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RURAL GEOGRAPHIES IN TRANSITION

3rd European Rural Geographies Conference

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Groningen, The Netherlands

Crossing Organic Agriculture and Short Supply Chains: The Evolution of Transitional Agriculture Geography in France (2010-2020).

Michael BERMOND* et Pierre GUILLEMIN**

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** Research fellow at INRAE - research lab AgroSystèmes, Territoires, Ressources (ASTER) – Mirecourt



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Introduction

- Context: Faced with decarbonization objectives in agriculture, biodiversity protection, economic sustainability of farms, and food security, European and French policies, centred around the Farm to Fork strategy ([Guyomard et al., 2020](#) ; [Moschitz et al., 2021](#)), are promoting a profound transition of agri-food systems.



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- Objective: To update the geography of agricultural transitions in France and analyse its evolution ([Bermond et al., 2019](#)).



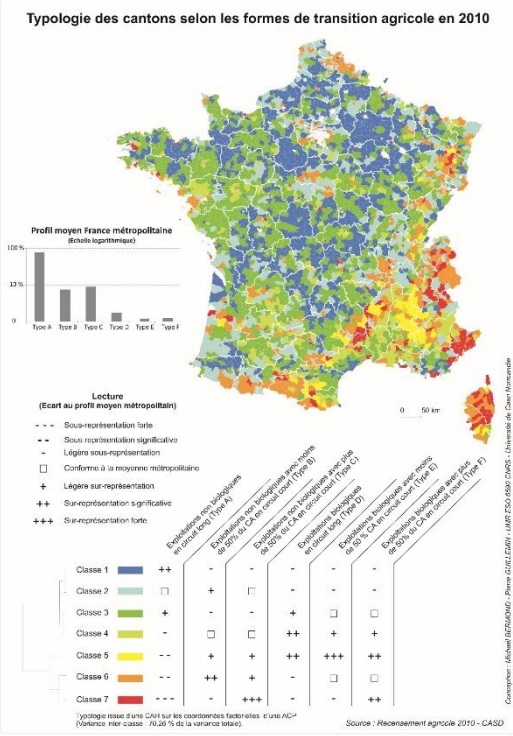
Calv. Agric. 2019, 28, 16
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Plan

1. Scientific knowledge and research fronts
2. Farms in transitions: a statistical approach in Agricultural Censuses 2010 and 2020
3. Evolution of agrifood transitions in France: a dynamic and contrasting geography, at the district level (in French : *canton*).



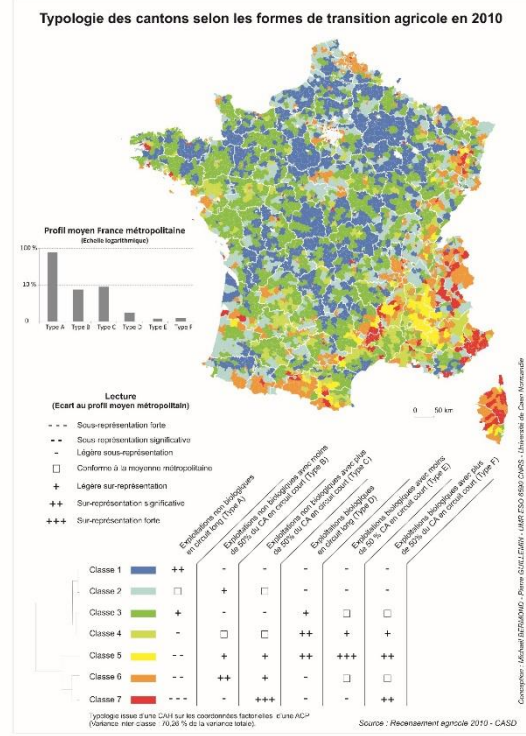
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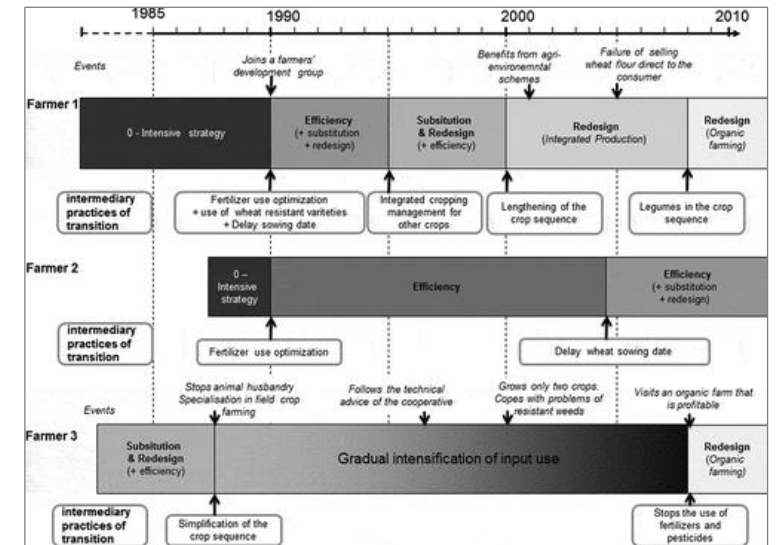
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1. Scientific knowledge and research fronts

□ Several fields, work that sheds different light on agricultural transitions:

- **Agronomy** : research on productive systems that make more efficient use of the ecological functions of agrosystems ([Griffon, 2013](#) ; [Elzen et al., 2017](#) ; [Therond et al., 2017](#)).
- **Agro-economy** : economic performance of systems, study of the historically constructed relationships between the productive organisation of farms and the logistical organisation of sectors (Chatellier, 2015 ; [Fares et al., 2012](#)).
- **Sociology** : conditions for the emergence of mobilisation of actors (agricultural or not) favourable to the processes of greening agriculture (Billaud, 2009 ; [Deverre et Lamine, 2010](#) ; [Chantre et Cardona, 2014](#)), study of the diversity of forms of sustainable agriculture ([Féret et Douguet, 2001](#) ; [Laurent et al., 2003](#) ; [Plumecocq et al., 2018](#))...
- **Geography** : development of a geography of quality ([Hirczak et al., 2013](#)) farming and a 'new food geography' ([Wiskerke, 2009](#)), the role of socio-spatial contexts in localisation of transitions forms ([Poulot M., 2014](#) ; [Wezel et al., 2016](#)) and the role of territorial authorities in the emergence of local food systems (Baisse-Layné, 2021 ; [Toussaint-Soulard et Perrin, 2014](#) ; Margetic, 2021).



Example of three farmers' trajectories, the events they included and the intermediary practices of transition from one phase to another within the ESR framework (Chantre et Cardona, 2014)

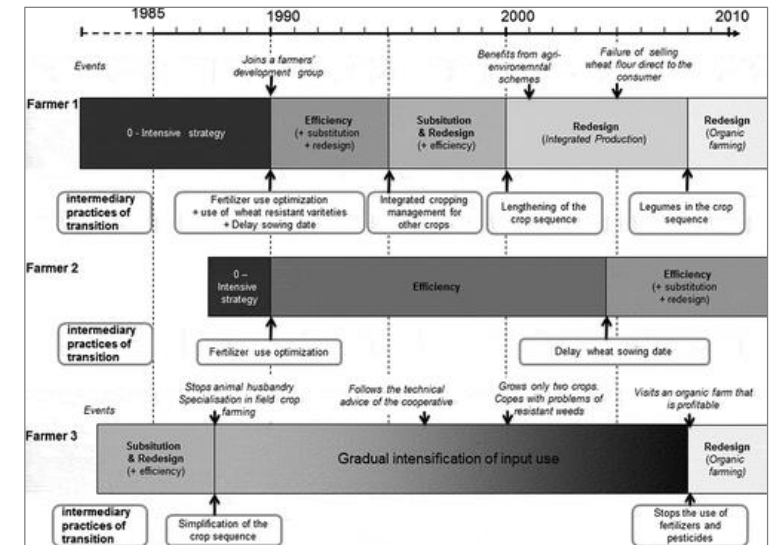
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The **Anglo-Saxon trend of mapping local foods** and direct sales' geography:

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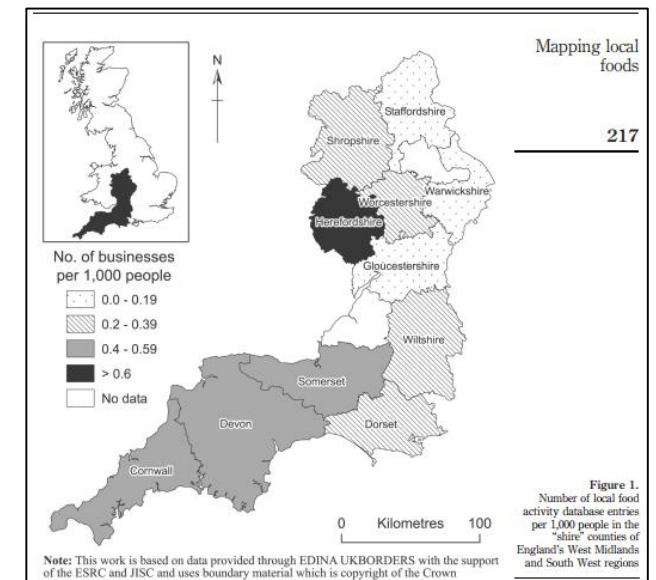
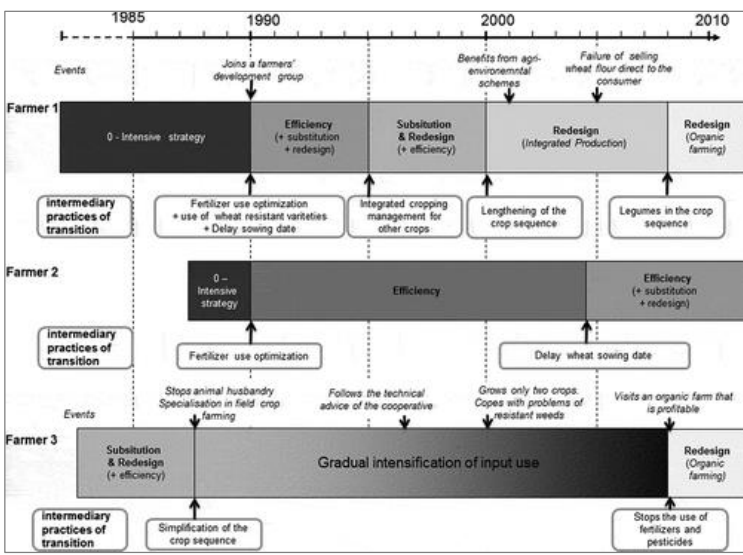


Figure 1. Number of local food activity database entries per 1,000 people in the 'shire' counties of England's West Midlands and South West regions

Scientific knowledge and research front

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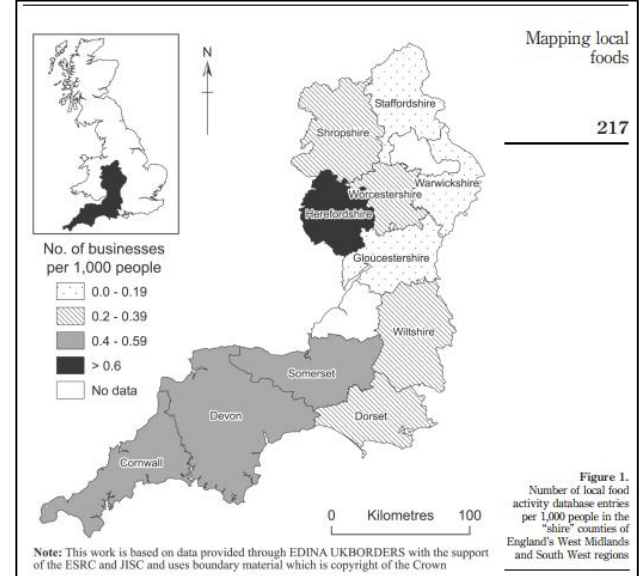
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There is a research front surrounding the spatialisation of agricultural and food systems transitions, examining the coexistence the models (Gasselin et al., 2021).

2. Farms in transitions: a statistical approach in Agricultural Censuses 2010 and 2020

A reviewing literature about diversity of farming models converge on the idea that two dimensions structure this diversity (Therond, 2017) :

- ❑ (i) the balance between external inputs versus ecosystem services in the biotechnical functioning of farming systems (vertical axis; Figs. 4)
- ❑ and (ii) the balance between the relationships farming systems have with their socio-economic environment, i.e. relationships based on global market prices versus territorial embeddedness (horizontal axis in Fig. 4).

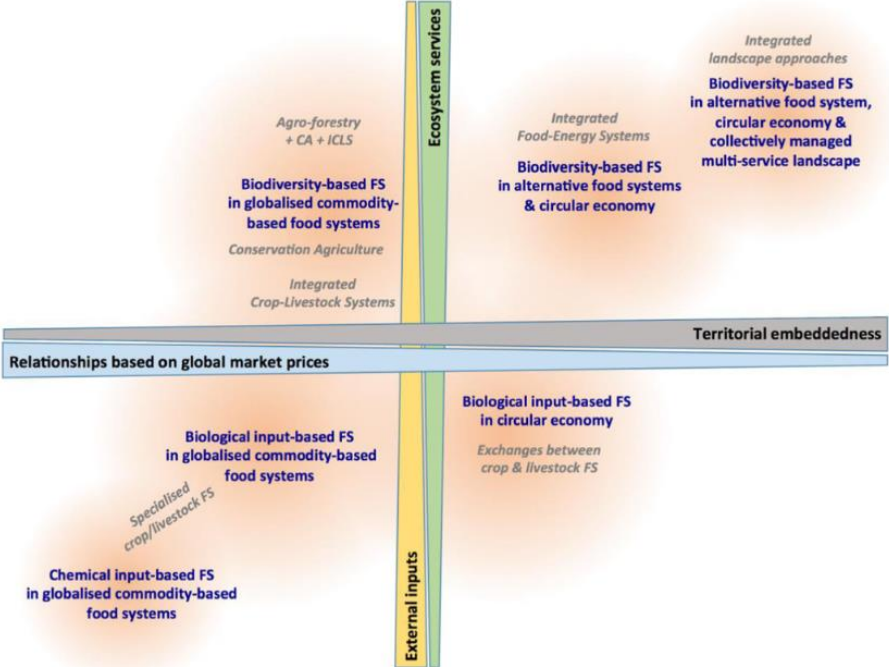
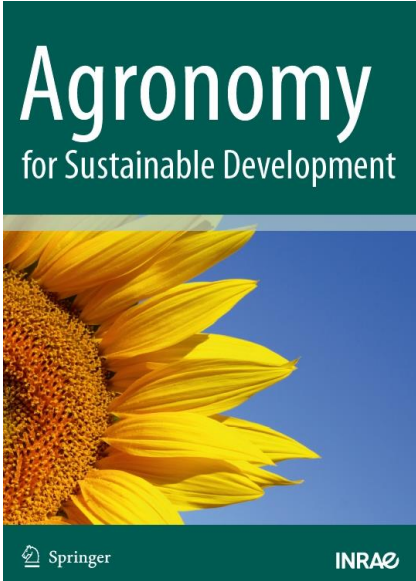


Fig. 4 Six key models of agriculture (blue text) according to the degree to which biotechnical functioning of farming systems (FS) is based on ecosystem services versus external inputs (Y-axis) and the degree to which their relationships with socio-economic contexts are based on global market prices versus territorial embeddedness (X-axis). Iconic examples are presented in grey. CA conservation agriculture, ICLS Integrated Crop Livestock System



REVIEW ARTICLE

A new analytical framework of farming system and agriculture model diversities. A review

Olivier Therond^{1,2} · Michel Duru² · Jean Roger-Estrade³ · Guy Richard⁴

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Abstract In most current farming system classifications (e.g. “conventional” versus “organic”), each type of farming system encompasses a wide variety of farming practices and performances. Classifying farming systems using concepts such as “ecological”, “sustainable intensification” or “agro-ecology” is not satisfactory because the concepts “overlap in... definitions, principles and practices, thus creating... confusion in their meanings, interpretations and implications”. Existing classifications most often focus either on biotechnical functioning or on socio-economic contexts of farming systems. We reviewed the literature to develop an original analytical framework of the diversity of farming systems and agriculture models that deal with these limits. To describe this framework, we first present the main differences between the biotechnical

Keywords Biodiversity · Ecosystem service · Biological input · Food system · Industrial ecology · Landscape · Embeddedness

- Contents**
1. Introduction
 2. Farming systems according to the role of ecosystem services and external inputs
 - 2.1 Chemical input-based farming systems
 - 2.2 Biological input-based farming systems
 - 2.3 Biodiversity-based farming systems
 3. Socio-economic contexts which determine farming

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2. Farms in transitions: a statistical approach in Agricultural Censuses 2010 and 2020

- ❑ Among the French agricultural databases, are there any indicators that could be used to classify farms according to their degree of agro-ecological transition ?
- ❑ If we look for **existing indicators**, we find two data in the 2010 and 2020 **Agricultural Census** (statistical office of French Ministry Agriculture):
 - ❑ **organic certification (AB)**
 - ❑ and marketing in **short supply chains** (less than one intermediary – CC).

These two variables indicate a transition level about production and commercialisation modes.
- ❑ But this approach is **partially reductive and prescriptive compared to other typologies**, e.g. Therond et al. (2017), based on biotechnical functioning of farming systems (external inputs/ecosystem services), and on integration level on globalised food system

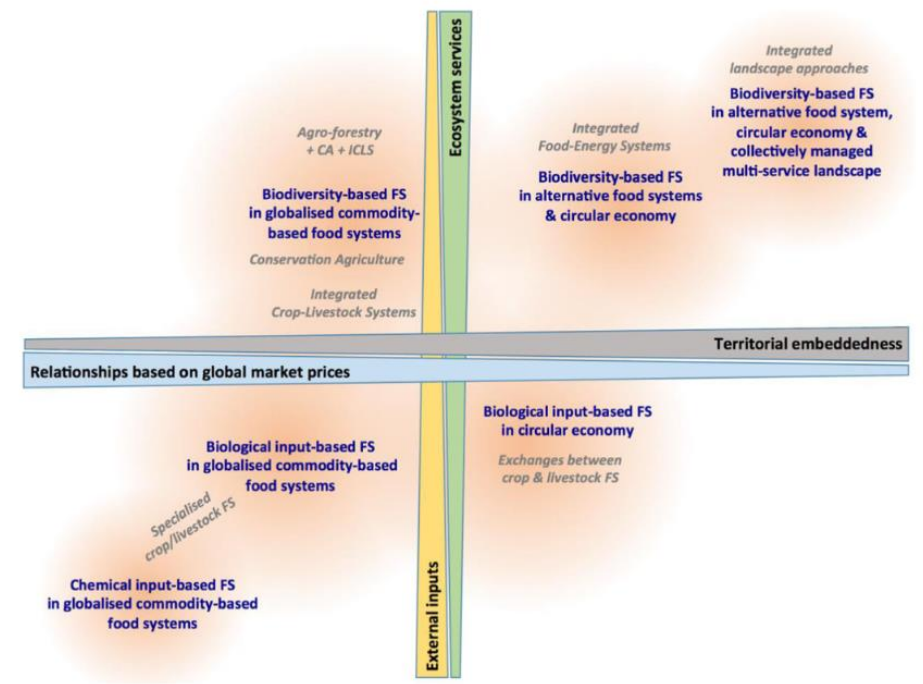


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- ❑ However, it's interesting to analyse **the two variables mentioned, through socio-economic characteristics** (size of farms, system of production, working group, age, training level, ...) **and their localisation.**

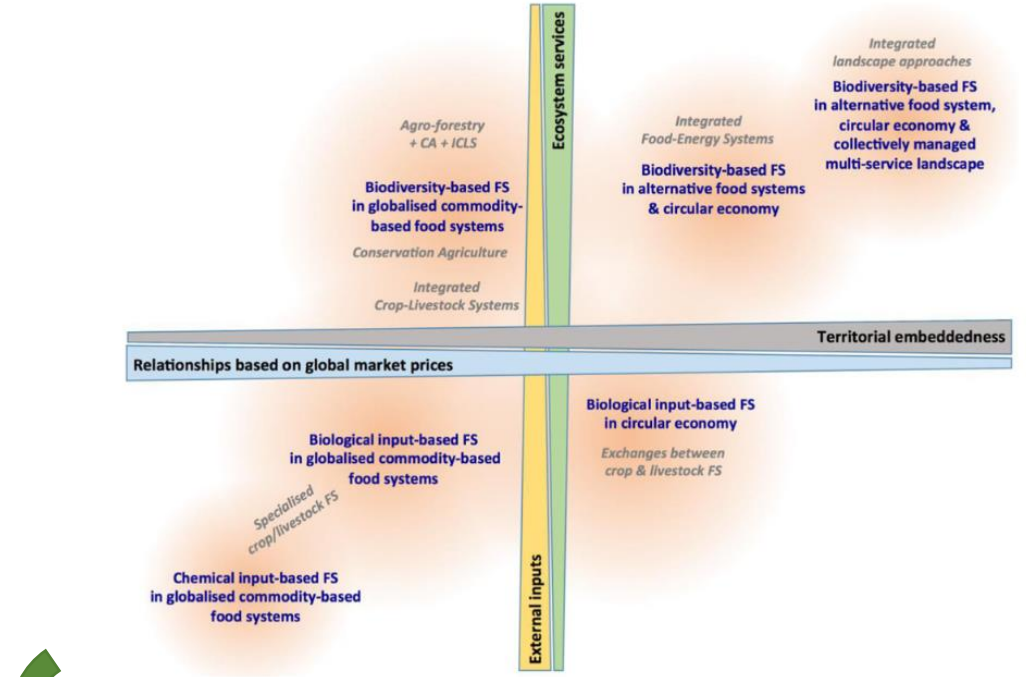
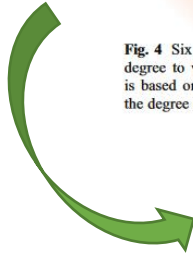


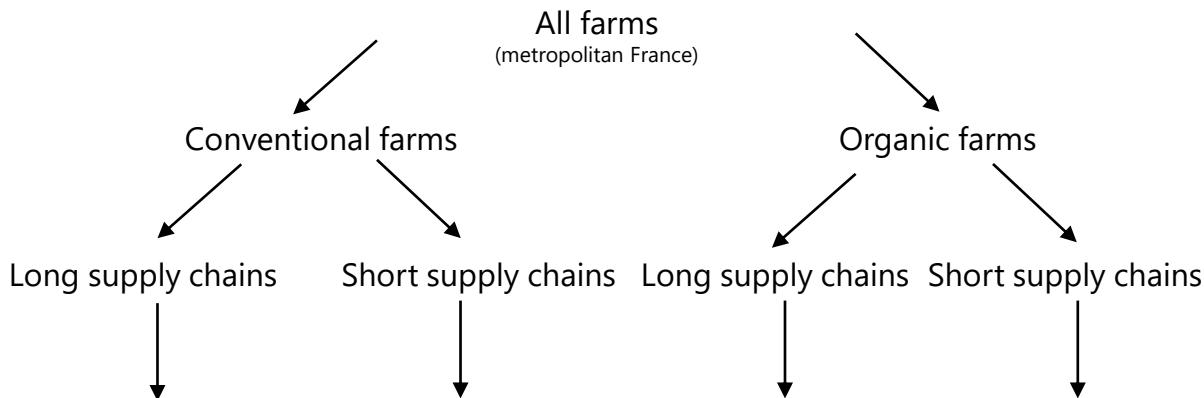
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To access the non-secret agricultural census

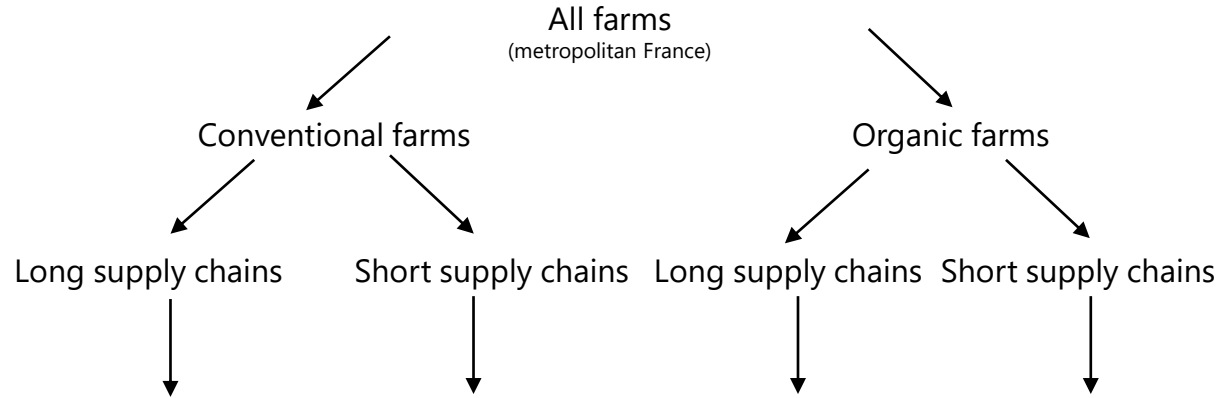


2. Farms in transitions: a statistical approach in Agricultural Censuses 2010 and 2020



	Type CF-L		Type CF-S		Type OF-L		Type OF-S		Total 2010	Total 2020
	2010	2020	2010	2020	2010	2020	2010	2020		
Number of farms (EA)	422 568	277 796	75 534	64 900	9 873	21 959	8 177	25 124	516 152	389 779
<i>As a total percentage of the line</i>	80,1%	71,3%	16,3%	16,7%	1,7%	5,6%	1,9%	6,4%	100%	100%
Average agricultural land area per farm	57 ha	73 ha	41 ha	56 ha	59 ha	77 ha	45 ha	46 ha	55 ha	69 ha
Number of Annual Work Units (AWU)	612 028	388 194	131 570	159 326	23 629	41 092	19 265	70 846	786 495	659 459
Average AWU per farm	1,4	1,4	1,8	2,5	2,4	1,9	2,4	2,8	1,5	1,7
Average AWU for 100 ha	2,5	1,9	5,6	4,4	4	2,4	5,2	6,1	2,8	2,3
Age group of farm managers (CE)										
Under 40 years	16%	16%	21%	21%	22%	22%	27%	30%	17%	18%
40-49 years	28%	20%	30%	24%	36%	24%	36%	30%	28%	22%
50-59 years	33%	34%	31%	33%	33%	35%	31%	27%	32%	33%
60 years and more	23%	30%	18%	22%	9%	19%	6%	13%	22%	27%
Total	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Gender of farm managers										
Men	77%	78%	76%	79%	81%	81%	77%	75%	77%	78%
Women	23%	22%	24%	21%	19%	19%	23%	25%	23%	22%
All CE	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
General level of education of CE										
No degree	20%	20%	29%	14%	13%	15%	11%	9%	21%	18%
School certificate, BEPC	45%	34%	34%	31%	34%	27%	30%	18%	43%	32%
CAP, BEP	15%	18%	16%	18%	11%	15%	11%	11%	15%	17%
High School Diploma	11%	16%	13%	20%	21%	22%	24%	25%	12%	18%
Short higher education (A-level +2)	4%	6%	4%	8%	8%	9%	11%	13%	4%	7%
Long higher education (A-level +3)	4%	6%	4%	9%	12%	13%	14%	23%	5%	8%
All CE	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

2. Farms in transitions: a statistical approach in Agricultural Censuses 2010 and 2020



RA 2020

	Type CF-L		Type CF-S		Type OF-L		Type OF-S		Total	
	Effectif	%	Effectif	%	Effectif	%	Effectif	%	Effectif	%
OTEX RA2020										
Crops	94 638	34%	7 942	12%	6 654	30%	2 591	10%	111 825	29%
Market gardening & horticulture	3 478	1%	7 485	12%	470	2%	3 914	16%	15 347	4%
Winegrowing	38 310	14%	12 218	19%	3 268	15%	5 236	21%	59 032	15%
Tree farming	6 542	2%	4 332	7%	1 740	8%	2 671	11%	15 285	4%
Dairy cattle	27 849	10%	2 947	5%	3 017	14%	1 216	5%	35 029	9%
Meat cattle	38 169	14%	6 802	10%	1 837	8%	1 590	6%	48 398	12%
Mixed cattle	6 654	2%	1 171	2%	286	1%	218	1%	8 329	2%
Sheep, goats and other grazers	23 993	9%	7 808	12%	1 357	6%	2 302	9%	35 460	9%
Monogastric (pigs & poultry)	13 069	5%	3 391	5%	1 279	6%	919	4%	18 658	5%
Polycropping & poly-breeding	23 536	8%	10 593	16%	2 017	9%	4 448	18%	40 594	10%
Unclassified	1 558	1%	211	0%	34	0%	19	0%	1 822	0%
All OTEX together	277 796	100%	64 900	100%	21 959	100%	25 124	100%	389 779	100%

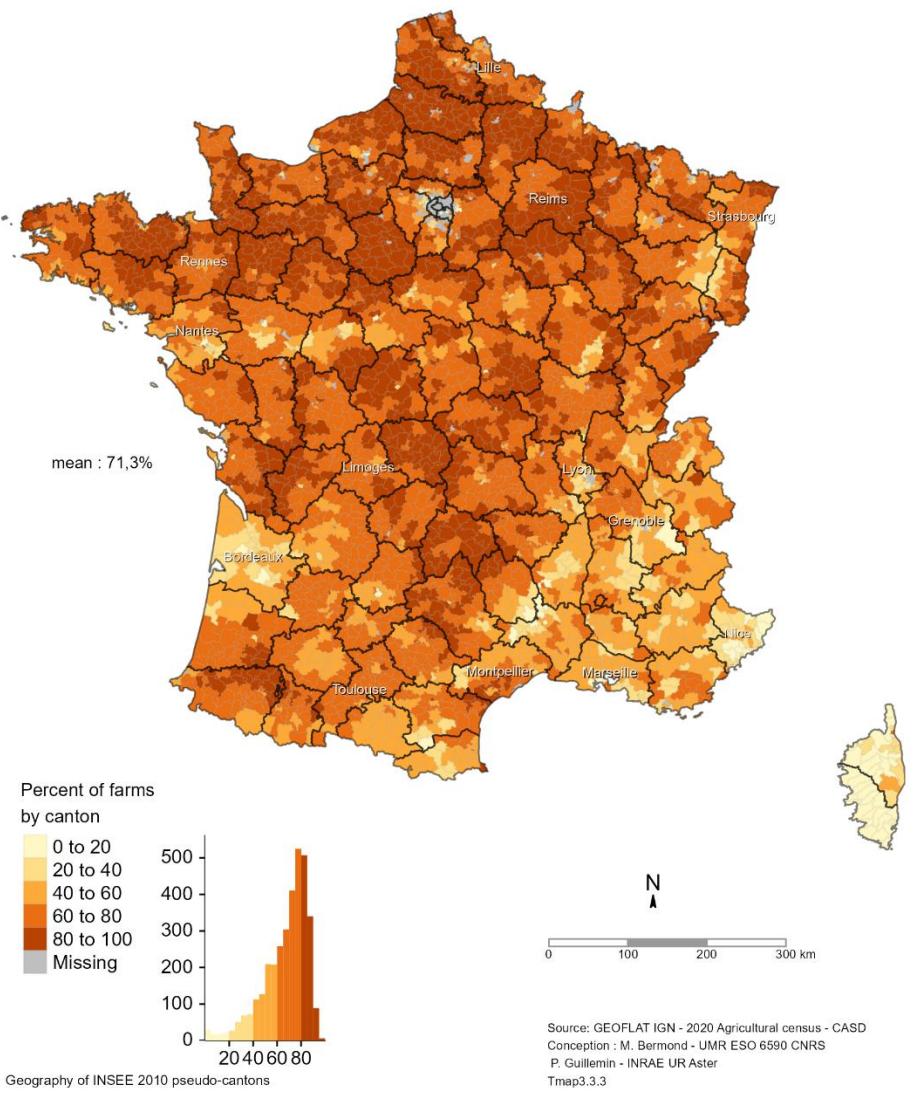
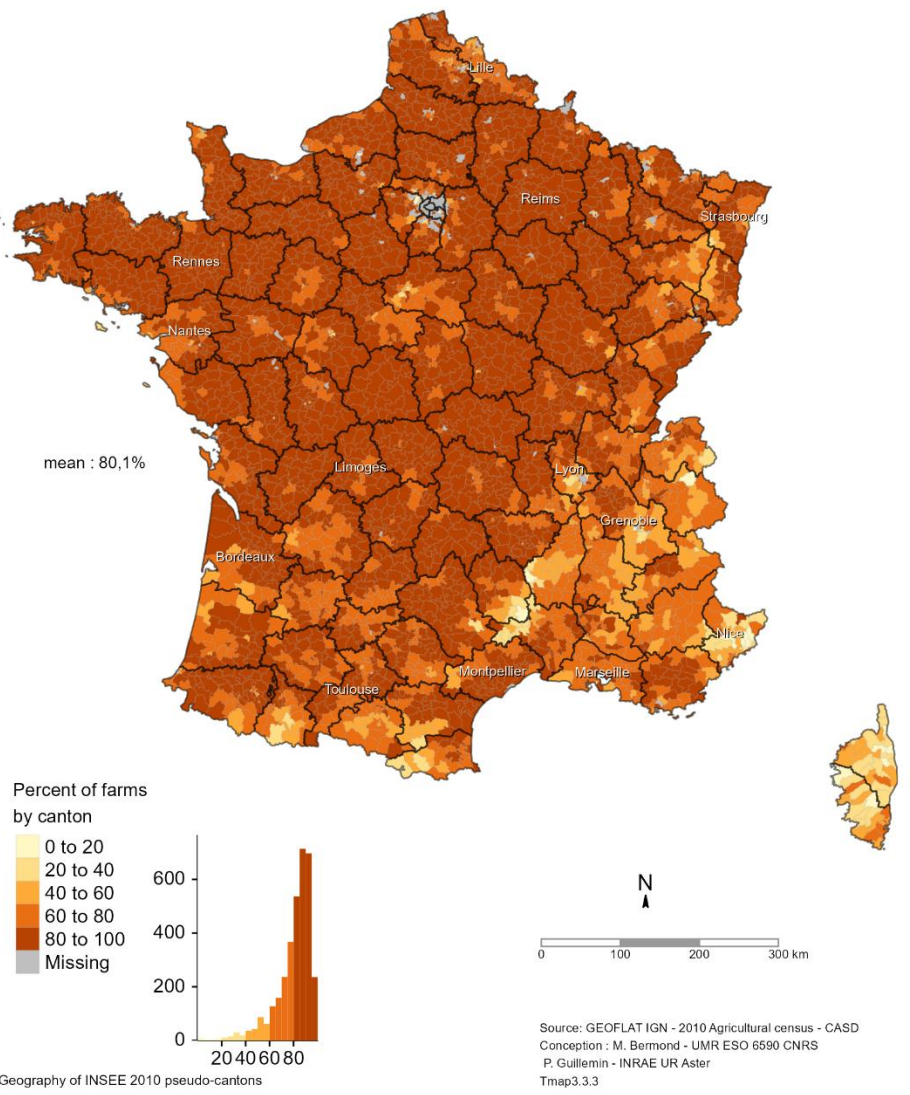
3. Evolution of Agrifood Transitions in France: a Dynamic and Contrasted Geography

Conventional farms in the long supply chain in 2010
Metropolitan France

Conventional farms in the long supply chain in 2020
Metropolitan France

2010

2020



Decrease in conventional farms in long supply chains:

- Along the coastline (*South Brittany, Atlantic Coast and Mediterranean Coast*);
- Mountains and foothills (*Alps, Pyrenees, Massif Central, Jura and Vosges*);

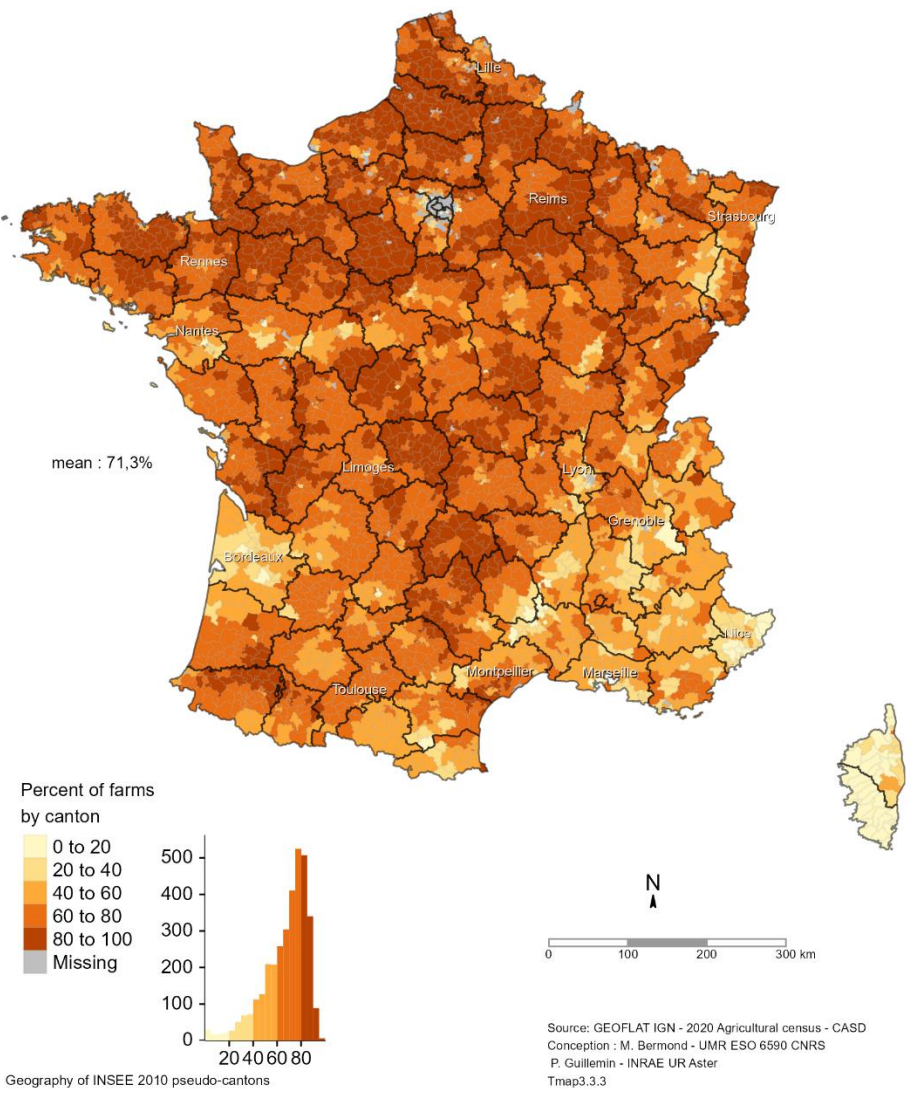
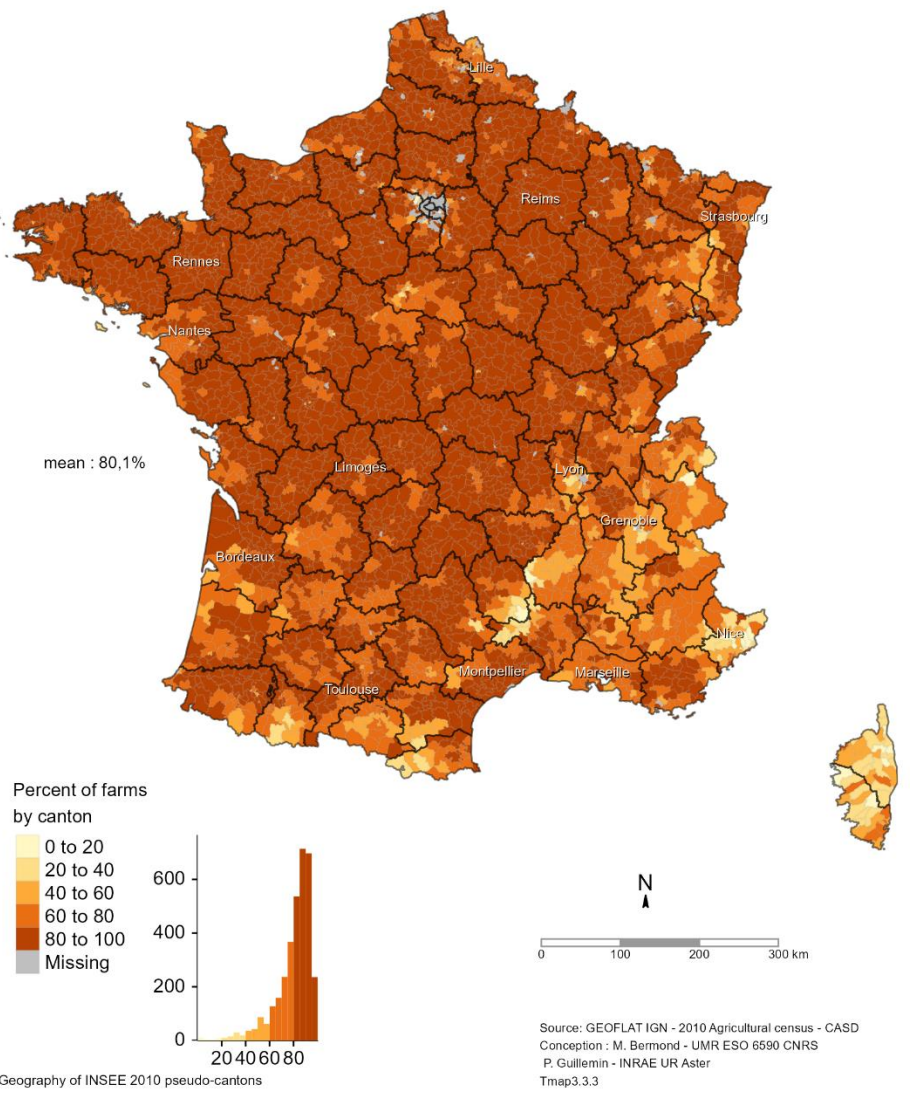
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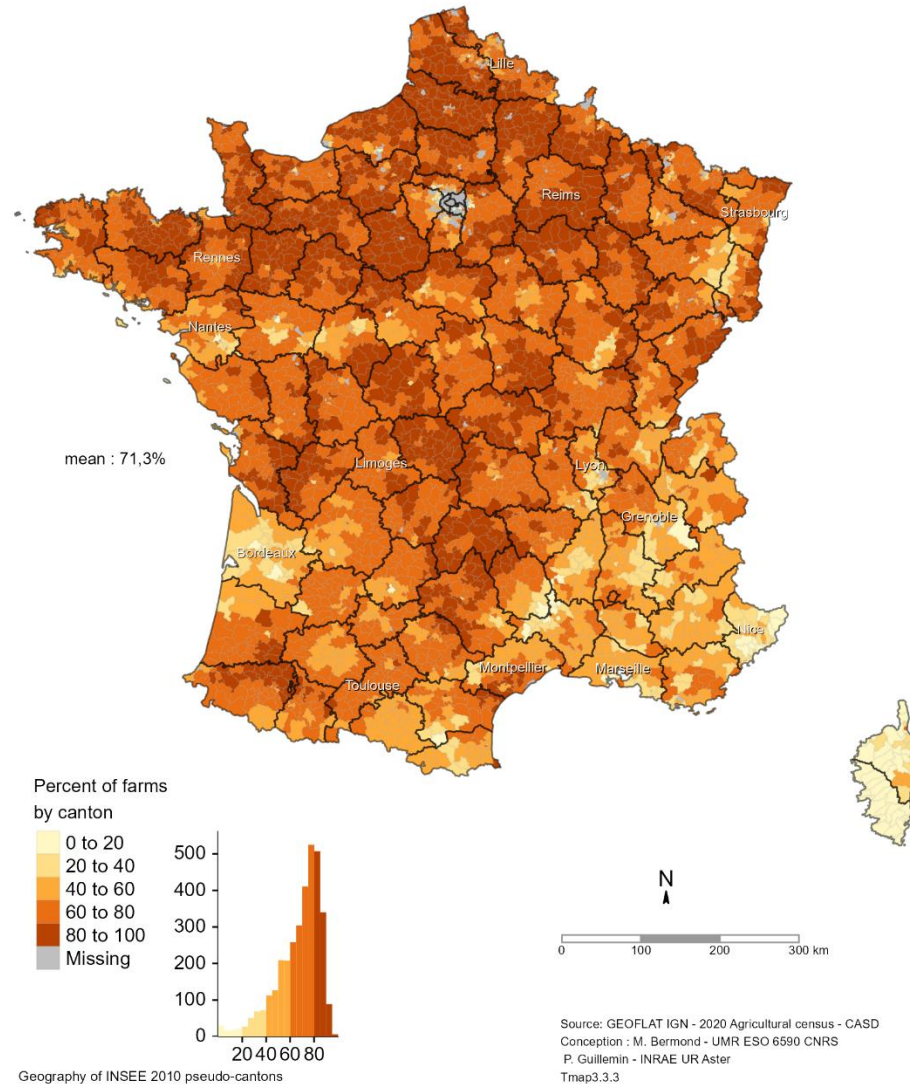
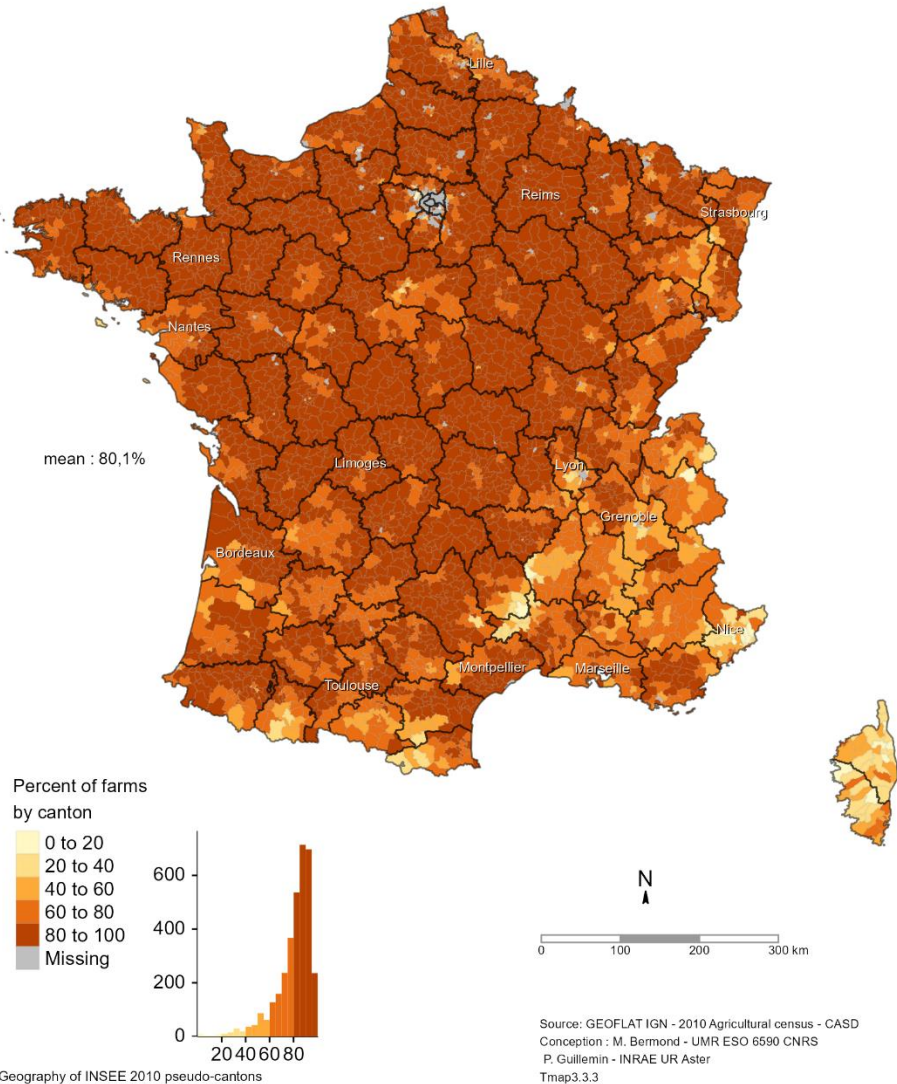
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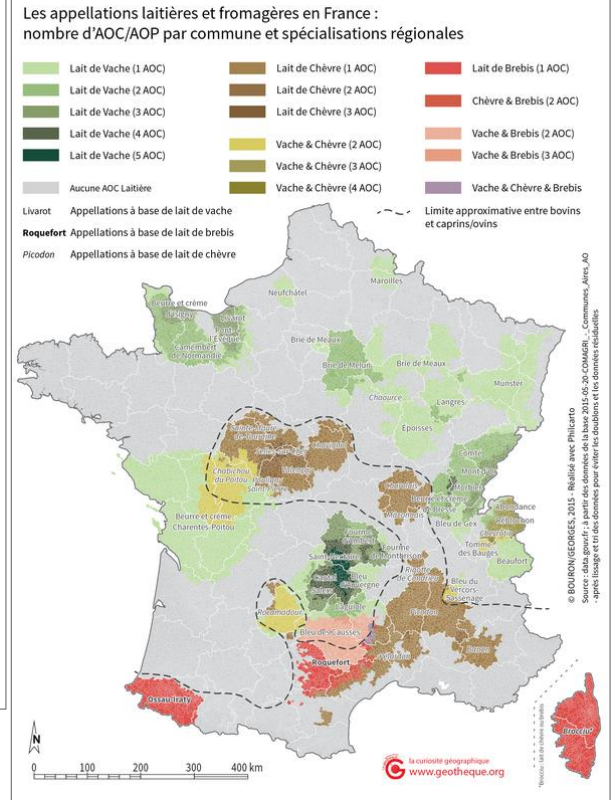
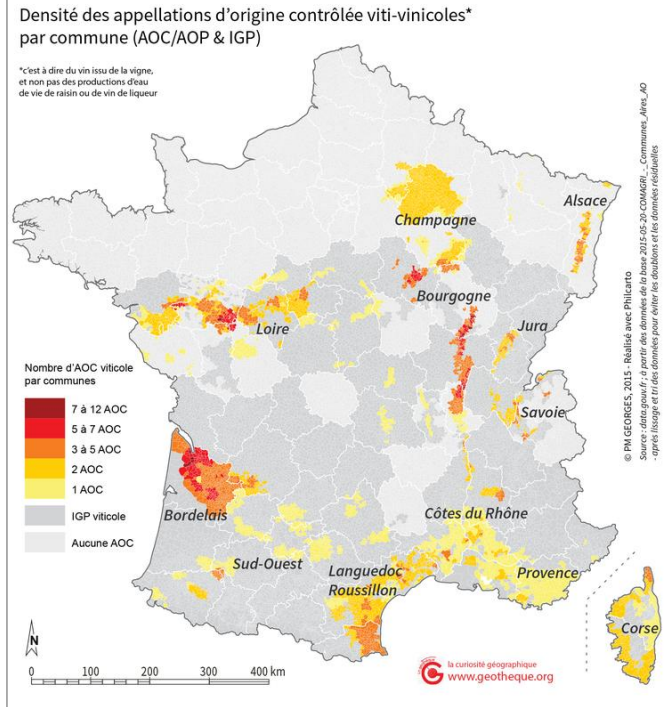
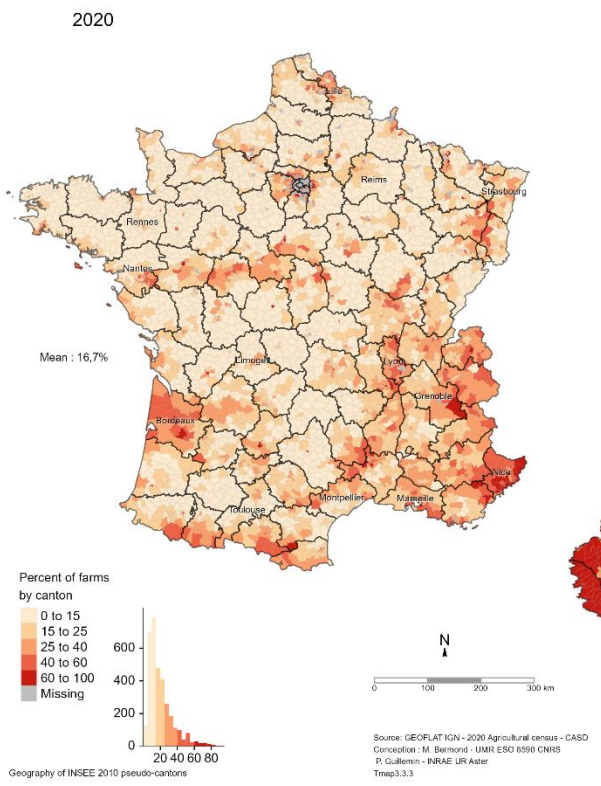
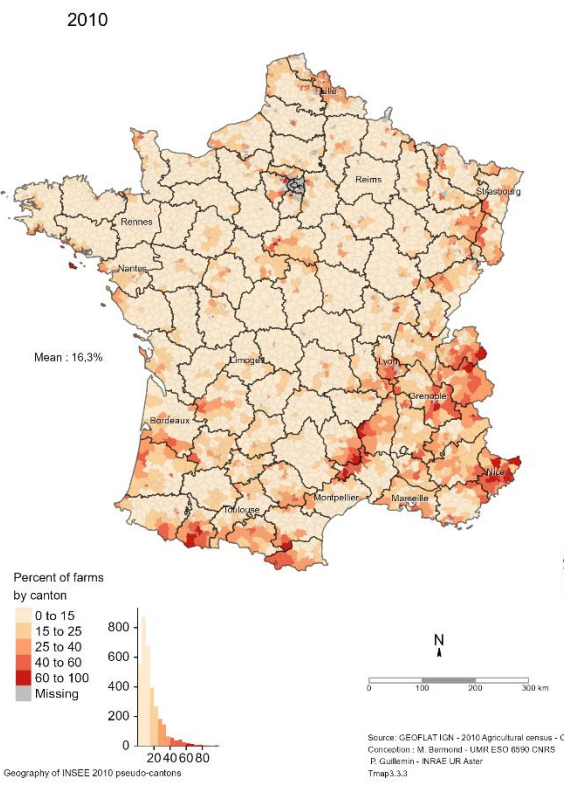
But these patterns persist in:

- Certain large regions dominated by crop production (*Hauts-de-France, western and eastern fringes of the Paris Basin*);
- Certain production areas such as milk and off-farm breeding in the West (*Avranchin, Virois, Domfrontais, Haut-Maine and Central Brittany*), but also in mountainous areas with extensive livestock farming (*Cantal*).

3. Evolution of Agrifood Transitions in France: a Dynamic and Contrasted Geography

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Conventional farms in the short supply chain in 2020
Metropolitan France



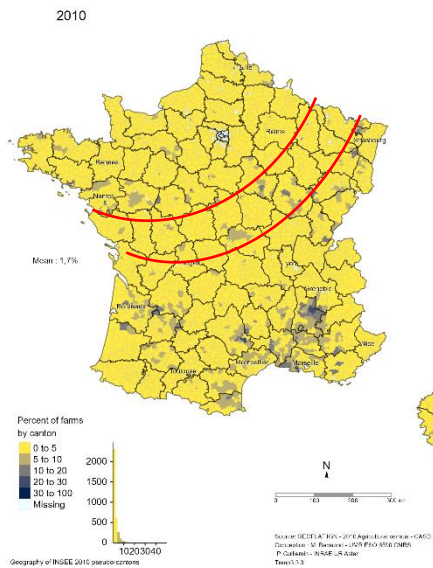
Development of Short Supply Chains on Conventional Farms:

- The geography of wine designations of origin (see map opposite: *Alsace, Champagne, Loire Valley, Burgundy, Côte du Rhône, Bordeaux, Langedoc-Roussillon, Corsica*);
- Moutain cheese designations (*Fourmes d'Ambert et de Montbrison, Saint-Nectaire; Comté, Morbier, Mont-d'Or; Bleu de Gex; Abondance, Reblochon, Beaufort; Ossau-Iraty*; etc.);
- Appellations and Label Rouge for vegetables and poultry in the north (*Garlic from Arleux, open-ground endives, potatoes from Merville, Lingot du Nord, poultry from Licques*).

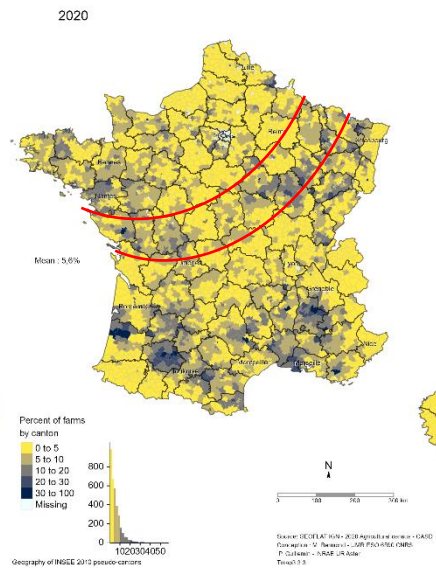


3. Evolution of Agrifood Transitions in France: a Dynamic and Contrasted Geography

Organic farms in the long supply chain in 2010
Metropolitan France

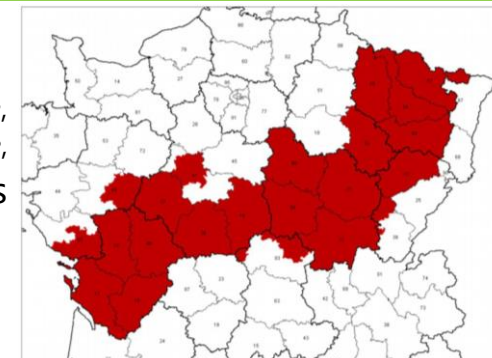


Organic farms in the long supply chain in 2020
Metropolitan France



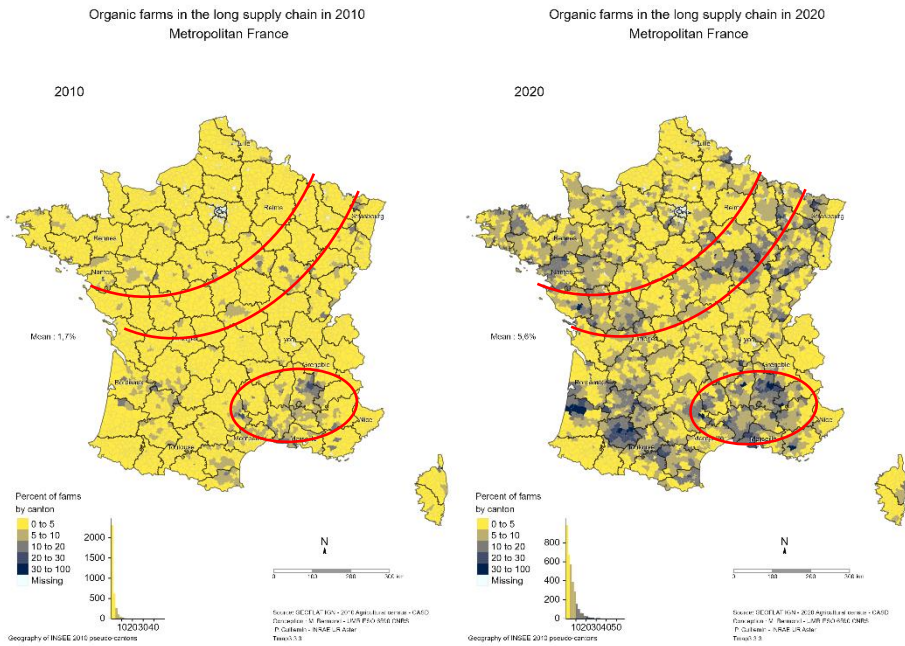
Development of Organic Farms in Long Supply Chains:

- The **Intermediate Agricultural Zones** (*Meuse, Meurthe-et-Moselle, Moselle and Vosges* (W), *Côte-d'Or, Haute-Marne, Haute-Saône, Yonne, Nièvre, Cher, Vienne, Deux-Sèvres, Vendée* (S-E), and *Charente* (N)): new sectors such as buckwheat and experimental crops like quinoa;



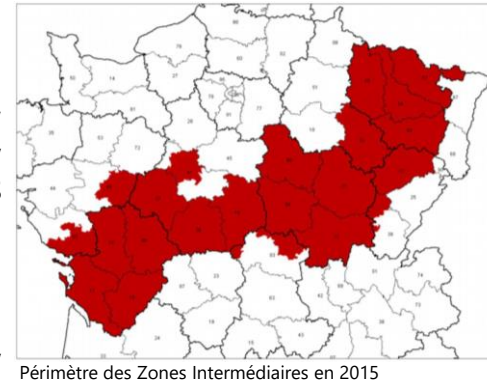
Périmètre des Zones Intermédiaires en 2015

3. Evolution of Agrifood Transitions in France: a Dynamic and Contrasted Geography.



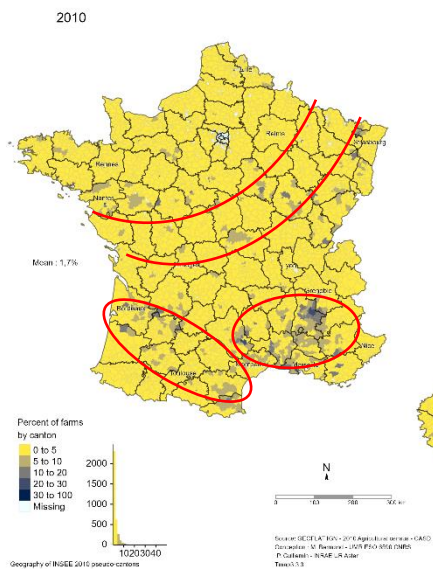
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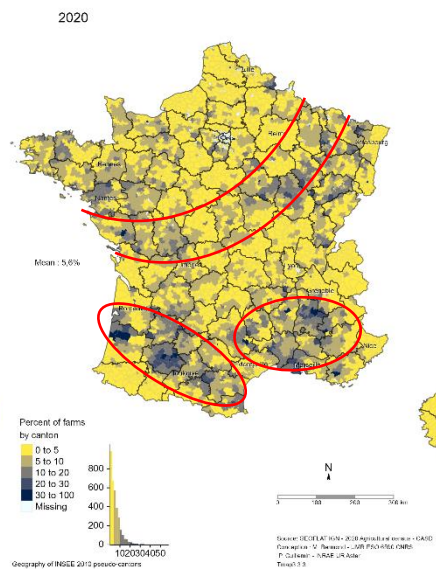


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Organic farms in the long supply chain in 2010
Metropolitan France

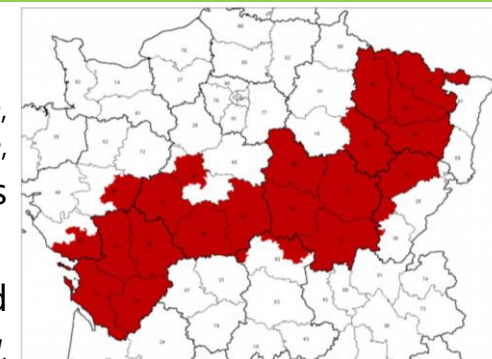


Organic farms in the long supply chain in 2020
Metropolitan France



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- **Heterogeneity of productions in the South-West**, from open field vegetables in the Landes, to market gardening and arboriculture in the Pyrénées-Orientales, via vineyards and meadows in the Gard (*Gironde* (S) et *Landes* (N), *Lot-et-Garonne, Gard, Tarn-et-Garonne, Haute-Garonne* (N), *Aude et Pyrénées-Orientales* (N))



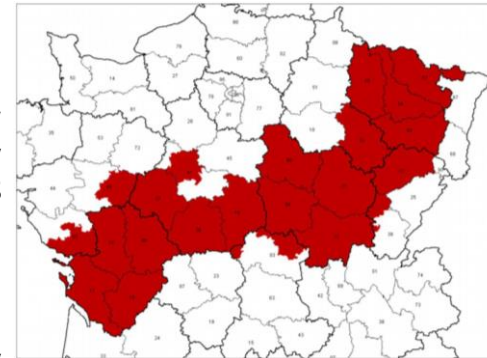
Périmètre des Zones Intermédiaires en 2015



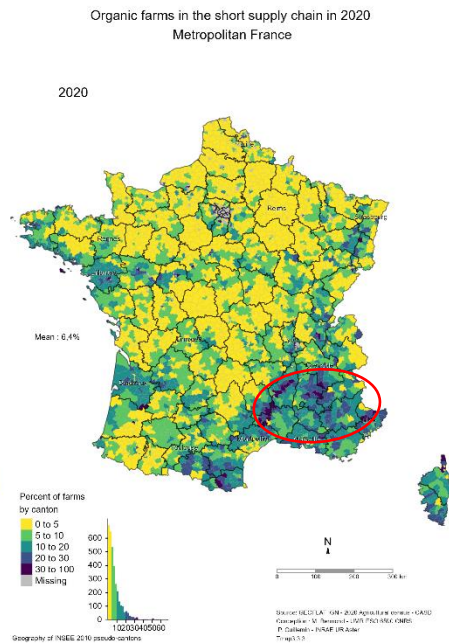
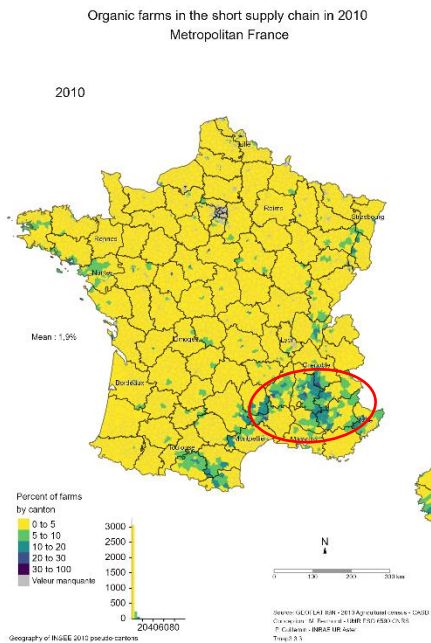
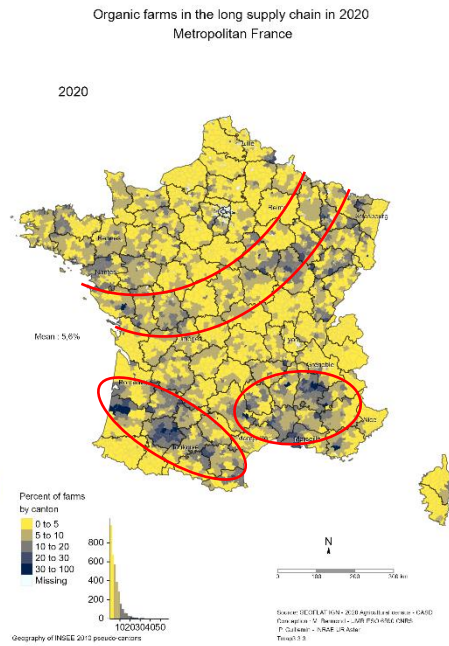
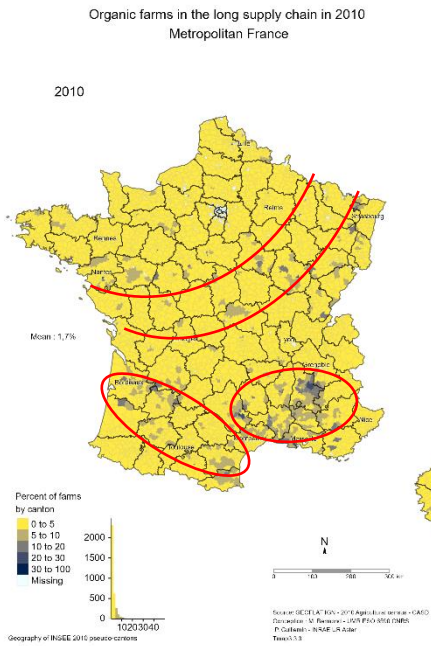
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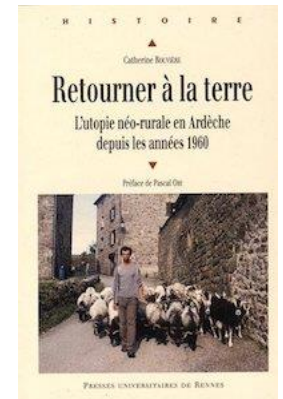


Périmètre des Zones Intermédiaires en 2015



Development of Organic Farms in Short Supply Chains:

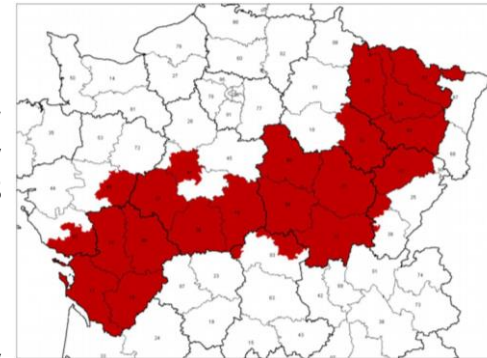
- Strengthening of its historical roots **in the Provençal hinterland** (return to the land in the 1970s);



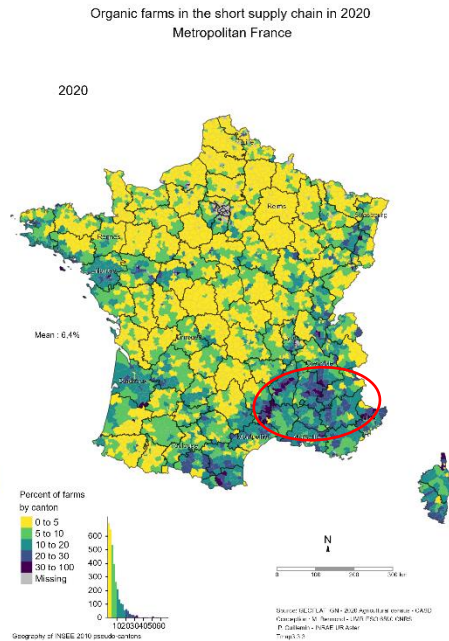
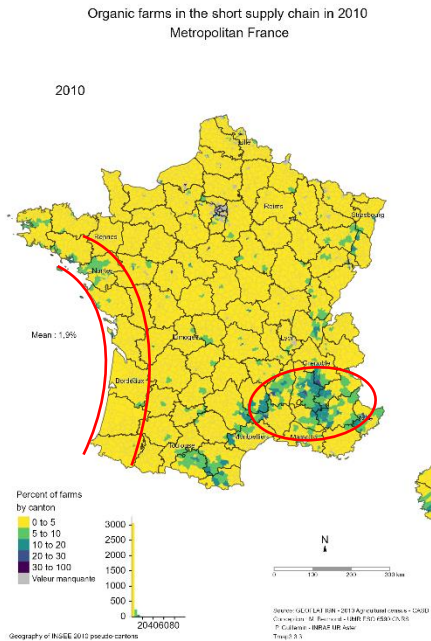
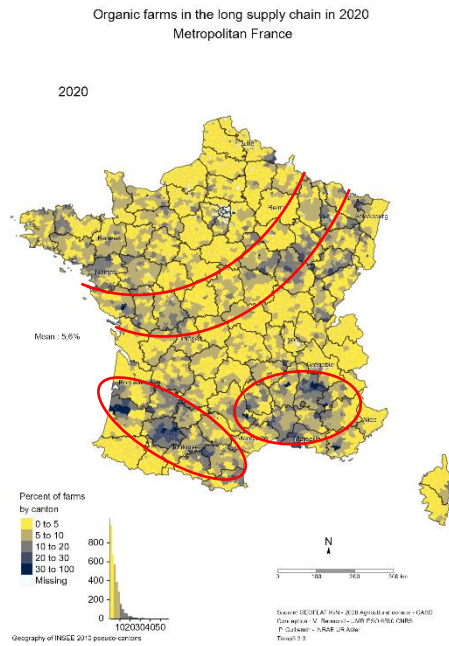
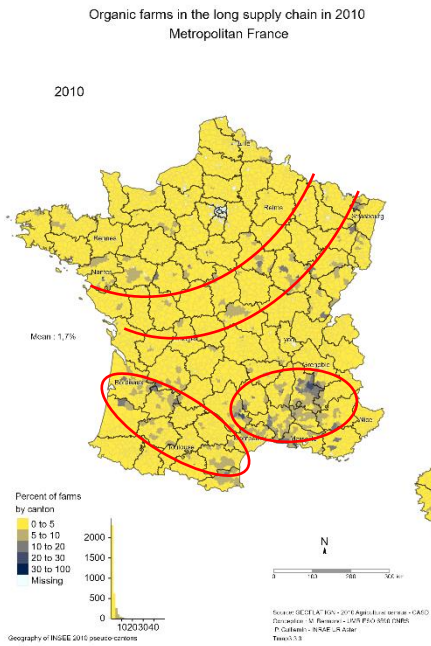
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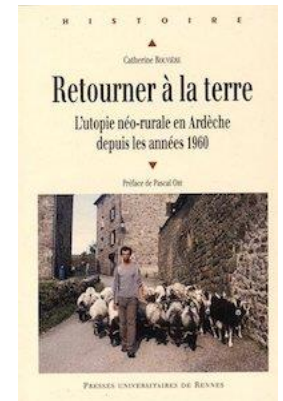


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Development of Organic Farms in Short Supply Chains:

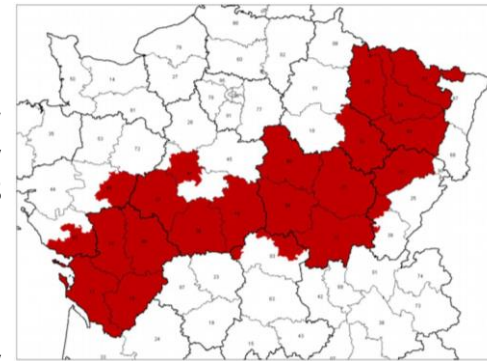
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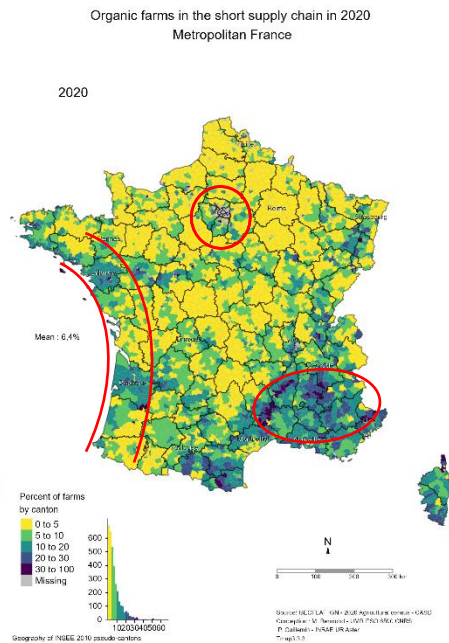
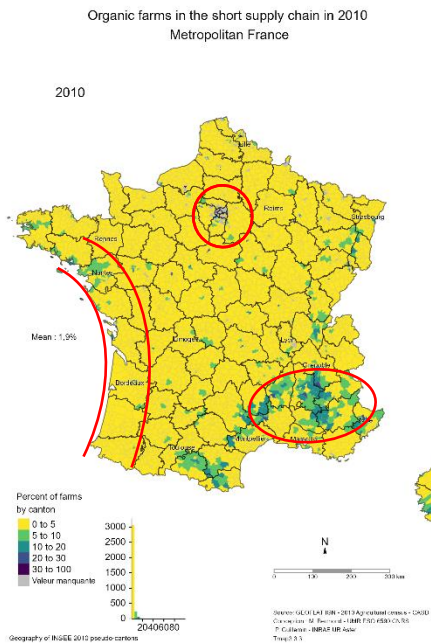
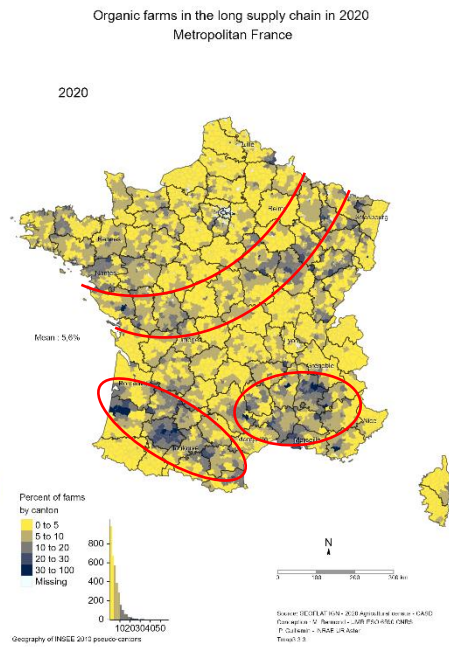
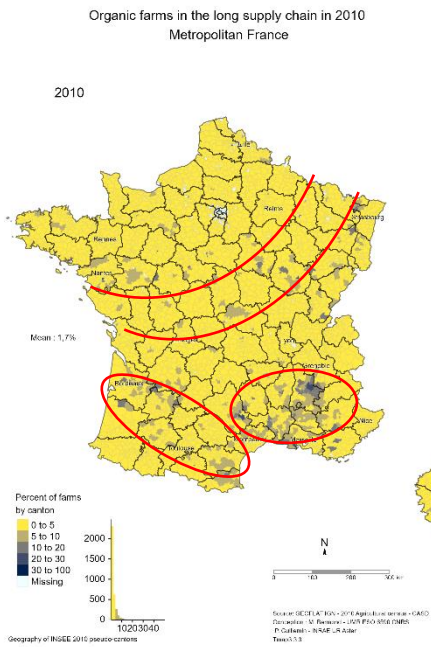
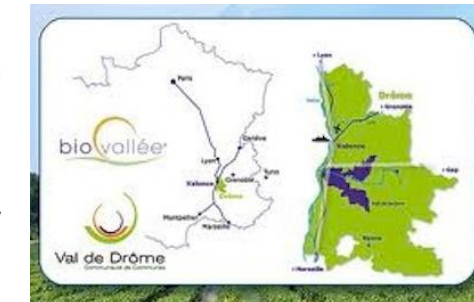
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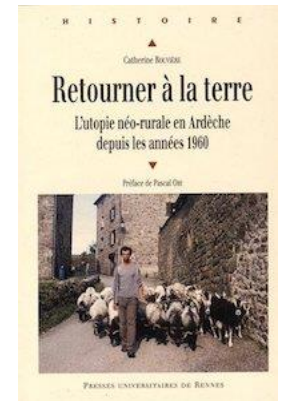


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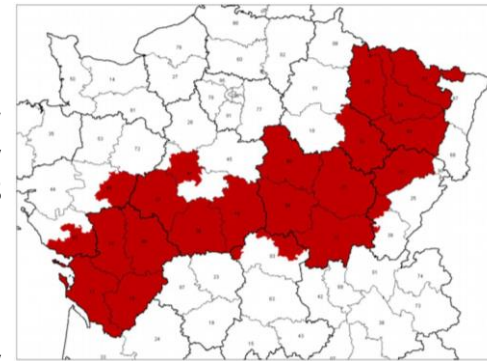
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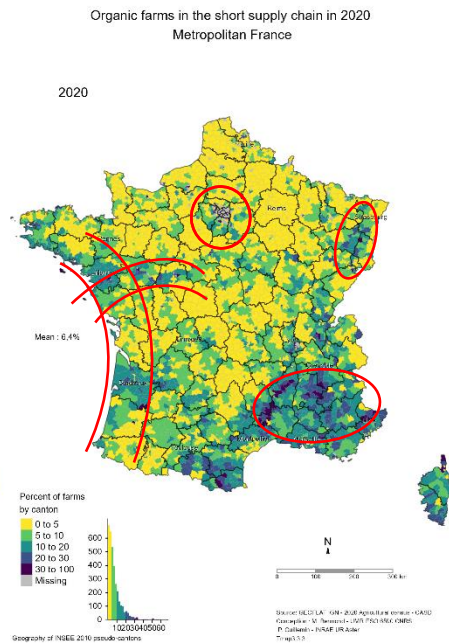
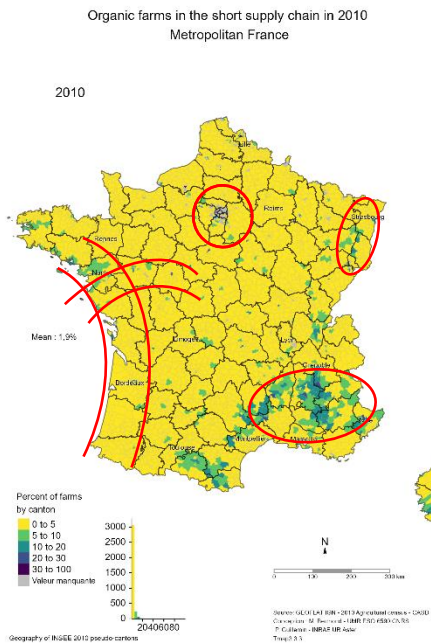
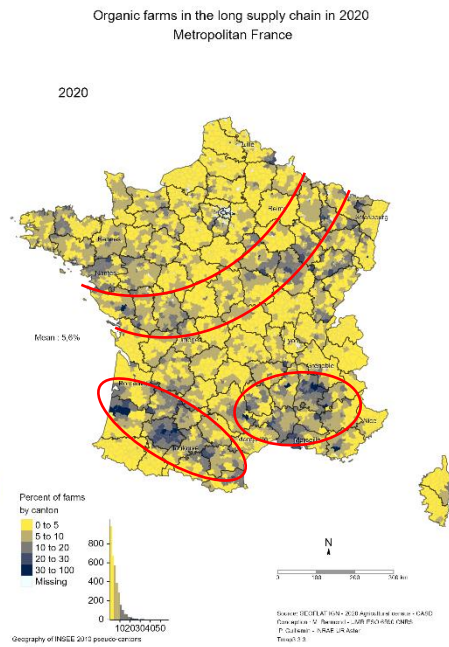
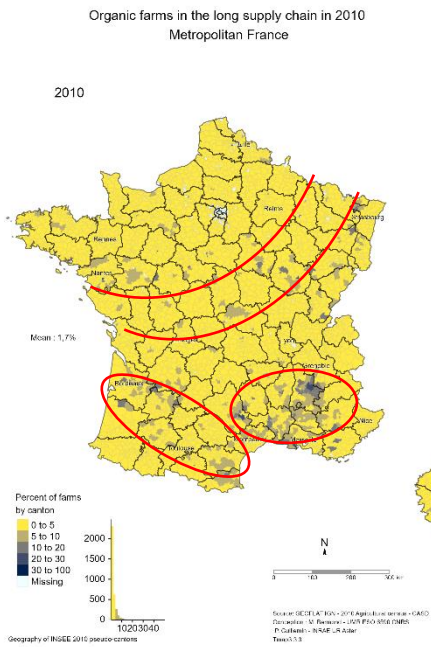
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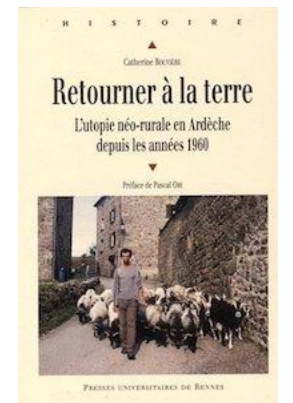


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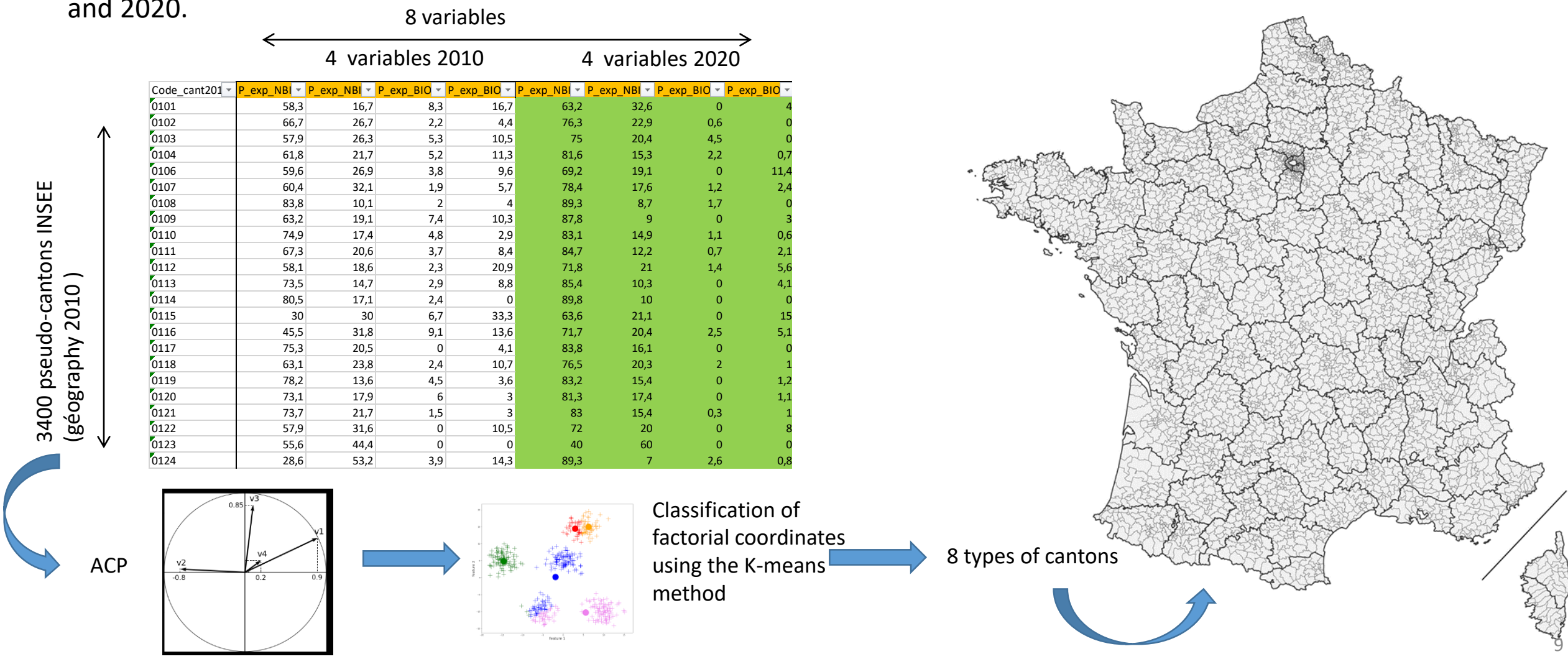
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- **Île-de-France**: the effects of the capital region;
- A physical geography combining **viticulture and recreational areas of green tourism**: *Loire valley, Vosges mountains, ...*



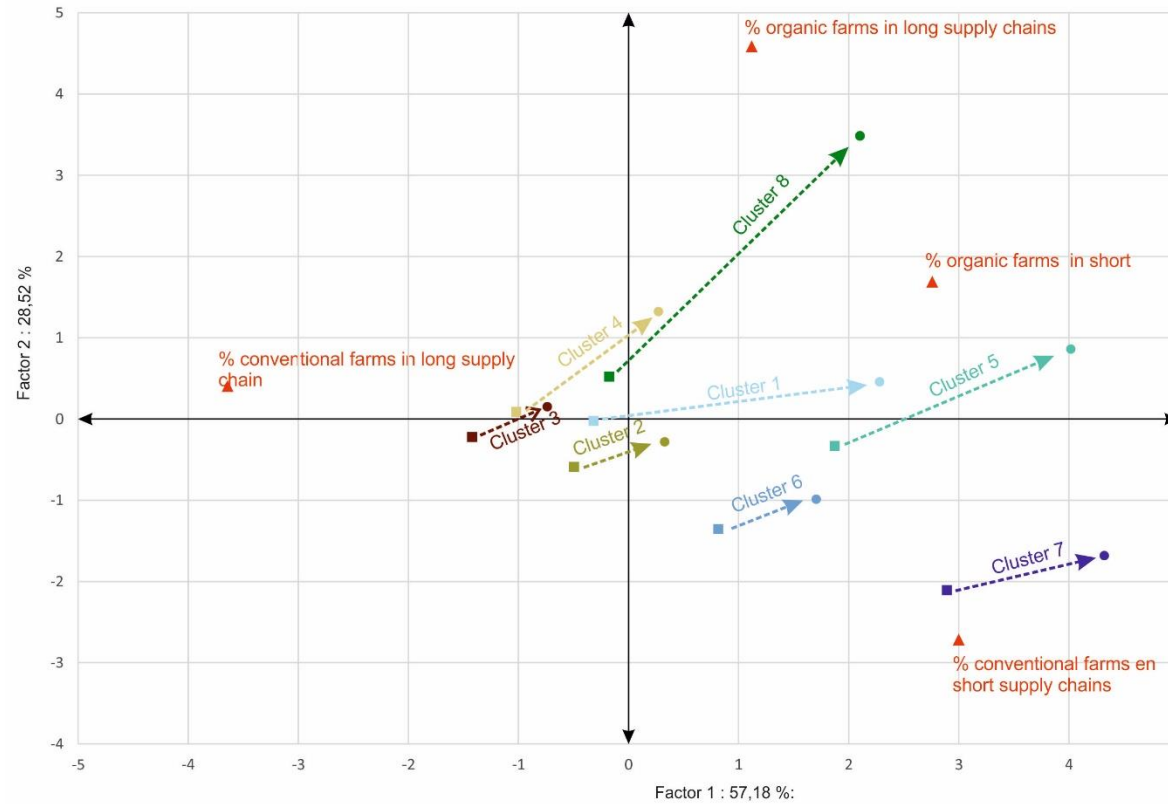
3. Evolution of Agrifood Transitions in France: a Dynamic and Contrasted Geography.

- ❑ The types of agriculture in transition vary across space and time.
- ❑ What is the synthesis of the main evolutionary trajectories from 2010 to 2020 of the cantons?
- ❑ Classification of the cantons based on the distribution profile of the 4 groups of farms and their evolution between 2010 and 2020.



3. Evolution of Agrifood Transitions in France: a Dynamic and Contrasted Geography.

□ Mains trajectories of the cantons in the french farming structure between 2010 and 2020. Factor plane (1,2)



Légende :

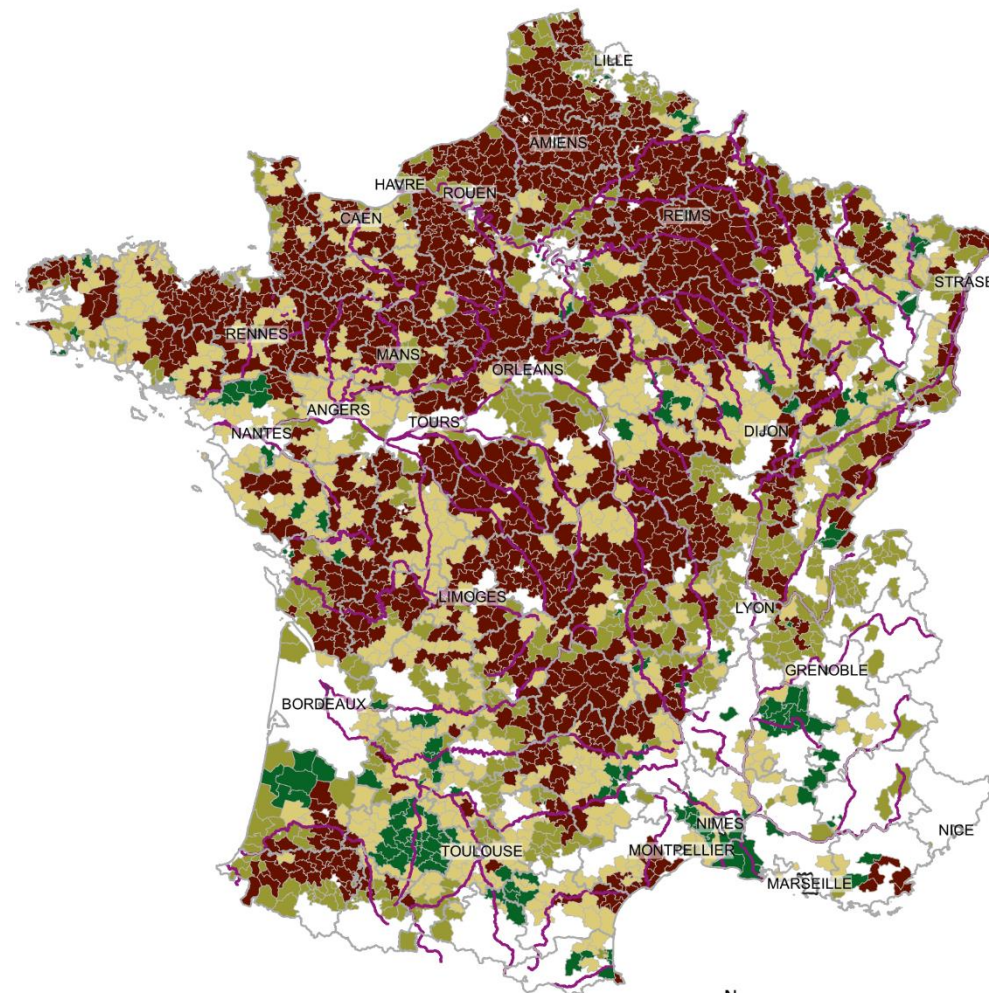
- ▲ Active variables
- Class barycentre in 2010
- Class barycentre in 2020

Cluster of agricultural trajectory for cantons between 2010 and 2020

- Cluster 3
- Cluster 2
- Cluster 4
- Cluster 8
- Cluster 5
- Cluster 1
- Cluster 6
- Cluster 7

3. Evolution of Agrifood Transitions in France: a Dynamic and Contrasted Geography

Typology of cantons in Metropolitan France based on the evolution of organic agriculture and short supply chains between 2010 and 2020



Cantons with a majority of conventional farming in the long supply chain between 2010 and 2020

- Type 3 Conventional farms in the long supply chain will remain dominant at 85% in 2020. Little change between 2010 and 2020.
- Type 2 Existence of a cluster of conventional farms in the short supply chain (20%) since 2010 in a context dominated by extended conventional farming (70%). Timid emergence of organic farms (8% in 2020).
- Type 4 Emergence of organic farms (16%) primarily within the long supply chain in a context dominated by conventional farming (86% > 71%).
- Type 8 Significant growth of organic farms in the long chain supply (6% > 22%) surpassing conventional farms in the long chain supply. Emergence of organic farms in the short supply chain.

Classification according to the K-means method based on 8 variables:

- Percentage of conventional farms in the long supply chain in 2010
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The same variables are used in 2020. Geography of INSEE pseudo-cantons 2010.

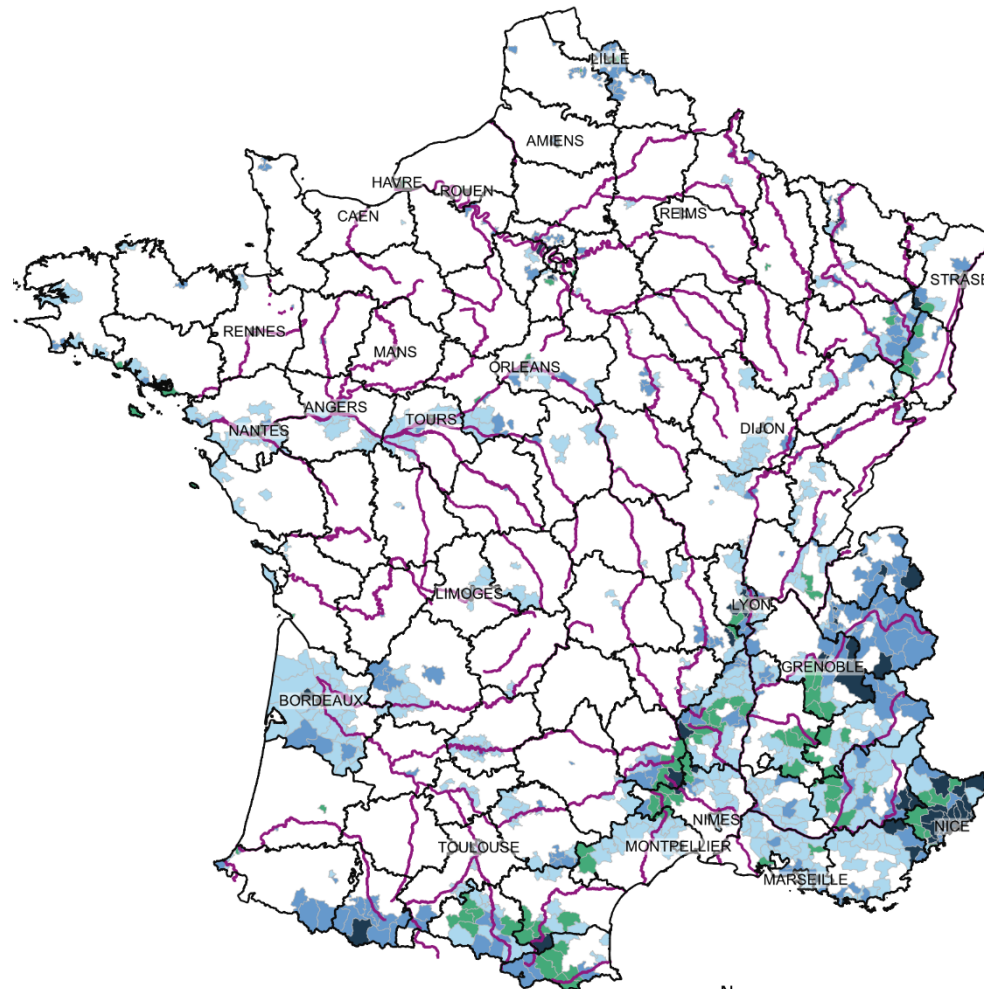
Intra-class variance : 32,3,52% / Inter-class variance : 61,05%

Source: IGN Geofla – Agricultural Census 2010 and 2020

Conception: M. Bermond – UMR ESO CNRS / P. Guillemain - INRAE UR Aster

3. Evolution of Agrifood Transitions in France: a Dynamic and Contrasted Geography

Typology of cantons in Metropolitan France based on the evolution of organic agriculture and short supply chains between 2010 and 2020



Cantons with a significant decline in conventional farming in the long supply chain

- Type 5 ■ Significant use of organic farms in the short supply chain (11% > 32%) in a context where conventional farms in the short supply chain were prevalent in 2010 (34%). Conventional farms in the long supply chain are becoming less prevalent.
- Type 1 ■ Significant growth of farms in the short supply chain, with a primary focus on conventional farming (16% > 29%) and a secondary emphasis on organic farming (3% > 16%).
- Type 6 ■ Establishment of a dual agricultural structure: 50% long supply chain - conventional farming/ 40% short supply chain - conventional farming in 2020.
- Type 7 ■ Maintenance of conventional farming in the short supply chain at 64%. Emergence of organic farming in the short supply chain. Conventional farming in the long supply chain < 20%.

— Main watercourses

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 Conception: M. Bermond – UMR ESO CNRS / P. Guillemain - INRAE UR Aster

- ❑ A significant North-South contrast, but with many nuances.
- ❑ Understanding the diversity of transition dynamics through case studies: sectoral logics, the role of rural/urban interfaces, neo-rural installations, production/residential systems, tourist appeal, the roles of local policies, etc.
- ❑ Limitations of the initial categorisation of the 4 forms of agriculture: refining the analysis categories by taking new criteria into account:
 - Grazing systems in livestock farming
 - Soil conservation agriculture
 - Agroforestry
- ❑ European typology/comparison perspective (Eurostat, NUTS 3)



Suckler cattle herd, Basque Country, May 2022 – Zoé Uteza



Vineyards at Vergisson, South Burgundy, Oct. 2022 – P.G.



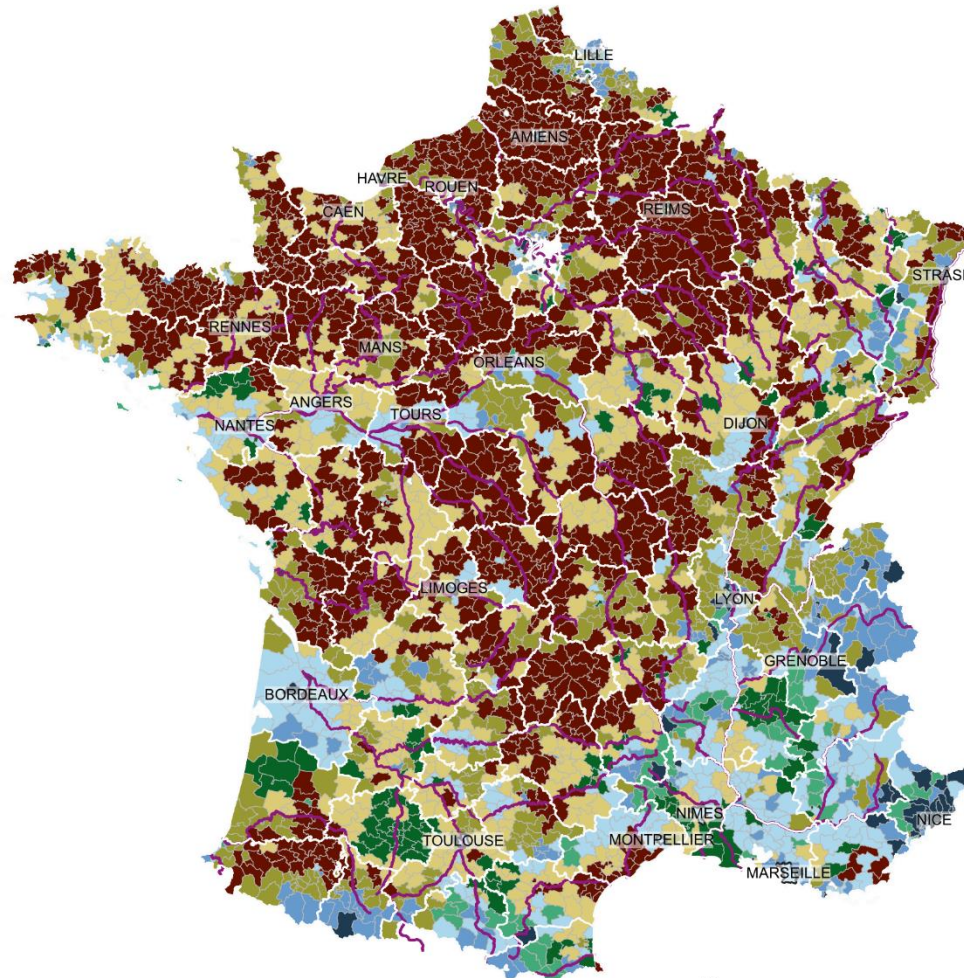
Organic buckwheat in Lorraine, Oct. 2019



Organic and local market, ruins of Reqnéville-sur-Mer castle, Channel coast, July 2018 – P.G.

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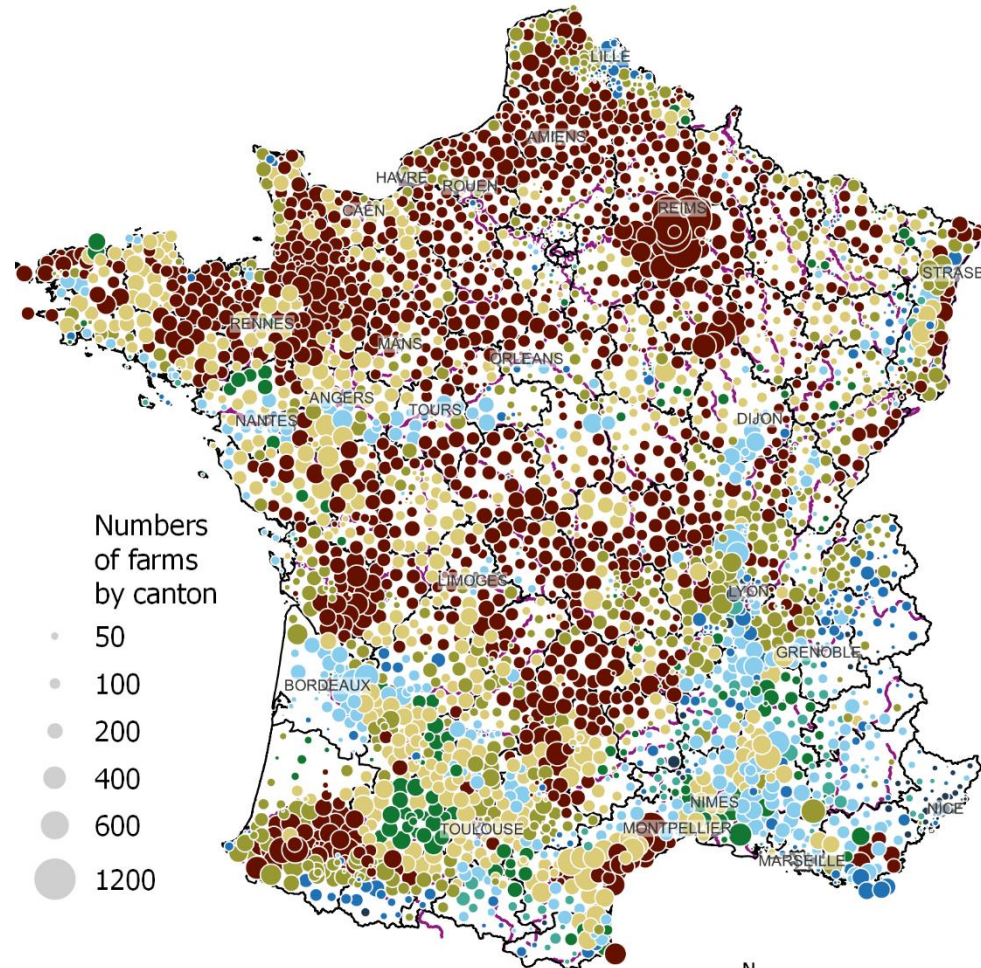
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- Type 8 ■ Significant growth of organic farms in the long chain supply (6% > 22%) surpassing conventional farms in the long chain supply. Emergence of organic farms in the short supply chain.

Cantons with a significant decline in conventional farming in the long supply chain

- Type 5 ■ Significant use of organic farms in the short supply chain (11% > 32%) in a context where conventional farms in the short supply chain were prevalent in 2010 (34%). Conventional farms in the long supply chain are becoming less prevalent.
- Type 1 ■ Significant growth of farms in the short supply chain, with a primary focus on conventional farming (16% > 29%) and a secondary emphasis on organic farming (3% > 16%).
- Type 6 ■ Establishment of a dual agricultural structure: 50% long supply chain - conventional farming/ 40% short supply chain - conventional farming in 2020.
- Type 7 ■ Maintenance of conventional farming in the short supply chain at 64%. Emergence of organic farming in the short supply chain. Conventional farming in the long supply chain < 20%.



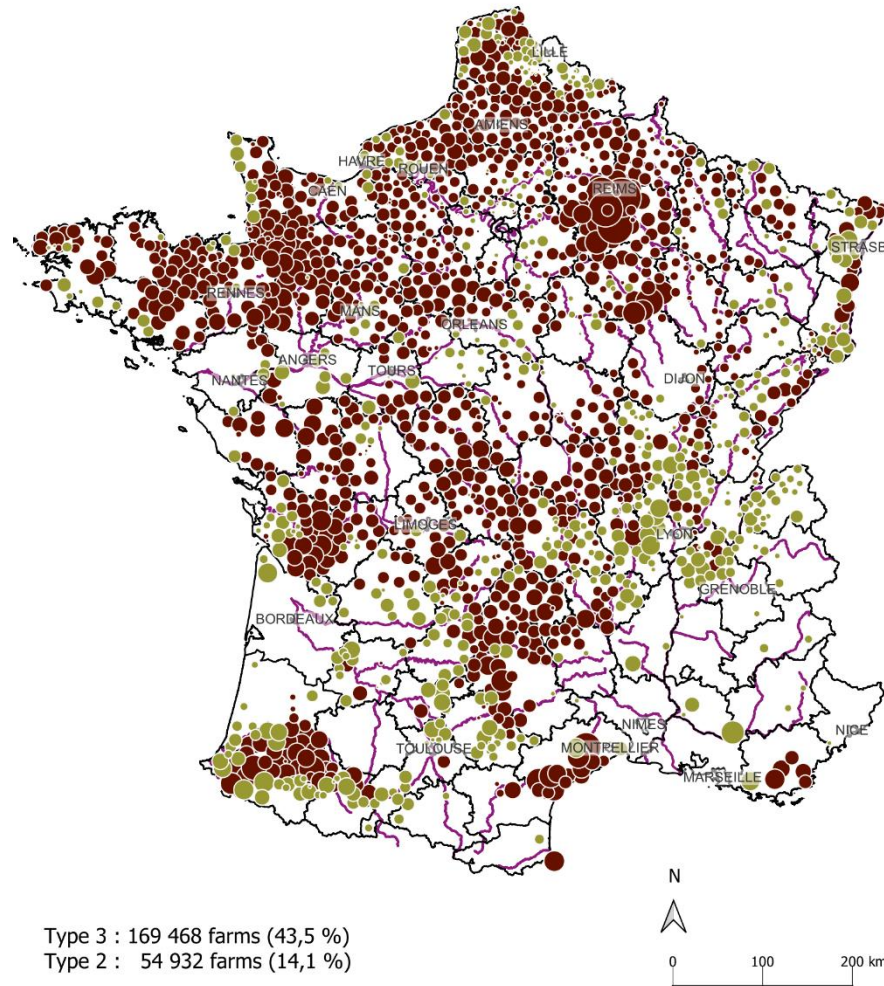
— Main watercourses

3. Evolution of Agrifood Transitions in France: a Dynamic and Contrasted Geography

Typology of cantons in Metropolitan France based on the evolution of organic agriculture and short supply chains between 2010 and 2020

Cantons with a majority of conventional farming in the long supply chain between 2010 and 2020

- Cluster 3 ■ Conventional farms in the long supply chain will remain dominant at 85% in 2020. Little change between 2010 and 2020.
- Cluster 2 ■ Existence of a cluster of conventional farms in the short supply chain (20%) since 2010 in a context dominated by extended conventional farming (70%). Timid emergence of organic farms (8% in 2020).



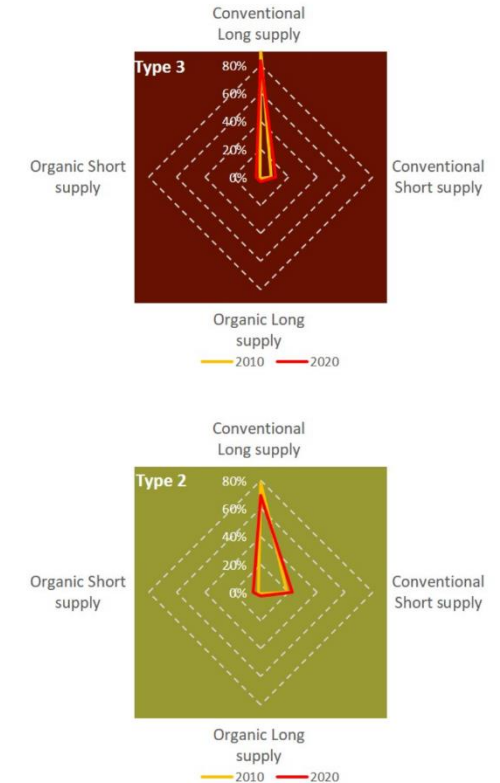
Type 3 : 169 468 farms (43,5 %)
 Type 2 : 54 932 farms (14,1 %)

Cluster 3 Numbers of farms by canton

- 50
- 200
- 400
- 600
- 1200

Cluster 2 Numbers of farms by canton

- 50
- 200
- 400
- 600

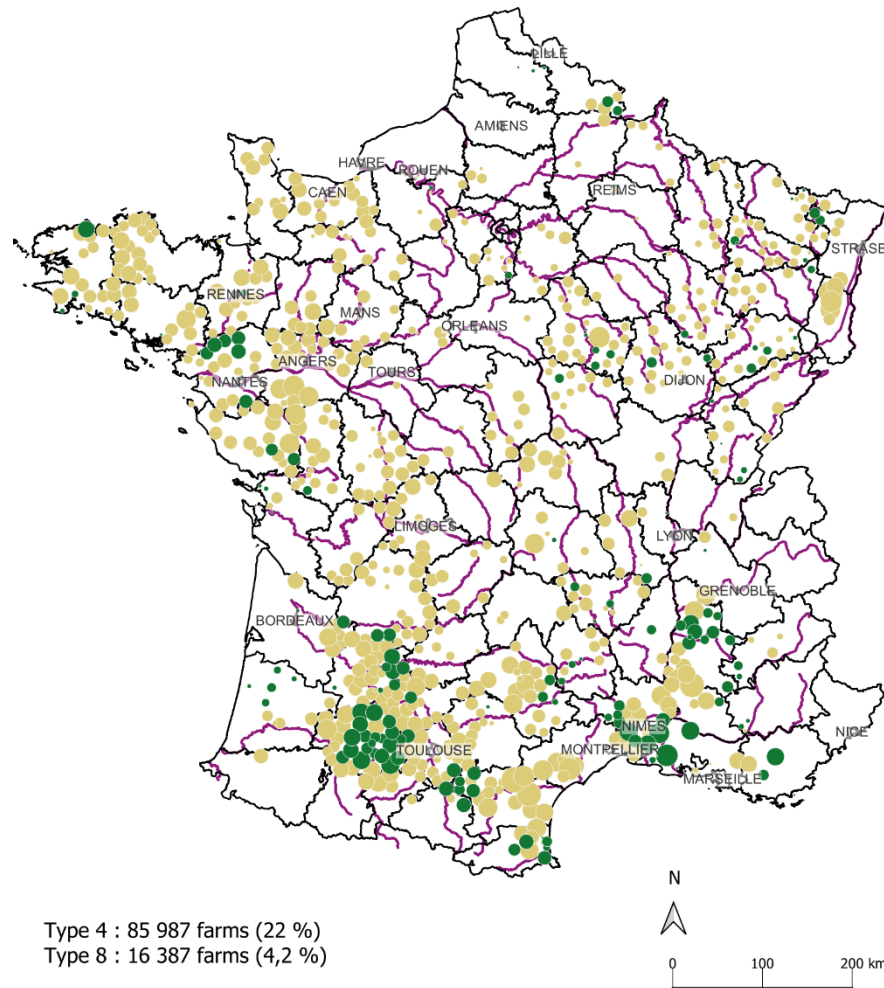


3. Evolution of Agrifood Transitions in France: a Dynamic and Contrasted Geography

Typology of cantons in Metropolitan France based on the evolution of organic agriculture and short supply chains between 2010 and 2020

Cantons with a majority of conventional farming in the long supply chain between 2010 and 2020

- Cluster 4 ■ Emergence of organic farms (16%) primarily within the long supply chain in a context dominated by conventional farming (86% > 71%).
- Cluster 8 ■ Significant growth of organic farms in the long chain supply (6% > 22%) surpassing conventional farms in the long chain supply. Emergence of organic farms in the short supply chain.



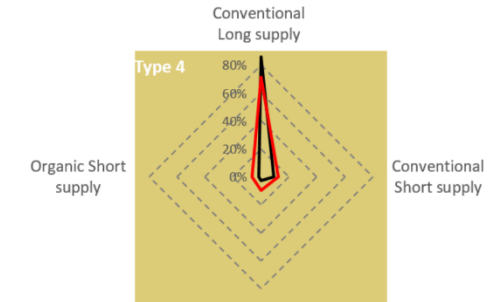
Type 4 : 85 987 farms (22 %)
Type 8 : 16 387 farms (4,2 %)

Cluster 4 Numbers of farms by canton

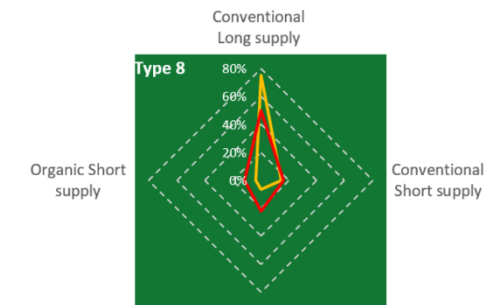
- 50
- 100
- 200
- 400
- 600

Cluster 8 Numbers of farms by canton

- 50
- 100
- 200
- 400



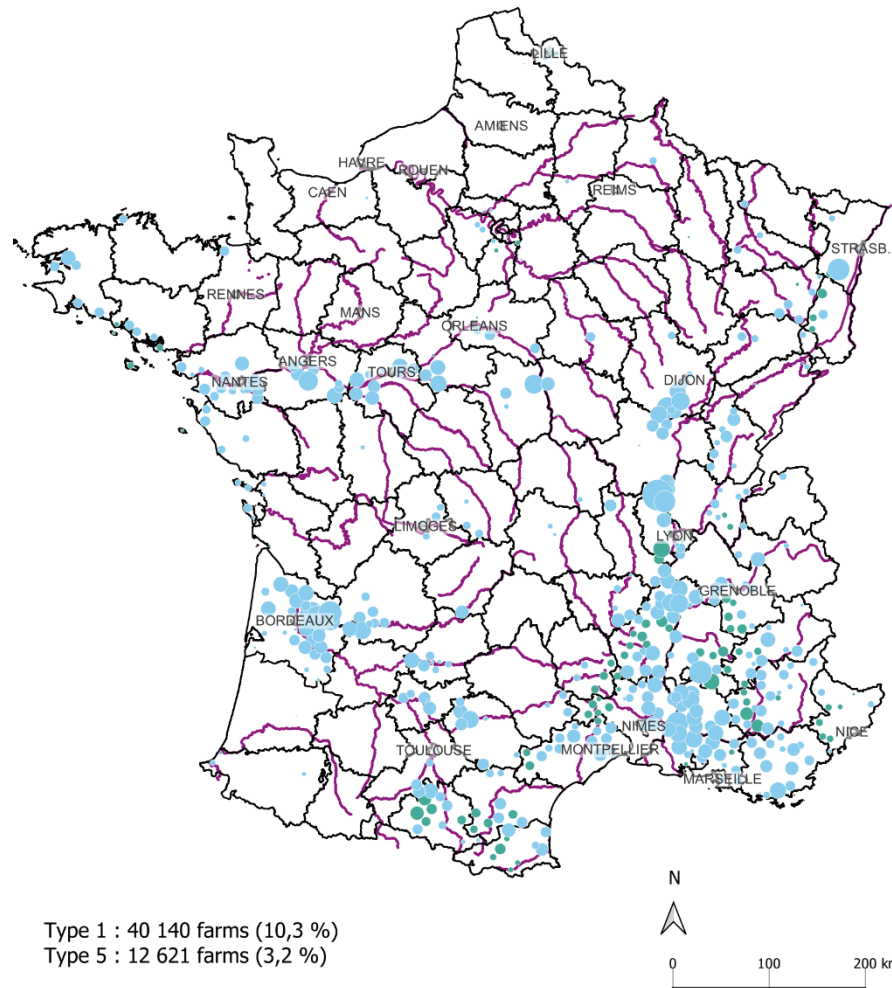
Organic Long supply
— 2010 — 2020



Organic Long supply
— 2010 — 2020

3. Evolution of Agrifood Transitions in France: a Dynamic and Contrasted Geography

Typology of cantons in Metropolitan France based on the evolution of organic agriculture and short supply chains between 2010 and 2020



Type 1 : 40 140 farms (10,3 %)
 Type 5 : 12 621 farms (3,2 %)

Cantons with a significant decline in conventional farming in the long supply chain

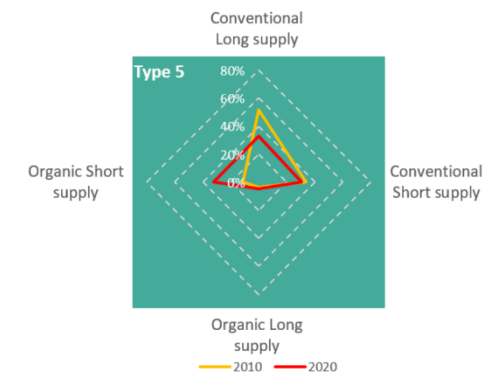
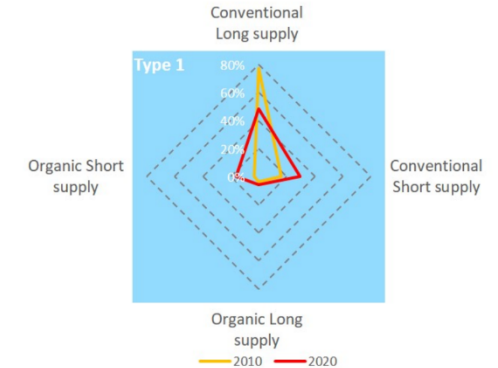
- Cluster 5 ■ Significant use of organic farms in the short supply chain (11% > 32%) in a context where conventional farms in the short supply chain were prevalent in 2010 (34%). Conventional farms in the long supply chain are becoming less prevalent.
- Cluster 1 ■ Significant growth of farms in the short supply chain, with a primary focus on conventional farming (16% > 29%) and a secondary emphasis on organic farming (3% > 16%).

Cluster 1 Numbers of farms by canton

- 100
- 200
- 400
- 600
- 800

Cluster 5 Numbers of farms by canton

- 50
- 100
- 200
- 400

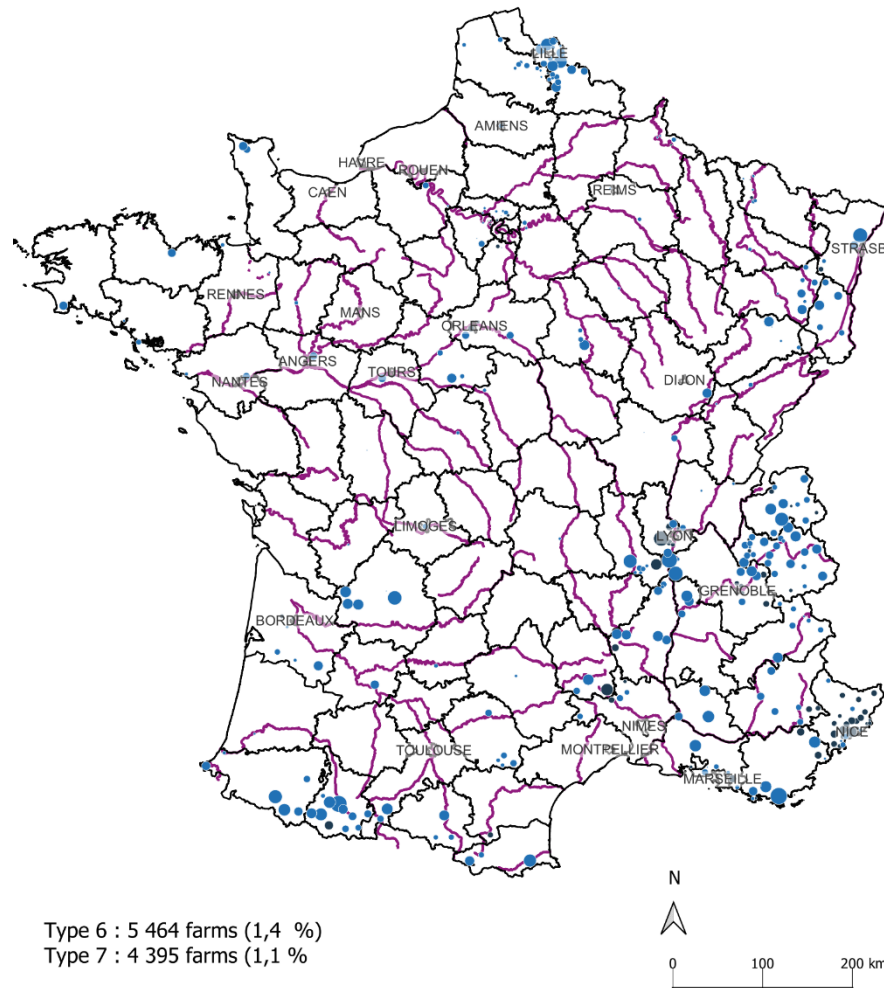


3. Evolution of Agrifood Transitions in France: a Dynamic and Contrasted Geography

Typology of cantons in Metropolitan France based on the evolution of organic agriculture and short supply chains between 2010 and 2020

Cantons with a significant decline in conventional farming in the long supply chain

- Cluster 6 Establishment of a dual agricultural structure: 50% long supply chain - conventional farming/ 40% short supply chain - conventional farming in 2020.
- Cluster 7 Maintenance of conventional farming in the short supply chain at 64%. Emergence of organic farming in the short supply chain. Conventional farming in the long supply chain < 20%.



Type 6 : 5 464 farms (1,4 %)
Type 7 : 4 395 farms (1,1 %)

Cluster 6 Numbers of farms by canton

- 50
- 100
- 200
- 400

Cluster 7 Numbers of farms by canton

- 50
- 100
- 200

