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## Collective Scientific Assessment “ Impacts of plant protection products on biodiversity and ecosystem services ” Dissemination and impact on public action

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**<https://hal.inrae.fr/hal-04391331>**

Submitted on 12 Jan 2024

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# Collective Scientific Assessment « Impacts of plant protection products on biodiversity and ecosystem services »

*Dissemination and impact on public action*

**Laure Mamy and Stéphane Pesce, INRAE**

**Scientific Coordinators** of the collective scientific assessment  
(together with **Wilfried Sanchez, Ifremer**)



- Introduction:  
Context, objectives, implementation, deliverables

# Introduction

## Context

**CSA Pesticides, agriculture & environment**

**CSA Agriculture & biodiversity**

**Growing & protecting crops differently**

**Ocean, climate**

**Pesticides & Human health**

**CSA Impacts of plant protection products on biodiversity and ecosystem services**

**CSA Protect crops by increasing plant diversity**

**Foresight European Chemical Pesticide-Free Agriculture in 2050**



French Ecophyto programme

« Pesticides package »

French Ecophyto II+ programme

# ➤ Introduction

## Context

- Preservation of biodiversity and ecosystem services is critical for sustainable development and human well-being
  - Unprecedented erosion of biodiversity observed for many years
  - Chemical pollution, including plant protection products (PPPs), is one of the main cause of biodiversity decline (IPBES, 2019)
- **French collective scientific assessment “Impacts of PPPs on biodiversity and ecosystem services”**



<https://www.inrae.fr/en/news/impacts-plant-protection-products-biodiversity-and-ecosystem-services-findings-inrae-ifremer-collective-scientific-expert-report>

INRAE

Laure MAMY & Stéphane PESCE  
PEER-Alternet webinar - January 11, 2024

# ➤ Introduction

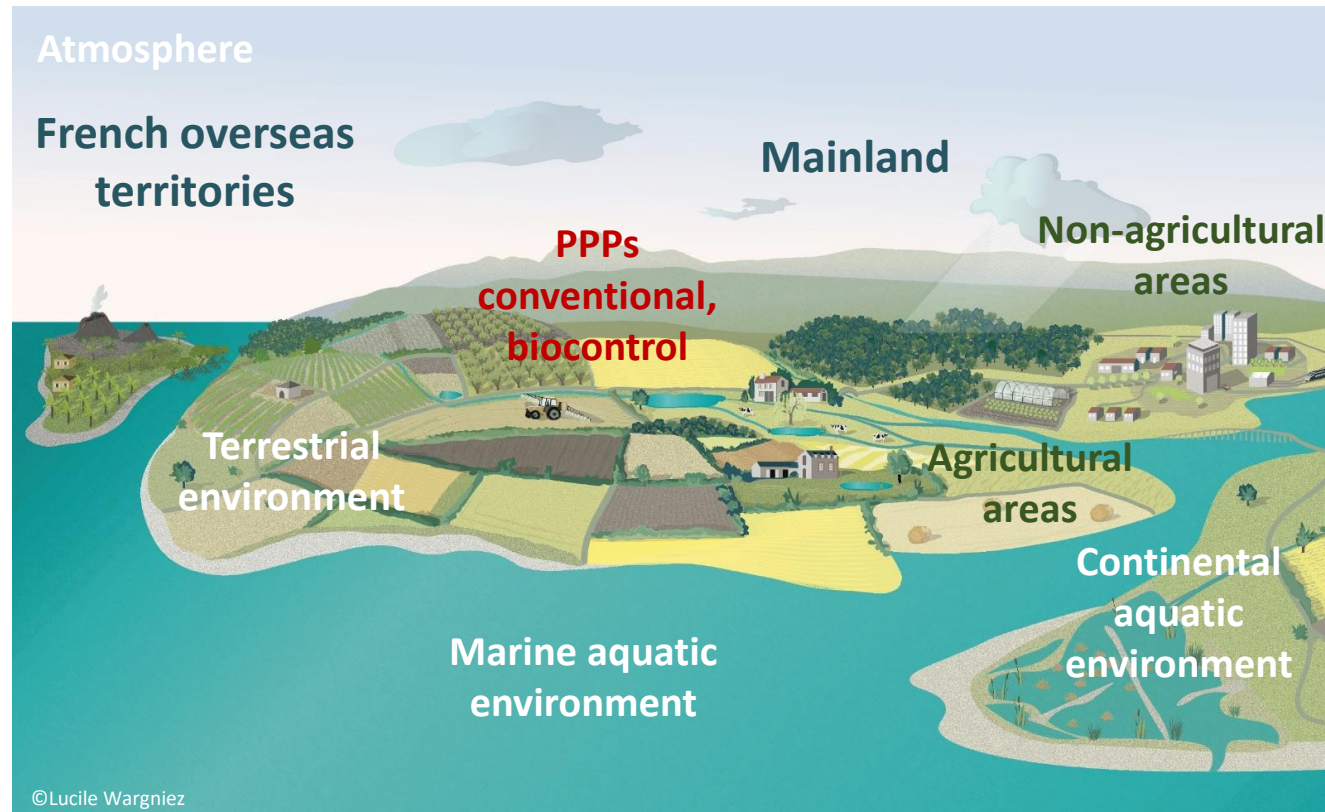
## Objectives of the CSA

- **To review scientific knowledge on the impacts of PPPs on biodiversity and ecosystem services along the source-to-sea continuum**
  
- **To inform public and risk assessment authorities:**
  - Improvement of evaluation procedures
  - Improvement of PPPs monitoring following their placing on the market
  - Risk management
  - Research needs



# ➤ Introduction

## Scope of the CSA



- Approved and banned PPPs
- Transformation products
- Adjuvants and co-formulants

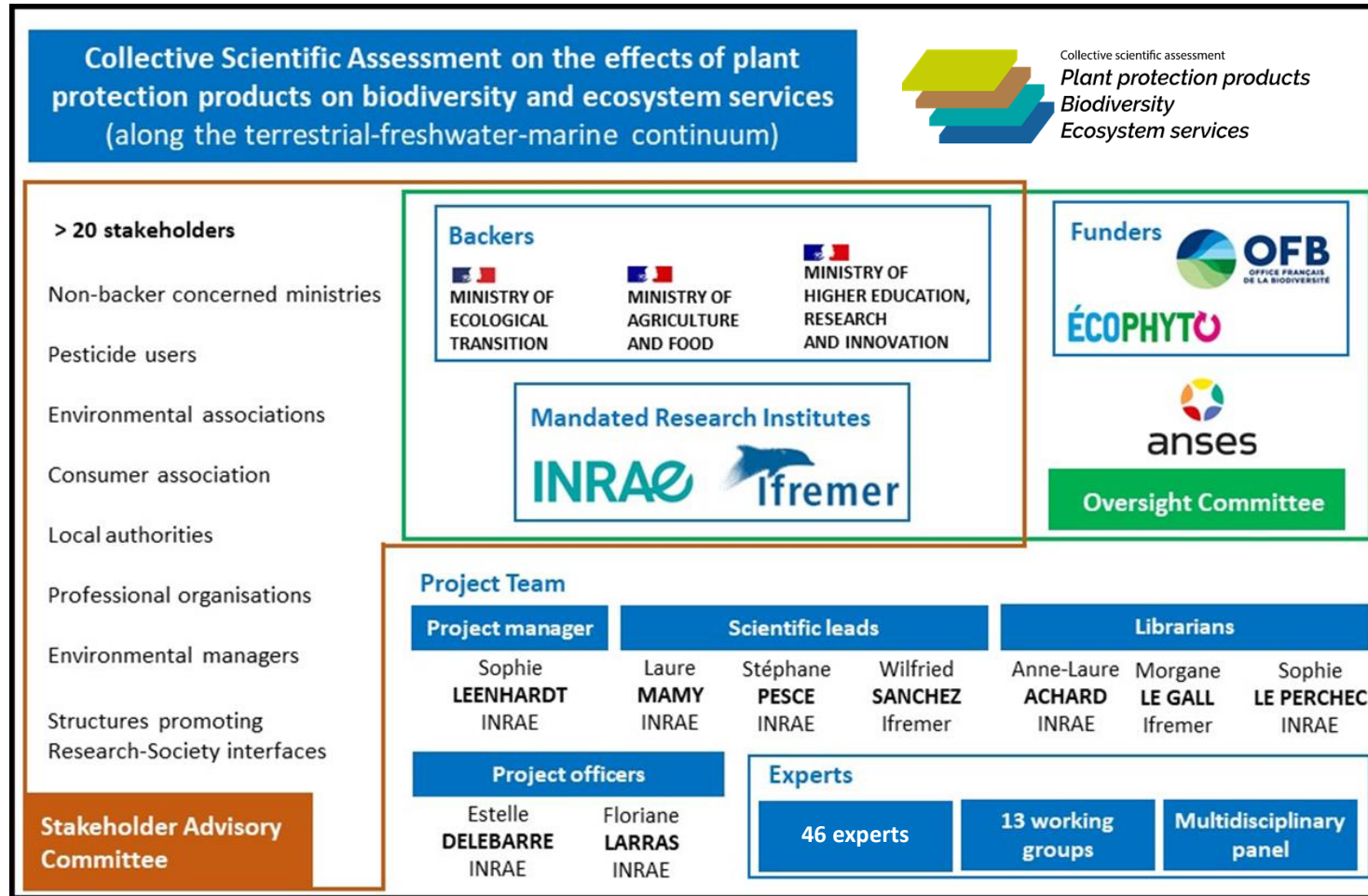
### ❗ Excluded from the CSA:

- Agricultural practices and cropping systems limiting the use of PPPs
- Groundwater
- Industrial discharges

➤ ~ 4 500 cited references

# ➤ Introduction

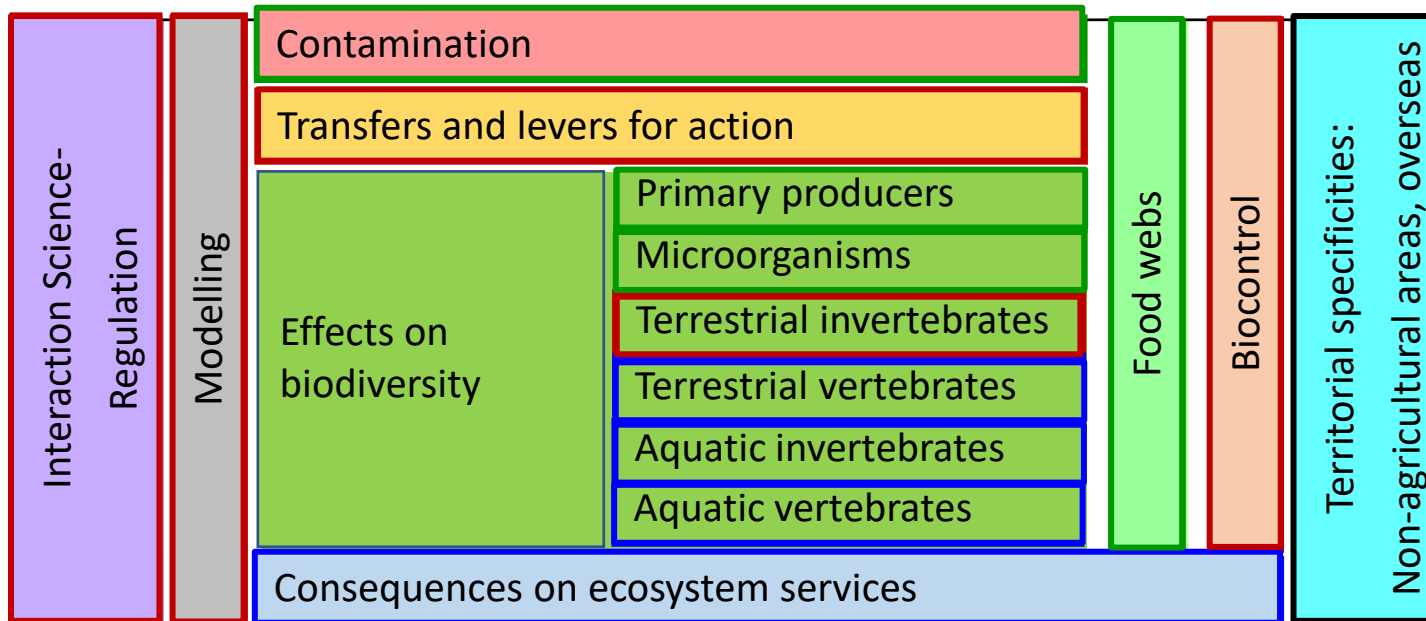
## Implementation





# ➤ Introduction

Thematic summaries – Working groups (13)



Coordination of working groups:

Laure Mamy

Stéphane Pesce

Wilfried Sanchez

Cross-cutting issues

# ➤ Introduction

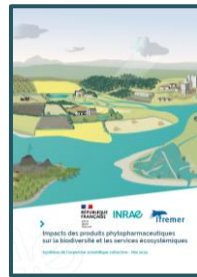
## Deliverables

**Main report (Fr)**  
1400 p



<https://hal.inrae.fr/hal-03777257/>

**Synthesis (Fr)**  
120 p



[https://www.inrae.fr/sites/default/files/pdf/PestiEcotox\\_Synth%C3%A8se\\_Experts\\_V12\\_rev2.pdf](https://www.inrae.fr/sites/default/files/pdf/PestiEcotox_Synth%C3%A8se_Experts_V12_rev2.pdf)

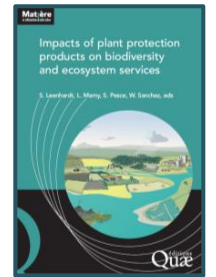
**Summaries (Fr & En)**  
12 p



**French:**  
[https://www.inrae.fr/sites/default/files/pdf/ExpertiseCollectivePestiEcotox\\_R%C3%A9sum%C3%A9.pdf](https://www.inrae.fr/sites/default/files/pdf/ExpertiseCollectivePestiEcotox_R%C3%A9sum%C3%A9.pdf)

**English:**  
[https://www.inrae.fr/sites/default/files/pdf/2022\\_05\\_02\\_PestiEcotox\\_R%C3%A9sum%C3%A9\\_anglais\\_web\\_0.pdf](https://www.inrae.fr/sites/default/files/pdf/2022_05_02_PestiEcotox_R%C3%A9sum%C3%A9_anglais_web_0.pdf)

**Books (Fr & En)**  
180 p



**French:**  
<https://www.quae-open.com/produit/216/9782759236572/impacts-des-produits-phytopharmaceutiques-sur-la-biodiversite-et-les-services-ecosystemiques>

**English:**  
<https://www.quae-open.com/produit/224/9782759237494/impacts-of-plant-protection-products-on-biodiversity-and-ecosystem-services>

**Public final seminar**



**> 600 attendants**  
*(hybrid format)*



➤ Dissemination of the main conclusions  
(to scientists, stakeholders, students and the general public)



# ➤ Scientific articles and conferences

## Scientific articles in peer reviewed international journals

Environmental Science and Pollution Research  
<https://doi.org/10.1007/s11356-023-26952-z>

KEY LEARNINGS FROM A COLLECTIVE SCIENTIFIC ASSESSMENT ON THE EFFECTS OF PLANT PROTECTION PRODUCTS ON BIODIVERSITY AND ECOSYSTEM SERVICES ALONG THE LAND-TO-SEA CONTINUUM

Main conclusions and perspectives from the collective scientific assessment of the effects of plant protection products on biodiversity and ecosystem services along the land-sea continuum in France and French overseas territories

Stéphane Pesce<sup>1</sup> · Laure Mamy<sup>2</sup> · Wilfried Sanchez<sup>3</sup> · Marcel Amichot<sup>4</sup> · Joan Artigas<sup>5</sup> · Stéphanie Aviron<sup>6</sup> · Carole Barthélémy<sup>7</sup> · Rémy Beaudouin<sup>8</sup> · Carole Bedos<sup>2</sup> · Annette Berard<sup>9</sup> · Philippe Bery<sup>10</sup> · Cédric Bertrand<sup>11</sup> · Colette Bertrand<sup>2</sup> · Stéphane Betoulle<sup>12</sup> · Eve Bureau-Point<sup>13</sup> · Sandrine Charles<sup>14</sup> · Arnaud Chaumot<sup>15</sup> · Bruno Chauvel<sup>16</sup> · Michael Coeurdassier<sup>17</sup> · Marie-France Corio-Costet<sup>18</sup> · Marie-Agnès Coutellec<sup>19</sup> · Olivier Crouzet<sup>20</sup> · Isabelle Doussan<sup>21</sup> · Juliette Fabure<sup>2</sup> · Clémentine Fritsch<sup>17</sup> · Nicola Gallati<sup>22</sup> · Patrice Gonzalez<sup>23</sup> · Véronique Gony<sup>24</sup> · Mickael Hedde<sup>24</sup> · Alexandra Langlais<sup>25</sup> · Fabrice Le Bellec<sup>26</sup> · Christophe Le Boulanger<sup>27</sup> · Christelle Margoum<sup>2</sup> · Fabrice Martin-Laurent<sup>16</sup> · Rémi Mongruel<sup>28</sup> · Soizic Morin<sup>29</sup> · Christian Mouglin<sup>2</sup> · Dominique Munaron<sup>27</sup> · Sylvie Néliu<sup>2</sup> · Céline Pelosi<sup>14</sup> · Magali Rault<sup>10</sup> · Sergi Sabater<sup>31</sup> · Sabine Stachowski-Haberkm<sup>32</sup> · Elliott Sucre<sup>27,33</sup> · Marielle Thomas<sup>34</sup> · Julien Tournebeize<sup>35</sup> · Sophie Leenhardt<sup>16</sup>



Environmental Science and Pollution Research  
<https://doi.org/10.1007/s11356-023-31032-3>

KEY LEARNINGS FROM A COLLECTIVE SCIENTIFIC ASSESSMENT ON THE EFFECTS OF PLANT PROTECTION PRODUCTS ON BIODIVERSITY AND ECOSYSTEM SERVICES ALONG THE LAND-TO-SEA CONTINUUM

Impacts of neonicotinoids on biodiversity: a critical review

Laure Mamy<sup>1</sup> · Stéphane Pesce<sup>2</sup> · Wilfried Sanchez<sup>3</sup> · Stéphanie Aviron<sup>4</sup> · Carole Bedos<sup>1</sup> · Philippe Bery<sup>5</sup> · Colette Bertrand<sup>1</sup> · Stéphane Betoulle<sup>6</sup> · Sandrine Charles<sup>7</sup> · Arnaud Chaumot<sup>8</sup> · Michael Coeurdassier<sup>9</sup> · Marie-Agnès Coutellec<sup>9</sup> · Olivier Crouzet<sup>10</sup> · Juliette Fabure<sup>1</sup> · Clémentine Fritsch<sup>8</sup> · Patrice Gonzalez<sup>11</sup> · Mickael Hedde<sup>12</sup> · Christophe Le Boulanger<sup>13</sup> · Christelle Margoum<sup>2</sup> · Christian Mouglin<sup>1</sup> · Dominique Munaron<sup>13</sup> · Sylvie Néliu<sup>1</sup> · Céline Pelosi<sup>14</sup> · Magali Rault<sup>15</sup> · Elliott Sucre<sup>13,16</sup> · Marielle Thomas<sup>17</sup> · Julien Tournebeize<sup>18</sup> · Sophie Leenhardt<sup>19</sup>

9 published articles  
 2 articles in revision  
 6 articles under review

## Presentations and posters in national & international scientific conferences



Natural Products & Biocontrol 2022

> 15 communications

## Scientific articles in French technical journals

THE CONVERSATION

SCIENCE & PSEUDO-SCIENCES



TECHNIQUES DE L'INGÉNIEUR

PHYTOMA  
 La santé des végétaux

YEAR BOOK  
 Santé et Environnement

9 published articles

## Presentations in national and international seminars and webinars



PARC  
 Partnership for the Assessment of Risks from Chemicals

oekotoxzentrum  
 centre ecotox

INRAE

Laure MAMY & Stéphane PESCE

PEER-Alternet webinar - January 11, 2024

## ➤ Interactions with various stakeholders

Plenary meetings (n=3) with a stakeholder advisory committee  
*(during the collective assessment)*

**Consultative body** that includes representatives of the main actors in society likely to be concerned by the conclusions of the CSA (e.g., environmental and consumer associations, local authorities, professional organizations, economic stakeholders in the agrifood and environmental sectors, scientific interest groups)



Guest conferences for public & private organizations and associations



INRAE

Laure MAMY & Stéphane PESCE

PEER-Alternet webinar - January 11, 2024

# ➤ Dissemination to students and the general public

## Media and social networks



Print media

>120 articles



TV and radio

>25 interviews & breaking news



Web media

>160 articles



Social networks

> 2000 mentions

## Conferences to the general public



## Lectures in MSc Courses



## Presentation to high school students





## ➤ Interactions with policy makers and public health and environmental managers



# > Contributions to parliamentary debates



French National Assembly

## Commission of Inquiry into the causes of France's inability to achieve the objectives of successive plans to control the impact of plant protection products on human and environmental health (July-December 2023)

>120 interviews including:

- **1 Scientific Coordinator** of the collective scientific assessment (Stéphane Pesce, INRAE)
- **3 Scientific Experts** (Céline Pélosi, INRAE; Christian Mougin, INRAE; Fabrice Le Bellec, CIRAD)



July 13, 2023

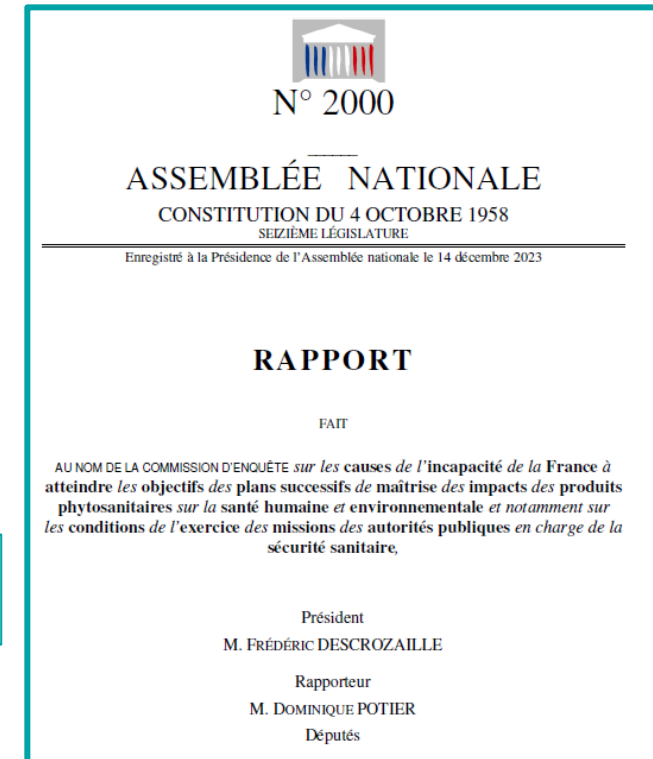


July 20, 2023



October 5, 2023

Report published on  
December 14, 2023



INRAE

Laure MAMY & Stéphane PESCE

PEER-Alternet webinar - January 11, 2024



## ➤ Contributions to parliamentary debates



French National Assembly

### Other commissions and workshops

#### Workshop “Weaknesses and consequences of pesticide assessment”

December 8, 2022

**Interview of 2 Scientific Coordinators** of the collective scientific assessment  
(Laure Mamy, INRAE & Wilfried Sanchez, Ifremer)



#### Commission for Sustainable Development and Spatial Planning

Information mission on the dynamics of biodiversity in agricultural landscapes and the assessment of related public policies

July 6, 2023

**Interview of 2 Scientific Coordinators** of the collective scientific assessment  
(Stéphane Pesce, INRAE & Wilfried Sanchez, Ifremer)



**INRAE**

Laure MAMY & Stéphane PESCE  
PEER-Alternet webinar - January 11, 2024

# ➤ Interactions with national decision-makers and health & environmental managers

Consultations and interviews for current and future national plans



**GOVERNEMENT**

*Liberté  
Égalité  
Fraternité*

**4<sup>th</sup> National Plan for Health and Environment**



**GOVERNEMENT**

*Liberté  
Égalité  
Fraternité*

**Ecophyto 2030**  
*(in process of implementation)*



**Phytopharmacovigilance scheme**  
*(collection and analyses of monitoring data on PPPs)*



**4<sup>th</sup> National Plan for Chlordecone**

Participation to a European Conference



**Ministry of Ecological Transition and Territorial Cohesion**



**FRANCE22**



“Chemical Products:  
Better protection of health  
and the environment”

**May 11-12, 2022**

**INRAE**

Laure MAMY & Stéphane PESCE  
PEER-Alternet webinar - January 11, 2024



## ➤ Impact on public action



*Just wait and see...*

# ➤ Acknowledgments



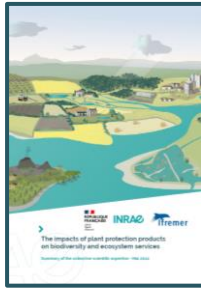
- **Experts\***
- Librarians: Anne-Laure Achard, Morgane Le Gall, Sophie Le Perchec
- Floriane Larras, Estelle Delebarre
- Illustrations: Lucile Wargniez
- Graph designer: Sacha Desbourdes
- Scientific Directions of INRAE, in particular Thierry Caquet, and of Ifremer
- INRAE-DEPE, in particular Sophie Leenhardt and Guy Richard
- Press and communication services of INRAE and Ifremer
- ANSES
- Oversight Committee, Stakeholder Advisory Committee
- Backers: Ministry of Ecological Transition; Ministry of Agriculture and Food; Ministry of Higher Education, Research and Innovation
- Funding: OFB



\* Laure Mamy (coord.) (INRAE), Stéphane Pesce (coord.) (INRAE), Wilfried Sanchez (coord.) (Ifremer), Marcel Amichot (INRAE), Joan Artigas (Univ. Clermont), Stéphanie Aviron (INRAE), Carole Barthélémy (Univ. Aix Marseille), Rémy Beaudouin (INERIS), Carole Bedos (INRAE), Annette Bérard (INRAE), Philippe Berny (VetAgro Sup), Cédric Bertrand (Univ. Perpignan), Colette Bertrand (INRAE), Stéphane Betouille (Univ. Reims), Eve Bureau-Point (CNRS), Sandrine Charles (Univ. Lyon), Arnaud Chaumot (INRAE), Bruno Chauvel (INRAE), Michael Coeurdassier (Univ. Franche-Comté), Marie-France Corio-Costet (INRAE), Marie-Agnès Coutellec (INRAE), Olivier Crouzet (OFB), Isabelle Doussan (INRAE), Juliette Faburé (AgroParisTech), Clémentine Fritsch (CNRS), Nicola Gallai (ENSFEA), Patrice Gonzalez (CNRS), Véronique Gouy (INRAE), Mickael Hedde (INRAE), Alexandra Langlais (CNRS), Fabrice Le Bellec (CIRAD), Christophe Leboulanger (IRD), Christelle Margoum (INRAE), Fabrice Martin-Laurent (INRAE), Rémi Mongruel (Ifremer), Soizic Morin (INRAE), Christian Mougin (INRAE), Dominique Munaron (Ifremer), Sylvie Néliu (INRAE), Céline Pelosi (INRAE), Magali Rault (Univ. Avignon), Sergi Sabater (Univ. Girona), Sabine Stachowski-Haberkorn (Ifremer), Elliott Sucre (CUFR), Marielle Thomas (Univ. Lorraine), Julien Tournebize (INRAE)

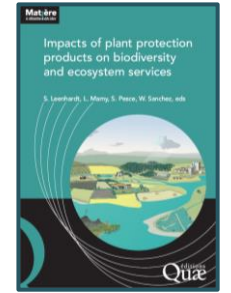


# ➤ To know more about the scientific collective assessment



English Summary: [https://www.inrae.fr/sites/default/files/pdf/2022\\_05\\_02\\_PestiEcotox\\_R%C3%A9sum%C3%A9\\_anglais\\_web\\_0.pdf](https://www.inrae.fr/sites/default/files/pdf/2022_05_02_PestiEcotox_R%C3%A9sum%C3%A9_anglais_web_0.pdf)

English Book: <https://www.quae-open.com/produit/224/9782759237494/impacts-of-plant-protection-products-on-biodiversity-and-ecosystem-services>



## Scientific articles:

### 2021

- Pesce et al. (2021) Collective scientific assessment as a relevant tool to inform public debate and policymaking : an illustration about the effects of plant protection products on biodiversity and ecosystem services. Environ Sci Pollut Res <https://doi.org/10.1007/s11356-021-14863-w>

### 2022

- Larras et al. (2022) A critical review of effect modeling for ecological risk assessment of plant protection products. Environ Sci Pollut Res <https://doi.org/10.1007/s11356-022-19111-3>
- Larras et al. (2022) A meta-analysis of ecotoxicological models used for plant protection product risk assessment before their placing on the market. Sci Tot Environ <https://doi.org/10.1016/j.scitotenv.2022.157003>

### 2023

- Morin and Artigas (2023) Twenty Years of Research in Ecosystem Functions in Aquatic Microbial Ecotoxicology. Environ Toxicol Chem <https://doi.org/10.1002/etc.5708>

### In press

- Bérard et al. Improved assessment of the impacts of plant protection products on certain soil ecosystem services requires better consideration of terrestrial microalgae and cyanobacteria. Environ Sci Pollut Res <https://doi.org/10.1007/s11356-023-31198-w>
- Mamy et al. Impacts of neonicotinoids on biodiversity: a critical review. Environ Sci Pollut Res <https://doi.org/10.1007/s11356-023-31032-3>
- Pesce et al. Main conclusions and perspectives from the collective scientific assessment of the effects of plant protection products on biodiversity and ecosystem services along the land–sea continuum in France and French overseas territories. Environ Sci Pollut Res <https://doi.org/10.1007/s11356-023-26952-z>
- Pesce et al. Linking ecotoxicological effects on biodiversity and ecosystem functions to impairment of ecosystem services is a challenge: an illustration with the case of plant protection products Environ Sci Pollut Res <https://doi.org/10.1007/s11356-023-29128-x>
- Pesce et al. Recommendations to reduce the streetlight effect and gray areas limiting the knowledge of the effects of plant protection products on biodiversity. Environ Sci Pollut Res <https://doi.org/10.1007/s11356-023-31310-0>