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# Urbanization and impact on sustainability of agrifood systems

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## Presenter Disclosure Information

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*urbanisation and the sustainability of food systems*

I **will not** discuss off label use or investigational use in my presentation.

I **have no** financial relationships to disclose:

Employee of: INRA

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# ACCESS TO FOOD AND URBANIZATION: OLD CHALLENGE

Since ancient times, the cities need *food security* to build its growth – *Food security for a city means access by its residents to enough food for an active, healthy life.*

↪ 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 par 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*

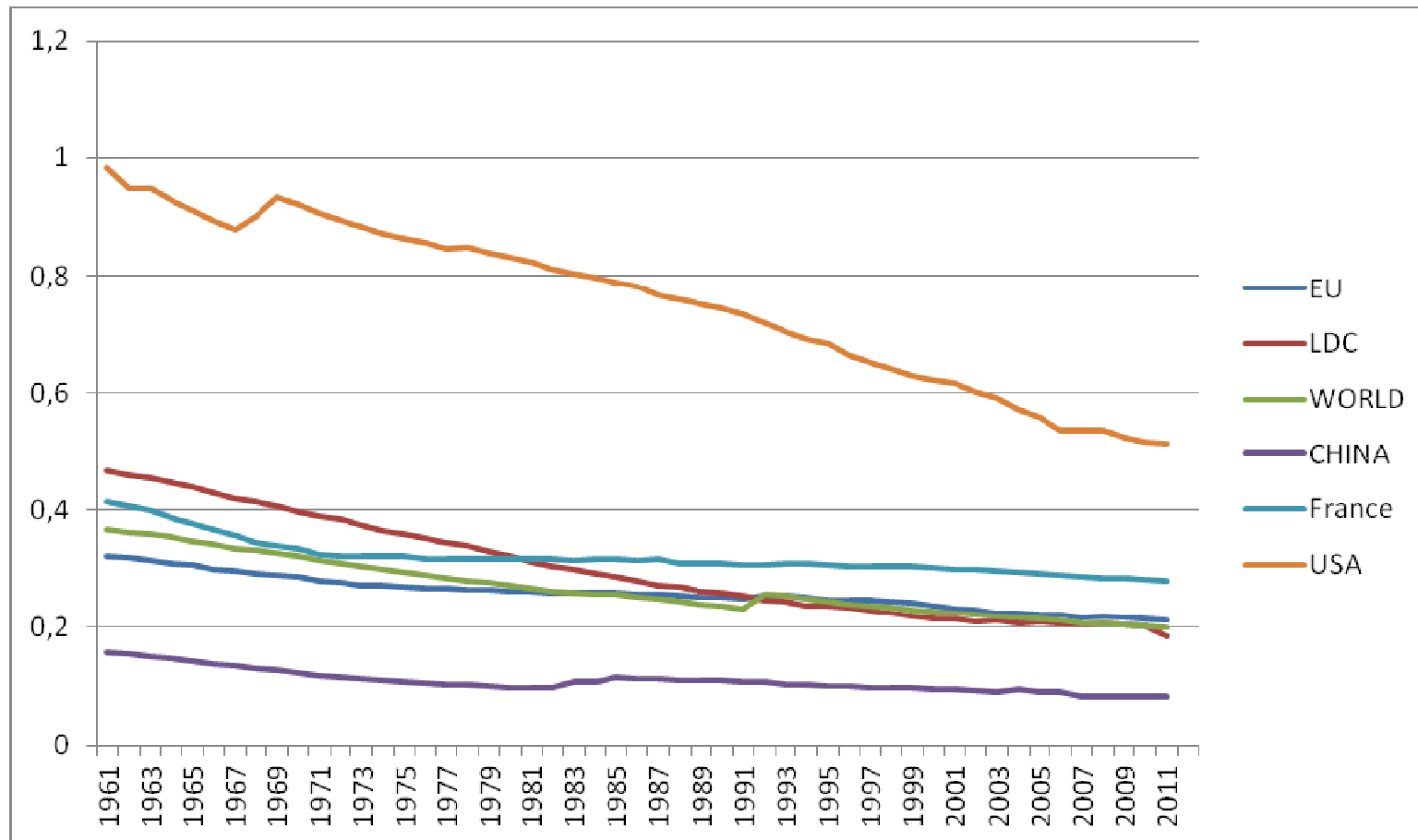
The land allocated to residential areas increased by **48%** between 1976 and 1992 in the USA, while the urban population increased by **18%**

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

# 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 far away from 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

## A last remark

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.