AGRICULTURE - AGRONOMY

LICENCE LEVEL

BREVET DE TECHNICIEN SUPÉRIEUR AGRICOLE
(BTSA, AGRICULTURAL TECHNICIAN CERTIFICATE)
(SECONDARY DIPLOMA + 2 YEARS OF HIGHER EDUCATION) – **L2**

The BTSA is offered in private and public secondary schools. 16 BTSA concentrations (options) are available:

> **Production**: agronomics, crop production; analysis, management, and strategy of farm businesses; aquaculture; agricultural development in hot regions; animal production; horticultural production; viticulture-enology. > **Agro-machinery**: agricultural machinery technician training. > **Processing of agricultural products**: agricultural, biological, and biotechnological analyses; food sciences and technologies.

> **Agribusiness and agri-supply**: technical/commercial training. > **Services and consulting**: rural development and planning.

> **Planning**: landscaping; forest management; nature management and protection; water management.

The **Brevet de Technicien Supérieur Maritime** (BTSM, maritime technician certificate) in **fisheries and marine environment management** is offered by the Lycée Professionnel Maritime Paul Bousquet in Sète and Boulogne-sur-mer.

www.campusfrance.org >Resources center >Educational and Research programs >Degree description >BTSA

PROFESSIONAL LICENCES
(SECONDARY DIPLOMA + 3 YEARS OF HIGHER EDUCATION) - **L2 +1**

Three academic programs in agriculture are available:

> **Law, economics, management** (distribution, agribusiness), commerce (consulting for members of livestock cooperatives, marketing and international export of French wines), and agribusiness law;

> **Social sciences and humanities** in agronomy (sustainable agriculture and environmental certification), landscaping (parks, gardens, green areas, sports fields), and land planning (development and management of natural areas);

> **Sciences, technologies, health** in agronomy (organic agriculture, sustainable resource management), animal products (consulting jobs in livestock, technical-commercial jobs in animal nutrition), crop production (crop protection techniques and plant technologies), maintenance of agro-machinery, biotechnologies.

www.campusfrance.org >What program are you looking for?> Undergraduate level

BACHELOR OF SCIENCES
(SECONDARY DIPLOMA+ 2 YEARS OF HIGHER EDUCATION) – **L3**

The **Bachelor of Sciences European Engineer Degree «Animal Products, Crop Products, International Agribusiness"** is offered in English by the *École Supérieure d'Agriculture* d'Angers in partnership with the *Université Agricole* de Dronten (Netherlands)

www.groupe-esa.com >Formation>Bac+3 & 4

MASTER LEVEL

MASTER
(SECONDARY DIPLOMA + 5 YEARS OF HIGHER EDUCATION) – **M2**

Several academic programs offer a Master with concentrations (mentions et spécialités) in the environment:

> **Sciences of the environment, land, and the economy** with the following concentrations: planning, energy and land ecology, risk governance, sustainable construction, green construction, ecosystems, marine environment, tourism, arctic studies, health, functional ecology, ecological modeling, environmental toxicology, sciences of industrial and urban environments, etc.

> **Life and environmental sciences and technologies**: risks of biocontaminants in human and animal food, engineering of products and processes, toxicology and health, biodiversity, continental environments and hydrosciences, tropical ecosystems management.

> **Sciences, technologies, health**: industrial environment, environmental engineering, ecology, sustainable development, risks, expertise, health/safety, naval environment, etc.

> **Law, economics and management** with the following concentrations: chemical pollutants, geological engineering, heritage, management, quality, safety, energy, construction, sustainable development.

> **Humanities and social sciences**: environmental projects, geomatics, sustainable development, social responsibility, archeology and environment, paleoenvironment, Mediterranean and African environments, etc.

www.campusfrance.org >What program are you looking for? > Postgraduate level

Programs at Engineering Schools (Écoles d'ingénieurs) are taught in English:

• **Engineering sciences:**

- MAN-IMAL: trandisciplinary management of global health and nutritional safety. www.manimal.fr/en/

http://taughtie.campusfrance.org/tiesearch/

MASTER OF SCIENCES IN MANAGEMENT (MSC)
(SECONDARY DIPLOMA + 5 YEARS OF HIGHER EDUCATION) – **M2**

Programs at Engineering Schools (Écoles d'ingénieurs) are taught in English:

> Agribusiness – Agroecology: www.groupe-esa.com>Formation> Bac +5

> Agroecology - organic agriculture: ISARA Lyon www.agroecology.fr

> Viticulture, Enology: SupAgro Montpellier: www.supagro.fr

http://taughtie.campusfrance.org/tiesearch/

DIPLÔME D'INGÉNIEUR (ENGINEERING DEGREE) / MASTER
(SECONDARY DIPLOMA + 5 YEARS OF HIGHER EDUCATION) – **M2**

Below are French institutions sponsored by the Ministry of Agriculture that offer engineering degrees accredited by the CTI (Commission des Titres d'Ingénieur):

> Agrocampus Ouest: Institut national supérieur des sciences agronomiques, agroalimentaires, horticoles et du paysage www.agrocampus-ouest.fr

> AgroParisTech: Institut des sciences et industries du vivant et de l'environnement www.agroparistech.fr

> Agrosup Dijon: Institut national supérieur des sciences agronomiques, de l'alimentation et de l'environnement www.agrosupdijon.fr

> Bordeaux Sciences Agro: École nationale supérieure des sciences agronomiques de Bordeaux-Aquitaine www.agro-bordeaux.fr

> ENGEES: École nationale du génie de l'eau et de l'environnement de Strasbourg www.engees.unistra.fr

> ENSAIA: École nationale supérieure d'agronomie et des industries alimentaires http://ensaia.univ-lorraine.fr

> INPT-ENSAT. École nationale supérieure agronomique de Toulouse www.ensat.fr

> Montpellier SupAgro: Institut national d'études supérieures agronomiques de Montpellier www.supagro.fr

> ONIRIS: École nationale vétérinaire, agroalimentaire et alimentation Nantes Atlantique www.oniris-nantes.fr

> El Purpan: École d'ingénieurs de Purpan www.purpan.fr

> ESA - École supérieure d'agriculture d'Angers www.groupe-esa.com

> ESB: École supérieure du bois www.ecoledubois.fr

> ESITPA: École d'ingénieurs en agriculture www.esitpa.org

> IAMM Institut agronomique méditerranéen de Montpellier www.iamm.fr

> Institut Polytechnique LaSalle Beauvais www.lasalle-beauvais.fr

> ISA Lille: Institut supérieur d'agriculture de Lille www.isa-lille.fr

> ISARA-Lyon Institut supérieur d'agriculture de Rhône-Alpes www.isara.fr

> VetAgroSup: Institut d'enseignement supérieur et de recherche en alimentation, santé animale, sciences agronomiques et de l'environnement www.vetagro-sup.fr

> www.cti-commission.fr

NIVEAU POST-M

MASTÈRE SPÉCIALISÉ (MS, SPECIALIZED MASTER)
(M2 +1 YEAR OF HIGHER EDUCATION)

Labeled by the *Conférence des Grandes Écoles*, the *Mastère Spécialisé* program enables students to earn an institutional credential attesting to dual competence in specialized areas of Environmental studies (French and/or English).

www.campusfrance.org >Resources center >Educational and Research programs >Degree description >*Mastères spécialisés*

> List of MS programs: www.cge.asso.fr/nos-labels/ms

STUDIES AREA

IN FIGURES

Sources : French Ministry of Agriculture, Agrifood and Forests - http://agriculture.gouv.fr

- **282,000 km²** of agricultural land in France
- **51%** of the total area of France is agricultural land
- **39%** of the total area of France is "natural" lands (forests, moorlands, scrublands, etc.)
- **15 million hectares** devoted to arable crops (2010)
- **515,000 farms** in metropolitan France
- **950,000 people** live and work on farms in France
- **3.5% of French farms** are involved in organic production (2010)
- **18,000 farms** produce certified organic plant or animal products

INTERNATIONAL

Europe is the world's leading agricultural power in terms of production value and the share of the working population employed in agriculture.

France is the 8th agricultural power in terms of contribution to the total value of global agricultural production.

French agricultural production is valued at € 76 billion, far ahead of Germany (56 billion), Italy (49 billion), and Spain (43 billion). France is also a global leader in exports of wheat, seeds, alcohols, wines, and spirits.

RELATED FIELDS

• Aquaculture • Biology • Chemistry • Ecology • Economics and management • Geography • Veterinary medicine • Enology • Earth and space sciences • Shipping • Viticulture

SUBFIELDS

• Equestrian activities • Agri-food • Agro-ecology • Food • Land planning and landscaping • Atmosphere • Biodiversity • Biotechnologies • Climate change • Climate challenges • Sustainable development • Water • Eco-technologies • Emissions • Ecological footprint • Carbon footprint • Alternative energies • Epidemiology • Forestry • Greenhouse gases • Genetics • Water management • Horticulture • Hydrology • Environmental engineering • Natural habitats • Environmental protection • Global warming • Public health • Aquatic sciences • Food safety • Silviculture • Water technologies • Earth • Veterinary sciences

USEFUL LINKS

- **ABioDoc, French national resource center for organic agriculture:** www.abiodoc.com
- **Agreste (agricultural statistics, assessments, and outlooks):** http://agreste.agriculture.gouv.fr
- **Agroécologie (MOOC) – Agreenium-IAVFF:** www.france-universite-numerique-mooc.fr
- **ANEFA (French national association for agricultural employment and training):** http://anefa.org
- **APECITA (French association for managers, engineers, and technicians in the agricultural and agrifood industries:** www.apecita.com
- **APCA (French permanent assembly of chambers of agriculture):** www.chambres-agriculture.fr
- **CIRAD (agricultural research for development):** www.cirad.fr
- **Chlorofil:** www.chlorofil.fr
- **Agricultural education in France and list of BTS certificates in the agricultural sector:** www.chlorofil.fr/diplomes-et-referentiels/formations-et diplomes/btsa.html
- **FNAP (French organic agriculture federation):** www.fnab.org
- **Fésia, 4 private écoles d'ingénieurs in life sciences, agriculture, the agrifood industry, and the environment:** www.fesia.org
- **IAVFF (French institute for agronomics, veterinary sciences, and forestry):** www.agreenium.org
- **Training for jobs in agriculture, forestry, nature, and land management:** www.educagri.fr
- **INRA (French national institute for agricultural research):** www.inra.fr
- **Young farmers:** www.jeunes-agriculteurs.fr
- **French Ministry of Agriculture, Agrifood, and Forests:** http://agriculture.gouv.fr/Enseignementagricole
- **GLEN:** http://glen-europe.org
- **Salon de l'agriculture:** www.salon-agriculture.com
- **UNREP (national rural union for education and promotion):** www.maformationagricole.com

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AGRICULTURE - ENVIRONMENT

AGRICULTURE AGRONOMY

France is the European Union's largest agricultural producer, followed by Germany, Italy, and Spain. With over 500,000 farms, agriculture accounts for more than 1 million jobs in France. Most of these are in the sectors of cereal production and dairy farming, but also in market gardening, viticulture, arboriculture, and horticulture. The arable crop sector is composed primarily of cereals (wheat, barley, corn, etc.), oilseeds (sunflower, colza, soy, *etc.*), and protein crops (peas, beans, *etc.*).

The census of agriculture reveals the richness and diversity of French agriculture: cereals, fruits, garden farming, wines, livestock, etc. With regard to medium and large farms, 30% specialize in cattle, 23% in arable crops, and 15% in viticulture. Organic farming is also growing in France with more farmers involved in on-farm processing and short food supply chains.

Thousands of jobs will need to be filled in agriculture, agribusiness, and forestry. From trees to wood products, the wood-forest sector includes diverse fields such as silviculture, logging, wood furniture, construction, sawing, woodwork, and the paper and cardboard industry.

Programs in agriculture are broken down into 8 subject areas: production, processing, spatial planning and environmental protection, equipment, marketing and sales, services, equestrian activities, and animal husbandry and care.

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CLIMATE

LICENCE LEVEL

BREVET DE TECHNICIEN SUPÉRIEUR (BTS, HIGHER TECHNICAL CERTIFICATE)

(SECONDARY DIPLOMA +2 YEARS OF HIGHER EDUCATION) – L2

The BTS in **fluids, energies, and domotics** with a concentration (option) in **indoor climate control systems and fluidics** is offered by 50 schools (public and private high schools, and CFA's, or apprentice training centers). Such programs provide technical training focused on HVAC systems (heating, ventilation, and air conditioning) and indoor sanitation. Subjects taught include: thermal energy, hydraulics, aeraulics, acoustics, maintenance, electrical engineering, climate control, energy management, and regulations.

www.campusfrance.org >Resources center >Educational and Research programs >Degree description>BTS

PROFESSIONAL LICENCE

(SECONDARY DIPLOMA +3 YEARS OF HIGHER EDUCATION) - **(L2 +1 YEAR)**

Some 60 schools (universities and institutes of technology) offer the professional licence in **climate control systems** with concentrations available in:

> Installation design

> Sustainable development

> Energy efficiency and expertise

> Renewable energies

> nstallation management and maintenance

> Energy management.

www.campusfrance.org >What program are you looking for? > Undergraduate level

LICENCE

(SECONDARY DIPLOMA +3 YEARS OF HIGHER EDUCATION) - **(L2 +1 YEAR)**

50 schools offer a licence in **earth and environmental sciences**. This degree covers the fields of geology, geophysics, geochemistry and hydrogeology while introducing students to glaciology and atmospheric and climate sciences. Students complete a portion of their studies in the field.

www.campusfrance.org >What program are you looking for? > Undergraduate level

MASTER LEVEL

MASTER

(SECONDARY DIPLOMA+5 YEARS OF HIGHER EDUCATION) – **M2**

Three schools offer master's degrees in climate studies. The following specialty areas are available:

Sciences, technologies, and health; Geography and environment track with the following concentrations:

• Atmosphere, climate, and spatial observations • Climate, risks, environment, and health • Climate and spatial observations • Climate and vineyards • Water, climate, and environment

Marine and coastal sciences with the following concentrations:

• Oceans, atmosphere, climate and remote sensing • Physics of the ocean and climate.

Humanities and social sciences in geography with a concentration in:

• Transportation, mobility, environment, and climate.

www.campusfrance.org >What program are you looking for? > Postgraduate level

Programs in English: Agrosciences, environment, territory, landscape, forests: climate, land-use and ecosystem services

• Université Paris-Saclay: www.universite-paris-saclay.fr/en/education/masters

DIPLÔME D'INGÉNIEUR (ENGINEERING DEGREE) / MASTER

(SECONDARY DIPLOMA+5 YEARS OF HIGHER EDUCATION) – **M2**

French engineering schools offer engineering and master's degrees accredited by the CTI (Commission des Titres d'Ingénieur).

Two schools offer the diplôme d'ingénieur in the area of energy and climate:

• École d'Électricité de Production et des Méthodes Industrielles (Cergy) www.ecam-epmi.fr >Nos Formations

• Institut National des Sciences Appliquées de Strasbourg, in partnership with Institut des Techniques d'Ingénieur de l'Industrie Alsace (ITII Alsace) à Mulhouse. www.insa-strasbourg.fr >Formations - www.itii-alsace.fr

In the areas of atmospheric and oceanic modeling, hydrology, air quality, renewable energies, scientific computing, and climate change:

• Institut National Polytechnique de Toulouse (INP)-ENSEEIHT École Nationale de la Météorologie (ENM Météo) www.enm.meteo.fr >Métiers et formations>Ingénieur et Master

POST-M LEVEL

MASTÈRE SPÉCIALISÉ (MS, SPECIALIZED MASTER)

(M2 +1 YEAR OF HIGHER EDUCATION)

Labeled by the Conférence des Grandes Écoles (CGE), the specialized master enables students to earn an institutional credential attesting to dual competence:

Management of Sustainable Development and Climate Change

Co-accreditations:

> École Nationale de la Météorologie (ENM): www.enm.meteo.fr

> Institut National Polytechnique de Toulouse (INP Toulouse) - École Nationale Supérieure Agronomique de Toulouse (INPENSAT): www.ensat.fr

> Toulouse Business School (TBS): www.tbs-education.fr

> Additional information on the MS degree: www.campusfrance.org/fr/ressource/les-masteres-specialises-ms

List of MS programs: www.cge.asso.fr/nos-labels/ms

L'ÉCOLE NATIONALE DE LA MÉTÉOROLOGIE

(EMN, NATIONAL SCHOOL OF METEOROLOGY)

ENM teaches students how to understand the atmosphere and predict its behavior, as well as how to produce, share, and use meteorological and climate data in a wide array of contexts. Not only do students learn how to analyze and perform critiques, they also learn how to lead and coordinate teamwork. EMN is the only French institution of higher learning that offers programs devoted entirely to the meteorological and climate sciences.

ENM offers degree programs geared toward research (Master's in Ocean – Atmosphere – Continental Surfaces, and MS in eco-engineering), as well as programs rooted in the practical applications of the meteorological and climate sciences. Through European and international networks, the school is involved in numerous bilateral cooperation, research, and training initiatives (Francophone Africa, Eastern Europe, Maghreb, etc.).

• INP Toulouse-ENM Météo France: www.enm.meteo.fr

IN FIGURES

Sources: French Ministry in charge of Ecology
www.developpement-durable.gouv.fr - www.cop21.gouv.fr

- **12% reduction** of GHG emissions (1990-2012)
- **30% reduction** of fossil fuel consumption (by 2030)
- **32% increase** in the share of renewable energies (by 2030)
- **40% reduction** of GHG emissions (by 2030)
- **50% reduction** of total energy consumption (by 2050)
- **75% reduction** of GHG emissions from 1990 levels (by 2050)

INTERNATIONAL

France, a signatory to the Kyoto Protocol, hosted and led the 2015 Conference of Parties of the United Nations Framework Convention on Climate Change (COP21/CMP11) from November 30 to December 11. The objective was to forge a commitment by the international community to preventing the earth from warming more than 2°C.
Within the European Union, France has taken an ambitious stance. It aims to reduce greenhouse gas emissions by 40% by 2030 and by 60% by 2040 (compared to 1990 levels). France is supporting priority areas of research in light of warnings from the Intergovernmental Panel on Climate Change (IPCC) and the role humankind plays in climate change.
The MISTRALS (Mediterranean Integrated Studies at Regional and Local Scales) initiative pools the research efforts of many countries of the Mediterranean basin.
www.mistrals-home.org

RELATED FIELDS

• Agriculture • Energy • Geosciences • Meteorology • Oceanography • Health • Environmental sciences • Earth sciences • Life sciences

SUBFIELDS

• Food •Atmosphere • Bio-geosciences • Climate change • Sustainable development • Water • Ecology • Emissions • Carbon footprint • Alternative energies • Environment • Greenhouse gas • Ocean • Pollution • Global warming • Earth

USEFUL LINKS

- **2015 Paris Climate Conference (COP21):** www.diplomatie.gouv.fr **>Politique étrangère de la France >Environnement et développement Durable**
- **2015 Paris Conference (COP21-CMP11):** www.cop21.gouv.fr
- **Climat-Environnement-Société, a French scientific interest group:** www.gisclimat.fr
- **École Nationale de la Météorologie (ENM):** www.enm.meteo.fr
- **Energies and climate: research challenges:** www.cea.fr/energie/energies-climat-les-de sde-la-recherche
- **Energies and climate, observation and statistics, French Ministry of Ecology, Sustainable Development, and Energy:** www.statistiques.developpement-durable.gouv.fr **>Énergies et climat**
- **ENM Météo - École Nationale de la Météorologie-INP Toulouse:** www.enm.meteo.fr
- **French Center for Meteorological Research (CNRM):** www.cnrm.meteo.fr
- **French and global climate data: www.statistiques.** developpement-durable.gouv.fr/publications/ **>Repères**
- **French Ministry in charge of Ecology:** www.developpement-durable.gouv.fr **>Énergie, air et climat**
- **Letter on climate research by the scientific interest group Climat-Environnement Société:** www.gisclimat.fr **>Nos activités >Diffusion scientifique**
- **La Recherche, climatology section:** www.larecherche.fr/savoirs/climatologie
- **Resource center on greenhouse gas emissions:** www.bilans-ges.ademe.fr
- **Sagascience, collection of multimedia data on multiple topics (climate, earth climate, polar climate, etc.) by the French National Center for Scientific Research (CNRS):** www.cnrs.fr/cw/dossiers/saga.htm
- **United Nations Framework Convention on Climate Change (UNFCCC):** https://unfccc.int

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CLIMATE

Climatology deals with climate and the statistical analysis of its various components. Climate is defined as "the typical succession of atmospheric conditions above a given location." Climatology is the science that provides a systematic description and explanation of the world's climate zones.

Climate research involves multiple spatial scales, each of which constitutes a eld of study. For instance, agro-meteorology produces forecasts useful to farmers whereas bioclimatology and biometeorology study how climate in uences lifeforms. Climatology often intersects with other disciplines such as physics, physiology, ecology, agronomy, and medicine.

Climatology students initially focus on indoor climate control systems as they relate to renewable energies and energy ef ciency. Temperature and air control in industrial contexts is an example of climatology being applied to installations and manufacturing processes.

Students can later specialize in the sciences, health technologies, or marine and coastal sciences. When studying climate and the atmosphere, climate change is viewed through the lens of sustainable development and the geosciences.

CAMPUS FRANCE
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WATER

LICENCE LEVEL

BREVET DE TECHNICIEN SUPÉRIEUR (BTS, HIGHER TECHNICAL CERTIFICATE)
(SECONDARY DIPLOMA +2 YEARS OF HIGHER EDUCATION) – **L2**

20 schools (public or private high schools and apprentice training centers) offer the **BTS** in water management. Students acquire technical and practical knowledge about water treatment, distribution, and purification.

BREVET DE TECHNICIEN SUPÉRIEUR AGRICOLE (BTSA, AGRICULTURAL TECHNICIAN CERTIFICATE)
(HIGH SCHOOL DIPLOMA +2 YEARS OF HIGHER EDUCATION) – **L2**

30 public and private high schools offer the **BTSA** with a concentration in **water management** with 12 offering a concentration in aquaculture.

The **Brevet de Technicien Supérieur Maritime** (**BTSM**, maritime technician certificate) in **fisheries and marine environment management** is offered by the *Lycée professionnel Maritime Paul Bousquet* in Sète and Boulogne-sur-mer.

www.campusfrance.org >Resources center >Educational and Research programs >Degree description >BTSA

DIPLÔME D'ÉTUDES UNIVERSITAIRES SCIENTIFIQUES ET TECHNIQUES (DEUST)
(SECONDARY DIPLOMA +2 YEARS OF HIGHER EDUCATION) – **L2**

The Université du Littoral Côte d'Opale offers the **DEUST** in **marine and coastal sciences** with two concentrations available:

> environmental and coastal management and planning

> marketing and production of aquatic bio resources

www.univ-littoral.fr

PROFESSIONAL LICENCE (BACHELOR'S DEGREE)
(SECONDARY DIPLOMA +3 YEARS OF HIGHER EDUCATION) – **L3**

30 **professional licences** in **sciences**, **technologies**, and **health** are offered. These focus on environmental protection. The following concentrations are available:

• water, sludge, and waste management and treatment; • water sports; • water use and infrastructure, including factory use, water networks, rural and urban use, quantity, and quality; • spa and wellness center management; • technology and clean water management.

Agronomics, aquaculture, and aquarium studies also focus on water use in sustainable agriculture.

www.campusfrance.org >Resources center >Educational and Research programs >Degree description >*Licences Professionnelles*

MASTER LEVEL

MASTER
(SECONDARY DIPLOMA+5 YEARS OF HIGHER EDUCATION) – **M2**

Master's programs in science, technology, and health are available to students with a bachelor's degree in earth and environmental sciences and law.

50 master's programs are offered:

> more than 30 in science, technology, and health with concentrations in earth and environmental science, ecology, and hydrology;

> 12 in agronomics (agricultural resources), biology (forestry ecology and water microbiology), and chemistry (medications, physics, and industrial chemistry);

> 12 in marine and coastal science with a focus on physics, geoscience, and coastal management and expertise.

The following master's programs are research-oriented:

> ecosystem biology, microbiology, medications, and health;

> law, economics, and management with specializations in public and private law, business law, and risk management;

> earth and environmental science: groundwater, chemical and physical hydrogeology, hydrosystem and drainage basin engineering;

> humanities and social sciences with a focus on history and the geography of territories.

www.campusfrance.org >What program are you looking for? > Undergraduate level

Programs taught in English:

> International Executive Masters Program OpT.
www.agroparistech.fr/-OpT-WaterforAll-.html

> Master of Science and Techniques of Urban Environment on Atmosphere, Water and Urban Environment: www.ec-nantes.fr/master

DIPLÔME D'INGÉNIEUR (ENGINEERING DEGREE) / MASTER
(SECONDARY DIPLOMA +5 YEARS OF HIGHER EDUCATION) – **M2**

French engineering schools issue degrees accredited by the CTI (*Commission des Titres d'Ingénieur*), granting students qualifications as engineers at the master's level:

École Polytechnique Universitaire de Montpellier (Polytech' Montpellier):

> Water and civil engineering

> Water sciences and technology

www.polytech.univ-montp2.fr >Formation

DIPLÔME D'INGÉNIEUR (ENGINEERING DEGREE) / MASTER'S
(SECONDARY DIPLOMA +5 YEARS OF HIGHER EDUCATION) – **M2**

> École Nationale du Génie de l'Eau et de l'Environnement de Strasbourg (ENGEES): http://engees.unistra.org

> Civil engineering - geotechnics, water, and risks: http://engees.unistra.org >Formation initiale

> École Nationale du Génie Rural des Eaux et des Forêts - AgroParisTech Institut des Sciences et Industries du Vivant et de l'Environnement - École Nationale du Génie Rural des Eaux et des Forêts, Clermont Ferrand, Montpellier, Nancy, Paris (ENGREF):

> Water and agriculture (Montpellier)

> Water and society (Montpellier)

> Continental environments & hydroscience (Paris)

www.agroparistech.fr >Formation >Masters

> École Nationale Supérieure de l'Énergie, l'Eau et l'Environnement (Ense3) - Grenoble INP:

- Master's in hydraulic and civil engineering

http://ense3.grenoble-inp.fr >Formation >Master's degrees

> École Nationale Supérieure d'Ingénieurs de Limoges (ENSI), specialization in water and the environment:

- Water and civil engineering:

www.ensil.unilim.fr >La Formation>L'offre de formation

> École Nationale Supérieure d'Ingénieurs de Poitiers (ESIP), specialization in water and civil engineering:

http://esip.univ-poitiers.fr >Espace formation

BEYOND THE MASTER

MASTÈRE SPÉCIALISÉ (SPECIALIZED MASTER'S DEGREE)
(**M + 1** YEAR OF HIGHER EDUCATION)

The title of specialized master's degree is accredited by the *Conférence des Grandes Écoles*.

> Water for All (AgroParisTech in Montpellier): www.agroparistech.fr

> Drinking water and sanitation (ENGEES Strasbourg): http://engees.unistra.org

> Water engineering (Polytech Lille): www.polytech-lille.fr

> Water management (AgroParisTech in Montpellier): www.agroparistech.fr

> Wastewater and surface water management (EIVP Paris): www.eivp-paris.fr

STUDIES AREA

IN FIGURES

Sources : INSEE - www.insee.fr - www.statistiques.developpement-durable.gouv.fr

- **5.8 billion m³** of water carried
- **24 million subscribers** to drinking water services in France
- **906,000 km** of water pipes
- **160,000 people** employed in the drinking water sector

INTERNATIONAL

Suez Environnement, Vivendi Water, and Veolia Environnement (Générale des Eaux, a division of Veolia, which provides water services in France) are among world leaders in environmental services (water, sanitation, energy, and distribution) developing operations in Eastern Europe and Asia (China, South Korea, Malaysia, the Philippines, Taiwan, and Thailand).
France has also seen the commercialization of spring water by 70 brands, some of which are sold around the world by large food corporations, including Danone (Badoit, Evian), Nestlé (Contrex, Perrier, Quézac, Vittel), and Castel (Vichy Célestins and Saint-Yorre).

RELATED FIELDS

• Agriculture • Aquaculture • Marine biochemistry • Biology • Construction and public works • Chemistry • Climatology • Ecology • Energy • Water engineering • Geosciences • Geotechnics • Geothermal energy • Environment • Meteorology • Marine science • Public health • Water sports • Tourism

SUBFIELDS

• Agrobiology • Agricultural resources • Aquarium studies • Irrigation • Sanitation • Rowing • Dams • Basins • Aquatic biodiversity • Canals • Cruises • Water levels • Spa treatments • Water cycle • Soil remediation • Levees • Drainage • Carbonated water • Mineral water • Water pollution • Locks • Renewable energy • Tidal power • Estuaries • Water use • Water geopolitics • Water management • H_2O • Hydraulics • Hydroelectricity • Hydrogeology • Hydrography • Hydrology • Hydrosphere • Hydrosystems • Floods • Irrigation • Coastal zones • Microbiology • Aquatic environments • Swimming • Boating • Water navigation • Pools • Diving • Water quality • Rafting • Marine resources • Droughts • Spas • Spa towns • Treatment plants • Thalassotherapy • Thermal baths • Pipework • Urban planning • Waterways • Coastal zones • Flood zones

USEFUL LINKS

- **Water agencies:** www.lesagencesdeleau.fr
- **Water agencies, international projects (ACODIA:** www.aquacoope.org/ACODIA
- **Association Scientifique et Technique pour l'Eau et l'Environnement (ASTEE):** www.astee.org
- **Comité National de l'Eau (CNE):** www.comitenationaldeleau.org
- **The World Water Council (headquartered in Marseille):** www.worldwatercouncil.org
- **Eau dans la Ville:** www.eaudanslaville.fr
- **Freshwater:** www.cnrs.fr/cw/dossiers/doseau
- **Water and health:** www.invs.sante.fr/surveillance/eau_sante/index.htm
- **Eau France:** www.eaufrance.fr
- **Gest'eau Outils de Gestion Intégré de l'Eau:** www.gesteau.eaufrance.fr
- **International Institute for Water and Environmental Engineering:** www.2ie-edu.org
- **Institut Méditerranéen de l'Eau (IME):** www.ime-eau.org
- **French Ministry of Agriculture, Agrifood, and Forestry:** http://agriculture.gouv.fr/Enseignementagricole
- **French Ministry of Ecology, Sustainable Development, and Energy (MEDDE):** www.developpement-durable.gouv.fr/+-Eau,22-+.html
- **Environmental Statistics and Observations - Water:** www.ifen.fr/acces-thematique/eau.html
- **International Office for Water:** www.oieau.org
- **Office National de l'Eau et des Métiers Aquatiques (ONEMA):** www.onema.fr
- **French Water Partnership (PFE):** www.partenariat-francais-eau.fr
- **Programme Solidarité Eau (PSEau):** www.pseau.org
- **Service Hydrographique et Océanographique de la Marine (SHOM):** www.shom.fr
- **Voies Navigables de France:** www.vnf.fr

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AGRICULTURE - ENVIRONMENT

WATER

Water, a vital element for life and all economic development, is a major strategic issue for many countries in the 21st century. Both the environment and our health are fundamentally dependent on water, which creates a need for advanced techniques for treating and distributing drinking water. Knowledge of all types of aquatic environments (groundwater, rivers, freshwater lakes and ponds, wetlands, coastal zones, and marine environments) constitutes the basis of adapted water management.

Large-scale water-based industrial activities affect resources, agriculture, aquatic biodiversity, health, urban areas, estuaries, and coastal zones. As a renewable energy source, water allows for the development of geothermal energy, which uses the earth's internal heat to produce energy in the form of vapor and hot water. This energy is then collected and distributed to heating networks incorporated in the construction of buildings and housing.

Today's training and education programs in the water industries and water management focus on environmental protection, including water, sewage and waste management, soil remediation, environmental quality measurement (air, water, soil), and optimization of water treatment plants. In marine and coastal science, marine biology promotes the preservation of marine resources and coastal environments. More than 250 programs are offered, with the treatment and distribution of drinking and industrial water as the basis of training for careers in water collection, sanitation, and purification of wastewater.

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RENEWABLE ENERGIES

LICENCE LEVEL

BREVET DE TECHNICIEN SUPÉRIEUR AGRICOLE (BTSA)
(BACCALAURÉAT + 2 YEARS OF POSTSECONDARY STUDY) – **L2**

The BTS in fluid, energy, and household automation is offered with three options:

> climate and fluid engineering

> cooling and air conditioning

> household automation and adjoining buildings

BTS DIPLÔME D'ÉTUDES UNIVERSITAIRES SCIENTIFIQUES ET TECHNIQUES (DEUST)
(BACCALAURÉAT + 2 YEARS OF POSTSECONDARY STUDY) – **L2**

The DUT is offered in university-affiliated technical institutions (IUT, Instituts Universitaires de Technologie).

> The DUT in civil engineering and sustainable construction addresses energy savings and new forms of energy. Students prepare to work in the renewable energy field.

> The DUT in thermal engineering and energy teaches specialized techniques of production, management, storage, and transportation of thermal energy in industrial settings. It also prepares graduates to work in renewable energy.

(BACCALAURÉAT + 3 YEARS OF POSTSECONDARY STUDY) - **L2 + 1**

More than 20 different specializations related to renewable energy are offered in the academic division of science, technology, and health. Examples include:

> climate engineering

> mastery of renewable energy

> marketing and management

> energy efficiency

> renewable energy for buildings

> renewable and alternative energy systems

> exploitation of renewable energy

> energy techniques

MASTER LEVEL

MASTER
(SECONDARY DIPLOMA+5 YEARS OF HIGHER EDUCATION) – **M2**

Students pursuing master's degrees in **sciences, technologies, and health** can specialize in renewable energies:

> Three specializations are available in the **renewable energies and intelligent systems** program: - eco-technology, - mechatronics, - information processing.

> Chemistry specialization in **new and renewable energies**

> Electronics and energy management with a specialization in **new and renewable energies**

> Physics and engineering sciences with specializations in: - **strategies and management in energetics and renewable energies, - new and renewable energies - renewable energies and efficient management of electrical energy**

> Materials science with a specialization in **materials for renewable energies**

> Physical sciences for the environment with a specialization in **energy systems and renewable energies**

> **Science and technology for renewable energies**

www.campusfrance.org >What program are you looking for ? >Postgraduate level

Program taught in English:

> Master Energy. Renewable Energy, Science and Technology
https://www.universite-paris-saclay.fr/en/education/masters

MASTER OF SCIENCE IN MANAGEMENT (MSC)
(SECONDARY DIPLOMA +5 YEARS OF HIGHER EDUCATION) – **M2**

> European Joint Masters of Science in Management and Engineering of Environment and Energy:
www.mines-nantes.fr/en/Study/Masters-of-Science-English-taught/ME3

> Project Management for Environmental and Energy Engineering:
www.mines-nantes.fr/en/Study/Masters-of-Science-English-taught/PM3E

MASTER OF BUSINESS ADMINISTRATION (MBA)
(SECONDARY DIPLOMA +5 YEARS OF HIGHER EDUCATION) – **M2**

An English-language MBA program is offered by IPAG, a French private institution of higher learning:

> Energy and Sustainable Development Management:
www.ipag.fr/programmes/mba/

DIPLÔME D'INGÉNIEUR (ENGINEERING DEGREE) / MASTER'S
(SECONDARY DIPLOMA +5 YEARS OF HIGHER EDUCATION) – **M2**

French engineering schools offer engineering and master's degrees accredited by the CTI (Commission des Titres d'Ingénieur). Several specializations are available.

> alternatives for energy of the future,

> thermal energy,

> environment, construction, and energy,

> energy engineering and environment,

> HVAC engineering and energetics,

> energy systems and renewable energies, etc.

List of accredited engineering programs:
https://www.cti-commission.fr

BEYOND THE MASTER

MASTÈRE SPÉCIALISÉ (MS SPECIALIZED MASTER'S DEGREE)
(**M2 + 1** YEAR OF HIGHER EDUCATION)

Labeled by the Conférence des Grandes Écoles (CGE), the specialized master enables students to earn an institutional credential attesting to dual competence. Numerous specializations related to the environment are available:

> energy efficiency,

> renewable marine energy,

> renewable energies,

> renewable energies and their production system,

> energy performance and renewable energies.

Programs taught in English:

> International Environmental Management

> Water Utility Management

Information on MS degrees:
www.campusfrance.org/fr >Resources center >Educational and Research programs >Degree description >*Les Mastères spécialisés*

List of MS programs: www.cge.asso.fr/nos-labels/ms

IN FIGURES

Sources : Ministry in charge of Ecology www.developpement-durable.gouv.fr

- **€ 24 million** spent on renewable energies in 2012
- Renewable energy sector produced **24.8 Mtep of primary energy** in 2013
- **23% of energy** originating from renewable sources by 2020
- Renewable energy accounts for **14.2% of total energy consumption** (2013)
- **11% increase** in renewable energy production between 2012 and 2013.

INTERNATIONAL

France is rich in renewable energy sources. It has Europe's fourth largest forest area after Sweden, Finland, and Spain (source: Food and Agricultural Organization of the United Nations). With its strong output of hydraulic, wind, and geothermal energy, France is Europe's second largest producer of renewable energy after Germany. Thanks to France's abundant wood resources, biomass accounts for 43% of its renewable energy output whereas hydraulic accounts for 25%, biofuels 10%, and heat pumps 7%.

When France signed the European Union's "2020 Energy & Climate Package," it set the goal of having renewable energy account for 23% of its final energy consumption. By the end of 2013, renewables, primarily wood and hydraulic energy, accounted for 14.2% of the total energy consumption. Photovoltaic energy has reached and surpassed the goal of 5,300 MW in continental France and 5,700 MW in French overseas territories. Other forms of marine energy are emerging. In fact, in 2016-2017, two pilot farms will be operating 11 marine turbines.

The French law on energy transition aims for 32% of French energy to be renewable by 2030 whereas the European Union has set a target of 27%.

RELATED FIELDS

• Ecology • Energy • Physics • Public health • Environmental science • Marine science • Earth and space sciences • Life sciences and health • Transportation • Urban planning

SUBFIELDS

• Bioenergy • Biomass • Wind energy • Energy efficiency • Geothermal energy • Hydraulics • Carbon-free energy • Marine energy • Photovoltaic energy

USEFUL LINKS

- **Agence de l'Environnement et de la Maîtrise de l'Énergie (ADEME):** www.ademe.fr
- **Alliance Nationale de Coordination de la Recherche pour l'Énergie (ANCRE):** www.allianceenergie.fr
- **Association Savoyarde pour le Développement des Énergies renouvelables (ASDER):** www.asder.asso.fr
- **Commissariat à l'Énergie Atomique et aux Énergies Alternatives (CEA):** www.cea.fr
- **Comité de Liaison des Énergies Renouvelables (CLER):** www.cler.org
- **Écosources.info, portal with data on renewable energies:** www.ecosources.info/
- **EDF Énergies Nouvelles:** www.edf-energies-nouvelles.com
- **Enercoop, a cooperative devoted to green electricity:** www.enercoop.fr
- **Grenelle Environnement:** www.legrenelle-environnement.fr
- **Groupe Énergies Renouvelables, Environnement et Solidarités (GERES):** www.geres.eu
- **French Ministry of European and Foreign Affairs:** www.diplomatie.gouv.fr >Politique étrangère de la France>Environnement et développement durable
- **French Ministry in charge of Ecology:** www.developpement-durable.gouv.fr >Énergie, air et climat
- **Observatoire des Énergies Renouvelables (Observ'ER):** www.energies-renouvelables.org
- **Planète énergies, online encyclopedia:** www.planete-energies.com
- **Pôle d'Excellence Rurale Énergies Nouvelles (PEREN):** www.peren.org
- **Syndicat des Énergies Renouvelables (SER):** www.enr.fr
- **Université Virtuelle Environnement & Développement Durable (UVED):** www.uved.fr

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RENEWABLE ENERGIES

Renewable energies, already a major research focus in France, include bioenergy, geothermal energy, thermodynamic heating, solar energy (thermal, photovoltaic, concentration), wind energy, hydroelectric and marine energy, and hydrogen-based generation.

Beneficial to the environment, renewable energies come from a variety of sources: the sun, wind, water, and geothermics, as well as rewood, crop residues, biogas, biofuels, urban or industrial waste, and heat pumps. In order to protect the environment and to mitigate climate change, carbon-free energies and sustainable development are now priority research areas.

The goal is to ensure greater energy efficiency by developing clean technologies and alternatives to technologies that depend on fossil fuels. Renewable energy development seeks to ensure high output and low emissions.

Students may begin studying some aspects of renewable energies in their rst years of higher education, including HVAC systems and marketing. However, at the master level, students decide to specialize in engineering (systems, energy ef ciency, etc.), physics (electricity, materials, etc.), or chemistry. Sustainable development is a component of programs in management and the environment.

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ENVIRONMENT

LICENCE LEVEL

BREVET DE TECHNICIEN SUPÉRIEUR
(HIGHER TECHNICAL CERTIFICATE)
(SECONDARY DIPLOMA +2 YEARS OF HIGHER EDUCATION) – **L2**

20 schools (private and public high schools and CFAs, or apprentice training centers) offer the **BTS in environmental services**. This degree offers specialized technical training on coordinating and delivering services relating to cleanliness, the hygiene of premises and equipment, urban sanitation, waste and sanitation management, etc. The **BTS in fisheries and marine environment management** is offered by Lycée de la Mer Paul Bousquet à Sète.

BREVET DE TECHNICIEN SUPÉRIEUR AGRICOLE
(AGRICULTURAL TECHNICIAN CERTIFICATE)
(SECONDARY DIPLOMA +2 YEARS OF HIGHER EDUCATION) – **L2**

The **BTSA in environmental management and protection** is offered by many *Lycées Agricoles* (agricultural secondary schools). The following concentrations are available to students: • water management • nature management and protection • forestry • rural development

DIPLÔME D'ÉTUDES UNIVERSITAIRES SCIENTIFIQUES ET TECHNIQUES
(SECONDARY DIPLOMA +2 YEARS OF HIGHER EDUCATION) – **L2**

The DUT is offered by the technology institutes of certain universities in: • biological engineering with a concentration in environmental engineering • environmental hygiene and safety

PROFESSIONAL LICENCES (BACHELOR'S DEGREES)
(SECONDARY DIPLOMA +3 YEARS OF HIGHER EDUCATION) - **(L2 +1 YEAR)**

Three programs offer degrees related to the environment:

> **Law, economics, and management** with concentrations in urban project and environmental management or safety and the environment.

> **Humanities and social sciences** with concentrations in sustainable agriculture and environmental certification, management of landscape and environmental projects; environmental and sustainable development education; geomatics, etc.

> **Sciences, technologies and health** with concentrations in construction; environmental management, acoustics; energy management; hygiene, health, quality, and safety; analytic chemistry and the environment, motor industry and environment; environmental risks and impacts; agro-resources and the environment; water treatment; etc.

The licence in **earth science** covers the earth, space, and environmental sciences.

www.campusfrance.org >What program are you looking for? > Undergraduate level

MASTER LEVEL

MASTER
(SECONDARY DIPLOMA+5 YEARS OF HIGHER EDUCATION) – **M2**

Numerous programs offer master's degrees in environmental studies with a wide range of specializations:

> **Sciences of the environment, territory, and economy** with specializations in: territorial development, energy, and ecology; risk management; sustainable construction; eco-construction; eco-innovation; ecosystems; marine environment; tourism; Arctic studies; health; functional ecology; ecological modeling; environmental toxicology; sciences of industrial and urban environments, etc.

> **Life and environmental sciences and technologies**: bio-contaminant control in food and feed; engineering of products and processes; toxicology and health; biodiversity; continental environments and hydro-science; tropical ecosystem management, etc.

> **Sciences, technologies, and health**: industrial environment; environmental engineering; ecology; sustainable development; risks; expertise; health/safety; naval environments, etc.

> **Engineering sciences** (degree in applied sciences with specialization in civil engineering and the environment).

> **Law, economics, and management** with specializations in: chemical pollutants; geological engineering; quality; safety; energy; construction; sustainable development, etc.

> **Humanities and social sciences**: environmental projects; geomatics; archeology and environment; Mediterranean and African paleo-environments, etc.

Programs taught in English:

> Agrosciences, Environment, Territory, Landscape, Forests: Climate, Land-use and Ecosystem Services. **www.universite-paris-saclay.fr/en/education/masters**

> Science in Project Management for Environmental and Energy Engineering: **www.mines-nantes.fr**

> Sustainable management of pollution: **www.isa-lille.com/programs/masters/msc-sustainable-management-of-pollution/**

DIPLÔME D'INGÉNIEUR (ENGINEERING DEGREE) / MASTER
(SECONDARY DIPLOMA+5 YEARS OF HIGHER EDUCATION) – **M2**

French engineering schools offer engineering degrees and master's degrees accredited by the CTI (Commission des Titres d'Ingénieur). Numerous specializations in environmental studies are available:

> water and environmental engineering,
> life and environmental sciences and industries,
> engineering for land development and the environment,
> environment, construction, and energy,
> agronomic and environmental science,
> energy, risks, and environment,
> georesources and engineering for sustainable development.

www.cti-commission.fr

BEYOND THE MASTER

MASTÈRE SPÉCIALISÉ (MS, SPECIALIZED MASTER'S DEGREE)
(M2 +1 YEAR OF HIGHER EDUCATION)

Labeled by the *Conférence des Grandes Écoles* (CGE), the specialized master enables students to earn an institutional credential attesting to dual competence. Numerous specializations in the environment are available:

> life and environmental sciences and industries,
> sustainable development and agriculture,
> eco-design and environmental management,
> mining and mine environments,
> global management of environmental risks,
> waste management and processing,
> environmental engineering and management,
> engineering and management of environmental risks,
> environmental management and eco-energy efficiency,
> quality, safety, and environmental management,
> management of health, food, and environmental hazards
> public policy and strategies for the environment,
> environmental quality and safety,
> industrial safety and environment.

Programs taught in English:

> International environmental management
> Water utility management

Information on MS degrees:
www.campusfrance.org/fr/ressource/les-masteres-specialises-ms
List of MS programs: www.cge.asso.fr/nos-labels/ms

IN FIGURES

Sources : INSEE - www.insee.fr

- **€ 68 million** spent on the environment in France (2012)
- **€ 47.5 million** spent on environmental protection (2012)
- **€ 24 million** spent on renewable energies in 2012
- **25,273 Ktep** of primary energy produced by the renewable energy sector in 2013
- **83,148 km²** of regional parks (2013) • **74,873 km²** of natural marine parks (2013)
- **5,431,434 km²** of national parks (2013)
- **38,034 km²** of biosphere reserves (2013)
- **12% reduction** of GHG emissions (1990-2012)

INTERNATIONAL

The "Climate, Environment, Raw Materials" challenge is one of seven social challenges embraced by the European Union's Horizon 2020 program of research and innovation. France plays an active role in this program by stimulating knowledge about the environment and climate, health, water use and management, and energy.
Within the European Union, France has taken an ambitious stance. It aims to reduce greenhouse gas emissions by 40% by 2030 and by 60% by 2040 (compared to 1990 levels). France is supporting priority areas of research in light of warnings from the Intergovernmental Panel on Climate Change (IPCC) and the role humankind plays in climate change.

RELATED FIELDS

• Agriculture • Agronomy • Architecture • Biology • Chemistry • Ecology • Economics and management • Energy • Law • Education • Geography • Geosciences • Engineering • Meteorology • Oceanography • Physics • Public health • Marine science • Earth and space sciences • Life and health sciences • Tourism • Transportation • Urban planning

SUBFIELDS

• Agri-food • Agro-ecology • Food • Animals • Land planning and landscaping • Astronomy • Astrophysics • Atmosphere • Biodiversity • Bio-geosciences • Biotechnologies • Climate change • Climate • Climate challenges • Sustainable development • Water • Eco-technologies • Emissions • Ecological footprint • Carbon footprint • Alternative energies • Epidemiology • Forestry • Greenhouse gas • Genetics • Civil engineering • Sanitation engineering • Genomics • Geo-chemistry • Geology • Geomatics • Geophysics • Geotechnics • Water management • Glaciology • Horticulture • Hydrology • Environmental engineering • Sea • Natural habitats • Ocean • Paleoclimatology • Planetology • Plants • Pollution • Global warming • Halieutic sciences • Soil • Silviculture • Water technologies • Earth •Territories •Toxicology • Urban planning

USEFUL LINKS

- **Alliance Nationale de Recherche pour l'Environnement (AllEnvi):** www.allenvi.fr
- **European Center for Research and Training in Environmental Geosciences (CEREGE):** https://www.cerege.fr
- **Climat-Environnement-Société, a scienti c interest group:** www.gisclimat.fr
- **Conseil Économique, Social et Environnemental (CESE):** www.lecese.fr
- **2015 Paris Conference (COP21-CMP11):** www.cop21.gouv.fr
- **École Nationale de la Météorologie - ENM Météo-INP Toulouse France:** www.enm.meteo.fr
- **EU Environment:** http://ec.europa.eu/environment/
- **European Geosciences Climate:** www.egu.eu
- **History of the environment, a multi-disciplinary database on the environment:** www.cnrs.fr/inshs/ >La recherche en SHS>RTP Histoire de l'environnement
- **Institut National des Sciences de l'Univers (INSU):** www.insu.cnrs.fr
- **Letter on research & climate by the scienti c interest group Climat-Environnement-Société:** www.gisclimat.fr >Nos activités>Diffusion scientifique
- **French Ministry of Europe and Foreign Affairs:** www.diplomatie.gouv.fr >Politique étrangère de la France >Environnement et développement durable
- **French Ministry in charge of Ecology,:** www.developpement-durable.gouv.fr >Énergie, air et climat
- **Office National de l'Eau et des Milieux Aquatiques (ONEMA):** www.onema.fr
- **Office National des Forêts (ONF):** www.onf.fr
- **Partnership for European Environmental Research (PEER):** www.peer.eu
- **Sagascience, collection of multimuldia data on multiple topics (climate, earth climate, polar climate, etc.):** www.cnrs.fr/cw/dossiers/saga.htm
- **Université Virtuelle Environnement & Développement Durable (UVED):** www.uved.fr

October 2018

ENVIRONMENT

Environmental science draws on a range of disciplines concerned with sustainable development and agriculture, the economy of resources and raw materials, climate and air, ecology and natural habitats, ecosystems, water and biodiversity, land planning, natural resource and waste management, as well as alternative energies and transportation.

Jobs in the eld of environmental services require two or three years of higher education. Entry level courses cover the life sciences and health, earth and space sciences, marine sciences, and basic disciplines such as agronomy, biology, chemistry, and physics, as well as economics, the social sciences, and management. In other words, environmental science is characterized by its interdisciplinary nature.

Beneficial to the environment, renewable energies come from a variety of sources: the sun, wind, water, and geothermics, as well as firewood, crop residues, biogas, biofuels, urban or industrial waste, and heat pumps.

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WINE AND ENOLOGY

LICENCE LEVEL

DIPLÔME UNIVERSITAIRE – L1
(SECONDARY DIPLOMA +1 YEAR OF HIGHER EDUCATION) – L1

The Institut des Sciences de la Vigne et du Vin at the Université de Bordeaux offers two diplômes universitaires (DU):

> **DU in wine tasting (D.U.A.D.)**

> **DU in introduction to enology (D.U.I.O.)**

www.isvv.univ-bordeauxsegalen.fr >Formation>

BREVET DE TECHNICIEN SUPÉRIEUR AGRICOLE (AGRICULTURAL TECHNICIAN CERTIFICATE)
(SECONDARY DIPLOMA +2 YEARS OF HIGHER EDUCATION) – L2

30 schools (public or private high schools, and CFA's, or apprentice training centers) offer the **BTSA** in **viticulture-enology.** Students receive technical education about grapevines and the chemistry of vinification.

www.campusfrance.org> Espace documentaire>Offre de formation>Fiches Diplômes>BTSA

LICENCE SECONDARY DIPLOMA
+3 YEARS OF HIGHER EDUCATION) – (L2 +1 YEAR)

Students can begin pursuing a general licence after two years of higher studies in the field of:

> Sciences, technologies, and health (option: **life sciences and wine**) at the Institut de la Vigne et du Vin Jules Guyot at the Université de Bourgogne in Dijon.

www.u-bourgogne-formation.fr >Formations>Licences

PROFESSIONAL LICENCE
(SECONDARY DIPLOMA +3 YEARS OF HIGHER EDUCATION) – (L2 +1 YEAR)

The professional licence in **wine marketing, wine tourism,** and **law** is available in two broad fields:

> **Law, economics, and management** (specializations: wine business, wine tourism, distribution networks, wine marketing and international sales, local wines, law)

> **Sciences, technologies, and health** (specializations: international wine and spirit business, hospitality and wine tourism, wine quality assurance, innovation and globalization in viticulture- enology)

www.campusfrance.org>Trouvez votre formation>Licence

Three professional licences are offered by the Institut des Hautes Études de la Vigne et du Vin (IHEV) at SupAgro Montpellier:

> **sustainable viticulture,**

> sales management, wines, and distribution networks,

> Management of **quality assurance systems in the wine and viticulture sector.**

MASTER LEVEL

DIPLÔME D'ÉTABLISSEMENT / MASTER DEGREE
(SECONDARY DIPLOMA +4 YEARS OF HIGHER EDUCATION) – M1

The Institut Paul Bocuse offers an English-language "Hotel and Restaurant" degree with a specialization in international management of wine and beverage.

www.institutpaulbocuse.com/en/hotel-and-restaurant-management/specializations/

MASTER
(SECONDARY DIPLOMA +5 YEARS OF HIGHER EDUCATION) – M2

Master's degrees are available in two broad fields:

> Law, economics, and management with a concentration in private law and the following specializations:

- **Vineyard and wine** law at the Université de Bordeaux,
- **Law for viticulture and quality products** at Aix-Marseille Université.

> Sciences, technologies, and health with the following concentrations:

- **Agronomy and agri-food** (specializations: **viticulture, enology, economics and vinicultural management**),
- Biology and health (specialization: **enology and vinicultural environment**).

www.campusfrance.org>Trouvez votre formation>Master

MASTER OF SCIENCE IN MANAGEMENT (MSC)
(SECONDARY DIPLOMA +5 YEARS OF HIGHER EDUCATION) – M2

The School of Wine and Spirits Business at the École Supérieure de Commerce Dijon-Bourgogne offers two MSc degrees:

• **Wine Business** • **Wine Management.**

ESC Dijon Bourgogne: www.swsb.eu

EUROPEAN AND INTERNATIONAL MASTER
(SECONDARY DIPLOMA +5 YEARS OF HIGHER LEARNING) – M2

> The **Master of Business and Science Vineyard & Winery Management** is offered by the Institut des Sciences, de la Vigne et du Vin at the Bordeaux Sciences Agro. Bordeaux Sciences Agro: www.agro-bordeaux.fr/vwmaster/?lang=en/

> International students can earn a European master entitled "Vinifera EuroMaster" with a concentration in agronomy-agrifood and a specialization in viticulture and enology. Montpellier SupAgro – ENITA Bordeaux : http://vinifera-euromaster.eu

> An international master entitled "VINTAGE" (Erasmus mundus) is available with a concentration in agronomy-agrifood with a specialization in viticulture and enology, vineyard-wine-terroir management. École Supérieure d'Agriculture d'Angers (ESA): www.vintagemaster.com

DIPLÔME NATIONAL D'OENOLOGUE (DNO, NATIONAL ENOLOGY DIPLOMA)
(SECONDARY DIPLOMA + 5 YEARS OF HIGHER EDUCATION) - (L3 +2 YEARS)

The DNO is the only degree in France that is an accredited credential for professional enologists. This 2-year national diploma is offered by the universities of Bordeaux, Dijon, Montpellier, Reims, and Toulouse.

This program is open to holders of a licence, preferably in biology, chemistry, or agronomic biochemistry, or a BTSA in viticulture-enology and a professional licence.

AGRICULTURAL ENGINEERING (OPTION VITICULTURE-ENOLOGY)
(SECONDARY DIPLOMA +5 YEARS OF HIGHER EDUCATION) – M2

Many agricultural engineering programs allow students to specialize in fields related to enology. For instance, the SupAgro Montpellier offers an agricultural engineering degree with a concentration in **viticulture-enology.** Students can work toward the DNO (national enology diploma) while pursuing the agricultural engineering degree.

Institut des Hautes Études de la Vigne et du Vin (IHEV) in Montpellier: www.supagro.fr

BEYOND THE MASTER

MASTÈRE SPÉCIALISÉ (MS, SPECIALIZED MASTER)
(M2 +1 YEAR OF HIGHER EDUCATION)

Labeled by the Conférence des Grandes Écoles, the MS degree enables students to earn an institutional credential attesting to dual competence in the engineering sciences.

> **International wine and spirit business** is offered full-time in Dijon and parttime in Paris (18 months).

ESC Dijon-Bourgogne – Schools of Wine and Spirit Business:

www.masterofwines.eu

> Knowledge and the international wine business (CCIV)

AgroSup Dijon - Institut National Supérieur des Sciences Agronomiques, de l'Alimentation et de l'Environnement: www.agrosupdijon.fr

> Wine and spirits management (MVS)

KEDGE Business School Bordeaux in Talence: www.kedgebs.com/fr/formations/management-des-vins-spiritueux-mvs

Information on MS degrees:

www.campusfrance.org/fr/ressource/les-masteres-specialises-ms

List of MS programs: www.cge.asso.fr/nos-labels/ms

IN FIGURES

Sources: French Ministry of Agriculture, Agrifood, and Forestry - http://agreste.agriculture.gouv.fr

- **46.8** million hectoliters of wine produced in France (2014)
- **110,000** vineyards
- **75,000** vineyard employees
- **870** cooperative wine cellars

INTERNATIONAL

In 2014, France regained its position as the largest wine producer in the world. Wine-producing areas appeal to tourists from all over and the world's most wellknown grape varieties originated in France: Merlot, Chardonnay, Sauvignon, Syrah, or Pinot Noir. Wine and culinary tours give visitors a chance to pair local wines and dishes. One example is the "Alsace Wine Route," which features 700 wine growers who open their cellars so visitors can experience a variety of tastes and aromas.

The wines of Champagne also enjoy worldwide recognition. This region earned protected status in 1927, and in 1936, the AOC label (controlled designation of origin) was granted to 15,000 Champenois wine growers.

More than two million hectoliters of Bordeaux wine are exported each year. Wines from the Loire region, including Touraine wines, are sold in 75 countries. In 2014, over 50,000 hectoliters of wines from Southern France with the AOP label (protected designation of origin) were exported. Beaujolais is a favorite among the Japanese and is widely distributed in Asia. Each year, on the third Thursday of November, millions of people worldwide excitedly await the arrival of the new Beaujolais, making this day the only global wine celebration. From New York to Tokyo, Beaujolais is a symbol of the French way of life. Since 1969, five of the last 14 titles of "Best Sommelier of the World" of the Association de la Sommellerie Internationale have been awarded to Frenchmen: Olivier Poussier (2000), Philippe Faure-Brac, Serge Dubs, Jean-Claude Jambon, and Jean-Luc Pouteau.

The "Champagne Hillsides, Houses, and Cellars" and the "climats, terroirs of Burgundy" were inscribed on the UNESCO World Heritage List on July 4, 2015.

RELATED FIELDS

• Culture • Gastronomy • Wine tourism • Heritage • Food service • Sommelier • Tourism (cultural/vinicultural) • Viticulture • Viniculture

RELATED SUBFIELDS

• Inns • Cellarman • Champagne • Vinicultural advisor • Wine quality assurance • Cooperative • Wine/spirits broker • Cures • Cooperative director • Wine tourism guide • Maître-restaurateur • Enologist • Cellar master • Vineyard keeper • World heritage • Grapevine nursery • Restaurants • Cultural and tourist sites • Sommelier • Cooper • Winemaker • Wine grower

USEFUL LINKS

- **Agreste (statistics on French agriculture):** www.agreste.agriculture.gouv.fr **>Thématiques >Viticulture**
- **ANIVIN de France:** www.vindefrance-cepages.org
- **Association de la Sommellerie Internationale (ASI):** www.sommellerie-internationale.com
- **UNESCO Chair "Culture and Traditions of Wine":** http://chaireunesco-vinetculture.u-bourgogne.fr
- **Comité Champagne (CIVC):** www.champagne.fr
- **Fédération des Exportateurs de Vins et Spiritueux (FEVS):** www.fevs.com
- **France Agrimer:** www.franceagrimer.fr/ **liere-vin-et-cidriculture/Vin**
- **INSEEC Wine & Spirits Institute:** www.wine-institute.com
- **Institut Français de la Vigne et du Vin (IFV):** www.vignevin.com
- **Institut National de l'Origine et de la Qualité:** www.inao.gouv.fr
- **Institut des Sciences de la Vigne et du Vin Bordeaux Aquitaine (ISVV):** www.isvv.univ-bordeauxsegalen.fr
- **Institut Supérieur du Vin (ISV):** www.isvin.fr
- **Institut Universitaire de la Vigne et du Vin Jules Guyot (IUVV):** http://iuvv.u-bourgogne.fr
- **Observatoire de la Viticulture Française:** www.observatoire-viti-france.com
- **Organisation Internationale de la Vigne et du Vin:** www.oiv.int
- **School of Wine and Spirits Business - ESC Dijon Bourgogne:** www.swsb.eu
- **Union des Maisons de Bordeaux (union of wine traders):** www.vins-bordeaux-negoce.com
- **Union of French enologists:** www.oenologuesdefrance.fr
- **Union of French sommeliers:** www.sommelier-france.org
- **Université du Vin, Suze-la-Rousse:** www.universite-du-vin.com
- **Vitisphère:** www.vitisphere.com

Novembre 2018

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WINE AND ENOLOGY

France is the world's largest wine producer, ahead of Spain, Italy, and the United States. It owes its position to a long tradition, dating back to the expansion of the Roman Empire into Gaul. The Romans brought the culture and cult of wine with them. Wine quality improved in the Middle Ages. In 800, Charlemagne proclaimed that wine must be stored "in the right vessel" and cautioned against "any manner of spoilage." Monks continued the wine and viticulture tradition by creating exceptional vineyards that still exist today.

The first attempts at wine classification were made in the 13th century in order to establish a hierarchy of white wines. Later, in 1855, the reference became the official classification of Bordeaux wines drawn up at the request of Emperor Napoleon III.

The "Champagne" label was introduced in the first half of the 20th century after this region's vineyards were devastated by phylloxera and World War I. These vineyards were replanted with the awareness that they constituted collective heritage deserving of protection. A law was passed that gave Champagne the status of a designated and protected agricultural area. In 1936, Champagne was decreed an Appellation d'Origine Contrôlée (AOC, or controlled designation of origin) in order to protect and perpetuate a centuries-old process.

In 2015, the "cultural landscape" of Champagne and Burgundy was added to UNESCO's World Heritage List.

Enology and viticulture cover a vast array of fields, ranging from grape cultivation, winemaking and packaging to tasting, conservation and retail consumption. Education in the wine sector is divided into three distinct branches: wine production, viticulture, and viniculture; enology with scientific and technical applications; and marketing and distribution in France and abroad.

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SUSTAINABLE DEVELOPMENT

LICENCE (BACHELOR) LEVEL

LICENCE
(BACCALAURÉAT + 3 YEARS OF POSTSECONDARY STUDY) – **L3**

Three tracks offer programs related to sustainable development. Arts, Letters, and Languages, major in applied foreign languages, emphasis on tourism, sustainable development, and heritage. Law, Economics, and Management, major in team management and sustainable development. Science, Technology, and Health, major in engineering, emphasis on mechanical engineering and sustainable development.

LICENCE PROFESSIONNELLE
(BACCALAURÉAT + 3 YEARS OF POSTSECONDARY STUDY) - **L2 +1**

Programs related to sustainable development are available in four tracks: **Law, Economics, and Management**—major in trade and distribution, emphasis on sustainable development; major in organizational management, specialization in sustainable development in rural settings and emphasis on sustainable tourism. **Humanities and Social Sciences**—several majors and specializations in land-use planning and urban studies; international aid and development, emphasis on international cooperation and sustainable development; regional development, emphases on environmental education, the ecological transition, and sustainable development; e-commerce and digital marketing, emphasis on sustainable regional development; geography and regional planning, emphasis on sustainable regional development. **Science, Technology, and Health**—multiple majors, specializations, and emphases: agronomy, specialization in sustainable agriculture in tropical island settings; land-use planning and land management, emphasis on sustainable development/management and biodiversity; building and construction, specialization in construction management, analytical chemistry and environmental quality, emphasis on chemistry and processes for sustainable development and the environment; energy and climate engineering, specialization in sustainable development and renewable energy; natural spaces, specialization in sustainable development of forests and local areas; energy planning and sustainable development; management of agricultural and rural businesses and sustainable development of rural areas; careers in environmental protection and management, emphasis on ecological restaurants and sustainable development; crop production, emphasis on crop protection and sustainable development. **Life and Earth Sciences**—emphasis on environment and sustainable development.

MASTER LEVEL

MASTER
(BACCALAURÉAT +5 ANNÉES D'ÉTUDES SUPÉRIEURES) – **M2**

In several academic tracks, a Master's degree can be earned with a concentration or specialization in sustainable development:

> **Law, Economics, and Management**—energy management, energy law, and sustainable development, sustainable regional development, concentration in management of sustainable tourism and outdoor recreation, legal management of risk and sustainable development, environmental and urban law, concentration in sustainable development; business law, double diploma in law and management of sustainable development, law of sustainable development; corporate legal planning around sustainable development; economics of sustainable development, the environment, and energy; management of sustainable development projects; environmental management and sustainable development; energy economics and sustainable development; law and management of sustainable development; Euro-Mediterranean management and sustainable development; managing legal risks and sustainable development; sustainable development in the French-speaking world; corporate social responsibility and sustainable development; advising local governments on sustainable development policy...

> **Science, Technology, and Health**—agroecology, biodiversity, sustainable environmental management and regional planning; biology and ecology applied to forests, agronomy, the environment, and ecosystem management; biodiversity and sustainable development; sustainable development strategy and peri-urban planning; biotechnology for sustainable development; chemistry, concentration in catalysis, environment, and sustainable development; construction and sustainable regional planning and eco-development; ecology and sustainable development; electrical power and sustainable development; environment, sanitation, and sustainable development; innovative process engineering and sustainable development; sustainable environmental engineering; environmental engineering and management for sustainable development; agro-resource production and sustainable development; materials science for energy and sustainable development...

> **Environmental Science, Regional Planning, and Economics**—land use, energy, & regional ecology; sustainable building & eco-construction; eco-innovation; ecosystems; ecological modeling; environmental toxicology...

> **Arts, Letters, and Languages**: —anthropology, specialization in sustainable development; intercultural studies and sustainable development; communication for ecological stewardship and sustainable development; environmental and geomatic management, applied foreign languages, emphasis on sustainable development, education, emphasis on the teaching of sustainable development...

> **Humanities and Social Sciences**—societies and sustainable development; sustainable local development in emerging areas; spatial dynamics and sustainable development in the countries of the global South; tourism and sustainable regional development...

Programmes Taught in English: 25 Master's-level programs related to sustainable development are offered in agroecology, environment, biology, chemistry, physics, engineering, energy, urban studies, humanities, and social sciences...

Agris Mundus MSc in agricultural development and sustainable management of natural resources: **www.agrismundus.eu**

European Joint Degree program MSc Sustainable Food Systems: **www.susfoods.eu**

European Master degree in Plant Health in Sustainable Cropping Systems (PlantHealth): **http://planthealth.upv.es**

DIPLÔME D'INGÉNIEUR / EQUIVALENT TO MASTER
(BACCALAURÉAT +5 YEARS OF POSTSECONDARY STUDY) – **M2**

France's schools of engineering deliver professional qualifications and master's-level degrees accredited by CTI, the commission on engineering degrees, with specializations in agroecology, environment, and energy, among others.

Bordeaux Polytechnic Institute, **https://ensegid.bordeaux-inp.fr**
www.cti-commission.fr/accreditation

BEYOND THE MASTER

MASTÈRE SPÉCIALISÉ (MS)
(**M2 + 1** YEAR OF POSTSECONDARY STUDY)

"*Mastère Spécialisé*" is a label conferred by the *Conférence des Grandes Écoles* to qualifying post-master programs. Several programs offer students a double competency in sustainable development and one of many specializations in agriculture, marine engineering, transportation, management...

Mastère Spécialisé programs list: **www.cge.asso.fr/nos-labels/ms**

IN FIGURES

Source : French Ministry in charge of Ecology

- **18% drop in** energy-related CO2 emissions between 1990 and 2015 (while GDP rose 44%)
- **16% drop in** greenhouse gas emissions since 1990
- **15.7% share of** renewable energy in France's final gross energy consumption (2016)
- **30% reduction** in consumption of fossil fuels and increase in share of energy from renewables (2030)
- **40% reduction** in emissions of greenhouse gases (2030)

INTERNATIONAL

France, as a signatory of the Kyoto Protocol, chaired the 2015 Conference of the Parties of the 1992 United Nations Framework Convention on Climate Change (COP21/CMP11), which resulted in an international agreement to strive to limit global warming to less than 2°C. Of the 197 parties to the conference, 174 ratified the Paris Accord. France, in helping to implement the United Nations' Sustainable Development Goals for 2030, has emphasized three priorities: (i) ensuring food security and sustainable agriculture; (ii) promoting resilient infrastructure, sustainable industrialization, and innovation; and (iii) preserving the world's oceans, seas, and marine resources through sustainable exploitation. Since 2012, the country's agro-ecological plan of action has aimed to reduce the consumption of inputs, to preserve natural resources, and to enhance the sustainability of resource use.

In 2017 France launched a plan to prevent climate change from growing in scale and becoming irreversible. The plan includes a series of innovative and ambitious measures to enshrine the goals of the Paris Accord in public policy and to rally all actors to the fight for planetary survival. France is accelerating its commitment to achieve the energy and climate transition domestically, within the European Union, and on the international stage. France has also increased by €4 billion the amount of financing it will make available for sustainable development between now and 2020—€2 billion of the increase will be devoted to the challenges of climate change. In parallel, an additional €400 million will be allocated to the most fragile nations in the form of bilateral grants.

RELATED FIELDS

• Agriculture • Agronomy • Biology • Chemistry • Earth and space sciences • Economics and management • Education • Energy • Engineering • Fishery sciences • Geography • Geosciences • Law • Life and health sciences • Oceanography • Physics • Public health • Sea sciences • Tourism • Transportation • Urban studies

SUBFIELDS

• Agroecology • Alternative energy • Biodiversity • Biogeosciences • Biotechnologies • Climatology • Ecology • Ecotechnologies • Environmental engineering • Forestry • Green growth • Greenhouse gases • Land use and planning • Meteorology • Pollution • Toxicology • Water management and hydrology

USEFUL LINKS

- **AllEnvi, national alliance for environmental research:** www.allenvi.fr
- **CEREGE, center for research and teaching in environmental geoscience:** https://www.cerege.fr/en
- **CESE, economic, social, and environmental council:** www.lecese.fr
- **EGU, European Geosciences Union:** www.egu.eu
- **ENM Météo-INP Toulouse, national school of meteorology:** www.enm.meteo.fr
- **French Ministry of European and Foreign Affairs:** www.diplomatie.gouv.fr >Politique étrangère de la France >Environnement et développement durable
- **French Ministry in charge of Ecology:** www.statistiques.developpement-durable.gouv.fr
- **Make Our Planet Great Again climate plan:** www.makeourplanetgreatagain.fr/Plan-Climat
- **Paris Accord:** http://unfccc.int/portal_francophone/accord_de_paris/items/10081.php
- **Reports on greenhouse gases from the resource center for greenhouse gas emissions:** www.bilans-ges.ademe.fr
- **Scientific interest group on climate, environment, and society:** www.gisclimat.fr
- **UN Framework Convention on Climate Change:** https://unfccc.int
- **UVED, virtual university for the environment and sustainable development:** www.uved.fr

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SUSTAINABLE DEVELOPMENT

Development that responds to today's needs without compromising the ability of future generations to respond to theirs—that is the definition of sustainable development that emerged from the first United Nations World Commission on the Environment and Development (Brundtland Report, 1987). The Earth Summit held under UN auspices in Rio de Janeiro in 1992 imparted formal status to the notion of sustainable development and its three pillars—development that is economically effective, socially equitable, and environmentally sustainable.

Sustainable development's fields of application are therefore numerous. Clustered around protection of the environment are a set of disciplines concerned with sustainable agriculture, the economics of primary resources, air quality and climate, the ecology of natural environments, ecosystems, water and biodiversity, land use, management of natural resources and waste, alternative energy, efficient buildings, and clean transportation.

Environmentally friendly renewable energy includes energy derived from solar irradiation, wind, hydropower, and geothermics. Other renewables are fuel wood, harvest byproducts, biogas, biofuels, and household and industrial waste products.

Sustainable development figures in technical programs in a variety of fields, such as agronomy, biology, chemistry, and physics, as well as in programs in engineering, law, economics, social sciences, and management. Research in sustainable development is therefore characterized by its interdisciplinarity.

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AGRI-FOOD

LICENCE LEVEL

BREVET DE TECHNICIEN SUPÉRIEUR
(SECONDARY DIPLOMA + 2 YEARS OF HIGHER EDUCATION) – **L2**

Two schools offer the **BTS in Quality Control in food industries and bio-industries:**

> École Nationale de l'Industrie Laitière Agroalimentaire - Lycée de l'Alimentation (LEGTA ENILIA) in Surgères: www.enil.fr

> CFA Agroalimentaire in Poligny: www.enilia-ensmic.fr

The **BTS in Agriculture** offers several options that prepare students for specific jobs in the agri-food industry:

> **Food sciences and technologies**, with 4 concentrations: Food and technical processes; Cereal products; Dairy products; Meat and fish products.

> Agricultural, biological, and biotechnical analysis

> Technical-Commercial diplomas in the areas of **Wines and spirits and Food and beverage products**

Options in agricultural production are offered by numerous Lycées Agricoles in specific areas: Viticulture-Enology, Livestock, Agronomy: Plant products, Aquaculture

DIPLÔME D'ÉTUDES UNIVERSITAIRES SCIENTIFIQUES ET TECHNIQUES
(SECONDARY DIPLOMA +2 YEARS OF HIGHER EDUCATION) – **L2**

Around 20 schools (IUT) offer the DUT in Biological engineering with the option Agri-food and biological industries.

LICENCES PROFESSIONNELLES
(SECONDARY DIPLOMA + 3 YEARS OF HIGHER EDUCATION) - **L2 +1** YEAR

Programs are offered in the following broad areas:

> **Law, economics, and management** (agricultural and agri-food companies) and trade (agrifood and agro-supply, international agri-food business, international marketing of agricultural and agri-food products – fruits and vegetables, agri-food logistics and marketing, consulting for livestock co-ops), agri-food industry (promotion of certified local products), logistics (international supply chain management for agri-food products).

> **Sciences, technologies, and health in agronomy** (management of rural agricultural companies and sustainable rural development), livestock production (consulting, technical-commercial in animal nutrition), agri-food industry (industrial development of food products, additives and health foods, biotechnology and engineering of beverage procedures, food design and production, agri-food controls, research and development in industrialized culinary arts, cheese, culinary engineering, sanitation and safety, applied nutrition).

www.campusfrance.org>Trouvez votre formation>Licence

MASTER LEVEL

MASTER
(SECONDARY DIPLOMA+ 5 YEARS OF HIGHER EDUCATION) – **M2**

Two programs offer a Master with the following concentrations (mentions et spécialités):

Sciences, technologies, health:

> Agronomy-agri-food: environmental management of ecosystems and tropical forests, environmental engineering, tropical agricultural systems and development management, innovative systems and techniques for sustainable agricultural development;

> **Integrative biology and agro-sciences**: sense perceptions and innovation in agri-food, food sciences and human nutrition;

> **Chemical engineering and agri-food**: bio-processes and marine biotechnologies, design and production of innovative food products;

> **Nutrition, food sciences and agri-food**: quality and risk control in the agri-food sector, quality control in agri-food and fisheries procedures, food safety, advanced food technologies, fermenting processes in agro-food (wine, beer, cheese), statistics, nutritional quality management, food products marketing, processing, industrial applications of agro-resources;

> Ecosystems, agro-systems, and sustainable development: crop production and **agri-food industries**;

> Environmental and natural resource management: **engineering of agri-food systems** in the Mediterranean region;

> Chemical and biological engineering: process engineering: agri-food environment.

Law, economics and management with concentrations available in:

> Law and management of agricultural and agri-food companies,

> European law and agri-food sectors,

> Marketing and sales in agri-food industries,

> Rural economics and strategy for agri-food companies

MASTER OF SCIENCE (MSC)
(SECONDARY DIPLOMA + 5 YEARS OF HIGHER EDUCATION) – **M2**

MSc degrees are offered by Écoles d'Ingénieurs:

> Aninam-man-food: transdisciplinary management of global health and nutritional safety: www.man-imal.fr/en/

> Agri-food engineering in Mediterranean and tropical regions: www.agroparistech.fr

Sustainable food manufacturing management:
www.isa-lille.com/programs/masters

EUROPEAN AND INTERNATIONAL MASTER
(SECONDARY DIPLOMA +5 YEARS OF HIGHER EDUCATION) – **M2**

> Food Innovation and Product Design (FIPDES) AgroParisTech: www.fipdes.eu

DIPLÔME D'INGÉNIEUR (ENGINEERING DEGREE) / MASTER
(SECONDARY DIPLOMA +5 YEARS OF HIGHER EDUCATION) – **M2**

Below are French Écoles d'Ingénieurs offering engineering degrees accredited by the CTI (Commission des Titres d'Ingénieur). Some specialize in agri-food:

> AgroCampus Ouest: Institut National Supérieur des Sciences Agronomiques, Agroalimentaires, Horticoles et du Paysage www.agrocampus-ouest.fr

> AgroParisTech: Institut des Sciences et Industries du Vivant et de l'Environnement www.agroparistech.fr

> Agrosup Dijon: Institut National Supérieur des Sciences Agronomiques, de l'Alimentation et de l'Environnement www.agrosupdijon.fr

> Bordeaux Sciences Agro: École Nationale Supérieure des Sciences Agronomiques de Bordeaux-Aquitaine www.agro-bordeaux.fr

> INPT-ENSAT: École Nationale Supérieure Agronomique de Toulouse www.ensat.fr

> El Purpan: École d'Ingénieurs de Purpan www.purpan.fr

> ENSAIA: École Nationale Supérieure d'Agronomie et des Industries Alimentaires http://ensaia.univ-lorraine.fr

> ENVA: École Nationale Vétérinaire d'Alfort www.enva.fr

> ESA: École Supérieure d'Agriculture d'Angers www.groupe-esa.com

> ESIAB: École Supérieure d'Ingénieurs en Agroalimentaire de Bretagne - Université de Brest Atlantique www.univ-brest.fr/esiab

> ISA Lille: Institut Supérieur d'Agriculture de Lille www.isa-lille.fr

> Institut Polytechnique LaSalle Beauvais www.lasalle-beauvais.fr

> ISARA-Lyon: Institut Supérieur d'Agriculture de Rhône-Alpes www.isara.fr

> Montpellier SupAgro: Institut National d'Études Supérieures Agronomiques de Montpellier www.supagro.fr

> ONIRIS: École Nationale Vétérinaire, Agroalimentaire et de l'Alimentation, Nantes Atlantique www.oniris-nantes.fr

> VetAgro Sup: Institut d'Enseignement Supérieur et de Recherche en Alimentation, Santé Animale, Sciences Agronomiques et de l'Environnement www.vetagro-sup.fr

> www.cti-commission.fr/-Liste-officielle-des-programmes

IN FIGURES

Sources: French Ministry of Agriculture, Agri-food and Forests http://agreste.agriculture.gouv.fr

- **€ 31.5** billion in value added to the French economy (2014)
- **15,788** companies in the agri-food industry (2014)
- **690,000** jobs in agri-food companies (2014)
- **138,000** retail jobs in delis and bakeries (2014)

INTERNATIONAL

Europe is the world's leading agricultural power in terms of production value and the share of the working population employed in agriculture.

France is the 8th agricultural power in terms of contribution to the value of global agricultural production. French agriculture is valued at 76 billion, far ahead of Germany (56 billion), Italy (49 million), and Spain (43 million). France is also a global leader in exports of wheat, seeds, alcohols, wines, and spirits.

Held every autumn in Paris, SIAL (international food salon) is the world's largest event devoted to agri-food innovation with over 6,500 presenters from 104 different countries.

RELATED FIELDS

• Agriculture • Agronomy • Food studies • Aquaculture • Biology • Chemistry • Ecology • Economics and management • Geography • Veterinary medicine • Enology • Health • Earth and space sciences • Shipping • Viticulture

RELATED SUBFIELDS

• Agro-ecology • Food • Animals • Biotechnologies • Climate change • Climate • Climate challenges • Sustainable development • Water • Eco-technologies • Livestock husbandry • Ecological footprint • Genetics • Water management • Horticulture • Hydrology • Sanitation • Environmental engineering • Natural habitats • Environmental protection • Quality control • Global warming • Aquatic sciences • Silviculture • Earth • Veterinary sciences

USEFUL LINKS

- **Agreste (agricultural statistics, assessments, and outlooks):** http://agreste.agriculture.gouv.fr
- **Agroécologie - MOOC Agreenium-IAVFF:** https://www.france-universite-numerique-mooc.fr
- **APECITA (French association for managers, engineers, and technicians in the agricultural and agri-food industries):** www.apecita.com
- **CIRAD (agronomic research for development):** www.cirad.fr
- **Chlorofil:** www.chlorofil.fr
- **Agricultural education in France and list of BTS certificates in the agricultural sector:** www.chlorofil.fr /diplomes-et-referentiels/formations-et diplomes/btsa.html
- **FNAB (French organic agriculture federation):** www.fnab.org
- **Fésia (4 private écoles d'ingénieurs in life sciences, agriculture,the agri-food industry, and the environment):** www.fesia.org
- **Training for jobs in agriculture, forestry, nature, and land management:** www.educagri.fr
- **IAVFF (French institute for agronomy, veterinary sciences,and forestry):** www.agreenium.org
- **INRA (French nation institute for agronomic research):** www.inra.fr
- **Ministry of Agriculture, Agri-food, and Forestry:** http://agriculture.gouv.fr/Enseignementagricole
- **Portal for the French agri-food industry:** www.franceagroalimentaire.com
- **GéCo-GLEN (European program):** http://glen-europe.org
- **SIAL (international food salon):** www.sialparis.fr
- **UNREP (national rural union for education and promotion):** www.maformationagricole.com

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AGRI-FOOD

France's leading industrial sector, agri-food deals with the design, production, and marketing of food products deriving from agriculture, such as dairy products. Non-food crops are agricultural resources with other purposes, such as pharmaceutical, chemical, textile, or energy. These crops fall under specific branches of agro-industry.

France produces a wide variety of food products: gourmet foods, fruits and vegetables, sweets, prepared foods, cereals, dairy, meats and meat products, seafood, wines, beers, spirits, soft drinks, spring water, etc.

The agri-food industry is composed of 9 product families: meats, fish, fruits and vegetables, dairy products, grain and starch products, baked goods and pastas, other food industries (chocolates, sweets), animal feed, and beverages and alcohols.

The agri-food industry absorbs 70% of French agricultural production. Processing, conserving, and packaging food requires highly sophisticated technologies. Automated processes regulate output depending on the needs of the production chain. These require in-depth technical knowledge. Food safety is a critical component of all activities in the agri-food industry. Technological innovation and the growth of retail distribution have created a need for increasingly qualified personnel.

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