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URBANISATION ET SÉCURITÉ ALIMENTAIRE

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FOOD SECURITY & URBANIZATION: OLD CHALLENGE

Food security for a city means access by its residents to enough food for an active, healthy life.

Since ancient times, the cities need *food security* to build its growth.

↪ First cities have been nearness to fertile agricultural land in order to secure the food supply

Large-scale urbanization has been induced by *economies of scale* in the production of manufactured products and services and in the production of public good (*a necessary condition but not a sufficient condition*)

Large-scale urbanization has been also allowed by structural changes in agriculture (*when the food supply was mainly in the land around the cities*)

⇒ **New agricultural products** (ex: the introduction of *potatoes*: provide more calories, vitamins, and nutrients per unit of land than other pre-existing staple crops = *potatoes require less land to produce the same amount of calories*)

⇒ **New agricultural technologies** induce productivity gains (reduce the “food problem” and releases labor for the urban sectors)

AND *allowed by the fall in (agricultural/food) transportation cost and time*

The food supply was mainly in the land around the cities; Today, the means of transport have been greatly improved and the system of logistics has been developed, leading to

More exports and imports of agricultural and food products

More big food companies

⇒ **INTERNATIONALIZATION AND SPATIAL DISPERSION OF FOOD SUPPLY**

WHILE

THE FOOD DEMAND IS MORE AND MORE SPATIALLY AGGLOMERATED

SUSTAINABLY FEEDING LARGE CITIES: BIG CHALLENGES

1. Large quantities of food need to be imported each day to feed the major cities. Indeed, about 6000 (14000) tonnes of food (beverage) need to be imported each day into cities of at least 10 million inhabitants
2. According to our calculations, about 0.18 hectares of crops and 0.12 hectares of permanent grassland are necessary to feed one person in France. In other words, about 3 million hectares of agricultural land are needed to feed the 10 million inhabitants.
3. Urbanization may also give rise to spatial and "nutritional" exclusion, *insufficient access to a satisfactory diet that can achieve a nutritional status that is favourable to health*. It is estimated that about one-third of the global urban population lives in a ghetto.

The food demand is more and more agglomerated

More than half of the global population now lives in urban areas

Even if a strict definition of a city is used, nearly 40% of the global population lives in a metropolitan area of more than one million inhabitants.

More big cities

The number of cities with more than 1 million inhabitants has more than doubled between 1950 and 2007, rising from 181 to 414.

High-speed urbanization in Africa and Asia

The proportion of the urban population in Africa increased at an average rate of 4.3% per year.

*Dhaka in Bangladesh, with a population of about 9 million inhabitants, is growing at an annual rate of 5%, which means **1300 additional people each day***

Spatial extension of cities (*urban sprawl*) to the detriment of agricultural land.

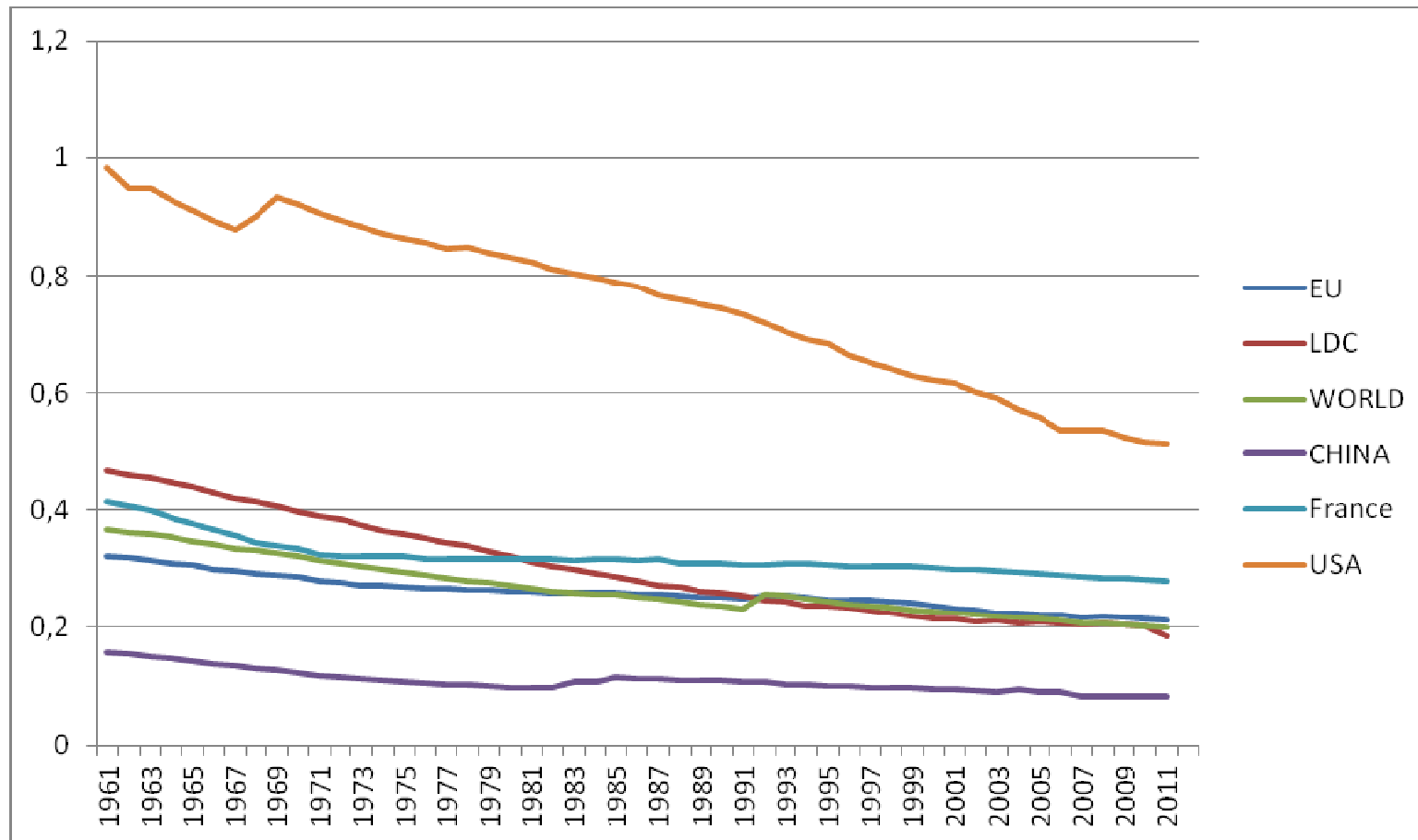
Spatial extension of a city increases more than proportionally with its population size

The land allocated to residential areas increased by **48%** between 1976 and 1992 in the USA, while the urban population increased by **18%**

Urbanization in the European Union: lost 30 million hectares of agricultural land between 1961 and 2003

Urbanization in China: Between 1996 and 2005, **8 million** hectares of arable land was lost (around **30%** of arable land in France)

Arable land per capita



A growing spatial dispersion of food supply

An increase in the average distances travelled by food products...

⇒ *The transport distances of foods and agricultural products have risen by 17% and 32% respectively, since 1975 in France (similar rises in Germany and in the UK)*

⇒ *The international transport of agricultural and food products by French carriers almost tripled between 1975 and 1995.*

...and an increase in the mean distances covered by road transport

⇒ *The average distances travelled by truck have also risen since 1975, by around 50%*

An increase in household mobility within cities (due to a growing dissociation between places of residence, workplaces, places of food suppliers)

For example, retail outlets are unevenly spread throughout the Île-de-France Region around Paris. More than half of large supermarkets are situated in the outer suburbs.

WHY? Several reasons can be put forward to explain the increase in the average distances travelled by goods.

Changes in food consumption behaviours

*As spatial concentration of the population (food demand) increases, more food needs to be transported to meet the needs of urban households,
Urbanisation, with a rise in income for a large share of the urban population, increases the food demand and the proportion of processed food products.*

The economic geography has also evolved, because of:

- (i) scale economies and low transport costs
- (ii) emergence of multinationals
- (iii) change in logistical management.

⇒ Specialization of regions/plants ⇒ long-distance trade

Illustration du poids des changements organisationnels (industriels et logistique) dans la hausse des distances parcourues

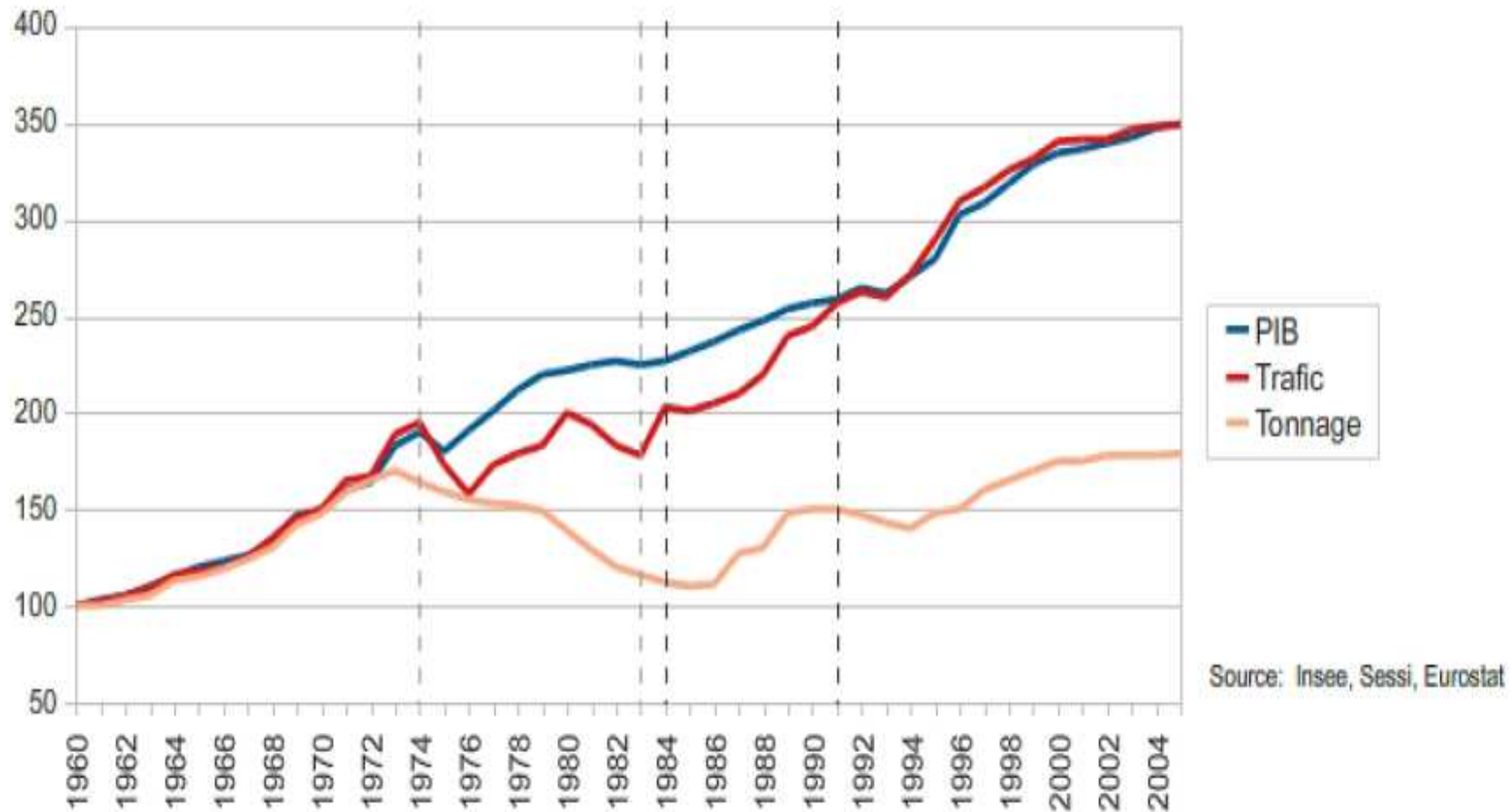


FIGURE 1.2 : ÉVOLUTION COMPARÉE DES INDICES DE PIB ET DE FRET TERRESTRE

SUSTAINABLY FEEDING LARGE CITIES: NEW CHALLENGES

⇒ Reducing greenhouse gas emissions

The transport of the yoghurt consumed in Paris accounts for one-third of the GHG emissions of this product (Rizet and Keita, 2005).

According to a report by the London Development Agency (2006), more than 40% of the city's carbon footprint can be attributed to its food system).

⇒ Managing rare resources (agricultural land, energy, water)

⇒ Food and the health of the inhabitants of large cities

URBANIZATION, FOOD AND HEALTH

Large cities are in the front line

Not only because they host the majority of the world's population.

But also because many large cities (such as New York, London, San Francisco) have developed full-fledged food strategies,

WHY?

⇒ Development of unhealthy diets in large cities

⇒ Possible connection between patterns of urban land development, physical activity and weight

Empirical evidence

High obesity rates are correlated with low food prices and job-related exercise, low time cost of food preparation, the prevalence of fast-food restaurants,

and to *urban sprawl* (Low density and distance to jobs)

WHY? Urban sprawl

⇒ people drive more, exercise less, and gain weight

⇒ lead to traffic congestion and the diversion of time from activities such as exercising

RESULTS

Controlling for gender, age, race, education, smoking, and diet, several empirical studies show that **BMI is positively and significantly related to urban sprawl index** (density and distance to jobs)

However, a positive *correlation* between *sprawl* and *obesity* does not necessarily imply that sprawl *causes* obesity because people predisposed to obesity prefer living in sprawling neighborhoods (*spatial sorting*).

A recent study show, after controlling this *endogeneity bias*, the changes in neighborhood do not lead to changes in weight of individuals who choose a new place of residence.

⇒ reducing sprawl does not *directly* lead people to lose weight

**Even if the size and the spatial structure of cities have no effect on the BMI of individuals,
large cities have allowed the development of unhealthy food**

An example: The urbanization has induced the development of supermarkets. A recent study published in *Journal of Urban Economics*, shows that, all things being equal, an additional Walmart Supercenter per 100,000 residents increases the obesity rate by 2.3%.

⇒ the proliferation of Walmart Supercenters explains 10.5% of the rise in obesity since the late 1980s.

Vers une régionalisation des systèmes alimentaires ?

Facteurs favorables

- ❑ **Décentralisation de la politique alimentaire/agricole (Ville, quelle que soit la taille : de Lons-le-Saunier à New York City)**

Mal/ sur/ sous-Nutrition

Pollution locale et globale

Sécurité Alimentaire

- ❑ **« valorisation » des produits locaux par les consommateurs**

- ❑ **« Meilleure » information/traçabilité**

- ❑ **Hausse des prix de l'énergie**

Coûts de transport élevés = moins d'échange sur longue distance

Valorisation des déchets ⇒ économie urbaine circulaire

Bilans écologique et énergétique contrastés

- food miles *vs* modes de transport
- food miles et conflits d'usage (foncier, eau, ...) \Rightarrow *intensification des terres à proximité des villes*
- food miles *vs.* technologies plus ou moins polluante selon les conditions locales de production (variant avec les changements climatiques)
- food miles *au sein des bassins de production* *vs* food miles entre les bassins de production et de consommation

- Flux de transport sont essentiellement sur des distances courtes (**au sein des bassins de production**)

Table 1: Total Ton-mileage and Average Shipment Distance of Agricultural Commodities and Food Products by Mode of Transport in the US and in France.

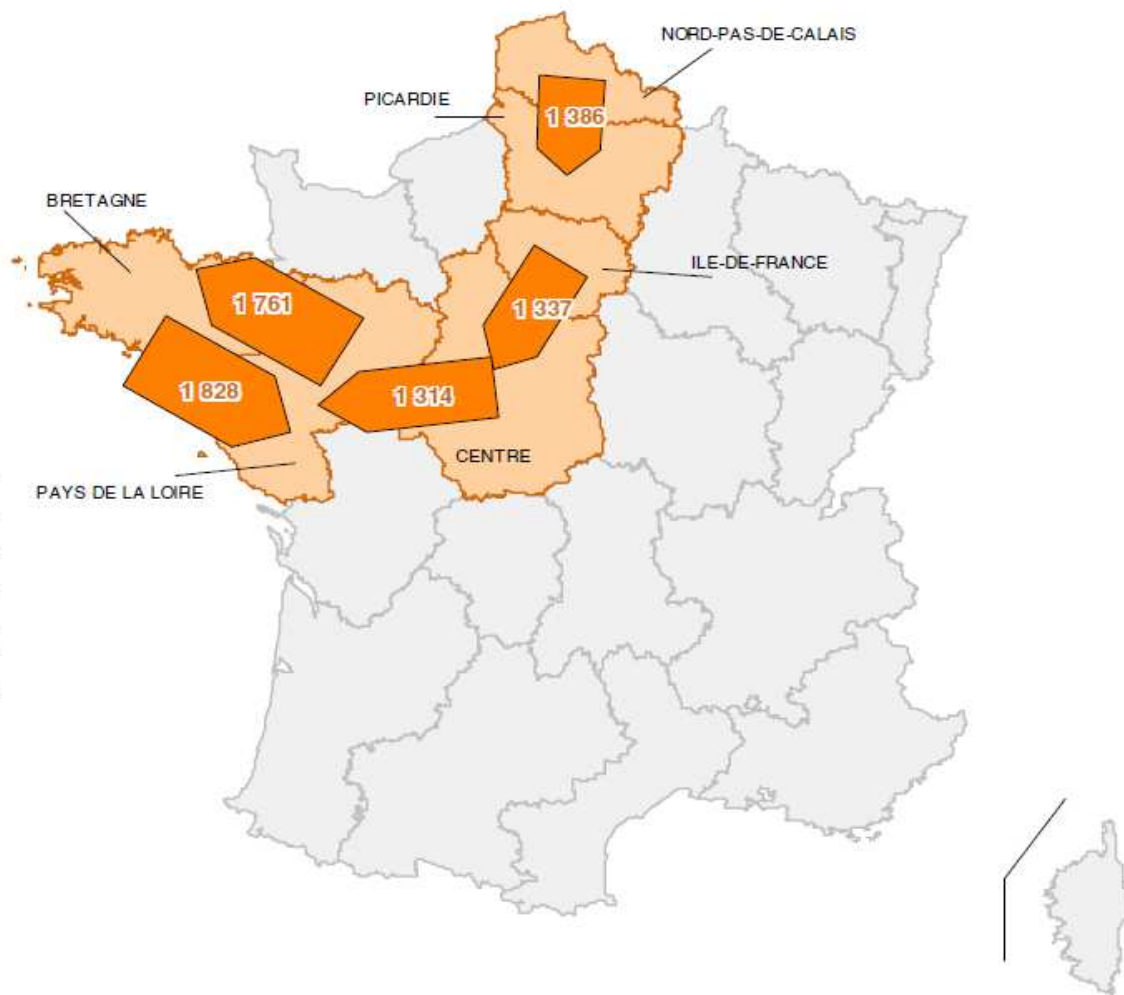
Commodity	1997					2007				
	Ton-Miles	All	Truck	Rail	Water	Ton-Miles	All	Truck	Rail	Water
	(10 ⁹)	Miles				(10 ⁹)	Miles			
USA										
1 Live animals and live fish	1.5	272	106	n/a	n/a	3.9	739	236	1463	n/a
2 Cereal grain	200.6	125	88	718	998	203.4	139	84	800	1008
3 Other agricultural product	80.7	438	87	1015	681	88.2	354	207	998	1024
4 Animal feed	46.8	79	56	807	526	76.1	499	136	884	2241
5 Meat, fish, seafood	36.4	137	104	1633	762	48.5	247	128	980	952
6 Milled grain and bakery product	48.5	122	72	1071	1965	50.7	403	103	1065	n/a
7 Other prepared foodstuffs	124.1	127	70	1167	n/a	171.4	268	95	1092	n/a
France										
0 Agricultural products	16.7	72	80	232	154	17.2	76	86	232	169
1 Food products	18.8	89	112	282	136	19.3	94	111	294	175

Sources: Adapted from BTS and U.S. Census Bureau (1999, 2010) for US Data and DAEI/SES (1998, 2008) for French data

Produits agricoles et animaux

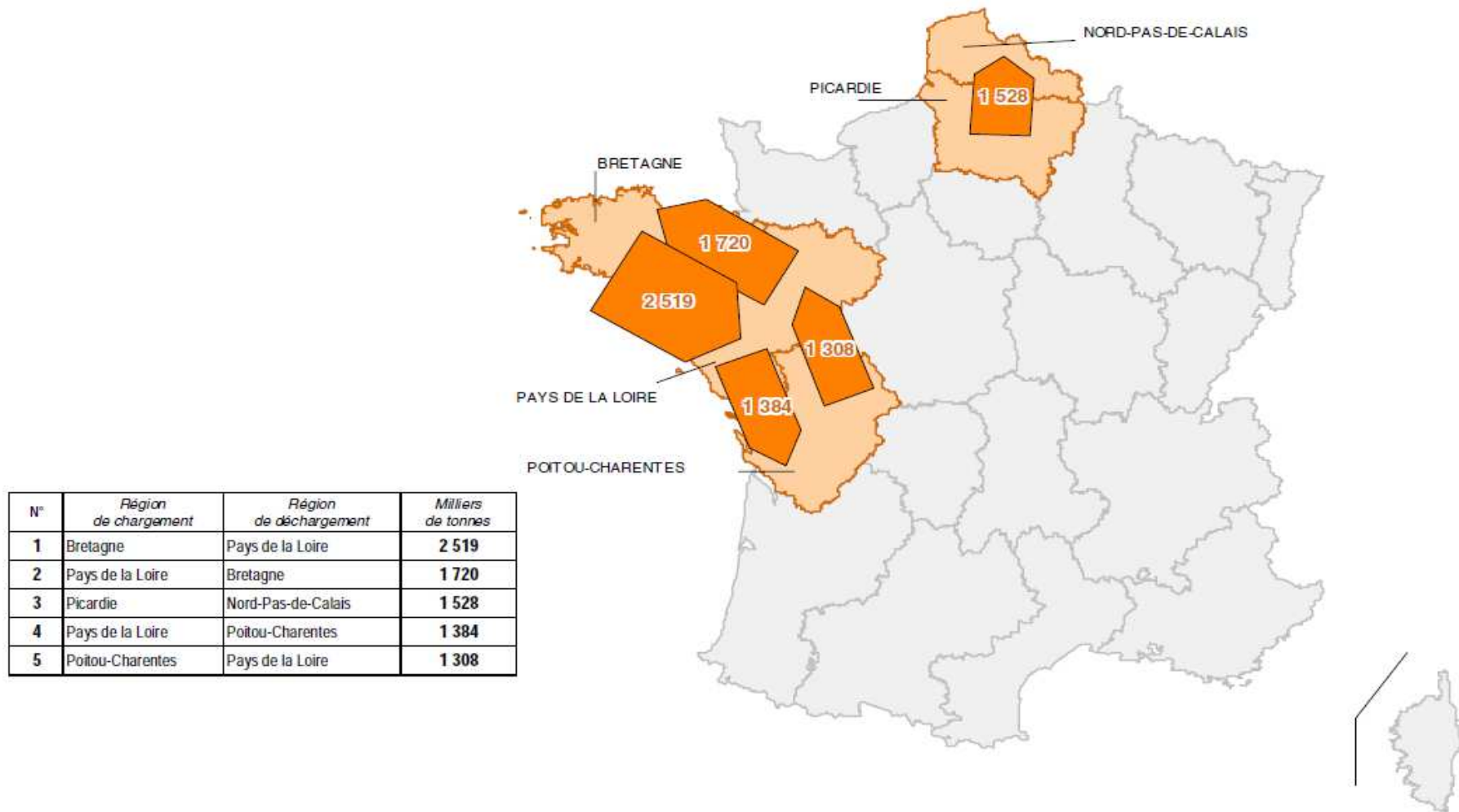
Flux routiers

N°	Région de chargement	Région de déchargement	Milliers de tonnes
1	Bretagne	Pays de la Loire	1 828
2	Pays de la Loire	Bretagne	1 761
3	Nord-Pas-de-Calais	Picardie	1 386
4	Île-de-France	Centre	1 337
5	Centre	Pays de la Loire	1 314



Denrées alimentaire et fourrage

Flux routiers



MEDAD/SESP, SitraM

Composition par type de produits

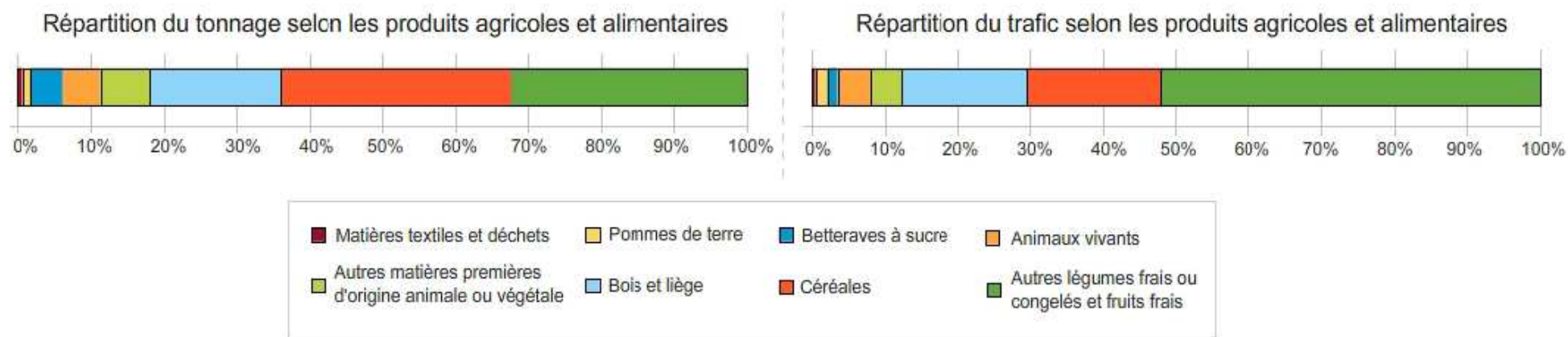


FIGURE 1.7 : RÉPARTITION DU TONNAGE ET DU TRAFIC SELON LA NATURE DU PRODUIT

Travail « feeding the cities and the transport-related GHG emissions » en révision pour AJAE

Modèle d'économie géographique d'un système hiérarchique de ville avec du transport au sein des bassins de production agricole et entre bassin de production et bassin de conso (système dit « hub & spoke »).

Il est optimal (d'un point de vue écologique) de faire co-exister deux types de filières (local et global) ssi

- Le système local est adopté par les villes intermédiaires
- Les rendements agricoles sont suffisamment élevés

- Intérêt limité pour les « grandes » collectivités locales

- En France: Pour nourrir une personne : 0.33 ha en moy.

IDF: Environ 3 millions d'hectare de terre agricole sont nécessaires

SAU de IdF $\sim 1/6^{\text{ième}}$ des besoins en terre pour nourrir les franciliens

- Diversifier leurs sources d'approvisionnement (local et global).

- Favoriser l'agriculture locale pour une meilleure maîtrise de la qualité
vs capacité à mettre en place des filières locales

Lons-Le-Saunier : env. 2760 repas par jr dans la rest. coll.

IDF : Plus d'un million de repas par jour

Intérêt limité pour les agriculteurs

- En France, les exploitations avec vente directe principalement localisées dans les territoires fortement urbanisés

Mais:

- baisse du nombre d'exploitation en vente directe et circuit court et pas de hausse de leur part
- Surtout des petites exploitations

Pour conclure : Quelle gouvernance locale dans l'émergence de systèmes alimentaires locaux ?

- Dans quelles conditions les collectivités locales peuvent-elles structurer « profitablement » des filières locales visant à alimenter leurs résidents ?
 - Grandes villes, moyennes villes?*
 - Avec quels interlocuteurs?*
- Quels instruments, leurs efficacité ? (politique foncière, contrats avec les agriculteurs,...)