SPRINT
SUSTAINABLE PLANT PROTECTION TRANSITION

In This Issue

Welcome from our project coordinator 1

Lock-ins and barriers in the pesticide use transition 2-3

Sprint publications 4-5

IPM blog 5

Meet the PhDs 6-7

Sprint live 7-8

Upcoming events 9

Become a Sprint stakeholder 10

Project partners 11

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Hello, and welcome

... to the 5th edition of the SPRINT newsletter. It has been a busy and productive time since our last edition, and results from our experiments are starting to come in, indicating some interesting findings.

Developments at the EU as they reassess their stance on pesticide use through the Farm to Fork Strategy are making our work more salient than ever. We recognise our potential contribution to the current discussions being held. As a result, we are working diligently to ensure that our results are robust and of the highest quality. We look forward to sharing these with you in more detail soon.

In this newsletter we are able to share with you results from our assessment of the lock-ins and barriers to pesticide transition, a whole batch of new publications, as well as details of the many events the team have been attending, and important dates for your diary.

Please get in touch with us if you have any questions.

- Violette Geissen, SPRINT project coordinator.

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LOCK-INS AND BARRIERS IN THE PESTICIDE USE TRANSITION

SPRINT aims to inform and accelerate the adoption of innovative transition pathways towards more sustainable plant protection. Within the project, we will translate the findings of our experiments into workable policy proposals. One step in this task involves identifying the key lock-ins and barriers affecting a transition away from reliance on synthetic pesticides in agriculture (D7.1).

On this, SPRINT partners Ana Frelih-Larsen, Josselin Rouillard, Jane Mills, Charlotte Chivers, May Hobeika, and Antonia Riedel have recently published their findings. The diagrams in this article are taken from the factsheet we have produced on this report. Drawing on mixed-methods qualitative research, they have identified the lock-ins and barriers that are holding back a transition to reduced dependence on synthetic pesticides.

The method:

- **Literature review** → Development of a conceptual framework
- **EU-level stakeholder interviews** → 13 interviews with 26 participants → European Commission (3), Farmer organisations (2), Industry organisations (5), Civil Society (4)
- **Farmer questionnaires** → 10 case study sites across Europe + 1 in Argentina
- **Farmer workshops** → 10 case study sites across Europe + 1 in Argentina
- **Stakeholder workshops** → 271 regional and national stakeholder participants from across the SPRINT case study sites

Despite there being multiple complex and interrelated processes which are frequently mutually reinforcing, some clear categories emerged amongst the reasons that farmers are unable or unwilling to transition away from pesticide use. These were:

- Agronomic and technological
- Economic
- Knowledge, awareness and research based
- Political
- Policy based
- Regulatory
- Cognitive

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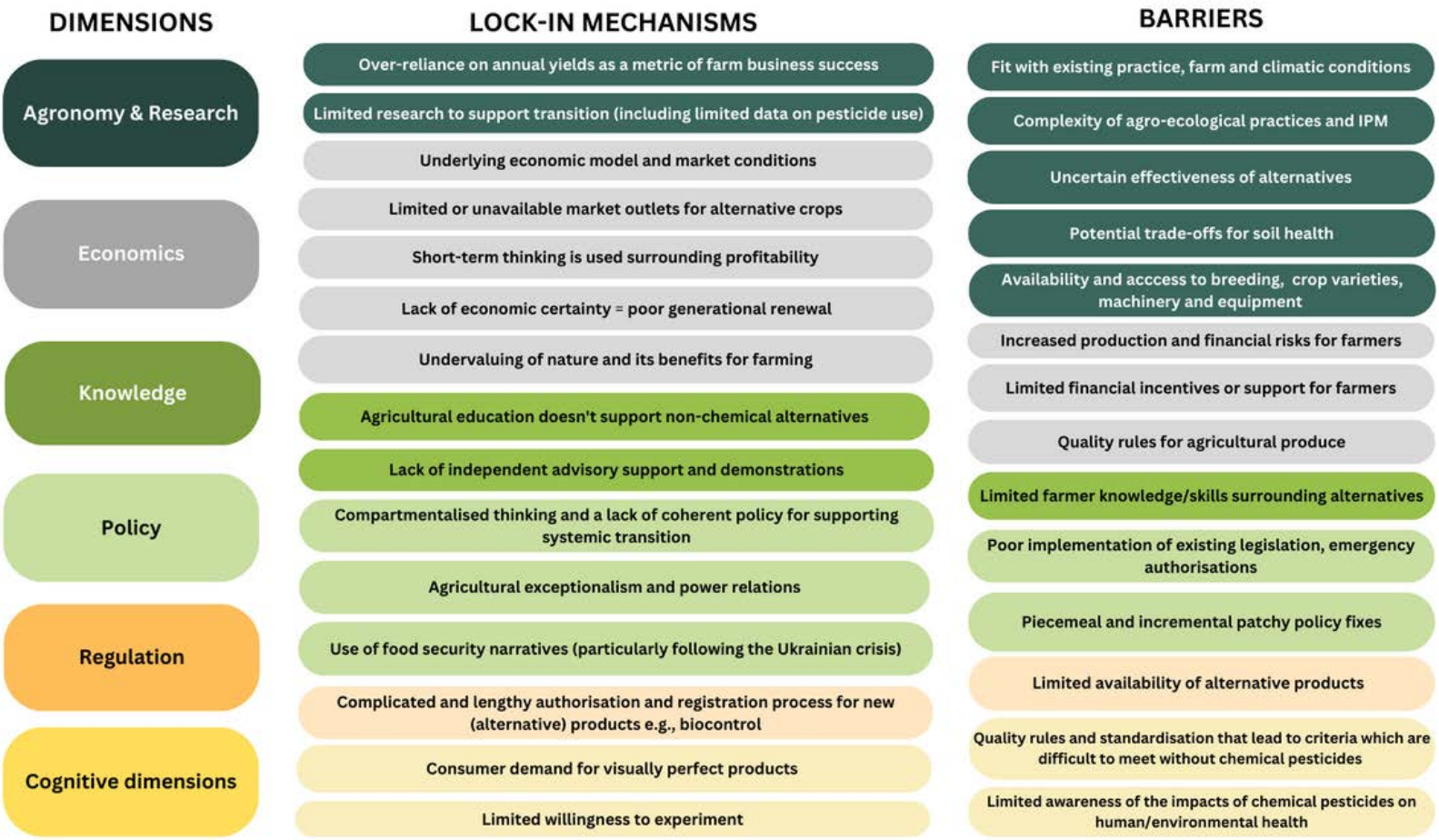
LOCK-INS AND BARRIERS IN THE PESTICIDE USE TRANSITION

Within each of these categories, there are barriers which interact and reinforce each other in complex ways, creating lock-in mechanisms. An example of a barrier might be a lack of available biocontrol alternatives to replace a pesticide treatment for a specific pest or disease. A lock-in mechanism producing this might be the more underlying and invisible causal processes that lead to a lack of biocontrol pesticide alternatives, such as industry funding not favouring the development of these technologies.

An accumulation of these lock-ins leads to the state of inertia, rigidity and resistance to change making current practices, well established, embedded in and supported by the wider agri-food system, difficult to change significantly.



In the next steps of the SPRINT project, together with stakeholders we will explore what possibilities and opportunities there are for breaking the pesticide lock-in situation. Amongst other approaches, we will work with those who have transitioned away from a reliance on synthetic pesticides. This will allow us to identify pathways to better support the emergence and diffusion of alternatives to synthetic pesticide use.

In time, we will draw on the findings of our work on this theme to understand what is needed to enable a transition towards reduced dependence on synthetic pesticides, and develop policy recommendations to support this change.

The D7.1 report "Pesticide lock-in and barriers to transition towards sustainable plant protection" can be accessed here and a summary fact sheet here

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SPRINT PUBLICATIONS

SPRINT partners (highlighted in bold) have been busy writing and we now have 23 published peer reviewed papers within the project, most recently:

- **Frelih-Larsen, A., Chivers, C. A., Herb, I., Mills, J., and Reed, M.** (2023). The role of public consultations in decision-making on future agricultural pesticide use: insights from European Union's Farm to Fork Strategy public consultation. *Journal of Environmental Policy and Planning*.

- **Matsuzaki, R., Gunnigle, E., Geissen, V**., Clarke, G., Nagpal, J., **Cryan, J F.** (2023). Pesticide exposure and the microbiota-gut-brain axis. *The ISME Journal* .

- Aderjan, E., Wagenhoff, E., **Kandeler, E**. et al. (2023) Natural soils in OECD 222 testing — influence of soil water and soil properties on earthworm reproduction toxicity of carbendazim. *Ecotoxicology*.

- Barão, L., **Alaoui, A**., & Hessel, R. (2023). Identifying and Comparing Easily Accessible Frameworks for Assessing Soil Organic Matter Functioning. *Agronomy*.

- **Suciu, N**., Russo, E., Calliera, M., Luciani, G. P., **Trevisan, M**., & Capri, E. (2022). Glyphosate, glufosinate ammonium, and AMPA occurrences and sources in groundwater of hilly vineyards. *Science of The Total Environment*.

- Li, Z., **Fantke, P**, (2022). Considering degradation kinetics of pesticides in plant uptake models: Proof of concept for potato. *Pest Management Science*.

- Kosnik, M. B., Kephalopoulos, S., Muñoz, A., Aurisano, N., Cusinato, A., Dimitroulopoulou, S., ... & **Fantke, P**. (2022). Advancing exposure data analytics and repositories as part of the European Exposure Science Strategy 2020– 2030. *Environment International*.

- Li, Z., & **Fantke, P**. (2022) Framework for defining pesticide maximum residue levels in feed: applications to cattle and sheep. *Pest Management Science*.

Congratulations for the hard work of all those involved. With several papers currently in the SPRINT pipeline, we look forward to reporting on more to come.

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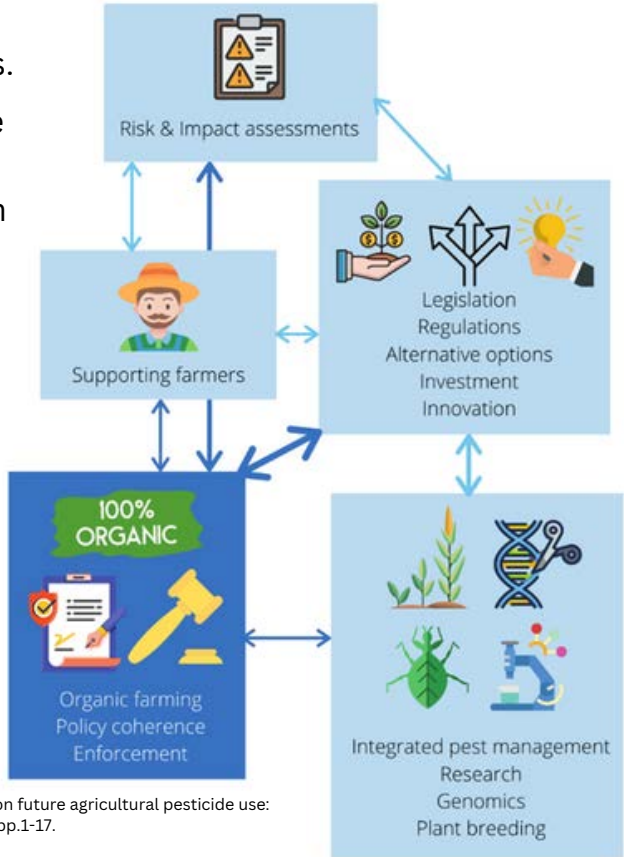
SPRINT PUBLICATIONS

The role of public consultations in decision-making on future agricultural pesticide use: Insights from European Union's Farm to Fork Strategy public consultation.

Newly published research from SPRINT explores the role of public consultations in democratic decision-making on agricultural pesticide use. Findings show that supporters of a transition away from pesticides emphasise planetary and human health, the existence of alternatives to synthetic pesticides, and the perceived lack of political will to change. Meanwhile, proponents of continued pesticide use focus their arguments on food security and a perceived lack of viable alternatives to synthetic pesticides.

Key mechanisms to support a transition away from reliance on synthetic pesticide use were identified. Effective governance, support for farmers, and scientific advances in alternative products would make the goals of the F2F strategy more achievable.

Pesticide use is a highly contentious topic. As such, creating space for two-way, deliberative discussions is important for making progress. Ana Frelih-Larsen, lead author of the paper, says, 'we found that a single public consultation is unlikely to result in democratic decision making. Going forward, we recommend that other, more deliberative approaches such as citizen juries may be more useful when seeking legitimate solutions to difficult challenges such as the future of pesticide use'.



Frelih-Larsen, A., Chivers, C.A., Herb, I., Mills, J. and Reed, M., 2023. The role of public consultations in decision-making on future agricultural pesticide use: insights from European Union's Farm to Fork Strategy public consultation. Journal of Environmental Policy & Planning, pp.1-17. https://doi.org/10.1080/1523908X.2023.2212369

IPM BLOG

Integrated Pest Management (IPM) is an ecosystems based approach to managing pests. It emphasises reducing the negative impacts of pest management on agro-ecosystems, through using natural pest control, improving crop resilience, and minimising the use of pesticides. Consequently, IPM is often salient in SPRINT discussions on how to make the sustainable plant protection transition.

The definition of IPM is necessarily flexible, to allow for different approaches to be used for different regions, weather conditions, soil types and crops. Over recent years, the term has been adopted by a diverse range of agricultural stakeholders, all supporting its principles. So what constitutes IPM practices, where did it come from, and who are (or perhaps are not...) using it? Click here to read more in our new blog.

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MEET THE PHDs

Over the next few editions of the newsletter, we will be introducing our talented cohort of PhDs. We asked them to give us an insight into who they are, their academic journeys so far, and what ignites them in life.

Hi! I am Maaike, 25 years old, and I am currently in the second year of my PhD project. I grew up in the Netherlands and studied Medical Technology & Science in Eindhoven and Systems Biology in Maastricht. I chose these programs because I was interested in human biology but also liked mathematics and physics. At these programs I acquired a lot of technical skills such as programming and modelling and learned to apply these skills to biological problems.

Currently, I am working at Wageningen University, but I still live in Eindhoven with my boyfriend and our pet snake named 'Danger Boop'. I am a very active and creative person and my hobbies include sailing, fitness, dancing, creative writing, theatre and playing board games.

My research in SPRINT focusses on the effects of pesticides on human health. I am studying the human gut and nasal microbiome in relation to pesticide exposure. Next to that, I am studying the effect of pesticides on human tissue directly by exposing gut and lung organoids to individual pesticides and mixtures. I am really happy that this project allows me to combine my interest in human health with my interest in sustainability!

My name is Nina Wieland and I have been a PhD student at the Radboud University since December 2022. I graduated from my master's degree in Biomedical Sciences in August last year, after interning for 6 months at the department of Pharmacy at the Radboudumc hospital. Here I studied pharmacokinetic boosting of an anticancer drug in a clinical research setting. During my PhD I will focus on defining the toxicokinetics of a subset of pesticides by collecting clinical data in a human volunteer study and toxicokinetic modelling together with Paul Scheepers and Martien Graumans.

I find it very interesting how humans and the environment interact, and how exogenous compounds can affect human health. Especially for vulnerable groups in our population, such as pregnant women, it is important to know what the impact of chemical substances is on our health. What I find interesting about pesticides is how humans are exposed through different routes, and how this relates to internal concentrations of the pesticide.

In my free time I enjoy sports, spending time in nature or traveling. In the picture you can see me combining all three; here I just harvested rice somewhere in the countryside of Northern Laos.

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MEET THE PHDs

I am a PhD student in environmental chemistry, specializing in the analysis of pesticides in the atmosphere across Europe. My academic journey began with a bachelor's degree in chemical and environmental chemistry at the Technische Hochschule Lübeck, followed by a master's degree in environmental engineering at the University of Rostock.

Currently, in my 3rd year of the PhD program at the Helmholtz-Zentrum Hereon in Geesthacht, Germany, I am focusing on the occurrence and distribution of pesticides in the European atmosphere, close to agricultural areas. Through a comprehensive monitoring study conducted at two sampling sites over a period of 14 months, air samples were analyzed to determine the presence and concentrations of pesticide residues. This research will provide insights into the distribution patterns of these chemicals in the atmosphere at these two sites.

Within the SPRINT project, my work focusses on pesticide distribution and exposure assessment. Consequently, my results will contribute to transport modelling and human and environmental risk assessment.

Outside my academic work, I enjoy practicing yoga, travelling, and playing the piano.

SPRINT LIVE

The team here at SPRINT have been busy attending key events across Europe presenting our preliminary findings and networking with other projects and groups to generate new ideas and approaches...

- In April, Vera Felix da Graca Silva (pictured) and Paula Harkes attended the EU CAP Network workshop on innovative crop protection and using pesticides sustainably in Amsterdam. The workshop was a platform for innovative projects and initiatives dealing with sustainable ways to reduce chemical pesticides on arable crops (cereals, oilseeds, legumes, potatoes, sugar beets) to share knowledge and ideas.

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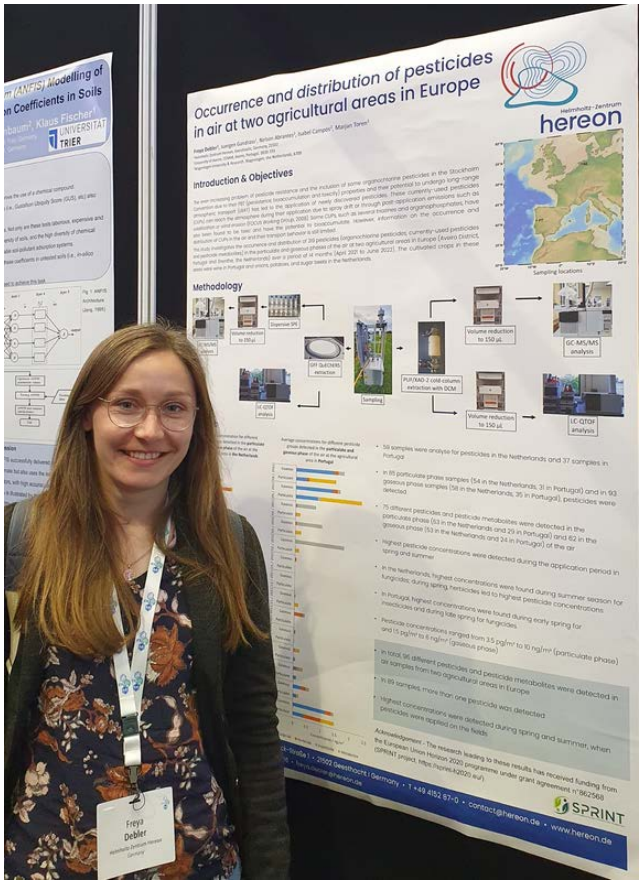
SPRINT LIVE

- In April, project lead Violette Geissen spoke at the European Environment Agency's event in Brussels (and online) on how pesticides impact health and ecosystems in Europe. Violette was on the panel discussion for this event with Loïc Rambaud (Santé Publique France) and Olivier Mora (French National Institute for Agriculture, Food and the Environment). She discussed our preliminary environmental findings.

- SPRINT partners Ana Belén Muñiz González and Freya Debler both presented at the Society for Enviromental Toxicology and Chemistry (SETAC) annual conference in Dublin this May. Freya's poster presentation (right) was on the occurrence and distribution of pesticides in air at two agricultural areas in Europe. Meanwhile, Ana (below) spoke on the topic "are pesticide mixtures at realistic environmental concentrations noxious to the freshwater microalgae Raphidocelis subcapitata?"



- Also in April, Daniele Mandrioli, SPRINT toxicologist, from the Ramazzini Institute (Italy) spoke at an event hosted by the Greens/EFA in the European Parliament on alternatives to the use of glyphosate. Daniele was a panel member discussing how and why glyphosate harms people, alongside Norbert Fraeyman (toxicologist) and DeWayne Lee Johnson (groundskeeper).

- SPRINT lead Violette Geissen also recently spoke at the European Citizens Initiative 'Save Bees and Farmers'. Together with other scientists and members of the initiative, she presented to the European Parliament and European Commission in the midst of proposed changes to the Sustainable Use of Pesticides Regulations on some preliminary SPRINT findings and their implications.

UPCOMING EVENTS

21st-23rd June.
The 12th International Symposium on Biological Monitoring in Occupational and Environmental Health (ISBM-12).
***Next Generation Monitoring*.**
Porto, Portugal.

27th-31st August.
The International Society of Exposure Science Symposium.
***Connecting Communities & Science through Addressing Environmental Exposures*.**
Chicago, Illinois.

We will be presenting twice at ISES Chicago, launching some of our preliminary findings. Both presentations are under the symposium area *Increased and widely dispersed pesticide use leads to exposure among farmers & residents. What does this mean for health?*

Paul Scheepers (Radboud University) and Hans Mol (Wageningen University & Research) will be speaking on:

- **The preliminary results of blood analysis from the sustainable plant protection transition (SPRINT)**
- **Pesticides biomonitoring: Faeces as new matrix and comparison with urine data**

28th August - 1st September.
Wageningen Soil Conference (this is the long awaited event originally scheduled for 2021 but delayed due to COVID).
***The Future of Soils*.**
Wageningen, Netherlands.

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UPCOMING EVENTS

12th-29th September.
Science Summit at UN General Assembly
New York.

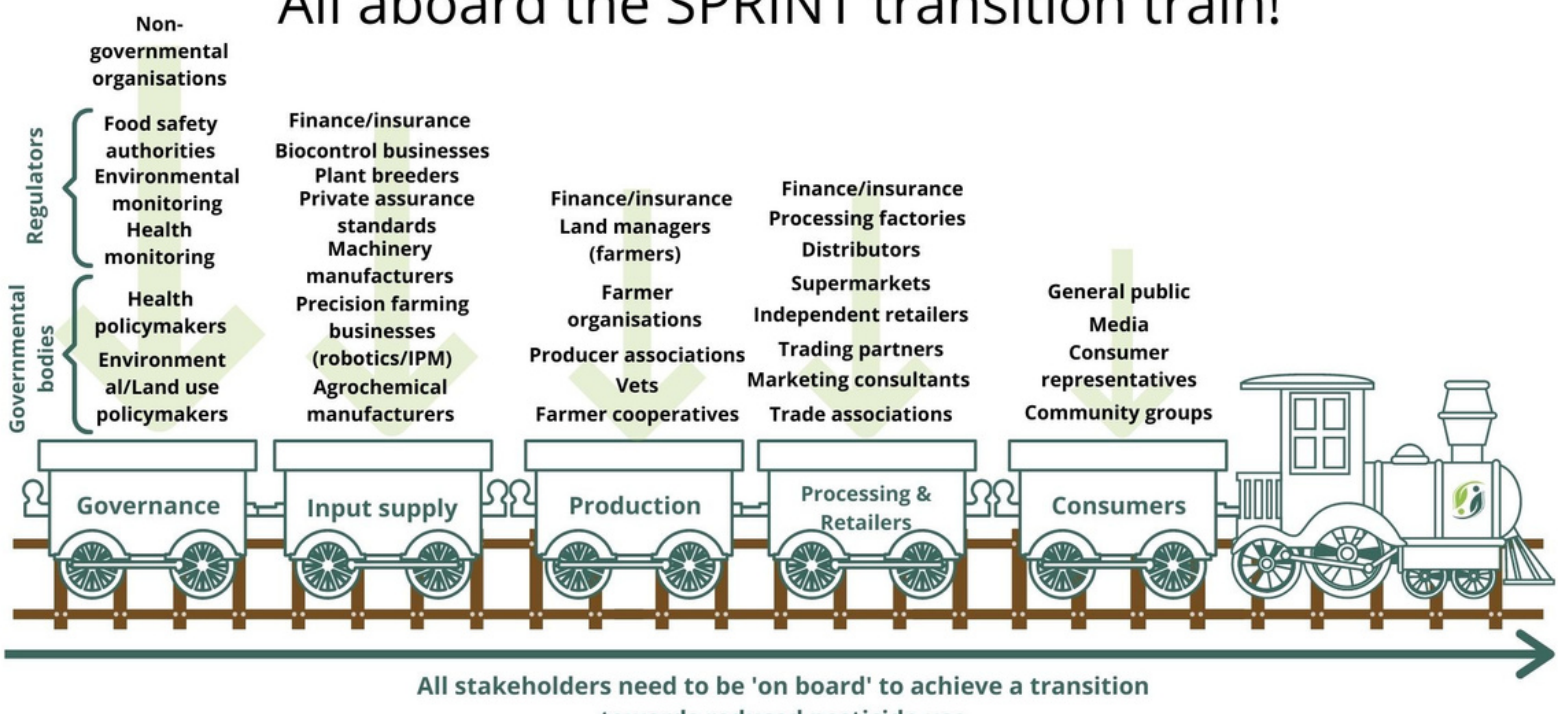
Presentations of the SPRINT monitoring results

20th-24th November.
International Conference on Environmental & Food Monitoring (ISEAC-41).
***Innovations in analytical techniques covering the environment-food continuum*.**
Amsterdam, Netherlands.

BECOME A SPRINT STAKEHOLDER!

Interested in becoming a SPRINT stakeholder and receiving updates on project progress and invitations to exchange knowledge and ideas? There's still time; register here.
The train below illustrates the wide range of stakeholders which may be interested in joining us.

All aboard the SPRINT transition train!



All stakeholders need to be 'on board' to achieve a transition towards reduced pesticide use

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PROJECT PARTNERS

Wageningen University (NL)
Land Quality Management Ltd (UK)
Universitaet Bern (CH)
Aarhus Universitet (DK)
Radboud Universiteit Medical Centre (NL)
Radboud Universiteit (NL)
Fundacio Institut D'investigacio Sanitaria Pere Virgili (Iispv) (ES)
Cooperativa Sociale Istituto Nazionale per lo Studio E Il Controllo dei Tumori E Delle Malattie Ambientali Bernardino Ramazzini (IT)
Universidade de Aveiro (PT)
Universiteit Utrecht (NL)
Forschungsinstitut Fur Biologischen Landbau Stiftung (CH)
Danmarks Tekniske Universitet (DK)
Ecologic Institut Gemeinnützige Gmbh (DE)
Countryside and Community Research Institute, University of Gloucestershire (UK)
Univerza V Ljubljani (SI)
Stichting Wageningen Research (NL)
Instituto Nacional De Tecnologia Agropecuaria (AR)
Centro De Investigaciones Energeticas, Medioambientales y Tecnologicasciemat (ES)
Institut za poljoprivredu i turizam (HR)
Universidad Politecnica De Cartagena (ES)
Food and Agriculture Organization Of The United Nations (FAO) (IT)
Masarykova Univerzita (CZ)
Steunstichting Vereniging Voor Zoogdierkunde En Zoogdierbescherming (NL)
Helmholtz-Zentrum Geesthacht Zentrum Fur Material- Und Kustenforschung Gmbh (DE)
Universite De Bordeaux (FR)
University College Cork - National University Of Ireland (IE)
Universiteit Antwerpen (BE)
Universitaet Hohenheim (DE)
Universita Cattolica Del Sacro Cuore (IT)

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