



Press kit

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Agriculture - Innovation 2025

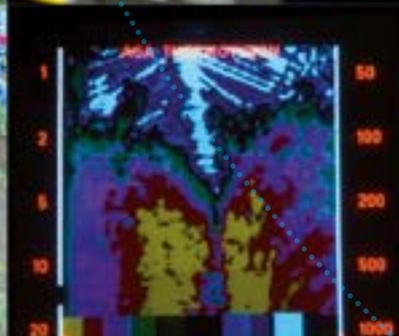
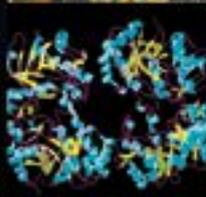
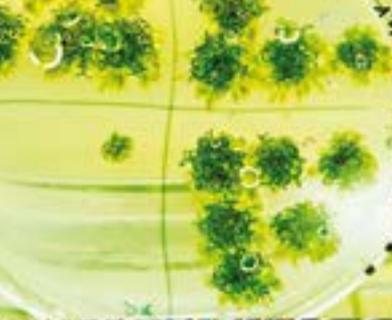
# 30 projects for competitive and environmentally friendly farming

#AI2025

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October 2015



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## Agriculture - Innovation 2025

### #AI2025

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# 30 projects

for competitive and  
environmentally friendly farming

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# Summary

## Agriculture - Innovation 2025

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### Background

Agriculture faces a number challenges: feed the world, with an ever-increasing demand in animal and plant protein from emerging countries, reduce its environmental footprint, participate in the fight against climate change and adapt to it through the agro-ecological transition, and provide raw materials which can be used to produce energy, chemicals, or materials by making full use of biomass.

Meeting these challenges will require a major change in agri-food sectors, keeping in mind that:

- at one end, there are the consumers: those who have diverse and sometimes contradictory expectations of food both in terms of products (quality, origin, from the most mundane product to haute cuisine) and production methods (environmental and social impacts, respect of animal welfare, etc.). However, ultimately, they want products that meet their needs and sensibilities of the moment at all times with ever higher safety and quality standards and at a competitive price
- at the other end, there are the farms: these are in essence, very different (starting with geography). A single model is therefore not possible but it is essential that all can be sufficiently profitable.

Performance in production, economy, environment, health, and welfare is therefore a necessity. The opening up of agricultural economies requires a high level of competitiveness. However, this should not be achieved at the expense of other performance and should consequently focus on integrating sustainable development. It is this search for sustainable competitiveness that has guided the "Agriculture - Innovation 2025" mission and resulting action plans with the conviction that innovation is essential.

1. As shown by the results of the ASIRPA project developed by the INRA and intended to develop a socio-economic analysis of the Impact of public agricultural research: <http://www6.inra.fr/asirpa>

2. The TRL (Technology readiness level) assesses the level of maturity of a technology from laboratory research (the lowest) up to marketing and deployment (the highest level).

## Mission statement

The purpose of the mission was to provide the basis for an "Agriculture - Innovation" plan to be completed by 2025. Identified action-oriented projects needed to be accompanied by "research and development institutions and procedure mobilisation methods" targeting the following areas of investigation:

- agro-ecology in its integrative dimension (including the "One Health" approach)
- biocontrol and its role in integrated crop protection strategies
- plant biotechnology, in its diversity and integrating related societal issues
- agricultural equipment and the development of digital agriculture
- bioeconomy

Before summarising the proposals, three points should be highlighted:

- 2025 is a deadline that is both short and long. The long period of time between research and its impacts<sup>(1)</sup> guided the mission in its choice to propose both projects that could be implemented immediately, i.e. which could be implemented in 2016, including the continuation and stepping-up of actions already initiated, to be able to measure their impact in ten years time in 2025, and projects requiring preparation before being initiated
- the mission deliberately chose a very broad spectrum, ranging from scientific research to innovation disseminated and adopted in the field, including training and regulations where relevant. By focusing on the topics explicitly mentioned in the mission statement scope recommendations also covered other issues that emerged during the interviews and workshops conducted such as this issue of competitiveness which was not explicitly included in the mission statement. The mission also sought to fully integrate reflections and orientations adopted within the framework of the French national research strategy
- the agri-food industry was not explicitly included in the mission statement either. Consultation with some of its stakeholders as well as the fact that the paths of agriculture and the agri-food industry are intertwined suggested that additional work on the agri-food industry would be pertinent.

## Proposals

This reports focuses on proposals: thirty projects on priority research and innovation topics which identify issues, actions, stakeholders, financing sources, and, wherever pertinent, a Technological readiness level indicator<sup>(2)</sup>.

These thirty projects are grouped into nine core areas.

**Two areas are focused on integration** and include research and innovation involving different disciplines and expertise mobilised around systemic approaches:

- agro-ecological transition
- bioeconomy

**Four areas cover technologies** to develop to serve sustainable competitiveness:

- digital technology
- robotics
- genetics and biotechnology
- biocontrol

**Three areas bring together all agricultural R&D, experimentation, and development stakeholders:**

- open innovation specifically targeting experiments and initiatives of farmers
- evaluation of multi-performance and innovation in agricultural economics
- training that should serve all types of innovation

## Conclusion

The different areas and the projects and actions composing them are not independent. They form a coherent and articulated whole in response to the goal of the initial mission statement. Projects are different in nature but each is clearly identified. They do not cover all research, development, transfer, and innovation actions conducted by the various scientific and technical stakeholders; they are priorities.

These proposals are not an immediate response to the current agricultural crisis. Offering short-term solutions to this was not included in the mission statement and is beyond the competences of the authors of this report. Similarly, they do not explicitly address the loss of market share of the French agri-food industry abroad as the proposals of the area relating to competitiveness focus on agricultural income (level and variability). However, do these difficulties ultimately reflect the competitiveness gap of our agriculture and food industry? Our strong belief is that these proposals, structured around nine core areas, are the right response to recreate conditions for sustainable competitiveness by 2025 both on international markets and regionally.

They should help set a course for our agriculture and rebuild trust between the various stakeholders, from agricultural producer to the consumer, provided that they can be tracked over time.

# Agriculture - Innovation 2025

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3 Priorities

9 Areas

- 1** Develop a system approach and ensure that agriculture contributes to the fight against climate change  
2 areas - 9 projects - 31 actions



Agro-ecology



Bioeconomy

- 2** Enable the full development of new technologies in agriculture  
4 areas - 12 projects - 45 actions



Digital agriculture



Robotics



Genetics & biotechnology



Biocontrol

- 3** Bring together all stakeholders in agricultural research, experimentation, and development to support competitiveness  
3 areas - 9 projects - 22 actions



Open innovation



Agricultural economy



Training

# 30 Projects

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**Project 1** - Develop research on soil biology

**Project 2** - Improve soil fertility and mitigate climate change

**Project 3** - Anticipate climate change and adapt to it: develop and promote integrated water management

**Project 4** - Anticipate climate change and adapt to it: develop a service portal for agriculture

**Project 5** - Develop quick disease diagnostic tools in the field

**Project 6** - Contribute to France's and Europe's protein self-sufficiency

**Project 7** - Step up research in technology and process engineering

**Project 8** - Structure research in systems biology and synthetic biology for bio-industries

**Project 9** - Structure research for and in bioeconomy

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**Project 10** - Implement an agriculture-based data portal for open innovation

**Project 11** - Structure research on the use of digital technology in agriculture

**Project 12** - Accelerate research and development in agribot technologies

**Project 13** - Structure and support the industrial fabric in agribot technologies

**Project 14** - Implement agribot testing and qualification procedures

**Project 15** - Develop animal and plant genomic selection

**Project 16** - Master new biotechnologies

**Project 17** - Address the industrial issue of the diversification and development of secondary metabolites

**Project 18** - Develop procedures and protocols for genetic progress and promote its adoption

**Project 19** - Structure and support research and development on plant pest biocontrol

**Project 20** - Support biocontrol in livestock farming to improve performances and animal health

**Project 21** - Adapt plant pest biocontrol assessment procedures and protocols

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**Project 22** - Include the experiences of farmers in innovation dynamics

**Project 23** - Mobilise RDI in agriculture in response to social challenges

**Project 24** - Create regional *Living labs* for agro-ecology and the bioeconomy

**Project 25** - Develop experimentation and observation networks

**Project 26** - Develop and disseminate multi-criteria assessment tools for agricultural and food systems

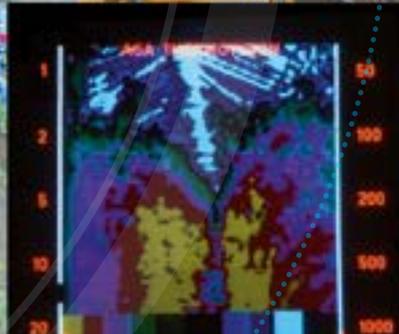
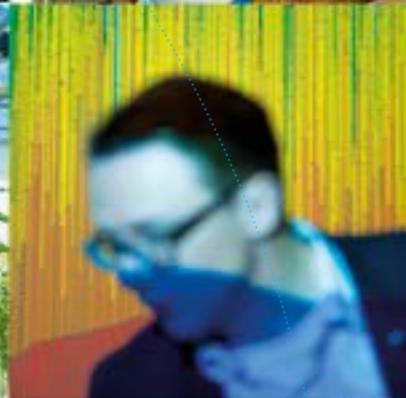
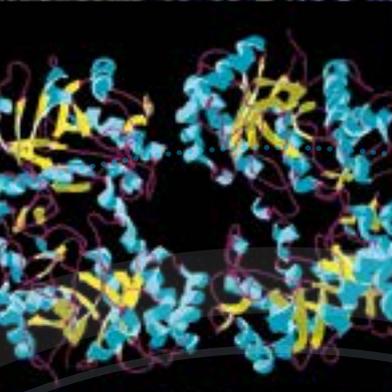
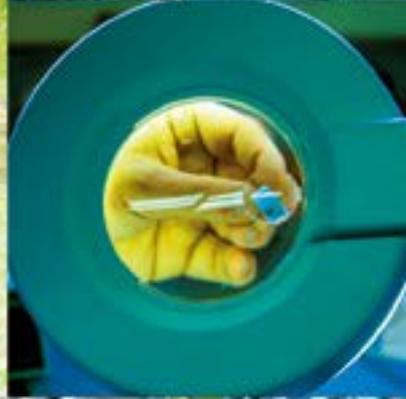
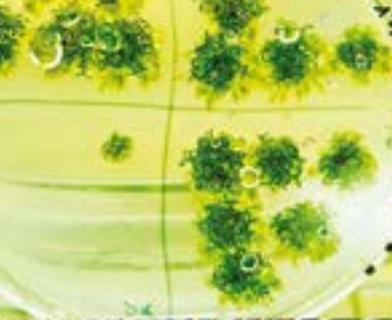
**Project 27** - Identify new sources of revenue and funding for agriculture

**Project 28** - Create an international agriculture and agri-food competitiveness observatory

**Project 29** - Strengthen the adequacy of training and support systems with necessary skills

**Project 30** - Step up the deployment of skills to accompany change in the agricultural world

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# Agro-ecology

Priority **1** Area AGROECO

## Support and stimulate agro-ecological transition

13,000

### Figures

This is the value, in billions of dollars, of ecosystem services provided annually by soil worldwide (primary, agricultural, and wood production).

5

This is the average weight, in tonnes, of living organisms present in one hectare of arable land.

1.2

This is the weight, in billions of tonnes, of carbon that could be stored in agricultural soils per year (an annual rate of storage of around 4 per 1,000 in topsoil).

This area follows on from the report published by Marion Guillou *et al.* (2013) and the French Loi d'avenir pour l'agriculture, l'alimentation et la forêt (2014). A large spectrum is covered: research on soil, action plan to fight against climate change ("4 per 1,000" initiative), services and climate data portal for agriculture, promotion of integrated water management, and quick disease diagnostic tools that are easy to use on farms.

### FOCUS PROJECT 1

#### Develop research on soil biology

##### Three challenges

- **Allow soil to continue to provide its services:**
  - supply agricultural products, wood, and fibres
  - mitigate climate change by storing carbon
  - regulate the water regime and water bio-filtration
- **Use scientific progress to:**
  - better understand soil biodiversity
  - map this biodiversity.
- **Predict the effect of soil type and the use of its biodiversity as a decision support tool.**

##### Actions

- **Improve understanding of biodiversity in reference soils and identify new functional markers.**  
Example: microbial communities limiting emissions of nitrous oxide (N<sub>2</sub>O), the most powerful agricultural GHG related to the use of fertilizers.
- **Map soil biodiversity** and compare it with that of reference soils, establish and model the relationship between soil types, their fauna and flora, and ecosystem services.
- **Identify plant and microbial characters** involved in beneficial interactions.  
Example: symbiotic fixation of atmospheric nitrogen by leguminous crops limiting additional nitrogen input by farmers.
- **Design and implement an international system of networks of farmers** testing and implementing diagnostic tools, decision support models and advisory actions.

# Bioeconomy

Priority

1

Area  
BIOECO

## Develop research and innovation for the bioeconomy

### Figures

12,000

*This is the weight, in billions of Euros, of the European bioeconomy, all sectors combined.*

20%

*This is the expected annual increase of biobased products (excluding food) to reach a market share of 22 to 28% of chemistry in 2025 (reference 12.5% in 2015).*

90,000

*This is the number of new jobs expected to be created by 2017 in the agri-food industry.*

Understood as the sustainable use of natural capital, bioeconomy encompasses all animal and plant biomass production, processing, and recycling sectors. Projects cover specific themes (protein self-sufficiency of France and Europe following on from Anne Lauvergeon's "Innovation 2030" report published in 2013), expanding technological and engineering research already funded by the French Programme d'investissements d'avenir (biorefineries and high throughput fermentation), science fronts (synthetic and systems biology), and more generally, structuring research in bioeconomy (finalisation of an inter-ministerial road map, and creation of inter-disciplinary research centres).

FOCUS

PROJECT 7

### Step up research in technology and process engineering

#### Four challenges

- **Contribute to energy sovereignty** and diversify the mix of existing solutions (wind, solar, etc.) by using biomass resources.
- **Contribute to re-industrialisation** by creating new products and sectors derived from the use or recycling of biomass. E.g. biobased products, biofuels, or molecules for pharmaceuticals or cosmetics.
- **Reason, at country level, to articulate bioeconomy and agroecology** and adapt to biomass diversification.
- **Change scale in processes and processing industries**
  - o Upscaling: increase the size of the biorefinery
  - o Downscaling: biorefining on the farm

#### Actions

- **Develop research on "white" or "industrial" processes and biotechnology** (based on enzymes or micro-organisms) to diversify the biomass used.
- **Support, step up and network existing technology platforms** with a new Programme d'investissements d'avenir.

# Digital Agriculture

Priority **2**

Area  
DIG

## Data: new knowledge and new services

### Figures

20+

*This is, in billions of dollars, the market for services from agricultural Big Data covered by Monsanto based on the 400 million hectares of land monitored.*

3x

*This is how much extreme weather events causing yield losses have increased by.*

46%

*This is the share of French farmers who used GPS in 2013, potential for geo-referenced data.*

This area extends the mission on agricultural equipment entrusted to Jean-Marc Bournigal in 2014. The scope ranges from research programmes (decision support tools, sensors) to development actions (creation of an open agricultural digital data portal, use of digital data for experimentation).

FOCUS

PROJECT 10

### Implement an agriculture-based data portal for open innovation

#### Four challenges

- **Bring French agriculture into the digital age and support agro-ecological transition.**
- **Control** massive data acquisition (onboard computers or computer-controlled).
- **Store and use this data** with the aim to create:
  - o new knowledge
  - o new decision support tools
  - o new services
- **Promote the creation and development of service companies** for agriculture on a very promising emerging market.

#### Actions

Create a data portal for agriculture to:

- **provide** stakeholders with multiple types of data: open public geo-referenced data (maps, topographic surveys, satellite images, etc.), soil and climate data, health and economic data, data shared by farmers or other economic stakeholders.
- **define new services** (indicators, models, decision support tools, climate services) by promoting exchanges between users with common operating parameters (crop varieties, breeds raised, water resources, weather, etc.).
- **make this national portal a pilot project** moving towards a European initiative.

# Robotics

Priority

2

Area  
ROB

## Rapid, precise, and safe agricultural equipments

### Figures

16.3

This is, in billions of dollars, the estimated world market for agribots in 2020.

1,300

Is the number of French researchers in robotics who could potentially be mobilised to work on agricultural robotics.

20

This is the number of laboratories in the world specifically positioned on agricultural robotics, particularly in livestock, cultivation in greenhouses, and fruit and vegetable harvesting.

In continuation of the mission on agricultural equipment, this area includes three projects: inclusion of a dedicated agricultural robotics programme in the "Plan sur la nouvelle France industrielle", structuring the industrial base through public-private programmes, and creation of an open test and validation platform for innovations in robotics.

FOCUS

PROJECT 12

### Accelerate research and development in agricultural robotics

#### Three challenges

- **Implement new practices to:**
  - o improve precision in agricultural work
  - o improve farmer comfort and safety
  - o create time for activities with higher added value (observation, management).
- **Create new automated production systems through:**
  - o co-designing robots and the agro-system in which it operates
  - o reliable and robust robots
- **Create a major French robotics offer** within 5/10 years.

#### Actions

- **Include agricultural robotics** in "Nouvelle France industrielle".
- **Launch a research programme** in agricultural robotics to produce up to 2025, five types of French agribots either to support farmers (carrier), as a swarm (harvesting, processing, etc.), or autonomous (weeding, mowing, harvesting, etc.) with a priority on a sprayer robot for vineyards and orchards.
- **Make agricultural issues attractive** to students in robotics by organising "challenges" on agricultural uses.

# Genetics & biotechnology

Priority 2

Area  
GEN

## Mobilise the genetics lever and biotechnologies for animal and plant productions

### Figures

0%

*This is the evolution of wheat yields in France and Europe.*

181.5

*This is the estimation, in millions of hectares, of the surface area that was cultivated with genetically modified crops worldwide in 2014.*

1+

*This is, in billions of Euros, the net value of the genomic selection for dairy cattle in France.*

This is a key driver of competitiveness which is experiencing strong international competition. France has a very high level of research expertise but is behind in experimentation and dissemination.

Projects cover plant and animal genomic selection, control of biotechnology, and use of plant metabolic diversity. This area also includes a regulatory component to specify the release procedures for varieties derived from biotechnology (at national, in line with the High council for biotechnology, and European level).

### FOCUS PROJECT 15

## Develop animal and plant genomic selection

### Three challenges

- **Agricultural:** strengthen diversity and sustainability by expanding the number of varieties and breeds as well as targeted characters (disease resistance, drought tolerance, diversity of human consumption, and meeting the needs of bioindustry).
- **Economic:** maintain our seed industry's position as world market leader in export industries.
- **Science and technology:** meet international competition in high throughput biology, genomic selection, and new biotechnology.

### Actions

- **Continue and step up PIA 1 projects: develop and conduct genomic selection programmes on a larger number of animal and plant species** and ensure the adequacy of selection targets with sustainability criteria.
- **Strengthen key infrastructures to change scale and increase the number of characters that can be taken into consideration.** Genetic resources, high throughput genotyping and phenotyping platforms and experimental field equipment.
- **Create "data centres", key infrastructures for information storage, maintenance, sharing, and processing:** infrastructure organisation, ontology creation, resources for data processing, and development of skills in bioinformatics and bioanalysis in companies.
- **Affirm, in a European context, international ambition in the field of genomic selection:** strengthen methodological research skills, build international partnerships, and increase the presence of French companies abroad.

# Plant & animal Biocontrol

## Structure research and foster innovation



### Figures

15%

*This is the estimated weight of biocontrol on the French domestic plant protection market.*

15%

*This is the expected annual growth rate of turnover in the French plant biocontrol industry up to 2020 (currently 100 million Euros).*

5,500/  
20,000

*This is the number of direct and indirect jobs in the biocontrol sector in France today and in 2020.*

It is appropriate here to structure research (creation of public-private consortia in both plant and animal fields) and support the development of biocontrol solutions integrated into more sustainable production systems (launch of a limited number of integrated research - development - innovation projects). The issue of assessment procedures for pest biocontrol products for plants is covered in a specific project.

FOCUS

PROJECT 19

### Structure plant pest biocontrol research and development

#### Two challenges

- **Protect the health of crops and trees** with no negative consequences on the environment and human health through the use of macro-organisms (wasps, earthworms, etc.) micro-organisms, chemical transmitters (pheromones), plant defence stimulators, and natural substances (algae, etc.).
- **Find alternative and complementary solutions:**
  - o to replace chemical pesticides
  - o focusing on natural pest population balancing mechanisms.

#### Actions

- **Create a public-private research, development and innovation (RDI) consortium** to structure, coordinate, and lead the French biocontrol community.
- **Structure the R&D community by creating themed networks and centres.**
- **Fund research projects for a period of time adapted to biocontrol characteristics (8-10 years).**
- **Launch a limited number of integrated RDI projects** organised by farming system.

# Innovation

Priority **3** Area OPINNOV

## Foster open innovation

### Figures

8

This is the percentage of *Living labs* worldwide that were focused on agriculture and forestry in 2008.

50

This is the number of *Living labs* in France on 1 January 2014.

0

This is the number of *Living labs* in France devoted to agriculture.

Open innovation aims to involve professional stakeholders and researchers in specific experimental processes at different levels: regional *Living labs*, system experiment networks, identification, qualification, and sharing experiences in the field, addressing major societal issues (nitrates in waterways, soil pollution, etc.).

Open innovation allows the direct participation of users and rapid implementation of methods and tools in the field.

FOCUS

PROJECT 24

### Create regional "Living labs" in agroecology and bioeconomy

#### Three challenges

- **Adapt innovations** to the specific context of farms and regions.
- **Decomartmentalise the levels of approaches** to meet the requirements of multi-performance in agriculture.
- **Encourage a special partnership dynamic** with:
  - research, research & development, innovation, and field stakeholders
  - around a limited number of areas of activity.

#### Actions

##### Create regional *Living labs*:

- **supported by consortia** involving professionals (farmers, EEIG, Agricultural chambers and cooperatives) and technical and research institutes
- **to implement innovation projects** of all kinds developed in the field or by RDI.
- **in agroecology and bioeconomy:**
  - mixed crop and stock farming
  - intensive and extensive farming
  - field crops
  - perennial crops (vines and orchards)
  - peri-urban farming
  - forest

# Agricultural economy

## Multi-performance & innovation in agricultural economy



### Figures

**-2.6**

This is, in points, the drop in the market share of French agricultural products and food in northern European Union countries between 2005 (12.4%) and 2013 (9.8%).

**25,000+**

This is, in Euros, the average agricultural income received per non-salaried asset over the last decade.

**23**

This is the number of performance indicators listed in the study, "The shift to high-performance agriculture" published in 2013 on behalf of the General Commission for strategy and foresight (CGSP).

This is the most comprehensive area. The proposals made only fall under the scope and skills of research, development, and innovation of the mission. Projects therefore relate to the development of research and multi-criteria assessment tools for agricultural and food systems, the development of new and complementary agricultural financing arrangements, resistance to uncertainties of all kinds (climate, health, or economic) and organisational innovation needs.

FOCUS

PROJECT 26

### Develop and disseminate multi-criteria assessment tools for agricultural and food systems

#### Two challenges

- **Qualify and quantify the impacts of technological or organisational innovations by measuring their performance:**
  - o economic
  - o health
  - o social
  - o environmental
- **Provide robust information to stakeholders** and contribute to developing agricultural income favourably.

#### Actions

- **Strengthen the methodological framework of multi-criteria assessments:**
  - o improve multi-criteria assessment approaches (methods, models, indicators, etc.)
  - o remove blocks on knowledge (consideration of all aspects of sustainability, vertical (sectors) and horizontal (regions) dimensions, time dynamics, *ex ante* and *ex post* assessments, etc.).
- **Build an open platform to quantify and qualify all farms, sectors and territories performances:**
  - o better coordinate and improve interoperability of initiatives already initiated
  - o collect and make available indicators, methods, decision support tools, etc.
  - o compare the microeconomic performance of various types of farms differentiated by production, practices, systems, product value adding methods, etc.
  - o analyse the effectiveness of alternative sectors organisation patterns, or contracts between stakeholders, etc.

# Training

Priority **3** Area **FORM**

## Ensure that agricultural stakeholders drive change

**50%**

*This is the trend for 2025: half of farm managers will have secondary education level qualifications and a quarter will have higher education qualifications.*

**-4**

*In 2007, less than 4% of farmers had followed vocational training in the past three months.*

**11,282**

*This is the number of participants in the Agreenium-IAVFF's (France's Agricultural, Veterinary and Forestry Institute) first Massive online open course (MOOC) on 28/09/2015.*

FOCUS PROJECT 30

### Boost skills development to support change in the agricultural world

#### Two challenges

- **Understand the concepts and principles of implementation of agroecology and the bioeconomy in response to the search for multi-performance.**
- **Understand and control digital tools.**

#### Actions

- **Boost and support agroecology training actions**, from agricultural colleges to higher education institutions, from initial training to vocational training to ensure that agroecology becomes a cornerstone of agriculture by 2025. Relationship with Agreenium-IAVFF (Virtual agroecology university, IDEFI AgreenCamp project, Agroecology MOOC, etc.).
- **Encourage integration and knowledge of the bioeconomy issues, approaches, and tools** in higher education.
- **Build a deployment plan for training on the use of digital technology in agriculture at all stages of the career** in line with existing training: initial and further training, "model farm" demonstrations, discussion networks focusing on experience using digital technology in agriculture.

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# Authors

#AI2025



## Jean-Marc Bournigal

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Born in 1964, Jean-Marc Bournigal has been Chairman of Irstea, the French National Research Institute of Science and Technology for Environment and Agriculture, since 2012. He has also been Deputy Chairman of Innovation, Development, and Support for the public policies of the French National Research Alliance for the Environment (AllEnvi) since 2012. He wrote the report on the future of the agricultural equipment industry provided to ministers of Agriculture, Economy, and Research in January 2015.

Jean-Marc Bournigal managed Bruno Le Maire's office at the Ministry of Agriculture between 2010 and 2012. This former Inspector General of Veterinary Public Health managed two key departments in the Ministry of Agriculture: General Directorate for Food Safety (2006-2009) and General Directorate for Agricultural, Agri-food and Regional Policies (2009-2010).

Jean-Marc Bournigal has dedicated his career to agricultural and food issues and representation abroad. This veterinary surgeon began his career as assistant to the Director of Veterinary Services of the Pyrénées-Orientales. He then went on to work as Assistant Agricultural Attaché at the French Trade Commission of the French Embassy in London, assistant to the head of the passport, licensing, and accreditation office in the General Directorate for Agriculture of the Ministry of Agriculture, Head of the offices of the General Directorate for Food Safety in 1992, advisor to Philippe Vasseur, the Minister of Agriculture, Fisheries, and Food of Juppe's government, head of the international health coordination mission of the General Directorate for Food Safety, Agricultural Attaché in Rome, and, finally, delegate for agricultural affairs in France's permanent delegation to the European Union in Brussels between 2002 and 2006.

He was made Knight of the Order of Merit and Commander of the Order of Agricultural Merit.



## François Houllier

Born in 1959, François Houllier was appointed Engineer General of rural, water, and forestry engineering on leaving the Ecole Polytechnique. Meanwhile, his research activities led him to address the modelling of plants, ecological systems, and forest biometrics early on: he defended a doctoral thesis in 1986 and a thesis for accreditation to direct research in 1999.

After working with the National Forest Inventory (1985-1988) and teaching forest biometrics at the ENGREF (French National School for Rural Engineering, Water and Forestry) (1988 - 1994), he was appointed Director of the French Institute of Pondicherry (India) in 1994 where he worked for three years.

In 1998, he joined the INRA (French National Institute of Research for Agriculture) first as Director of several mixed research units (1998-2002): he was appointed head of the "forest and natural habitat" research department in 2001 (2001-2004) and then head of the "Ecology of Forests, Grasslands, and Wetlands" department in 2004. Between 2005 and 2009, he was the Chief Scientific Officer for "plants and plant products" before being promoted to Deputy Managing Director of INRA's organisation, resources, and scientific assessments. On 26 July 2012, François Houllier was appointed Chairman of the INRA (French National Institute of Research for Agriculture) by the French President.

In addition to his responsibilities at the head of INRA, François Houllier has chaired AllEnvi, French National Research Alliance for the Environment (food, water, climate, and land) since October 2012. Finally, he chaired the board of the European Forest Institute between 2004 and 2006.



## Philippe Lecouvey

Born in 1953, Philippe LECOUEY has been Managing Director of ACTA since 1 January 2014. He manages this network of fifteen technical agro-industrial institutes (ITA), with some 1,800 employees, which are devoted to applied research in agriculture. ITAs are the pioneers in the creation and dissemination of technical progress and innovation serving agricultural industries. In close partnership with applied research, the ACTA and technical institutes have a major role as an interface between public policy and regional farming communities and development stakeholders. Their position is strengthened at European and regional level. Under his leadership, the network also studies the dynamics of change resulting from the digital revolution and, more generally, the main agriculture and agri-food development trends.

He began his career in the pig industry in the areas of applied research, companies, and cooperatives. In particular, he was the Managing Director of the IFIP - French pig and pork institute between 2002 and 2013 following a merger between the Technical Pig and Pork Institute (ITP) and the Technical Centre for the Curing, Preparation, and Preservation of Meat. He contributed to the implementation of a public/private phenotyping unit. He managed the ARCA between 1997 and 2002 bringing together the cooperatives in Western France and participated in creating Nudéus, a company specialising in genetics and the launch of an organic sector and collective production units. He also contributed to the development of French expertise in pig production in China.

Philippe Lecouvey was made knight of the Order of Merit in 2012. He qualified as an engineer at Ecole Lasalle Beauvais and is a graduate of the ICG (Management Control Institute). He is a member of the INRA's Scientific Committee.



## Pierre Pringuet

Born in 1950, Pierre Pringuet is a former student of Ecole Polytechnique and has an engineering degree from Ecole des Mines. He began his career as a civil servant. He was advisor to the minister Michel Rocard between 1981 and 1985 before being appointed director of the Ministry of Agriculture's Agriculture and Food Industries Department.

He joined Pernod Ricard as Business Development Director in 1987 and played a key role in developing the Group abroad. He was Chairman and Managing Director of Pernod Ricard Europe between 1997 and 2000.

In 2000, he joined Patrick Ricard, the then Chairman and Managing Director, at the head office as Deputy Managing Director alongside Richard Burrows. He became the Group's only Deputy Managing Director in 2005. In 2008, he completed Pernod Ricard's internationalisation with the acquisition of Vin & Sprit. The same year, following Patrick Ricard's withdrawal from business functions, Pierre Pringuet was appointed Managing Director of Pernod Ricard until the end of his term of office in February 2015. Pierre Pringuet has been Deputy Chairman of Pernod Ricard's Board of Directors since 2012.

Pierre Pringuet was Chairman of the Sully Committee between 1990 and January 2015 and was appointed Chairman of the AFEP (French Association of Private Enterprises) in June 2012. In December 2014, he was appointed Chairman of the Scotch Whisky Association (SWA) and Chairman of AgroParisTech's Board of Directors.

In January 2015, he was appointed Chairman of the AAIM (Association Amicale des Ingénieurs des Mines). Pierre Pringuet has also been a member of Vallourec's Board since February 2015. He was made Knight of the National Order of the Legion of Honour and the Order of Merit and Officer of the Order of Agricultural Merit.

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