 2016. Statistical Processing: SDES, 2018*

Analysis

France produced 328 million tonnes of waste in 2014. 1.2 million tonnes (less than 1%) was generated by the agricultural sector, according to the Statistical Waste Regulation (Règlement statistique sur les déchets, RSD). A quarter of this agricultural waste was classified as hazardous.

To eliminate their waste, farmers call upon specialised collection agencies or eco-organisations (producers finance the elimination of their own waste). In 2001, agricultural professionals established the company Adivalor (farmers, distributors, and industrial partners, for energy recovery from agricultural waste).

According to Adivalor, and as indicated by agricultural supply sales, 116 000 tonnes of packaging and plastic enters into the market each year. In 2015, 61% of this spent waste, i.e. 71 000 tonnes, was collected thanks to the contributions of 300 000 agricultural operators. The recycling rate for waste collected stood at 92%.

A framework agreement for 2016-2020 was signed between Adivalor and the Ministry of Environment, with the objective of collecting 90 000 tonnes in 2020 (+27% compared with 2015).

Hazardous waste, particularly unused crop protection products (UCPPs), represented 184 tonnes collected in 2015. 10 900 tonnes have been collected since the initiative was put in place.

A communication and collection effort has been established in the overseas departments since 2016.

In Europe

Only France and Belgium have a perennial UCPP recuperation system.

To find out more

- Data and Statistical Studies Department
- Environment and Energy Management Agency (Ademe)
- Adivalor

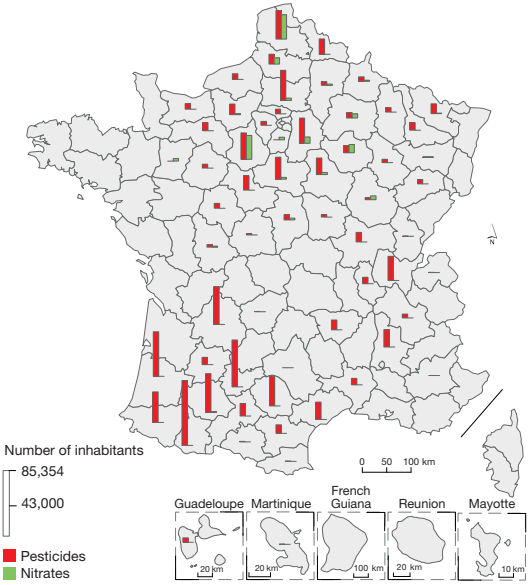
Part 3

Consequences of agricultural pressures on the condition of the environment: type and intensity

— In 2015, 96% of the population was permanently supplied by water respecting the regulatory quality parameters for pesticides, compared with 99.3% for nitrates. However, recourse to the treatment of raw water is sometimes necessary to denitrify or eliminate certain pesticides. While the link between intensive agricultural activity and surface water quality is easily proven, the phenomenon is less clear where groundwater is concerned.
The enrichment of water with both nitrogen and phosphorus can lead to the phenomenon of eutrophication.
Agricultural activity is responsible for 98% of ammonia emissions contributing to air pollution; this rate has been stable for the past several years.
The CO_2 level in the air can be stabilised by increasing the quantity of carbon contained in the soils by "4 per 1000" via agroecological practices.
Specialist farmland bird species have declined by 30% in 20 years, particularly due to the destruction of their habitat.

Tap water quality

POPULATION SUPPLIED WITH NON-PESTICIDE-COMPLIANT AND NON-NITRATE-COMPLIANT WATER BY DEPARTMENT IN 2015



Note: This map shows:
- the number of inhabitants supplied with water displaying recurring excesses above the quality limits for pesticides without incurring usage restrictions, i.e. with concentrations greater than the quality limits for a period exceeding 30 cumulative days over a one-year period without ever surpassing the maximum threshold for public health.
- the number of inhabitants supplied with water with an annual nitrate average greater than 50 milligrammes per litre (mg/l).
***Source:** Ministry of Health, ARS, SISE-Eaux, 2015. Statistical Processing: SDES, 2018*

Analysis

In 2015, more than 312 000 water samples and more than 16 million analyses made it possible to monitor the quality of water supplied. Between 2007 and 2015, 573 tap water catchments were abandoned due to non-compliance linked to nitrates and/or pesticides, which is 11% of abandonments. Other reasons included rationalisation of networks, insufficient volumes, and obsolescence. Of the abandonments linked to pesticides and nitrates, 44% were due to excess nitrates, 31% to breaching of the pesticide threshold, and 25% to both.

In 2015, 96% of the population was supplied by permanently pesticide-compliant water. 950 000 people were supplied by water that presented recurring excesses beyond the quality limits for pesticides without incurring usage restrictions (1.4% of the population). Approximately 1 800 people (compared with 3 200 in 2013) representing 0.003% of the population, were affected by water usage restrictions for consumption and food preparation, as a result of the presence of pesticides at levels exceeding the quality limit of 0.1 microgrammes per litre.

As regards the nitrate content in tap water, this was below the quality limit of 50 milligrammes per litre (mg/l) throughout the year 2015 for 99.3% of the population. It was higher than 50 mg/l at least once in 2015 for approximately 460 000 inhabitants (compared with 900 000 in 2013), i.e. 0.7% of the French population. The annual average of nitrate concentrations is between 50 and 100 mg/l in 22 departments (126 000 inhabitants or 0.2% of the French population). The most affected departments are Pas-de-Calais (32 000 people) and Eure-et-Loir (31 400 people). The nitrate concentrations measured in tap water never surpassed 100 mg/l.

To find out more

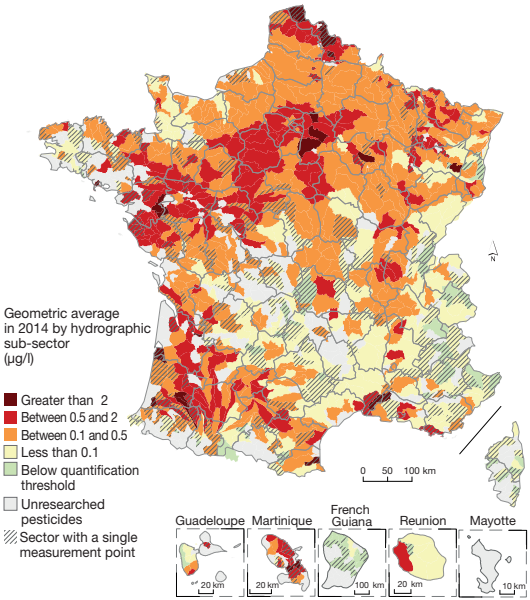
- Ministry of Health – tap water quality assessment
- Data and Statistical Studies Department

Indicators&indices > number of tap water catchments closed

- National Observatory of Water and Sanitation Services
- Eurostat/drinking water

Pesticides in surface water

AVERAGE TOTAL PESTICIDE CONCENTRATION IN SURFACE WATERS IN 2014



Note: geometric average of mean content per point, by hydrographic sub-sector, expressed in micrograms per litre (µg/l).
Scope: waterways, all of France.
***Sources:** water agencies and offices; BRGM, Banque ADES and BDLisa; MTES, BD Carthage®. Statistical Processing: SDES, 2018*

Analysis

The monitoring of pesticides in waterways covered 84% of French territory in 2014. Waterways are directly exposed and highly vulnerable to this pollution arising from the contamination of soils via the agricultural or non-agricultural use of pesticides, some of which have been prohibited for decades.

90% of the territory assessed demonstrated the presence of at least one pesticide, while 63% exceeded the drinking water standard of 0.1 µg/l.

In 2014, the most representative total concentrations were:

- herbicides: glyphosate, atrazine, metolachlor, S-metolachlor, chlortoluron, isoproturon, bentazon and their degradation products;
- fungicide: boscalid;
- insecticide: imidacloprid.

In waterways, environmental quality standards are based on the presence of aquatic organisms and at present pertain to a limited number of substances (47 substances or groups), although they are applicable to human health and to all pesticides found in groundwater. In 2014, excesses above these standards in surface waters most often originated from herbicides (isoproturon, 2-4 MCPA and diuron).

Some zones are exempt from the presence of pesticides. These were located primarily in regions with less intensive agricultural production, as well as those close to mountainous zones or located in the overseas departments, with the exception of the Antilles.

The highest concentrations correspond to areas with large vineyards or arboriculture productions such as in Beauce, the Parisian basin, and northern France. Territories with specific distribution channels are also concerned, such as Martinique, which has historically experienced chlordecone pollution, an insecticide used in banana plantations whose use has been banned for 20 years.

To find out more

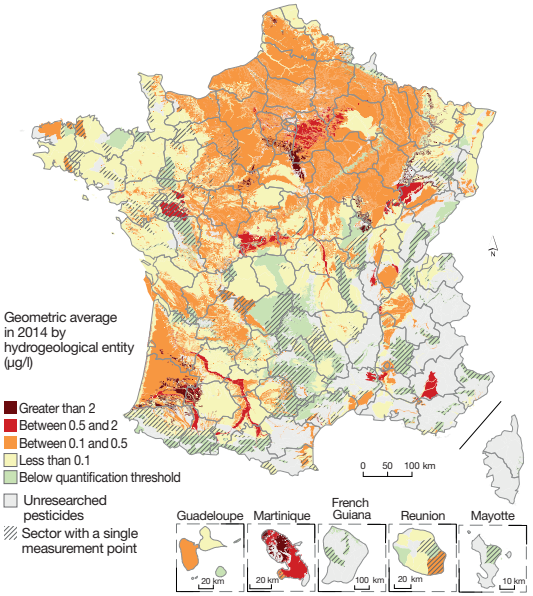
- Data and Statistical Studies Department

L'Essentiel sur > Eau > les pesticides dans l'eau

- Eurostat/pesticide pollution of water

Pesticides in groundwaters

AVERAGE TOTAL PESTICIDE CONCENTRATION IN GROUNDWATERS IN 2014



Note: hydrogeological entities in the higher level of the BD Lisa with 2 021 measurement points.
Scope: groundwaters, all of France.
Sources: *water agencies and offices; BRGM, Banque ADES and BD Lisa; MTES. Statistical Processing: SDES, 2018*

Analysis

Taking into account the configuration of hydrogeological entities and their characteristics, research into pesticides in groundwater covered 73% of the national territory.

In 2014, 698 active substances from crop protection products were sought in water tables. Of these substances, 266 were found at least once. Compliance with the regulations on groundwater pesticide contamination requires that the annual average does not exceed 0.1 µg/litre for each pesticide and 0.5 µg/litre for the total pesticide concentration. At least one of these maximum values was exceeded on 31% of national territory. These excesses primarily pertained to the northern half and the south-west of metropolitan France, as well as Martinique. In the absence of degradation mechanisms such as light and biological action, and due to the confinement of water among rocks and underground formations, certain pesticides can remain within the groundwater for a number of years.

Of the 50 substances most frequently found across national territory, 26 are prohibited and 24 are authorised (bentazon, metsulfuron-methyl, glyphosate). Despite having been prohibited for more than a decade, atrazine (present in over 40% of points of measurement), simazine, metolachlor and alachlor share the four top positions in the ranking of most widespread substances within French groundwaters. Martinique is associated with historic chlordecone pollution, which has been banned since 1993.

Among these 50 substances, 32 substances are directly derived from crop protection products and 18 are degradation products of these substances (also known as metabolites). For example, metolachlor (banned in 2003) and its replacement substance S-metolachlor (authorised in 2003) have the same metabolites, which were found in more than 30% of measurement points.

To find out more

- Data and Statistical Studies Department

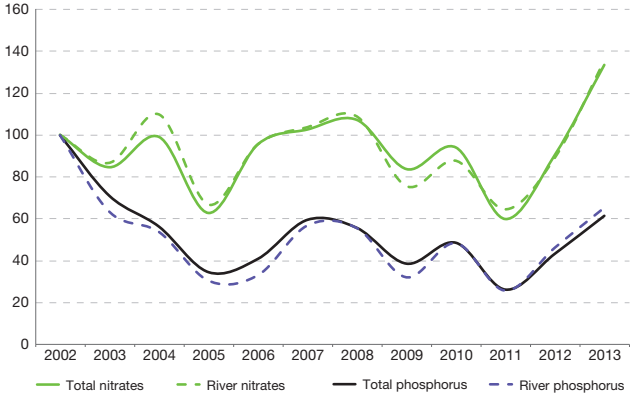
L'Essentiel sur > Eau > les pesticides dans l'eau

- Eurostat/pesticide pollution of water

Flow of nitrogen and phosphorus into the sea

CHANGE IN FLOWS LINKED TO NITROGEN AND PHOSPHORUS

On an index basis where 2002 = 100



Scope: all territories in metropolitan France whose outlets correspond to the maritime zones of metropolitan France. This covers 95% of the territory of the metropolitan.
Sources: *Ministry of the Environment; water agencies-Schapi; Banque Hydro. Statistical Processing: RTrend® and SDES, 2017*

In Europe

The study of flows for the northeastern Atlantic seaboard is the result of the OSPAR convention, which entered into force in 1998 and defined the international cooperation procedures for the protection of the marine environment.

Analysis

Nitrogen reaches the sea via rivers and river basins, most commonly in the form of nitrates primarily originating in agriculture, and, in smaller amounts, in the form of ammonium which is mostly domestic in origin. In 2010, the nitrogen surplus supplied to agricultural soils is estimated at 902 000 tonnes throughout metropolitan France (Nopolu estimate).

Between 2002 and 2013, nitrogen flows linked to nitrates are estimated at an average of 528 000 tonnes per annum (RTrend® data). During this period, no distinction was made between the significant variations in nitrogen flows to the sea. Atmospheric nitrogen deposition in the seawater of northern France, the English Channel and the Atlantic is estimated at 170 000 tonnes per annum (average 1999-2008, EMEP model – *European Monitoring and Evaluation Programme*). These inflows are of the same type as those transported via waterways, but are more diffused than river inputs being concentrated at sea outfalls and plumes in the primary rivers.

Phosphorus flows represented an average input of 19 000 tonnes between 2002 and 2013. Between 2002 and 2006, they were cut to one third as a result of efficiency improvements in purification plants, an increase in the number of inhabitants connected to collective wastewater treatment and lower usage of phosphate fertilisers in agriculture. Following this, the flows fluctuated without displaying a trend from 2005 to 2011 and the increase in 2012 and 2013 appeared to be the result of higher rainfall and flow rates, since the concentrations did not increase.

Overall nutrient flows to the sea are linked to the flows of the four great rivers. The river basins of the Seine, the Loire, the Rhône and the Garonne represent 56% of the territory studied. These rivers transport more than half of all nitrate-linked nitrogen flows to the sea (55%), and two thirds for phosphorus (67%). The observed consequences were eutrophication phenomena.

To find out more

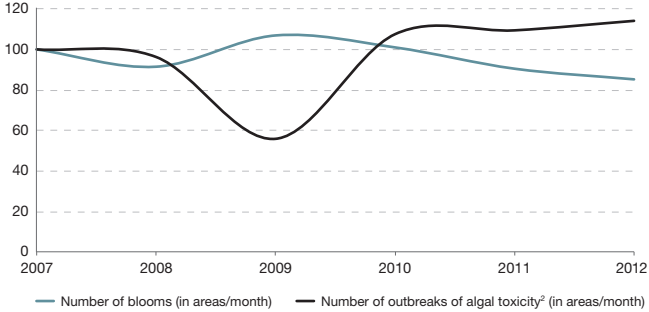
- Data and Statistical Studies Department

L'essentiel sur > Agriculture > Fertilisation

- French National Observatory on the Sea and Coastal Zones
- OSPAR Convention

Eutrophication phenomenon at sea

CHANGE IN ALGAL BLOOMS [1] IN METROPOLITAN WATERS
On an index basis where 2007 = 100



[1] ***Algal bloom*** *(in French:* ***efflorescence algale****): the relatively rapid increase in concentration of one or several species of algae, generally belonging to the phytoplankton category, within a freshwater, brackish water, or seawater aquatic system.*
[2] ***Algal toxicity****: toxicity linked to a toxin produced by algae, often leading to food poisoning.*
Scope: metropolitan France.
Sources: *Ifremer; Quadrige - Rephy; Ceva. Statistical Processing: SDES (French National Observatory on the Sea and Coastal Zones) 2016*

In Europe

In France, 894 events of algal invasion were identified between 1980 and 2015, making it the country with the highest number of incidents. Portugal came next with 475 outbreaks.

Analysis

Excess flows of nitrogen and phosphorus and imbalances between these inputs are responsible for, among other things, eutrophication phenomena which disrupt the condition of rivers, water bodies, estuaries and marine waters. Notably, eutrophication can manifest itself in the form of sharp increases in microalgae development (blooms) or green algae leading to green tides. Nutrients such as nitrogen and phosphorus are naturally present in aquatic ecosystems, and are essential for the development of algal communities. They come from a variety of sources (surface run-off, infiltration, atmospheric deposition), or from more specific sources.

The number of occurrences of algal blooms varies interannually but remained largely stable between 2002 and 2007, while episodes displaying a proliferation of toxins are trending very slightly upwards. These toxins can be harmful to the health of wildlife but also for humans, if they consume infected shellfish. Consequently, these episodes also have economic and public health impacts.

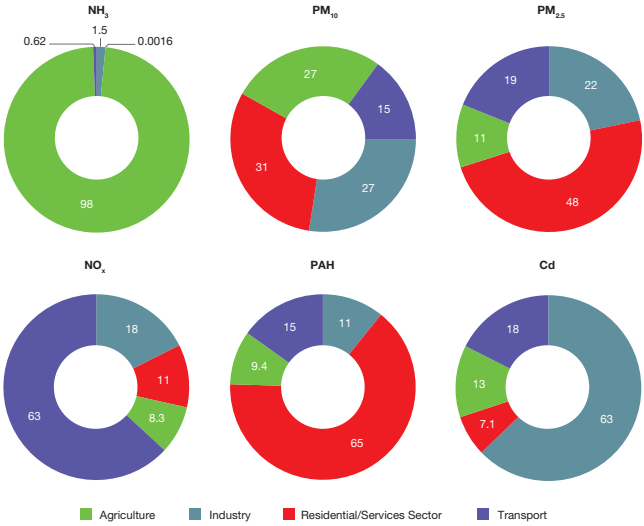
Eutrophication phenomena have been observed over certain coastal areas in metropolitan France. The various maritime seaboards are not associated with eutrophication phenomena to the same extent. Overall, in the English Channel, most coastal areas present problems linked with eutrophication; however, they remain limited to the areas surrounding estuaries (Seine, Somme) and confined bay heads (Saint-Brieuc, Lannion, Morlaix). In the Atlantic seaboard, the beginnings of enrichment through nitrogen and phosphorus are limited to the north of Gironde. Only the bays at Douarnenez and Vilaine appear to be in normal condition. In the Mediterranean, eutrophication issues essentially concern highly localised sites within certain lagoons in Occitanie.

To find out more

- French National Observatory on the Sea and Coastal Zones
- OSPAR Convention
- *Algal bloom and its economic impact*, technical report from the Joint Research Center, Isabella Sanseverino *et al*, 2016

Emission of pollutants into the air

SHARE OF EACH SECTOR OF ACTIVITY IN THE EMISSION OF CERTAIN POLLUTANTS IN 2015



Notes: industry includes the manufacturing and energy transformation industries; transportation includes road and other types of transportation (air, railway, river and maritime excluding international transportation); NH_3: ammonia, PM_{10}: particles under 10 µm in diameter, $PM_{2.5}$: particles under 2.5 µm in diameter, NO_x: nitrous oxides, PAH: polycyclic aromatic hydrocarbons; sum of PAH as defined by the CEE-NU: benzo(a)pyrene, benzo(b) fluoranthene, benzo(k)fluoranthene et indeno(1,2,3-cd)pyrene, Cd: cadmium.
Scope: metropolitan France.
***Source:** Citepa, updated April 2017, format Secten. Statistical Processing: SDES, 2017*

Analysis

Agricultural activities contribute more than 5% of total national emissions of the following pollutants: ammonia (NH_3), certain particles, nitrous oxides (NO_x), polycyclic aromatic hydrocarbons (PAH) and cadmium (Cd).

NH_3 is the pollutant for which agriculture has the highest share (98% in 2015). Livestock is the primary emitter, with 65% of agricultural emissions in 2015. Crops also contribute to these emissions, particularly via the spreading of mineral fertilisers.

Agricultural activities also emit particles into the air: activities such as tilling emit large particles, while fine particles predominantly originate from burning. The contribution of agriculture to PM_{10} particle emissions is on a par with those of industry and the residential/tertiary sector.

NO_x are emitted primarily by the transportation and industry sectors. Agriculture also contributes to the latter, at a rate of 8.3% in 2015, essentially through the combustion of petroleum products by tractors and in greenhouses.

Agriculture also emits PAHs and cadmium (9.4% and 13% respectively of total national emissions), due to the burning of crop waste (residues).

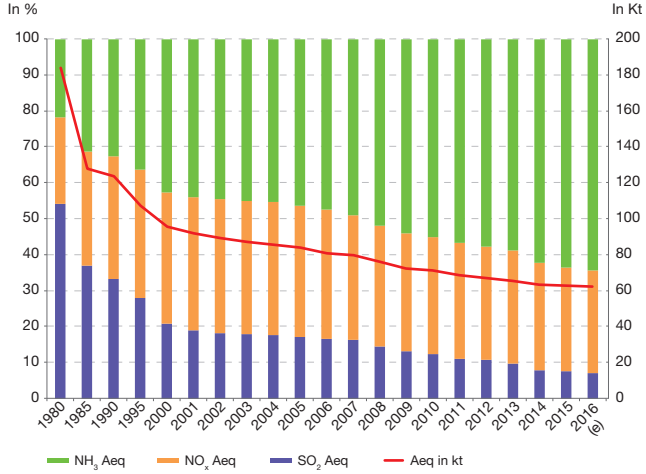
The new national plan for reduction of emissions of atmospheric pollutants (Prepa), launched in May 2017, sets the State's strategy for the reduction of atmospheric pollutant emissions on a national level and compliance with European requirements.

To find out more

- Data and Statistical Studies Department
- Interprofessional technical centre for atmospheric pollution studies (Citepa)

Emission of acidic pollutants into the air

AIR EMISSIONS WITH THE RESPECTIVE AEQ SHARE PER POLLUTANT



Notes: Aeq = "acid equivalent" indicator calculated based on the proportion of H+ ions by mass, i.e.: 0.0313 for SO_2, 0.0217 for NO_x, and 0.0588 for NH_3; (e) = preliminary estimate. Scope: metropolitan France. Relative to the perimeters under the CEE-NU/NEC, the emissions recorded outside of the national total are as follows: international maritime emissions, emissions at the cruising stage (≥ 1 000 m) of domestic and international air traffic, as well as emissions from biotic sources within agriculture and forests, and emissions from non-anthropic sources.

Source: *Citepa, updated April 2017, format Secten. Statistical Processing: SDES, 2017*

Analysis

Acid pollution refers to the deposition into the soil of acidifying or acidic compounds under the effect of wind and precipitation. It has been known about since the 19th Century. The acidification of soils leads to their impoverishment in the minerals necessary for plant nutrition. Acid pollution modifies the chemical balance of natural environments, and leads to the endangerment of aquatic flora and fauna.

Sulphur oxides (SO_2) and nitrous oxides (NO_x), as well as ammonia (NH_3), are primarily to blame for this type of pollution, which can affect areas far removed from the source of the emissions.

In France, total acid emissions fell by 66% between 1980 and 2016. This trend can be explained by the reduction in SO_2 (-96%) and NO_x (-60%) emissions. For the most part, these pollutants originate from the industrial and transportation sectors respectively. NH_3 is currently the primary contributor to acidification with nearly two thirds of emissions in acid equivalent (aeq) – (64% in 2016). Agricultural activities are the almost exclusive source of emissions of this pollutant (98%). NH_3 emissions have decreased slightly (-4%) over the 1980-2016 period.

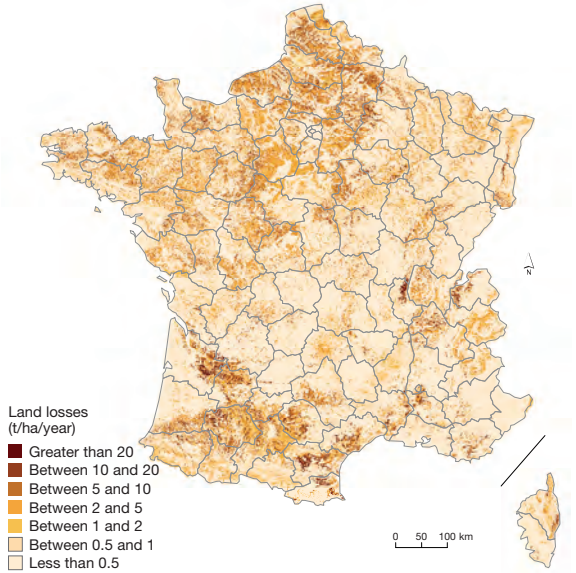
The protocol regarding the reduction of acidification, eutrophication and ground-level ozone, known as the "multi-pollutant/multi-effect" protocol, was signed in 1999 in Gothenburg and amended in 2012. It concerns the emissions of three acid pollutants in particular, with never-to-be-exceeded caps for the horizon 2020: notably for SO_2, NO_x and NH_3. French NO_x and NH_3 emissions must decrease further by 17% and 10% respectively by 2020. For SO_2, emissions are already below the target level.

To find out more

- Data and Statistical Studies Department
- Interprofessional technical centre for atmospheric pollution studies (Citepa)

Water erosion of soils

LAND LOSS DUE TO WATER EROSION OF SOILS



Source: *BRGM, according to Cerdan* et al.*, 2010. Statistical Processing: SDES, 2018*

Analysis

Erosion, a natural phenomenon attributed essentially to rain, degrades soils by displacing the materials of which they are composed. Inappropriate agricultural practices can exacerbate this natural phenomenon and aggravate its consequences. The loss of the fertile layer upstream and the submersion of crops downstream (mudslides) is accompanied by a reduction of agricultural yields, disruption of soil biodiversity, and the degradation of water quality.

Water erosion of soils is estimated at 1.5 tonnes per hectare per annum (t/ha/an) on average in France, with high levels of spatial heterogeneity. As such, the Northern regions – Pas-de-Calais, Picardie, Haute-Normandie, Basse-Normandie and Brittany present risks of land loss greater than 5 t/ha/an over more than 10% of their territory. In the north of France, arable land is particularly vulnerable as a result of its poor plant coverage for part of the year. The Pyrenean foothills are also highly exposed to soil loss. Vineyards (Languedoc, Bordeaux), and to a lesser extent cultivated land and orchards, are the most fragile.

In Europe

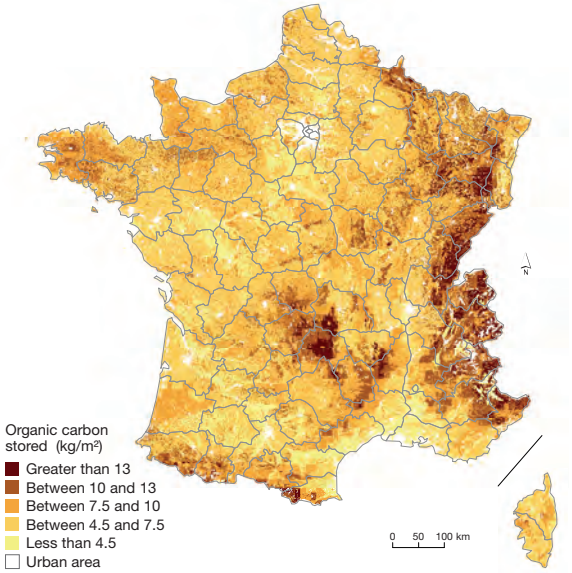
The countries most affected by water erosion of soils are Italy, Slovenia and Austria, with an average equal to or greater than 2.3 t/ha/an, i.e. approximately twice the European average (1.2 t/ha/an). France is situated within the European average.

To find out more

- *Sols et environnement – Chiffres clés – 2015 edition*, CGDD/SOeS, *Repères*, November 2015, pp. 72-86
- Eurostat/soil erosion

Organic carbon storage

ORGANIC CARBON STOCKS IN THE SUPERFICIAL SOIL LAYER



Source: *Gis Sol, 2013, following Meersmans* et al.*, 2012. Statistical Processing: SDES, 2018*

Analysis

Organic matter in the soil has a regulatory function: it fulfils a stoppering role with regards to other environments by trapping contaminants, regulating greenhouse gases, improving the fertility and stability of soils, and boosting their aeration, water reserves and biodiversity. Composed of 58% organic carbon on average, organic matter originates primarily from the transformation of decomposing plant debris, essentially through microorganisms.

The quantity of organic carbon stored in the superficial layer of the soil is estimated at 3.75 gigatonnes (Gt) – (give or take 1.27 Gt) in metropolitan France, an average of 7 kg/m^2.

These stocks depend primarily on the type of soil and on its use: lower stocks in vineyards (3 kg/m^2) and very intensive crops, medium in large plains of crops (approximately 6 kg/m^2) and high (between 8 and 9 kg/m^2) in prairies, forests, lawns and natural pastures. Mountainous soils contain the highest stocks (more than 13 kg/m^2), as a result of climate conditions that are unfavourable to microorganism activity.

While land reclamation at the expense of prairies or forests entails a reduction in the carbon stock, other changes in usage or agro-ecological practices promote carbon storage, such as soil conversion agriculture (reduction or elimination of soil tillage, permanent cover and diversified crop rotation).

According to the "4 per 1000" initiative borne by the Ministry of Agriculture, increasing the quantity of carbon stored in soils by 0.4% per annum through agro-ecological practices would make it possible to halt the annual increase in CO_2 concentration in the atmosphere (4.3 billion tonnes of CO_2 worldwide).

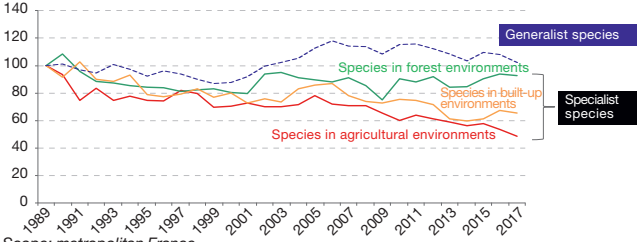
To find out more

- Ministry of Agriculture and Food, "4 per 1000" initiative

Common farm bird populations

CHANGES IN METROPOLITAN POPULATIONS OF COMMON BIRDS

On an index basis where 1989 = 100

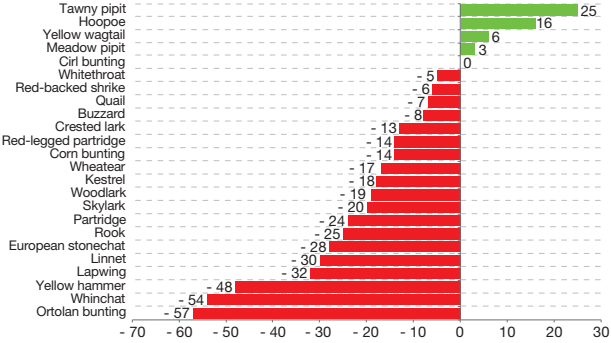


Scope: metropolitan France.

Sources: *Vigie Nature; French Centre for Ecology and Conservation Sciences (CESCO), French Natural History Museum (MNHN) – Mixed Service Unit for Natural Heritage (UMS Patrinat), December 2017. Statistical Processing: SDES, 2018*

VARIATION OF FARM BIRD POPULATIONS BETWEEN 2001 AND 2015

In %



Scope: metropolitan France.

Source: *MNHN - Muséum national d'histoire naturelle / French National Museum of Natural History, 2015. Statistical Processing: SDES, 2017*

Analysis

Birds are generally considered to be good indicators of the condition of biodiversity due to their elevated position in food chains. As such, the data gathered by the STOC programme (suivi temporel des oiseaux communs / temporal monitoring of common birds) facilitates the understanding of the condition of ecosystems and the changes they are undergoing. This data is all the more important given that it constitutes one of the rare long-term temporal series on biodiversity in France.

Overall, common bird populations are experiencing a decline. Among these populations, so-called "specialist" species are declining in favour of generalist ones (uniformisation of aviary fauna). The trend over the 1989-2012 period indicates decreases of 31% for specialist species in agricultural environments (24 species monitored), 21% for species in built-up environments (13 species monitored) and 6% for species in forest habitats (24 species monitored). On the contrary, this indicator of abundance, calculated for generalist birds (14 species), increased by 25% over the same period. Specialist farm birds are particularly affected, being less tolerant of change compared with generalist species when faced with disruptions to their habitat (reduction in food resources, disturbance or destruction of nesting sites).

On a regional level, for the 2003-2013 period, a contrasted variation was observed for species in agricultural environments. Only 2 of 20 regions displayed a positive trend: Champagne-Ardenne and Rhône-Alpes (respectively +6% and +3%). There is also a wide disparity with regards to the various species of farm birds. Populations of tawny pipit thus increased by 25% between 2001 and 2015, while those of the skylark fell by 20%, and the ortolan bunting by 57%.

In Europe

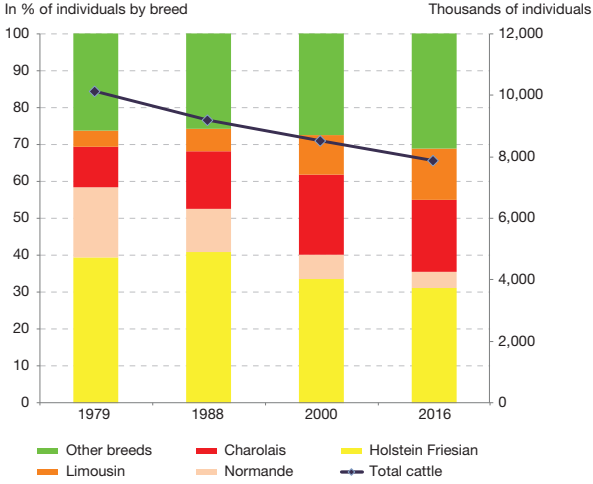
Between 1990 and 2014, common bird populations on agricultural land declined overall by nearly one third in the 26 European countries equipped with monitoring programmes. No recovery trend was observed.

To find out more

- Data and Statistical Studies Department
- French National Observatory on Biodiversity
- Eurostat/environmental indicator – population trends of farmland birds

Diversity of cattle breeds

CHANGE IN DISTRIBUTION OF THE PRIMARY CATTLE BREEDS



Note: population in number of cows
Scope: all of France.
***Sources:** agricultural surveys 1979, 1990, 2000; key figures from the Livestock Institute 2016.*
Statistical Processing: SDES, 2017

In Europe

The Prim'Holstein breed is the top dairy breed worldwide. The size of the livestock population in cows positions French livestock in second place in the world (2.5 million cows), after the United States (8.3 million) and before Germany (2.2 million).

Analysis

Protecting the diversity of cattle breeds not only allows the preservation of biological heritage and genetic diversity, but also the gastronomic specialties of the regions as well as landscape management.

Beginning in the 1930s, a policy for the rationalisation of cattle breeds deemed too populous was implemented in favour of so-called mixed breeds (i.e. those producing both milk and meat). This lasted until 1965. Cattle populations continued to rise until 1979 with specialisation in dairy production, and then fell.

In 2015, France contained 19 million cattle over 46 cattle breeds distributed between 199 000 farms. There are 9 dairy breeds, 16 beef breeds, 16 mixed breeds and 5 other breeds. The 4 main races were Holstein Friesian, Charolais, Limousin, and Normande. In 1979, they represented 74% of France's cattle livestock population, which exceeded 23 million. Following a stabilisation of this predominance, a slight increase in the share of other breeds to 31% was observed in 2016.

Of the other breeds, 21 with fewer than 7 500 female breeding animals were considered threatened by agricultural abandonment. The Bordelaise, Béarnaise and Armorican breeds, for example, are particularly threatened, with 87, 224 and 253 female breeding animals respectively as surveyed in 2014.

Plans to help these threatened breeds recover were put in place from 1976 onwards. These plans have facilitated the recovery of the Vosgienne breed, for example. While 125 000 individuals were recorded in the late 19th Century, by the 1970s only 3 000 remained. In 2016, more than 10 000 individuals were recorded, of which approximately 5 000 were cows.

To find out more

- IDELE livestock institute
- Ministry of Agriculture and Food

Agricultural territory located within Natura 2000 zones

LOCATION OF AGRICULTURAL LAND LOCATED WITHIN NATURA 2000 ZONES IN 2015

Sources: *UE-SDES, CORINE Land Cover 2012; MNHN, base Natura 2000, September 2015. Statistical Processing: SDES, 2016*

In Europe
In late 2015, Natura 2000 sites covered a land surface of 78.8 million hectares, 18% of European territory.

Analysis

Natura 2000 is a European network of natural sites aimed at preserving species and environments with high heritage value, taking into account economic, social, cultural and local needs. It is founded on two directives:

- the Birds directive (79/409/EEC) adopted in 1979 aimed at implementing special protection areas (SPAs) to ensure the good conservation status of threatened or rare birds on a European scale. In late 2015, the global surface area classified as SPA stood at 4.4 million hectares (Mha);
- the Habitats directive (92/43/EEC) adopted in 1992 with the aim of defining special areas of conservation (SACs) to ensure the good conservation status of the habitats of rare or threatened flora and fauna on a European scale. In late 2015, the global surface area classified as SAC stood at 4.8 Mha.

After difficult implementation during the 1990s, the Natura 2000 network was expanded significantly in 2006 and stabilised at close to 12.8% of metropolitan land territory. In late 2015 in metropolitan France, Natura 2000 sites represented 7 Mha in land surface (without duplication).

As such, 8% of metropolitan agricultural surfaces are covered by a Natura 2000 zone. This proportion is higher in the southern part of the metropolitan (for example 42% in Bouches-du-Rhône and 30% in Alpes-de-Haute-Provence), as well as in mountainous zones. Conversely, in Pas-de-Calais, only 2 000 ha of agricultural areas were covered by a Natura 2000 zone, some 0.4%.

This distribution is closely linked with the types of farms. Sheep and goat farms, as well as farms specialising in arboriculture and viticulture, are more represented in Natura 2000 zones. On the other hand, field crops and off-land livestock farms are less present in these zones.

To find out more

- *Les communes abritant des espaces naturels protégés*, CGDD/SOeS, *Chiffres&statistiques*, n° 706, December 2015, 11 p.
- Ministry for an Ecological and Solidary Transition

Natura 2000 European network

- National inventory of natural heritage

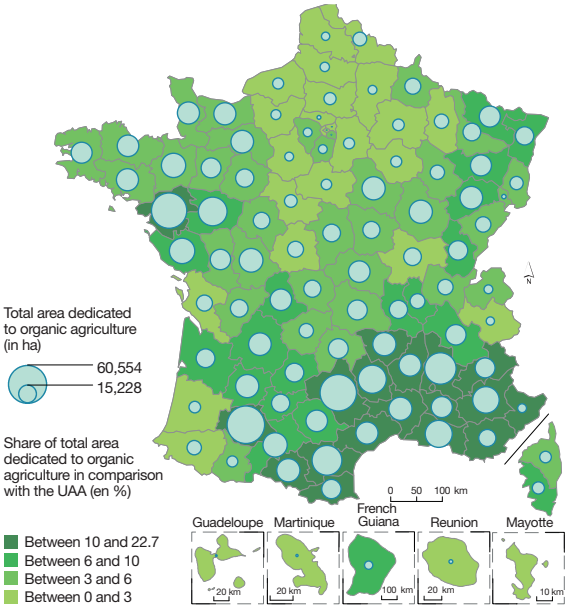
Part 4

Eco-friendly agricultural practices: where do we stand?

— Faced with a society that is increasingly concerned for its health and for the conservation of its environment, agriculture is evolving every day and improving its practices thanks to innovation under the impulse of regulatory changes or with the support of public funding.
The development of organic agriculture, the implementation of experimentation networks for building an economically, socially and environmentally efficient farming system in which the development of agricultural products reflects the increased conscientiousness of the agricultural world with regard to its environmental impact.

Areas used for organic agriculture

AGRICULTURAL AREA CULTIVATED FOLLOWING ORGANIC METHODS BY DEPARTMENT IN 2016



Note: utilised agricultural area from the annual agricultural statistics for Martinique and French Guiana. The UAA in Mayotte (actually cultivated UAA) represents one third of the potentially exploitable UAA.

***Sources:** Agence bio/certifying organisations, 2016; Agreste, 2016. Statistical Processing: SDES, 2018*

Analysis

To qualify for organic agriculture certification, committed farmers comply with rigorous specifications as defined by European and national regulations. The fundamental principles of organic agriculture are based on not using chemically synthesised products and genetically modified organisms, and on recycling organic materials, crop rotation, biological control and respect for animal welfare.

In 1995, organically farmed areas made up 0.4% of the utilised agricultural area (UAA) of French farms. Following a period of relative stability, the sector has experienced another boom since 2010. In 2016 it made up more than 7% of farms in the agricultural sector and 5.7% of the UAA. Of the 1 538 047 hectares (ha) cultivated according to organic methods, 483 170 ha are in conversion (31%) and 1 054 877 ha are certified organic with the option of marketing under the "AB" organic logo. The average area per farm stands at 47.6 ha.

In 2016, the distribution of organic UAA varies widely by region. Nearly half of organic farmland in France is located within three regions (Occitanie 23%, Auvergne-Rhône-Alpes 13% and Nouvelle-Aquitaine 12%). The organic share of UAA varies between 19% in Provence-Alpes-Côte d'Azur and 1% in Hauts-de-France. Outside of forage areas (65%), 23 % of organic surfaces pertain to field crops, 5% to vines, and 4% to fruits, fresh vegetables and aromatic plants. The number of organic livestock farms continues to increase, with 7 000 cattle farms, 2 000 sheep farms and 1 600 in laying hens. A new programme, Ambition Bio 2022, was launched in June 2018 aimed at reaching 15% of UAA under organic agriculture.

In Europe

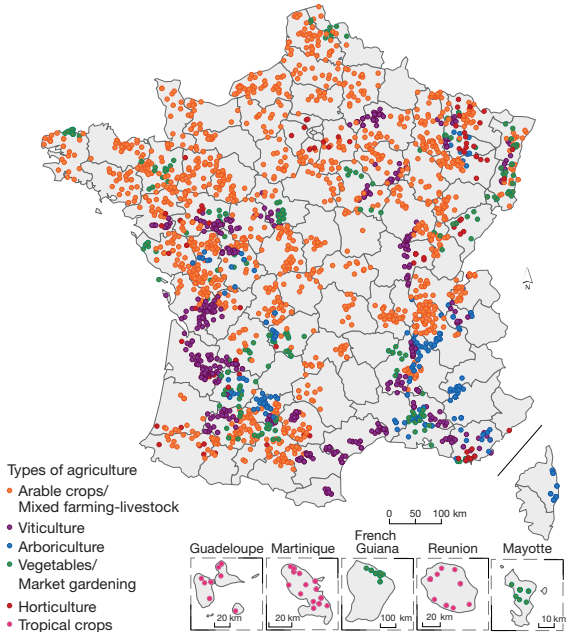
The organic share of agricultural land over the 28 EU member states was 6.7% in 2016. With 21.2% of UAA in 2016, Austria is the EU country with the highest amount of organic area. France is in 19th place.

To find out more

- Ambition Bio 2022 programme
- French Agency for the Development and Promotion of Organic Agriculture

Dephy farm network

DISTRIBUTION OF DEPHY FARMS (ÉCOPHYTO REPORT – AUGUST 2016)



Source: *Cellule d'animation nationale Dephy, August 2016. Statistical Processing: SDES, 2016*

Analysis

The Dephy network began as part of the Écophyto plan and aims at reducing the use of crop protection products in France to arrive at an economically, socially and ecologically efficient agricultural system and preserve public health.

Launched in 2008 on the initiative of the ministry of agriculture, this plan mobilises a wide variety of stakeholders throughout the metropolitan territory and overseas departments. It envisages establishing a network of 3 000 pilot farms, known as Dephy farms, linked with an network of experiments with the primary aim of demonstrating, trialing, and producing reference documents on the economic systems and practices for crop protection products. This approach was aimed at identifying and broadcasting systems that were economic and efficient under real farming conditions. After several years of operation, the objectives are now to discover, promote, and deploy agricultural systems and techniques that are economical with crop protection products while remaining economically, environmentally and socially efficient.

In 2009, an initial network of 180 farms was born. In 2016, it was renewed and expanded. In August 2016, the Dephy farm network included 2 621 voluntary farms committed to reducing the use of pesticides, and covered 6 key agricultural sectors across all production types. The network continues to grow, with more than 3 000 farms in 2017.

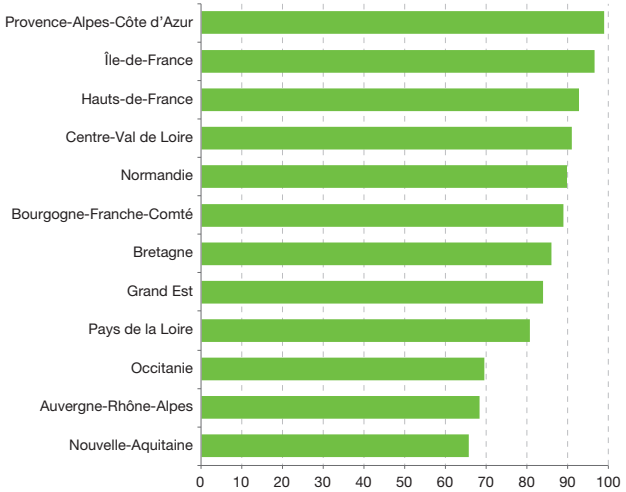
Overall, the farms in the Dephy network have reduced their treatment frequency index by 18%, across all sectors, in approximately 4 years, with no impact on the productivity or margins per hectare.

To find out more

- Ecophytopic
- Ministry for an Ecological and Solidary Transition

Soil coverage in winter

SHARE OF FIELD CROP SURFACE AREA COVERED OVER WINTER IN 2014
In %



Scope: metropolitan France.
***Source:** Agreste/inquiry on cultivation practices, 2014. Statistical Processing: SDES, 2017*

Analysis

In winter, bare soils can be subject to physical degradation phenomena (plough-pans, soil compaction, surface run-off and erosion), disruptions to biodiversity, acceleration of carbon depletion and of the leaching of nitrogen residues. Plant cover in winter, along with no-till farming and direct seeding, make it possible to limit these drawbacks and are thus considered to be eco-friendly growing practices.

Farmers planted more than 13 million hectares of field crops in 2014 (grains, oil seeds, protein crops, potatoes, and industrial crops including fallow land), i.e. 46% of the utilised agricultural area.

One third of field crops are seeded in spring, of which 20% benefit from a preceding crop in the winter. These preceding crops could be "nitrate-fixing intermediate crops" (CIPAN in French) – (54% crucifers), catch crops (i.e. harvested), "intermediate crops providing energy recovery"(CIVE in French) or crop regrowth. In 2014, 17% of spring field crop plots remained bare in winter, compared with 20% in 2011. This concerns the south of France above all (excluding the Provence-Alpes-Côte d'Azur region).

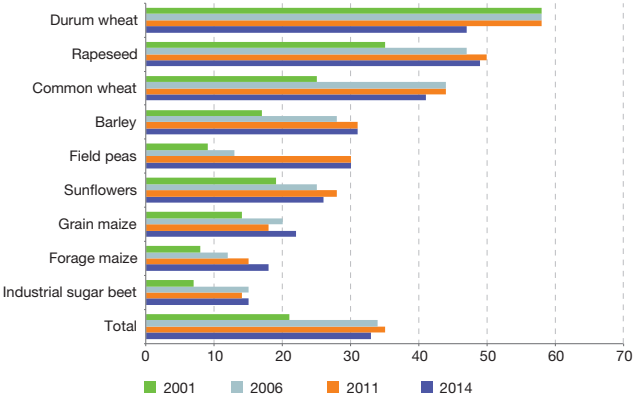
To find out more

- *Les acteurs économiques et l'environnement – 2017 edition*, Insee, *Insee Références*, December 2017, 180 p.
- Data and Statistical Studies Department
- *L'état des sols de France*, Soil science interest group, November 2011, 188 p.
- Graphagri2017/pratiques culturales

No-till seeding

SHARE OF FIELD CROP SURFACE AREA SEEDED WITHOUT PRIOR TILLING

In %



Note: field crops excluding potatoes.
Scope: metropolitan France.
***Source:** Agreste/inquiry on cultivation practices, 2001, 2006, 2011 and 2014*

Analysis

Tilling has a powerful impact on soils: physical degradation (plough-pans, soil compaction, surface run-off and erosion), disruption of biodiversity, acceleration of carbon depletion and of nitrate leaching.

No-till techniques combine simplified growing practices with superficial working of the soil and direct seeding, with no working of the soil. These conservation techniques contribute to the preservation of the environment, as well as to more sustainable agriculture. They make it possible:

- to protect soils against erosion by maintaining plant cover of the soil on an almost permanent basis;
- to reduce the use of inputs and thus the pollution associated with these uses;
- to preserve the biological activity of the soil.

However, biological tilling replaces physical tilling and several years are required before it becomes efficient. In fact, during the first years of no-till agriculture, weed management can prove to be more difficult. Adjusting crop rotation makes it possible to manage these weeds more effectively.

In France in 2011, nearly 35% of areas under field crops were managed without prior tilling. These areas had increased by 14 points since 2001. Overall, no-till techniques continue to progress, notably for silage maize and grain maize. However, a slight regression was observed in 2014 with 33% of crops managed without tilling, particularly common wheat, durum wheat, sunflowers and rapeseed.

Tilling remains more present in spring crops than in autumn ones.

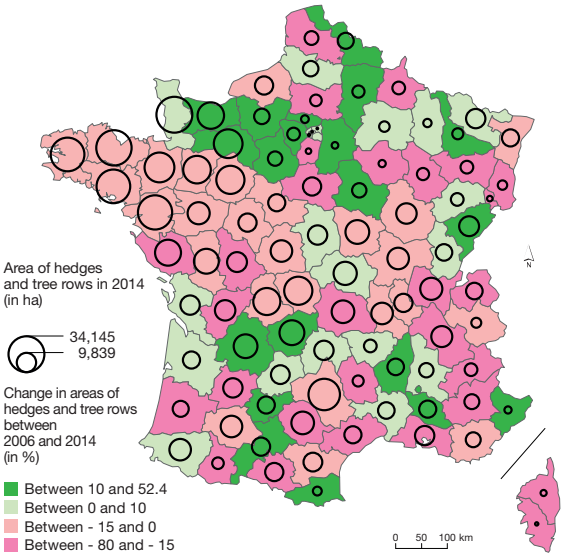
Direct seeding increased by one point between 2011 (2%) and 2014 (3%).

To find out more

- Graphagri2017/pratiques culturales
- *Enquêtes pratiques culturales 2011*, Agreste, *Les dossiers*, n° 21, July 2014, 70 p.

Hedges and tree rows

AREA OF HEDGES AND TREE ROWS BY DEPARTMENT IN 2014



Note: hedges and tree rows = wooded land in linear formations whose average width (vertical projection of tree crowns over the soil) is between 3 and 20 metres and whose length is greater than 25 metres with no interruptions greater than 10 metres.
Source: *Agreste, Teruti-Lucas, 2006-2014. Statistical Processing: SDES, 2016*

Analysis

In 2014, in metropolitan France, the area under hedges and tree rows amounted to 944 546 hectares (ha) compared with 1 003 028 in 2006: a loss of 58 482 ha. This represents a reduction of nearly 6%.

Aside from being a non-negligible source of wood production, hedges and tree rows play several important roles from an environmental standpoint. First of all, the impact of global warming on crops is limited by the shade provided by trees, which delays the evaporation and drying of the land. Hedges also constitute a wind-break, which has a positive impact on crop yield. Trees and shrubs house a number of organisms, such as crop auxiliaries and birds which, by hunting rodents and insects that can be harmful to plant growth, provide more ecologically-friendly crop protection than the use of chemical products. In addition, hedges and tree rows have a positive impact on the landscape and play a role in water regulation.

The Bouches-du-Rhône department has lost the most hedges and tree rows in recent years, with 5 419 ha or more than one third less of these plantations between 2006 and 2014. These areas represent approximately 2% of the total area of the department, but 7% of the utilised agricultural area.

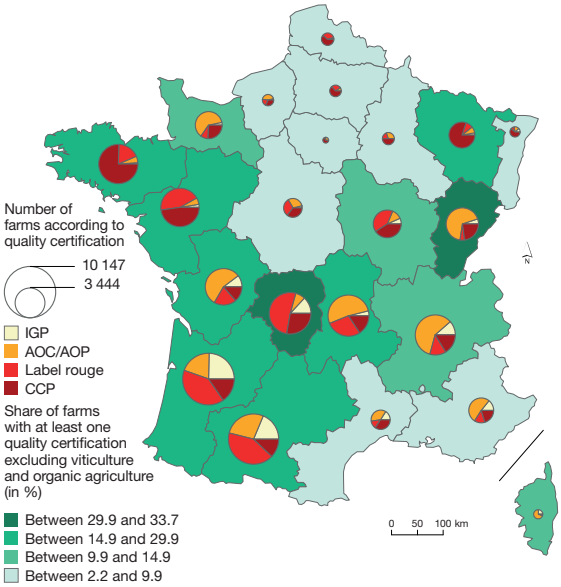
Conversely, in the Calvados department, areas planted to hedges and tree rows represented 18 470 ha in 2014 (3.3% of the area of the department), with an increase of 5 251 ha in 8 years. The Manche department has the largest amount of areas planted to hedges and tree rows compared with its total area (5.7%) with 34 145 ha.

To find out more

- Agreste/Teruti-Lucas
- French National Observatory on Biodiversity

Value added to agricultural and food products

PRESENCE OF QUALITY SIGNS BY REGION IN 2010



Note: one farm may make use of several quality signs. This concerns product compliance certifications and official quality and origin identification signs excluding organic agriculture and viticulture.
Source: *Agreste, agricultural survey 2010. Statistical Processing: SDES, 2018*

Analysis

The official means of adding value to agricultural and food products can be divided into 3 categories:

- the official quality and origin identification signs (SIQO in French). There are 4 of these:
  - guarantee of origin (663 products in 2015): controlled designation of origin (AOC) and its European equivalent the protected designation of origin (AOP in French), protected geographical indication (IGP in French),
  - guarantee of superior quality (425 products in 2015): label rouge (LR),
  - guarantee of a traditional recipe (SGT) – (1 product in 2015: Bouchot mussels),
  - eco-friendly and animal welfare guarantee: organic agriculture (AB);
- value-adding statements, e.g. "farm produce";
- the product compliance certification (CCP in French) structure.

These different methods of adding value allow the development of a variety of products, and often an agriculture that is more respectful of the environment and of animal welfare. They also help sustain economic activity in disadvantaged rural areas by promoting expertise and areas of production.

In 2010 in metropolitan France, 65 724 farms had at least one product that was recognised under a quality sign (including CCP, excluding AB and excluding viticultural production), i.e. 13.4% of the total number of farms. The CCPs and LRs primarily applied to beef products, while the designations of origin essentially applied to dairy and plant products, as well as wines.

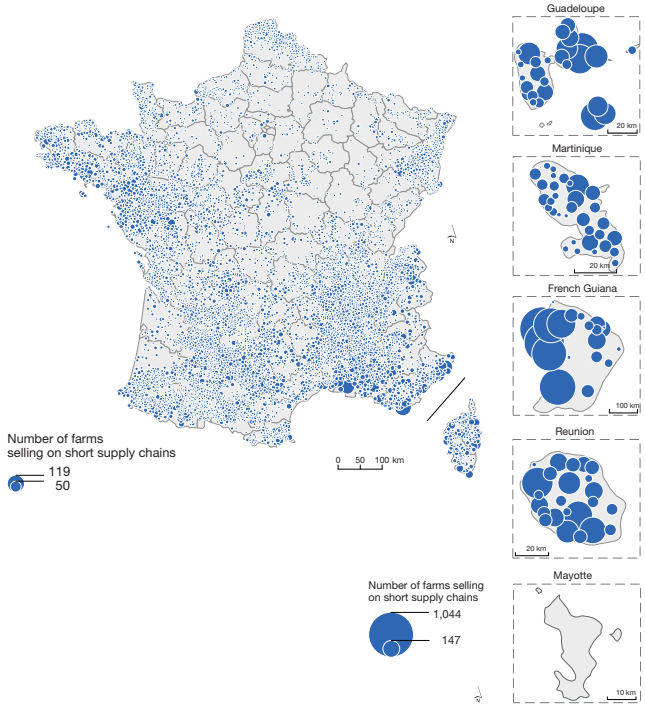
The Aquitaine region contained the highest number of farms with at least one quality sign, with 8 271 farms for a rate of 20%. In Franche-Comté, one in three farms produces at least one product under a quality sign.

To find out more

- *Une exploitation sur cinq engagées dans une démarche qualité*, Agreste, *Primeur*, n° 294, December 2012, 4 p.
- French Institute of Origin and Quality (Institut national de l'origine et de la qualité, INAO)

Short-circuit retail

SALE OF AGRICULTURAL PRODUCTS ON SHORT SUPPLY CHAINS BY MUNICIPALITY IN 2010



Source: *Agreste, agricultural survey 2010. Statistical Processing: SDES, 2017*

Analysis

Short-circuit retail presents not only environmental benefits (maintenance of peri-urban agriculture to limit urban sprawl, reduction of long-distance transportation and packaging volume, etc.), but also economic and social advantages by promoting the maintenance or development of local jobs, as well as creating social links.

In 2010, during the most recent agricultural survey, 107 000 farmers, i.e. 21%, sell on short supply chains, meaning those limited to a maximum of one intermediary between the producer and the consumer. Direct sales, with no intermediaries, represent 14% of farmers with 71 200 structures concerned.

This sales method primarily concerns honey and vegetable producers. 51% of farms with beehives sell on short supply chains, as well as 46% of farms with areas planted to vegetables. A quarter of fruit and wine producers also opt for this sales method. Animal products, which are more complicated to process and preserve, are rarely sold in this way.

All products considered, this type of retail is most common in Corsica (60% of farms) and in the overseas departments (65%). In the regions where there are many farmers for each product, the farmers are often grouped into collective structures which ensure sales through a long supply chain. As such, in regions with high fruit production such as Provence-Alpes-Côte d'Azur, Languedoc-Roussillon and Rhône-Alpes, the proportion of farmers selling fruit on short supply chains is lower than in less productive regions such as Île-de-France and Nord-Pas-de-Calais (source: Agreste).

To find out more

• *Un producteur sur cinq vend en circuit court*, Agreste, *Primeur*, n° 275, January 2012, 4 p.
• *Alimentation - les circuits courts de proximité*, Ademe, *Les avis de l'Ademe*, June 2017, 8 p.

Part 5

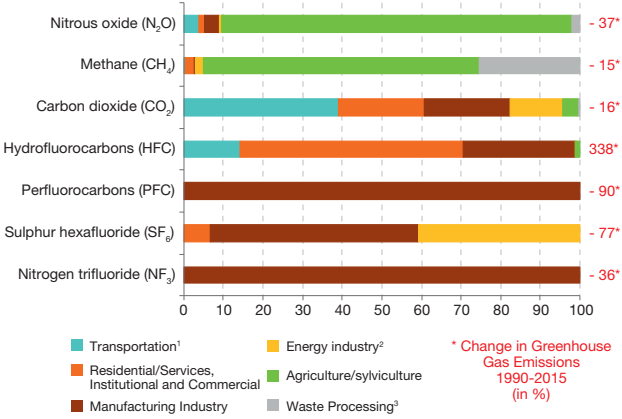
How is agriculture connected to climate change?

— In 2015, greenhouse gas emissions from agriculture represented 20% of total greenhouse gas emissions, primarily composed of methane and nitrous oxide. These emissions, originating from livestock farms and crop management respectively, are linked with biological processes.
Climate change reduces the water resources available and can modify the farming calendar (dates of harvest, seeding, flowering).
Like other sectors, agriculture also contributes to the production of renewable energy, with methanisation for example.

Greenhouse gas emissions

SHARE BY SECTOR OF ACTIVITY OF EMISSIONS OF THE SIX GREENHOUSE GASES IN 2015

In % of total emissions of each GHG



Notes: excluding land use, land-use change and forestry (LUCF); the percentages given are calculated based on the quantities of GHGs expressed in CO_2 equivalent;
[1] domestic traffic only; [2] including waste incineration with energy recovery; [3] excluding waste incineration with energy recovery.
Scope: all of France.
***Source:** Citepa, inventory (climate plan format), April 2017. Statistical Processing: SDES, 2017*

Analysis

In 2015, overall greenhouse gas (GHG) emissions in France stood at 457 million tonnes of carbon dioxide equivalent ($MtCO_2$-eq). Emissions linked to the agricultural sector represent 20% of these emissions at 91 $MtCO_2$-eq.

While CO_2 accounts for 73% of worldwide GHGs, the primary GHGs emitted by the agricultural sector are methane (CH_4) and nitrous oxide (N_2O), which represent 45% and 40% respectively of agricultural emissions. CO_2 emissions from the agricultural sector represent 14% of French CO_2 emissions.

GHG emissions from the agricultural sector have declined by 4% since 1990, but this sector's contributions are slightly on the rise (17% in 1990 compared with 20% in 2015). As regards the other sectors, they have also decreased their emissions, with the exception of transportation. In fact, emissions from the latter have increased 12% during the same period for a contribution of almost 30% in 2015.

The global warming potential over 100 years of N_2O is 298 times greater than that of CO_2, while that of CH_4 is 25 times higher.

In Europe

The share of GHG emissions linked to agricultural activity stood at 10% within the 28 EU member countries in 2015, as in 1990. Latvia had the highest level of GHG emissions linked with agriculture, with 24%, ahead of Lithuania (23%).

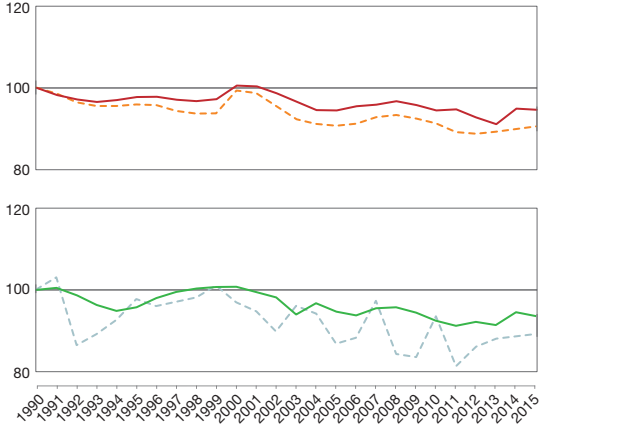
To find out more

- Data and Statistical Studies Department
- Interprofessional technical centre for atmospheric pollution studies (Citepa)

Greenhouse gas emissions from agriculture

CORRELATION BETWEEN N_2O AND CH_4 EMISSIONS AND THE QUANTITIES OF NITROGEN SOLD AND CATTLE POPULATIONS

On an index basis where 1990 = 100



Scope: all of France.
Sources: *Agreste, annual agricultural statistics; Citepa, June 2016. Statistical Processing: SDES, 2017*

Analysis

In 2015, greenhouse gas (GHG) emissions linked to agricultural emissions stood at 91 million tonnes of CO_2 equivalent ($MtCO_2$-eq), i.e. 20% of total GHG emissions.

Farming activity primarily emits two GHGs: nitrous oxide (N_2O) and methane (CH_4). The particular trait of these emissions is that they are essentially non-energetic and linked to biological processes.

Agriculture is the primary source of N_2O emissions (88%), in particular as a result of nitrogen inputs on cultivated soils (86%) and of the mineralisation of nitrogenous matter. Between 1990 and 2015, nitrogen sales declined 11%, while nitrogen emissions fell by 6%.

The primary source of CH_4 emissions is the agricultural sector (70%), particularly due to enteric fermentation (60%), animal manure (10%) and anaerobic fermentation in humid or flooded zones such as rice fields. These emissions decreased by 5% between 1990 and 2015 in parallel with the reduction in cattle numbers (-9%).

In Europe

Agricultural activity over the 28 EU member countries emits 1 033 $kgCO_2$-eq per capita of CO_2, CH_4 and N_2O. Irish agriculture emits the most greenhouse gas with 4 224 $kgCO_2$-eq per capita. France is in 6th place with 1 413 $eqCO_2$-eq per capita.

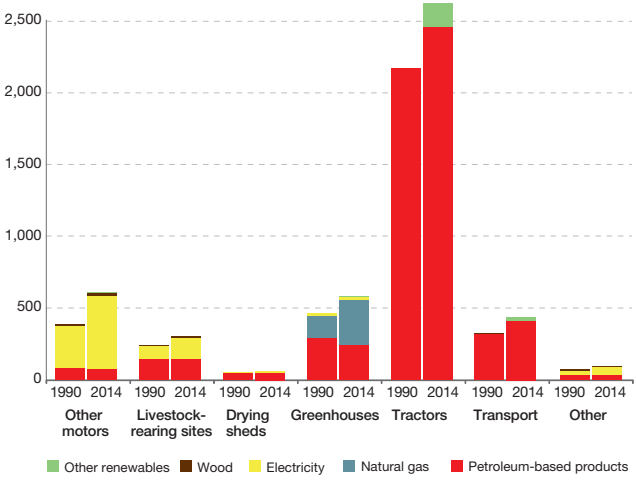
To find out more

- *Chiffres clés de l'énergie – 2016 edition*, CGDD/SDES, *Datalab*, February 2017, 72 p.
- *Bilan énergétique de la France pour 2016*, CGDD/SDES, *Datalab*, March 2018, 140 p.
- *En matière d'énergie, les exploitations agricoles consomment majoritairement des produits pétroliers*, CGDD/SOeS, *Chiffres&statistiques*, n° 517, May 2014, 5 p.

Energy consumption in agriculture

CHANGES IN ENERGY CONSUMPTION IN AGRICULTURE BETWEEN 1990 AND 2014

In ktoe



Notes: RE = renewable energy; ktoe = kilotonne oil equivalent.
Scope: all of France.
***Source:** Citepa, Namea matrices, 2017. Statistical Processing: SDES, 2017*

In Europe

The final energy consumption by the agricultural and silvicultural sector represents 2.2% of total consumption on a European level (28 EU member countries).

Analysis

Since 1990, final energy consumption has increased by 7%, particularly driven by the residential/tertiary sector, which represented more than 45% in 2015.

The agricultural sector's share of energy consumption, compared with final energy consumption, has remained stable and represents 3%, with 4.5 megatonnes oil equivalent (Mtoe) in 2015.

The energy sources used by agriculture are distributed as follows: 74% comes from petroleum-based products, 7% from natural gas, 16% from electricity and 3% from thermic renewable energies and waste. The quantity of petroleum-based products used has remained constant since 1973 at approximately 3.3 Mtoe per annum, 55.5% of which is used in tractors and automotive engines. In 1990, tractors used only classic petroleum products, while in 2014, 6.5% of fuels used were agrofuels.

According to a survey of the Ministry of Agriculture on energy consumption and production in French farms, the regions of Brittany and Pays de la Loire represent more than one quarter of all energy purchases by farms (26.2% in 2011). This can be explained by the activity of livestock buildings (29% of energy purchases) as well as crops under glass or high cover (36% of energy purchases). Overall, field crop farms consume more than 25% of the energy consumed by the agricultural sector.

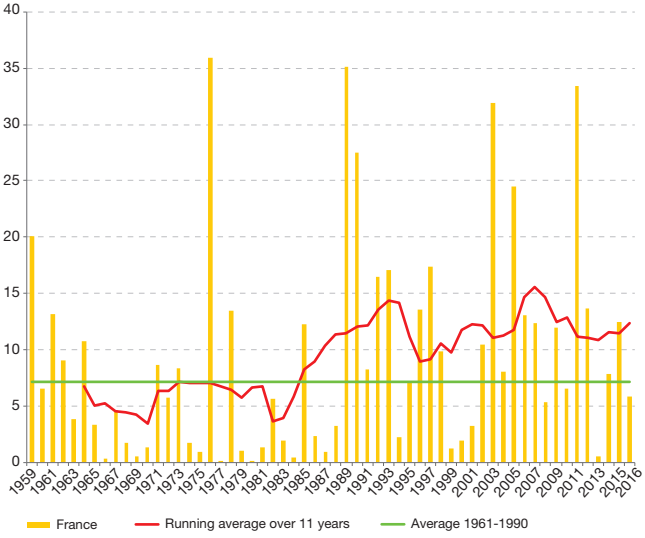
To find out more

• *Chiffres clés de l'énergie – 2016 edition*, CGDD/SDES, *Datalab*, February 2017, 72 p.
• *Bilan énergétique de la France pour 2016*, CGDD/SDES, *Datalab*, March 2018, 140 p.
• *En matière d'énergie, les exploitations agricoles consomment majoritairement des produits pétroliers*, CGDD/SOeS, *Chiffres&statistiques*, n° 517, May 2014, 5 p.
• Environment and Energy Management Agency

Surface area of France affected annually by drought

ANNUAL SHARE OF SURFACE AREA IN FRANCE AFFECTED BY DROUGHT BETWEEN 1959 AND 2016

In % of area



Scope: metropolitan France.

Sources: *French weather service (Météo France); Ministry of the Environment, National Observatory for the Effects of Global Warming (Onerc). Statistical Processing: SDES, 2018*

Analysis

The issue of water management during periods of drought arises over both the short term, in the event of provisional shortages, and the long term, in the context of climate change.

The years 1976, 1989, 1990, 2003 and 2011 appear to have experienced the most severe soil drought incidences in terms of geographical scope. The change in the ten-year average illustrates that the index entitled "average scope of droughts" has been trending upward since the 1990s. This index makes it possible to understand the level of drought on the scale of metropolitan France. Its evolution over the 1959-2016 period allows us to identify the years in which drought affected a significant portion of the territory: for example 1976, or the years 1989 and 1990, 2003 and 2011. The year 1976 presented the most significant soil moisture deficits on French territory at least since 1959, followed by the years 1989, 2011 and 2003. The running average over 11 years illustrates the escalation of the spatial scope of soil droughts since the 1990s. Since the beginning of the 21st Century, 11 of 16 years have exceeded the average of the areas affected over the 1961-1990 period. This observation can be related to the observed weather trend of drying soils throughout nearly all French territory and in every season.

During periods of drought, the departmental prefect orders progressive water use limitation measures, particularly in agriculture. These measures are applied on the level of the watershed or group of watersheds.

As part of the first National Plan for Adapting to Climate Change 2011-2016, France committed to reducing its water consumption by 20% by 2020. In 2018, a second National Plan for Adapting to Climate Change will be adopted.

To find out more

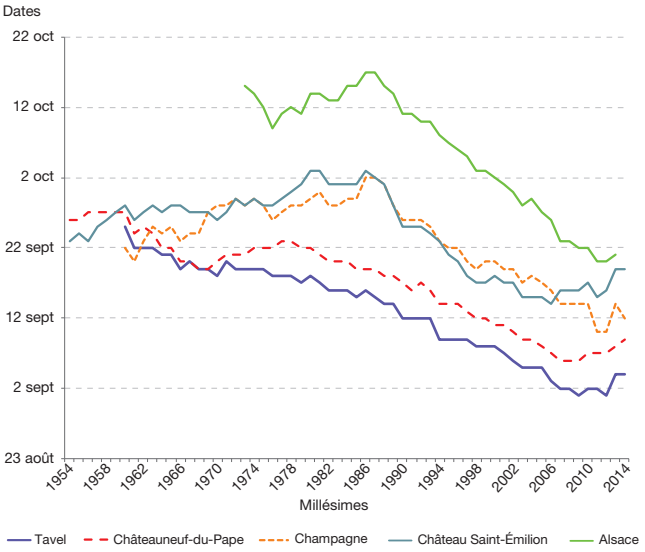
- Data and Statistical Studies Department

L'essentiel sur > eau > ressources en eau

- Propluvia
- National Observatory for the Effects of Global Warming

Grape harvest dates

CHANGE IN GRAPE HARVEST DATES



Note: the harvest dates for Alsatian wines are calculated in relation to ripening, the dates for wines in Champagne are calculated as an average throughout the region, and the other dates correspond to the harvesting of one (or two) reference plots.
Sources: *Inter-Rhône; ENITA Bordeaux; Inra Colmar; Comité interprofessionnel du vin de Champagne. Statistical Processing: Onerc, SDES, 2018*

Analysis

The grape harvest dates, like those of vine flowering or seeding for maize and wheat, vary alongside changes in the climate. According to the National Observatory for the Effects of Global Warming (ONERC), in 20 years, the full blossom dates for vines as well as the harvest dates are becoming progressively earlier in the season.

This trend is observed across all varieties and all regions. Harvest is now taking place at least two weeks earlier in the year compared with 1987. However, agronomic yields have not diminished over this period.

Although the general precocity of the harvest dates is significant and reasonably regular, variations from one year to the next also remain considerable, illustrating the variability of the climate in a temperate zone.

As such, this indicator illustrates the two aspects of climate variability: the short-term fluctuation of the climate (from year to year) and its longer-term evolution (over several decades).

Between the ten-year average of 1965-1974 and the ten-year average of 2003-2012, the harvest dates of vineyards in Tavel, Châteauneuf-du-Pape, Champagne, Château Saint-Émilion and Alsace moved from 29 September to 11 September, an 18-day advance.

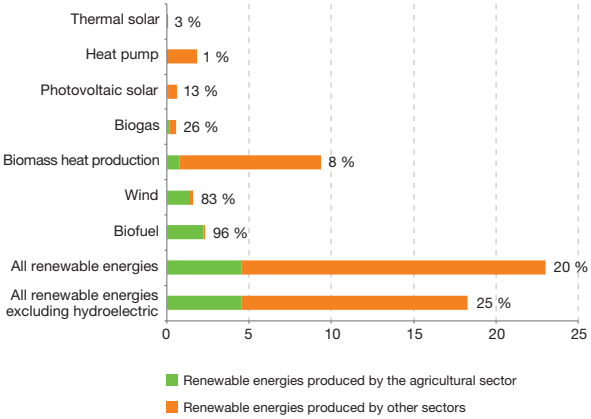
In France, although the year 2014 as a whole was the warmest since at least 1900, it was not exceptional for vines as temperatures in the months of July and August were below the seasonal norm.

To find out more

- Impacts du changement climatique : agriculture et forêt
- National Observatory for the Effects of Global Warming
- French National Observatory on Biodiversity

The contribution of the agricultural sector to the production of renewable energies

SHARE OF AGRICULTURE IN NATIONAL RENEWABLE ENERGY PRODUCTION IN 2015
In Mtoe



Note: Mtoe = millions of tonnes oil equivalent.
Scope: metropolitan France.
***Source:** Ademe, I Care & Consult report, 2017. Statistical Processing: SDES, 2018*

Analysis

The proportion of renewable energies produced in France covers 14.9% of final energy consumption in 2015, while the objective set for 2020 is 23% and 32% for 2030. Achieving this objective will require the mobilisation of all economic sectors, particularly the agricultural sector, which has significant potential for the production of renewable energies.

According to a study led by Ademe in 2017, the direct and indirect contribution of the agricultural sector to national renewable energy consumption is estimated at 20% of national production, with 4.6 million tonnes oil equivalent (Mtoe) in 2015. This amounts to a contribution of 1.8% of primary national energy consumption. The number of farms involved in the production of renewable energies is estimated at 50 000 (11% of French farms), including 32 000 in the biofuel sector, 11 000 in the photovoltaic solar energy sector, and 4 000 in the wind energy sector.

The proportion of agricultural contribution in national renewable energy production varies by type of renewable energy. It is estimated at 96% for agrofuels, 83% for wind and 26% for biogas.

45% of agricultural renewable energy production is concentrated in the regions Grand Est, Hauts-de-France and Centre-Val de Loire. This distribution can be explained in particular by the importance of their "field crop" and "mixed farming-livestock" sectors, favouring the establishment of wind turbines and the production of rapeseed and sunflower crops which are components of biodiesel, and of beet, wheat, maize and potatoes, which are components of bioethanol.

Bibliography

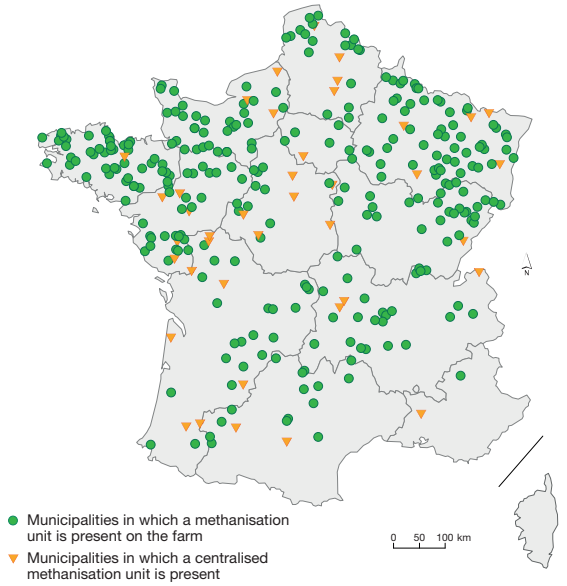
ADEME, I Care & Consult, Blézat consulting, CERFrance, Céréopa 2017, *Agriculture et énergies renouvelables : état de l'art et opportunités pour les exploitations agricoles*, 70 p.

To find out more

- Data and Statistical Studies Department
- Ministry for an Ecological and Solidary Transition/Renewable Energies and Energy Recovery
- Ministry for an Ecological and Solidary Transition/Biofuels

Renewable energy production through methanisation

ON-FARM AND CENTRALISED BIOGAS UNITS IN 2017



Note: the municipalities Plélo (22), Saint-Nicolas-du-Tertre (56) and Semallé (61) each had two on-farm biogas units.
Source: *Ademe, Sinoe®, export 7 November 2017. Statistical Processing: SDES, 2018*

Analysis

The agricultural sector, the primary producer of mobilisable biomass, like the forestry sector, is a key actor in the development of renewable energies.

Using a wide diversity of organic matter, the production potential of renewable energies through methanisation is significant. In 2010, 31 on-farm and centralised biogas units were registered: 107 in 2012 and 331 in 2017. In March 2013, the Ministry of the Environment and the Ministry of Agriculture affirmed their support for methanisation projects by drawing up the "Biogas Energy for Nitrogen Autonomy" plan with the aim of reaching 1 000 on-farm digestion tanks by 2020.

In 2017, the 331 biogas units exclusively or partly using agricultural inputs were distributed as follows:

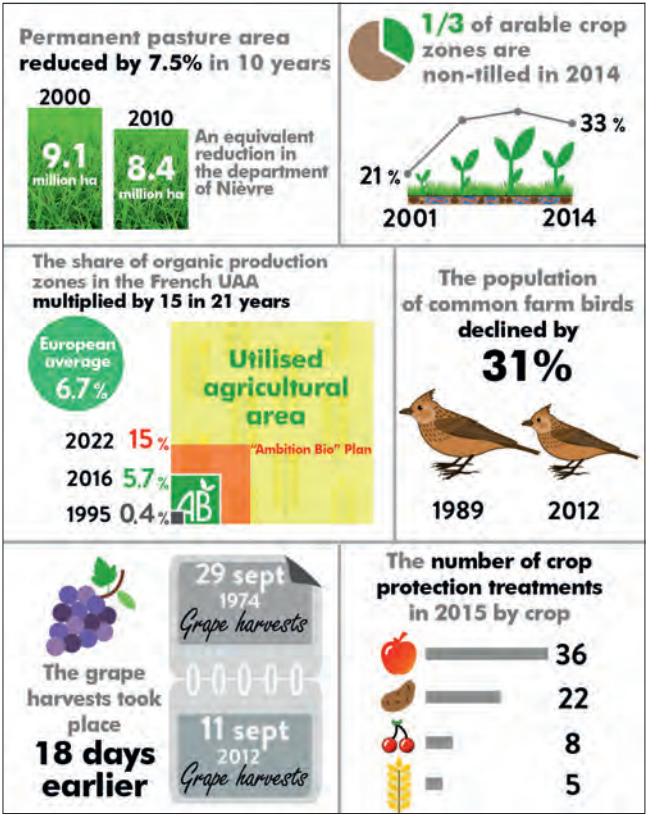
- 291 biogas units operated mostly by one or several farmers, in which predominantly livestock effluents and crop waste were used, and whose installed capacity was generally below 500 kilowatts-electric (kWe);
- 40 centralised or regional biogas units including both collective agricultural projects (proportion of agricultural residue greater than 60%) and industrial waste treatment projects using waste from industry, households, or purification stations, in which agricultural residue is in the minority. The installed capacity generally exceeds 500 kWe.

Methanisation provides environmental benefits: production of renewable energy, reduction of greenhouse gases, reduction of synthesized nitrogenous mineral fertiliser consumption. It also facilitates the diversification of a farm's agricultural activities.

To find out more

- Data and Statistical Studies Department
- Ministry for an Ecological and Solidary Transition/Renewable Energies and Energy Recovery
- SINOE®
- "Biogas Energy for Nitrogen Autonomy" plan

Key data


Permanent pasture area
reduced by 7.5% in 10 years
2000
9.1
million ha
2010
8.4
million ha
An equivalent reduction in the department of Nièvre
1/3 of arable crop zones are non-tilled in 2014
21 %
33 %
2001
2014
The share of organic production zones in the French UAA
multiplied by 15 in 21 years
European average 6.7%
Utilised agricultural area
"Ambition Bio" Plan
2022 15 %
2016 5.7 %
1995 0.4 %
AB
The population of common farm birds
declined by
31%
1989
2012
The grape harvests took place
18 days earlier
29 sept
1974
Grape harvests
11 sept
2012
Grape harvests
The number of crop protection treatments in 2015 by crop
36
22
8
5

Appendices

— Abbreviations
— Useful Links

Abbreviations

AAS	Annual agricultural statistics
AASQA	Associations agréées de surveillance de la qualité de l'air/Licensed bodies for air quality surveillance
Ademe	Agence de l'environnement et de la maîtrise de l'énergie/ Environment and Energy Management Agency
Adivalor	Farmers, distributors and industrialists for energy recovery from agricultural waste
AEM	Agri-Environment Measures
AFB	Agence française de la biodiversité/French Agency for Biodiversity
ANPEA	Association nationale professionnelle pour les engrais et amendements/National Professional Association for Fertilisers and Soil Additives
ARS	Agence régionale de santé/Regional health agency
AS	agricultural survey
BNVD	Banque nationale des ventes par les distributeurs/National Bank of Sales by Distributors
BRGM	Bureau de Recherches Géologiques et Minières/Office of Geological and Mining Research
Cd	cadmium
Cesco	Centre d'écologie et des sciences de la conservation/Centre for Ecology and Conservation Sciences
CH_4	Methane
CICV	Comité interprofessionnel du vin de Champagne®/ Interprofessional Committee for Champagne Wine

CITEPA	Centre interprofessionnel technique d'études de la pollution atmosphérique/Interprofessional technical centre for atmospheric pollution studies
CLC	CORINE Land Cover®
CO_2	Carbon dioxide
Comifer	Comité français d'étude et de développement de la fertilisation raisonnée/French Committee for the Research and Development of Sustainable Fertilisation
EAFRD	European Agricultural Fund for Rural Development
EEA	European Environment Agency
Enita	École nationale d'ingénieurs des travaux agricoles/National School of Agricultural Engineers
EU	European Union
FADN	Farm Accountancy Data Network
FAO	Food and Agriculture Organization
GWP	global warming potential
ICPE	Installation Classée pour la Protection de l'Environnement/ Regulated Environment Protection Facility
Idele	Institut de l'élevage/Livestock Institute
IFOP	Institut français d'opinion publique/French Institute of Public Opinion
Ifremer	Institut français de recherche pour l'exploitation de la mer/ French Institute for Marine Research
INERIS	Institut national de l'environnement industriel et des risques/ National institute for industrial environment and risks
INRA	Institut national de la recherche agronomique/French National Institute for Agronomy Research

INSEE	Institut national de la statistique et des études économiques/ French National Institute of Statistics and Economic Studies
IRSN	Institut de radioprotection et de sûreté nucléaire/Institute for Radioprotection and Nuclear Safety
ISAAA	International Service for the Acquisition of Agribiotech Applications
LCSQA	Laboratoire central de surveillance de la qualité de l'air/ Central laboratory for air quality surveillance
MAA	Ministère de l'Agriculture et de l'Alimentation/Ministry of Agriculture and Food
MNHN	Muséum national d'histoire naturelle/French National Museum of Natural History
MTES	Ministère de la Transition écologique et solidaire/Ministry for an Ecological and Solidary Transition
Namea	National Accounting Matrix with Environmental Accounts
NH_3	ammonia
Nodu	Number of unit doses
N_2O	Nitrous oxide
NO_2	Nitrogen dioxide
NO_x	Nitrogen oxides
ODR	Observatoire du développement rural/Observatory for rural development
ONB	Observatoire national de la biodiversité/French National Observatory on Biodiversity
Onerc	Observatoire national sur les effets du réchauffement climatique/National Observatory for the Effects of Global Warming (ONERC in French)

ONRB	Observatoire national des ressources en biomasse/National Observatory for Biomass Resources
PM_{10}	particles smaller than 10 µm in diameter
$PM_{2.5}$	particles smaller than 2.5 µm in diameter
SWR	Statistical waste regulation
SAR	small agricultural region
SDES	Data and Statistical Studies Department
Secten	Secteurs économiques et énergie/Economic and energy sectors
SO_2	sulphur dioxide
SSP	Service de la statistique et de la prospective/Statistics and Planning Agency
TFI	Treatment Frequency Index
TMCB	(in French STOC) Temporal monitoring of common birds
UAA	Irrigated agricultural area
UCPP	unused crop protection product
UMS Patrinat	Unité mixte de service patrimoine naturel/Mixed Service Unit for Natural Heritage
Unifa	Union des industries de la fertilisation/Union of industries in fertilisation
UPG	Unproductive permanent grassland

Useful Links

Ademe	Agence de l'environnement et de la maîtrise de l'énergie/ Environment and Energy Management Agency
Adivalor	Farmers, distributors and industrialists for energy recovery from agricultural waste
Agreste	Agricultural statistics from the Ministry of Agriculture and Food
ANPEA	Association nationale professionnelle pour les engrais et amendements/ National Professional Association for Fertilisers and Soil Additives
BRGM	Bureau de Recherches Géologiques et Minières/Office of Geological and Mining Research
EC/JRC	Joint Research Centre of the European Commission
CITEPA	Centre interprofessionnel technique d'études de la pollution atmosphérique/Interprofessional technical centre for atmospheric pollution studies
Eurostat	Statistical Office of the European Union
FAO	Food and Agriculture Organization of the United Nations
Soil SIG	Scientific Interest Group on Soil
Idele	Institut de l'élevage/Livestock Institute
IGN	Institut national de l'information géographique et forestière/ French National Institute of Geographical and Forestry Information
INERIS	Institut national de l'environnement industriel et des risques/ National institute for industrial environment and risks

INRA	Institut national de la recherche agronomique/French National Institute for Agronomy Research
INSEE	Institut national de la statistique et des études économiques/ French National Institute of Statistics and Economic Studies
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ISAAA	International Service for the Acquisition of Agri-biotech Applications
MAA	Ministère de l'Agriculture et de l'Alimentation/Ministry of Agriculture and Food
MTES	Ministry for an Ecological and Solidary Transition
ONB	Observatoire national de la biodiversité/French National Observatory on Biodiversity
OECD	Organization for Economic Co-operation and Development
ONERC	Observatoire national sur les effets du réchauffement climatique/National Observatory for the Effects of Global Warming
SDES	Data and Statistical Studies Department
UIPP	Union des industries de la protection des plantes/Union of industries for plant protection
Unifa	Union des industries de la fertilisation/Union of industries in fertilisation

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French agriculture is a cornerstone of France's food system and a major economic sector, but it also has its impacts on the environment, depending on the nature of the practices used and the vulnerability of the ecosystems that sustain them.

This publication presents a selection of agri-environmental key figures organised into five areas: contextual data on agriculture, pressures on the environment, the consequences of these pressures on the condition of the environment, the more eco-friendly agricultural practices, and the links between agriculture and climate change.

Environment & agriculture

Key figures
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General Commission for Sustainable Development

Data and Statistical Studies Department
Sub-Directorate for Environmental Information
Tour Séquoia
92055 La Défense cedex
E-mail: diffusion.sdes.cgdd@developpement-durable.gouv.fr

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