

DEPHY and the IPM monitoring lessons learnt in France



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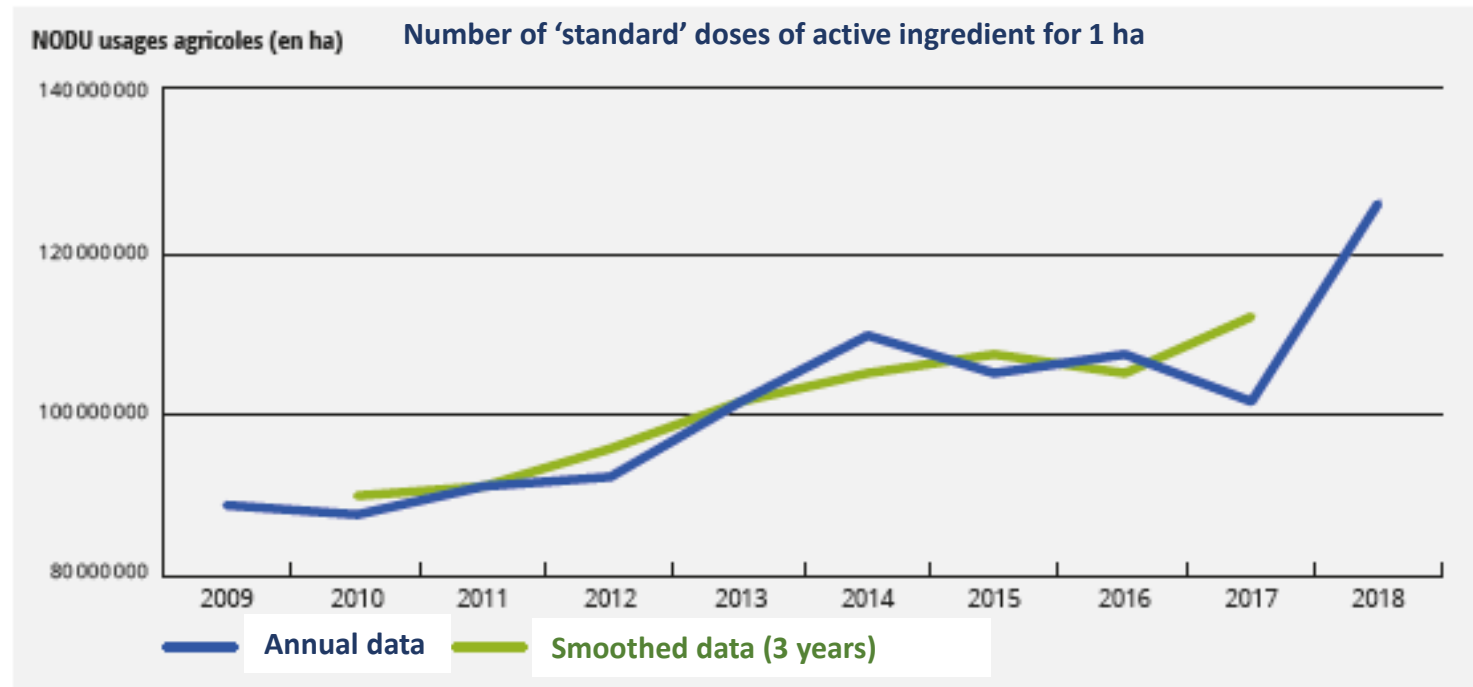


- ☐ The National Action Plan following the EU SUD Directive 2009/128/EC
- ☐ Launched in 2009
- ☐ Objective : halving pesticide use by 2018 >> 2025 (ECOPHYTO 2+)

>> not a success so far !

ÉCOPHYTO
RÉDUIRE ET AMÉLIORER
L'UTILISATION DES PHYTOS

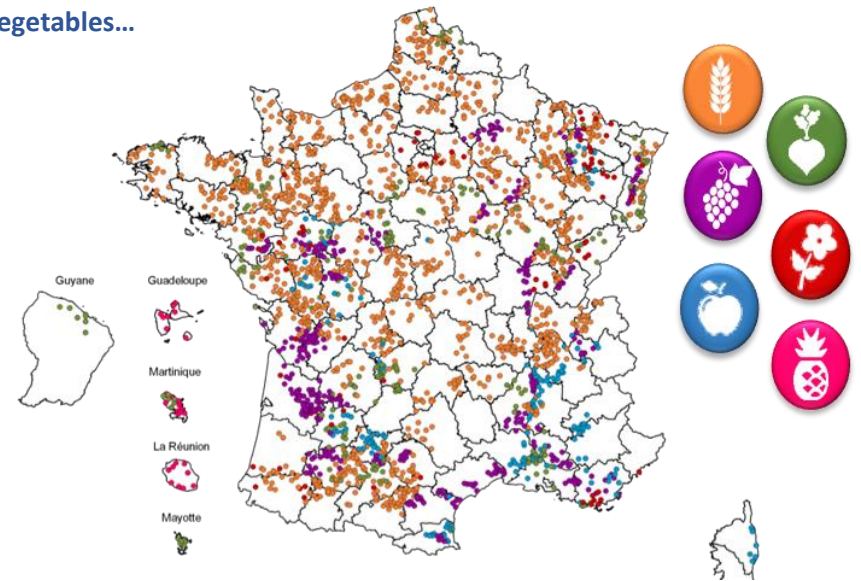
French agricultural area : 29 Million ha
>> ≈ 3,8 standard dose of active ingredient per ha



NOTE DE SUIVI 2018-2019 DU PLAN ECOPHYTO

The **ECOPHYTO** plan launched a unique tool the **DEPHY** network

- ❑ 3000 volunteer farmers all agricultural sectors arable crops, vineyards, orchards, vegetables...
- ❑ Large agricultural partnership chambers of agriculture, cooperatives, farming organizations, research...
- ❑ Explicit objective: decrease pesticide use
good way to decrease exposure to pesticide
- ❑ Explicit approach: cropping system re-design
holistic view of IPM
"find my own solutions adapted to local context!"
- ❑ Role of advisors coaching farm groups
network engineers, 10-15 farms per group
funded by a specific tax on pesticides
- ❑ A shared information system to collect data



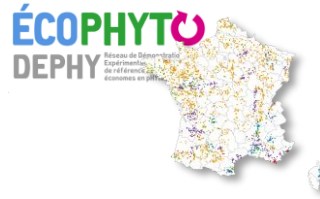
AGROSYST



Changes in pesticide use

Indicator : Treatment Frequency Index

2010 > 2017 pluri-annual smoothed data



-14%
Arable crops
including mixed farming with livestock
IFT 2017 = 2,6*



-38%
Vegetables
IFT 2017 = 3,4*



-25%
Orchards
IFT 2017 = 14,3*



-43%
Horticulture
IFT 2017 = 8,5*



-17%
Vineyards
IFT 2017 = 10,2



-37%
Tropical crops
IFT 2017 = 4,5*

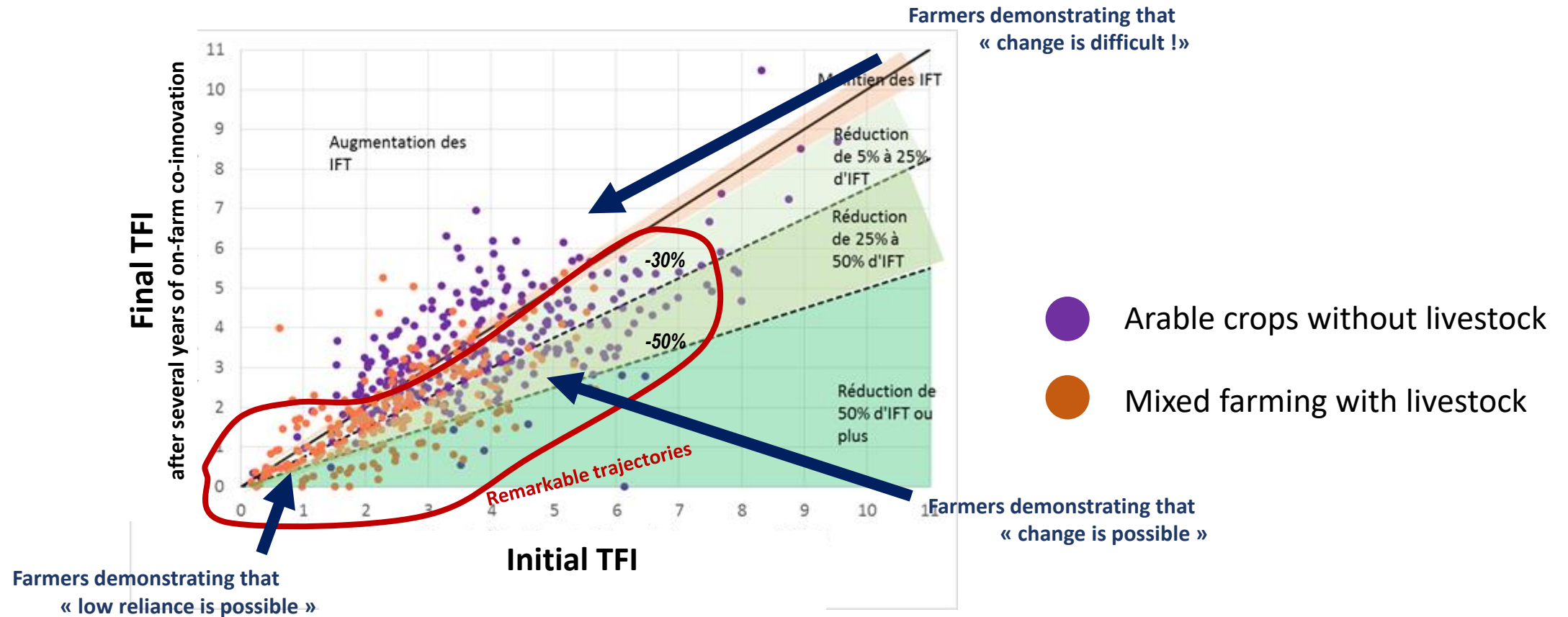
Changes in pesticide use

Indicator : Treatment Frequency Index

pluri-annual smoothed data



with a huge diversity across farms !



The DEPHY's communication and dissemination activities

- ❑ Leaflets describing IPM strategies
- ❑ Leaflets describing farming system trajectories : “success stories”
- ❑ Booklets describing “families” of successful adoption of IPM
- ❑ Thematic booklets e.g. glyphosate use and alternatives, biodiversity
- ❑ Local ‘open-farm’ days and dissemination events
> 2,000 yearly
- ❑ Conferences (local, national, by agricultural sectors...)
- ❑ Videos testimonies of farmers



Everything available (in French !) on the National Portal



<https://ecophytopic.fr/>



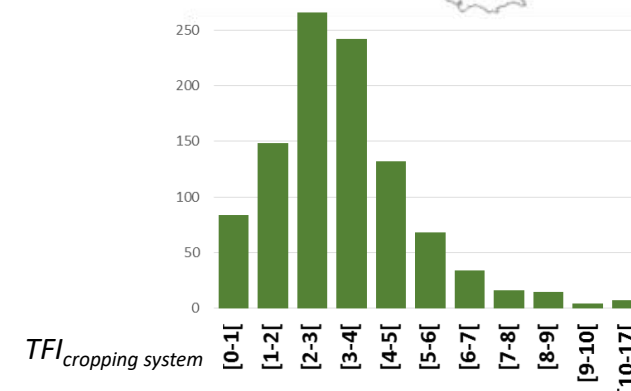
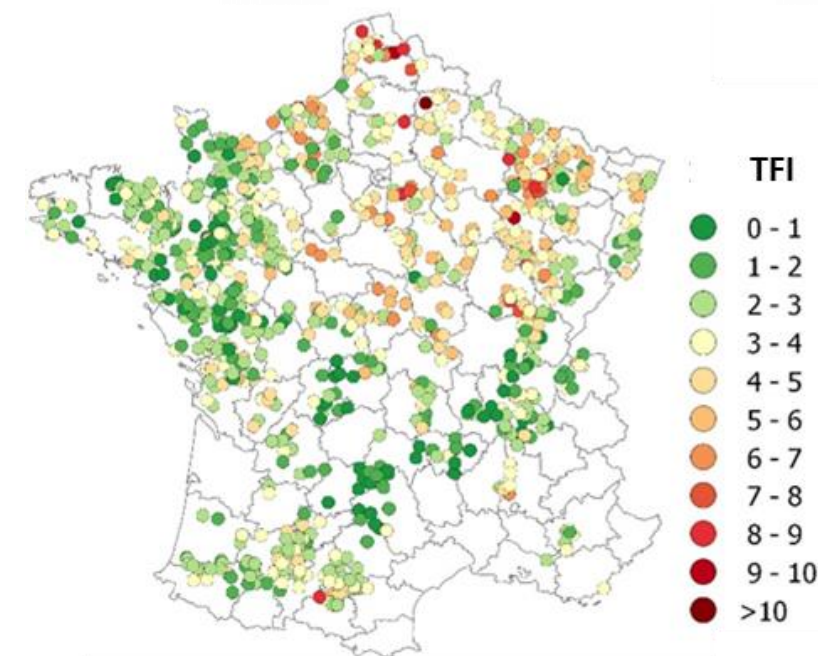
Martin Lechenet's PhD 2017



Analysed the huge diversity of DEPHY farms
Context, management strategies, reliance on pesticides
... at the network launching [2009-2011]

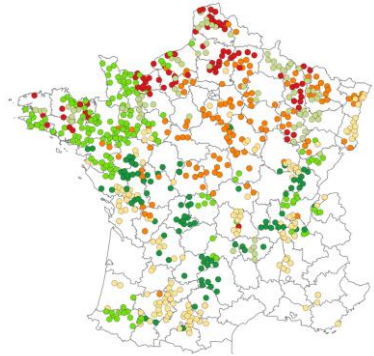
1012 arable cropping systems DEPHY

1. What are the technical strategies
of farmers using little amounts of pesticides ?
2. Low TFI = low productivity? Low profitability?
3. Scenario of general adoption of IPM-based systems at the country level – *what consequences?*



Profiling management strategies *with low pesticide use*














Clusters of production situations

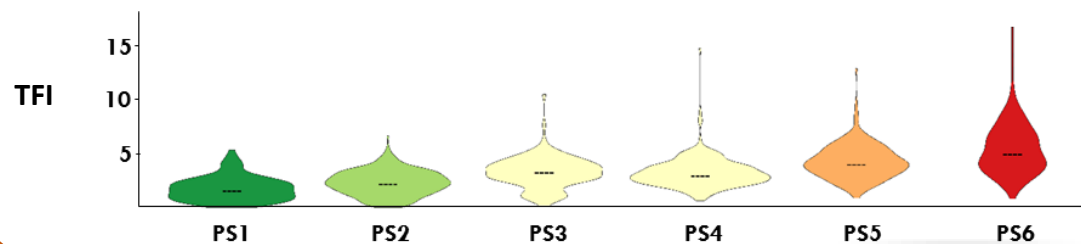


6 groups of production situation

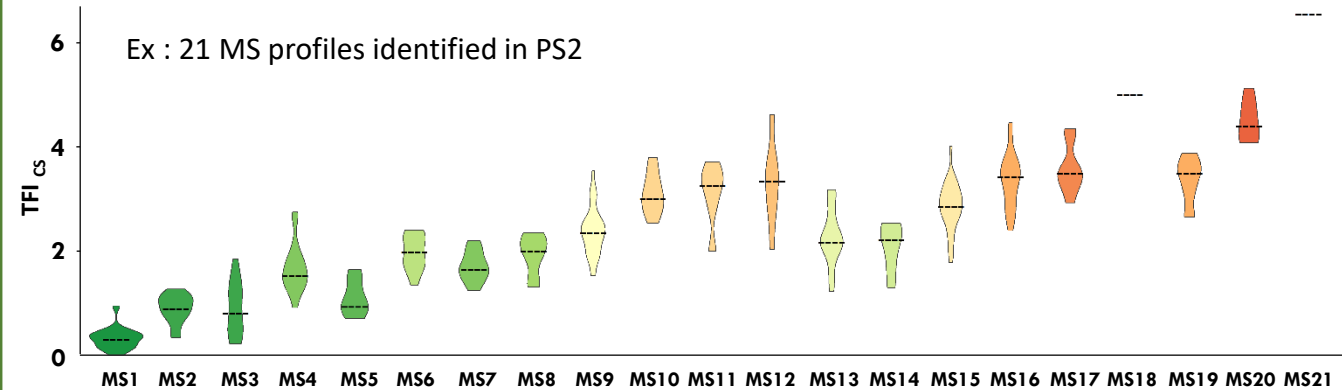
Main factors

- Livestock
- Local markets : Industrial crops
- Climate : radiation, rain, temperatures...

	PS1	PS2	PS3	PS4	PS5	PS6
livestock	 	 	 	 	 	  
Climate	High T° Dry	Mild	Low T° Wet	High T° Dry	Mild	Low T° Wet
Main crops	Cereals, grasslands, maize	Cereals, maize, grasslands	Cereals, maize, rape	Cereals, maize, sunflower	Cereals, rape	Cereals, rape, sugar beat, potatoes



Management strategies (MS) with low TFI



- Profiles with low TFI always combine several management measures
- Main management measures
 - ✓ Temporary grasslands
 - ✓ Crop diversification : rustic crops, sowing seasons
 - ✓ Cultivar diversification, disease resistant cultivars
 - ✓ Cereal delayed sowing dates
 - ✓ Reduced doses
 - ✓ Soil tillage – alternating ploughing
 - ✓ Moderate fertilisation

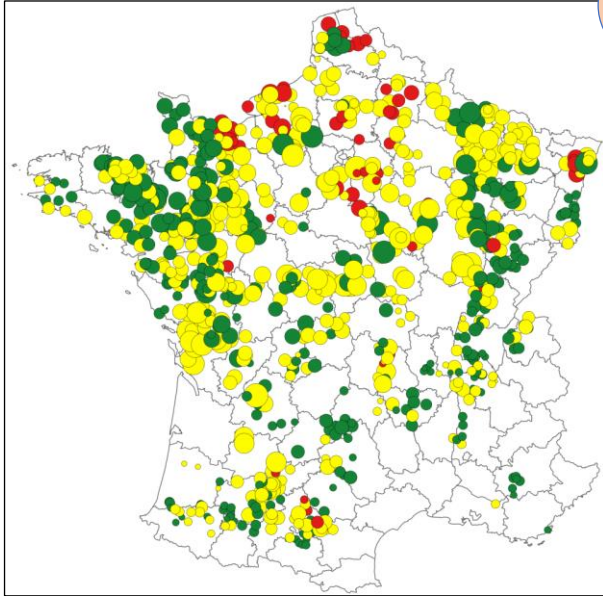
IPM allows reducing the reliance on pesticides
Lechenet et al., Agricultural Systems, 2016

Correlation between pesticide use and performances

a statistical method considering explicitly the interactions with soil, climate, context...



Pesticide use x Productivity



6%

**Soils with high
yielding potential
sugar beets, potatoes**

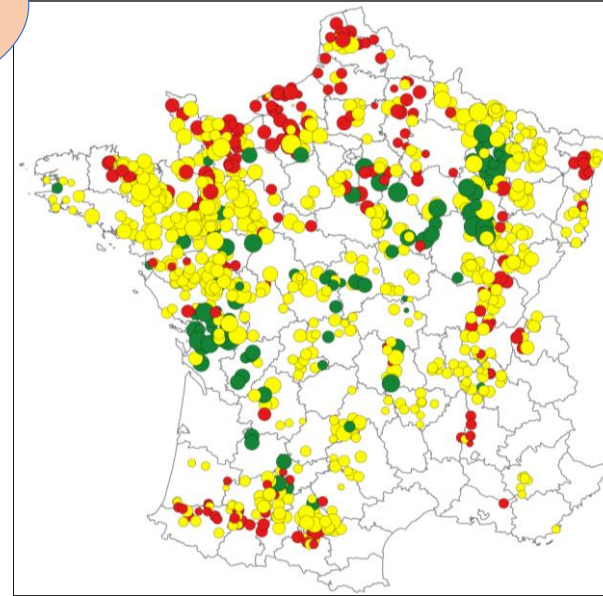
39%

**Mixed farming
Medium yielding potential
grasslands + maize**

No antagonism for 94% of sites

Scale =
Cropping system

Pesticide use x Profitability



22%

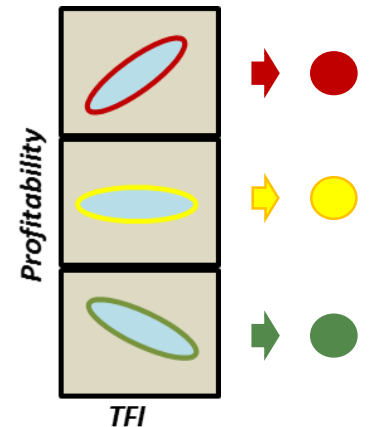
**Soils with high
yielding potential
sugar beets, potatoes**

11%

**Cereal based systems
Low yielding potential**

No antagonism for 78% of sites

method



Lechenet et al., Nature Plants, 2017

Correlation between pesticide use and performances

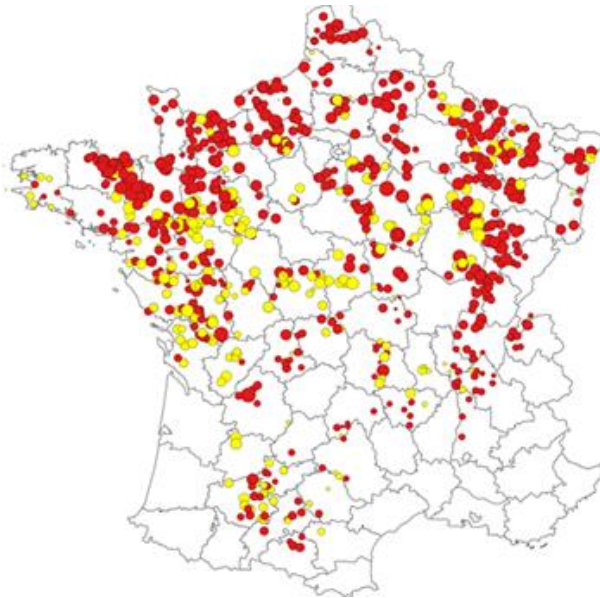
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Pesticide use x Productivity



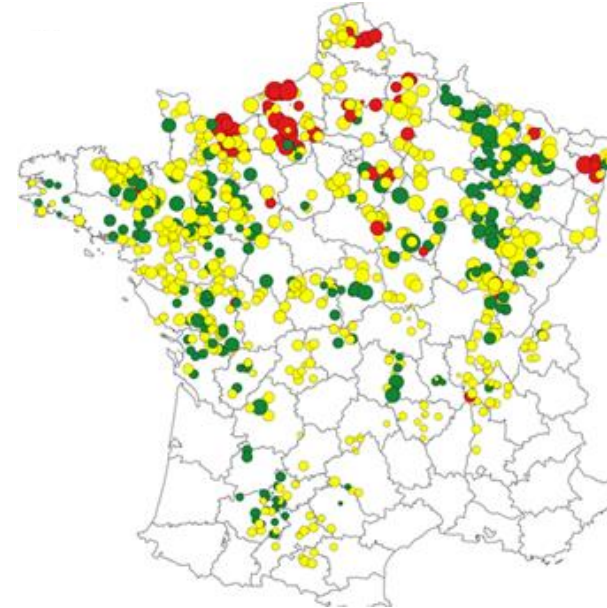
Scale = crop
wheat



In most cases (73%), wheats with low pesticide inputs have lower yields:

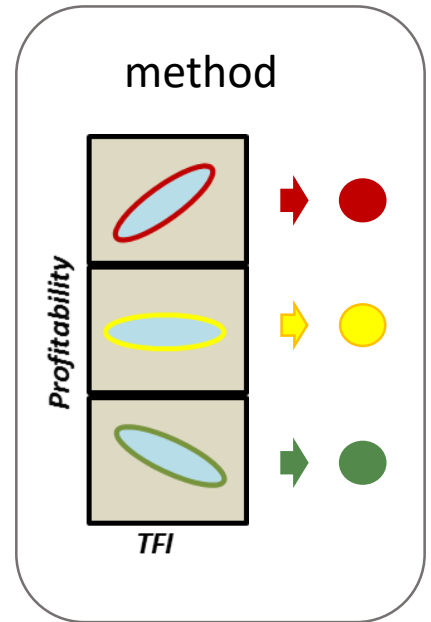
- Cultivars chosen for disease resistance
- Delayed sowing
- Moderate fertilization

Pesticide use x Profitability

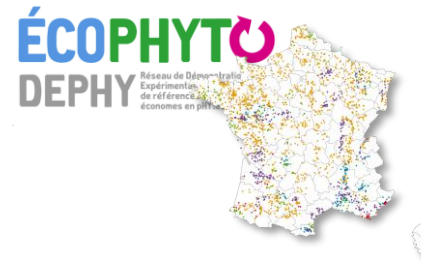


In most cases, reduced input costs offset reduced yield

In 24% of sites (rather soils with low potentials) wheats with low TFI have better semi-net margins



Scenario of general adoption of IPM at the country scale



What if ??

...all French farmers would adopt cropping systems (and performances) of the DEPHY farm with the lowest pesticide use in the same context (soil, climate, environment) ?



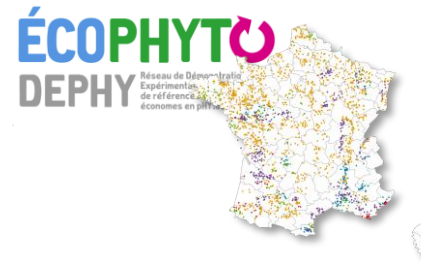
What consequences for French agriculture?

- ***Pesticide use***
- ***Production volumes, relocation of productions***
- ***Trade balance, energy inputs, autonomy for plant proteins***

Scenario of general adoption of IPM

at the country scale

Scenario ECOPHYTO



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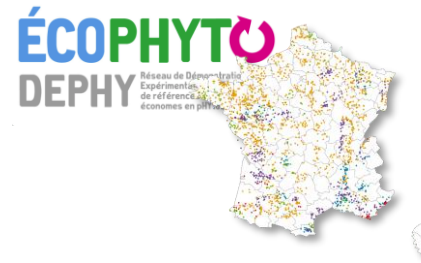


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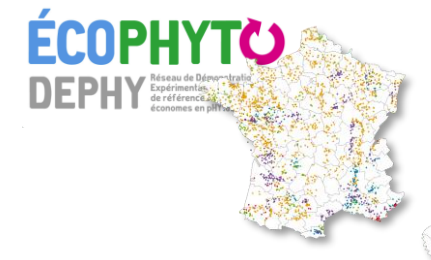
Pesticide use

≈ - 40 %

Scenario of general adoption of IPM

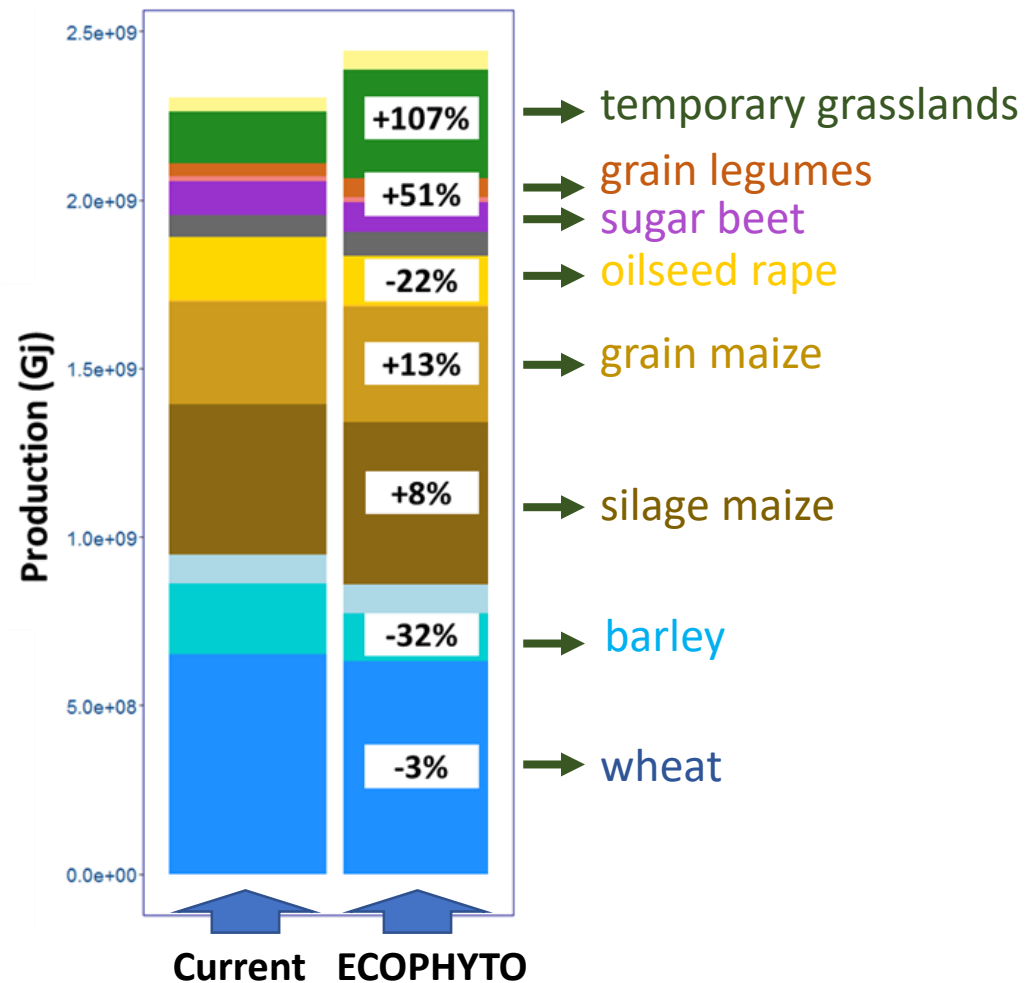
at the country scale

Scenario ECOPHYTO



Production volumes

(country scale)



- ✓ **Increase in overall productivity**
- ✓ **Decrease in cereal production**
 - lower yields
 - lower acreage
- ✓ **Increase in diversity**
 - At the farm scale
 - At the regional scale
 - At the country scale



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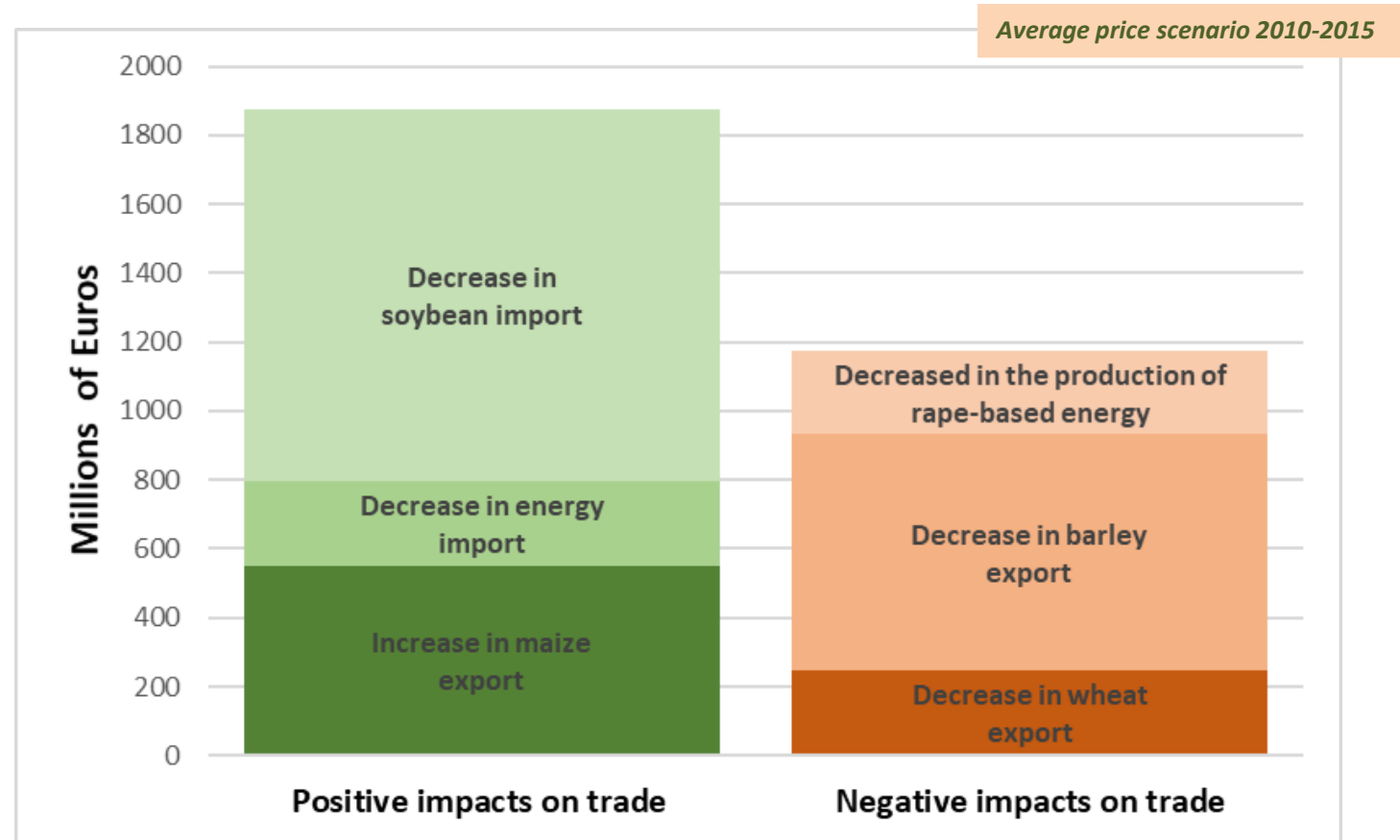
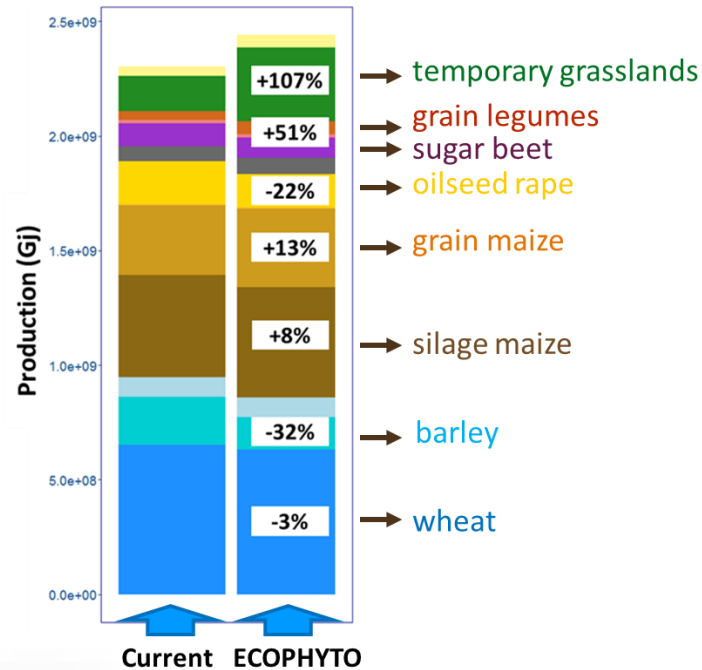
Scenario of general adoption of IPM at the country scale

Scenario ECOPHYTO



Positive impact on trade balance

Production volumes (country scale)



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Take home messages

- ☐ Promote a holistic view of IPM / agroecology
Scale matters ! Don't think at the crop scale, but rather at the farm/landscape/region scale
- ☐ IPM-based strategies enhance sustainability
- ☐ Transition requires education and peer-to-peer learning
- ☐ Upscaling IPM / agroecology at the country/global level would have consequences on trades



Thanks for your attention

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Action pilotée par le ministère chargé de l'agriculture et le ministère chargé de l'environnement, avec l'appui financier de l'Office national de l'eau et des milieux aquatiques, par les crédits issus de la redevance pour pollutions diffuses attribués au financement du plan Ecophyto

