



Aalto University
School of Arts, Design
and Architecture

5 November 2020

Systems Thinking I MUO-E8029 & SPT-1050

URBAN METABOLISM

*Alpo Tani, Strategic Urban Planner,
City of Helsinki , SPT course stream*

*Kata Fodor MAA, Doctoral Candidate
Aalto University, Department of Design*

SCHEDULE of the DAY

URBAN METABOLISM

5 November 2020

- 13:15 – 13:20** Reflection on Tuesday's session
- 13:20 – 13:30** Topic Introduction
Discussion: Reflections on Pre-Readings
- 13:30 – 14:15** Presentation by Alpo Tani
- 14:15 – 14:30** B R E A K
- 14:30 – 15:00** Presentation by Kata Fodor
- 15:00 – 15:10** B R E A K
- 15:10 – 15:40** Discussion Time
Orientation for next Session - Mikko
-
- 15:45 – 16:00** CS Book Groups meet in Breakout Rooms

URBAN METABOLISM

KENNEDY PAPER ON: URBAN METABOLISM

Abel Wolman (1965)

- developed the concept in response to deteriorating air and water quality in US cities
- quantifying the overall fluxes of energy, water, materials & wastes into/out of a specific urban region

Metabolism:

The production and consumption of organic matter, typically understood as energy (Odum, 1971)

Urban Metabolism:

Might be defined as the sum total of the technical and socioeconomic processes that occur in cities, resulting in growth, production of energy, and elimination of waste

A sustainable city:

implies an urban region for which the inflows of materials and energy and the disposal of wastes do not exceed the capacity of its hinterlands

- significance of spatial relationships with surrounding hinterlands and global resource webs

ECOSYSTEME BRUXELLES (16.178 ha)

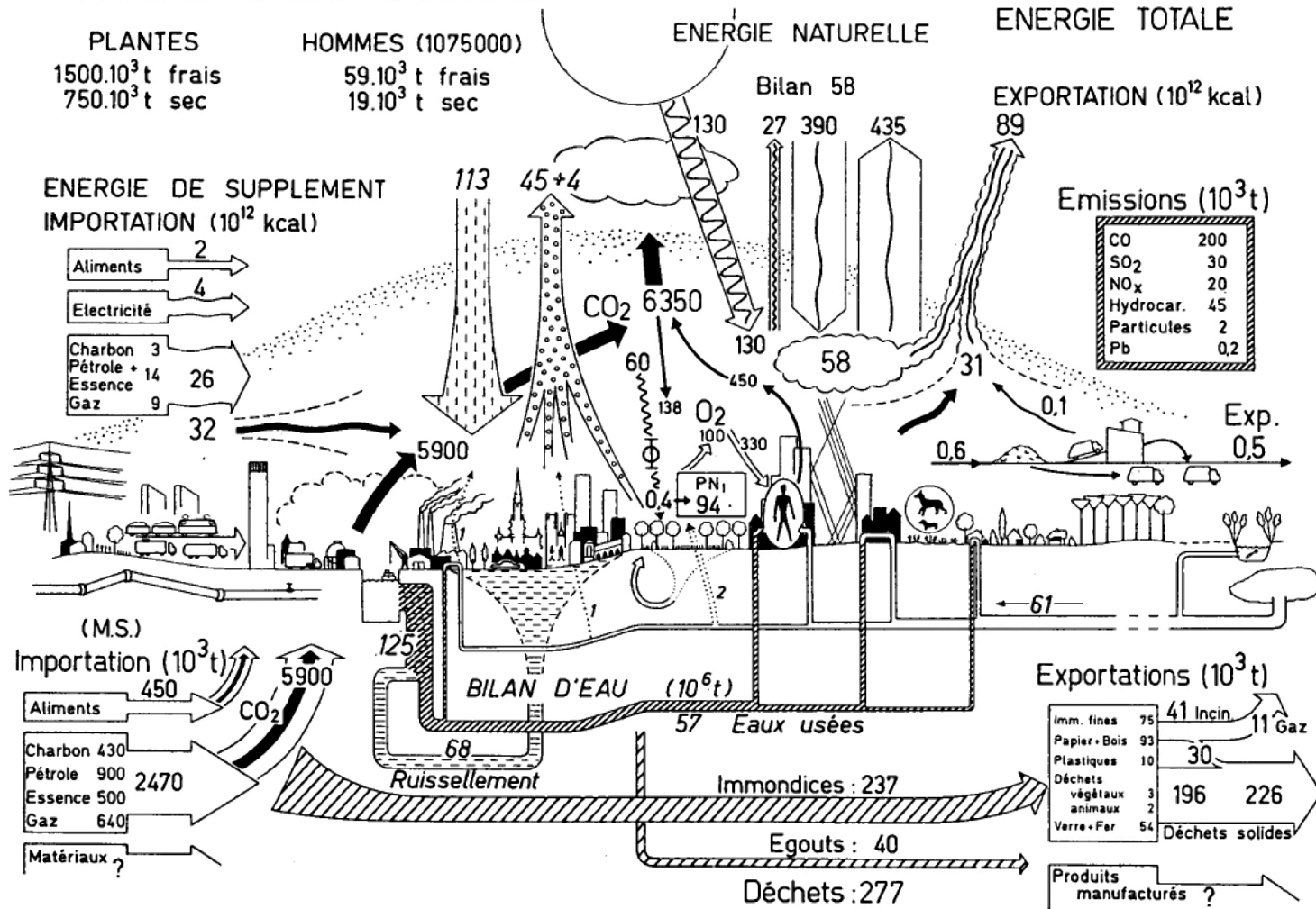


Figure 1 The urban metabolism of Brussels, Belgium in the early 1970s. Source: Duvigneaud and Denaeyer-De Smet 1977.



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URBAN METABOLISM: FOOD SYSTEM CHALLENGES

*Kata Fodor MAA, Doctoral Candidate
Aalto University, Department of Design*

FOOD SYSTEM

all elements and activities
that relate to production, processing,
distribution, preparation & consumption of food

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that relate to production, processing,
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“A system is an interconnected set of elements that is coherently organised in a way that achieves something.”

(Meadows, 2008)

SUSTAINABLE FOOD SYSTEM / DIETS

“Sustainable Diets are those diets with low environmental impacts which contribute to food and nutrition security and to healthy life for present and future generations. Sustainable diets are protective and respectful of biodiversity and ecosystems, culturally acceptable, accessible, economically fair and affordable; nutritionally adequate, safe and healthy; while optimizing natural and human resources.”

UN – Food and Agriculture Organization (FAO), 2010

Challenges?



**SUSTAINABLE
DIETS**

Challenges?



Pollution

Landfilling & Littering

Disposable Packaging

Monocultures

Monocropping

Soil Degradation

Biodiversity Loss

CAFOs

Overuse of Antibiotics

Food Loss

Food Waste

High Meat Consumption

Water Use

Obesity

Cropland Use

Refrigerants

Deforestation

Hunger

Overfishing

GHG emissions

Modern Slavery

Undernourishment

Ultra-Processed Foods

Complex Global Food Supply Chains

Societal Inequalities

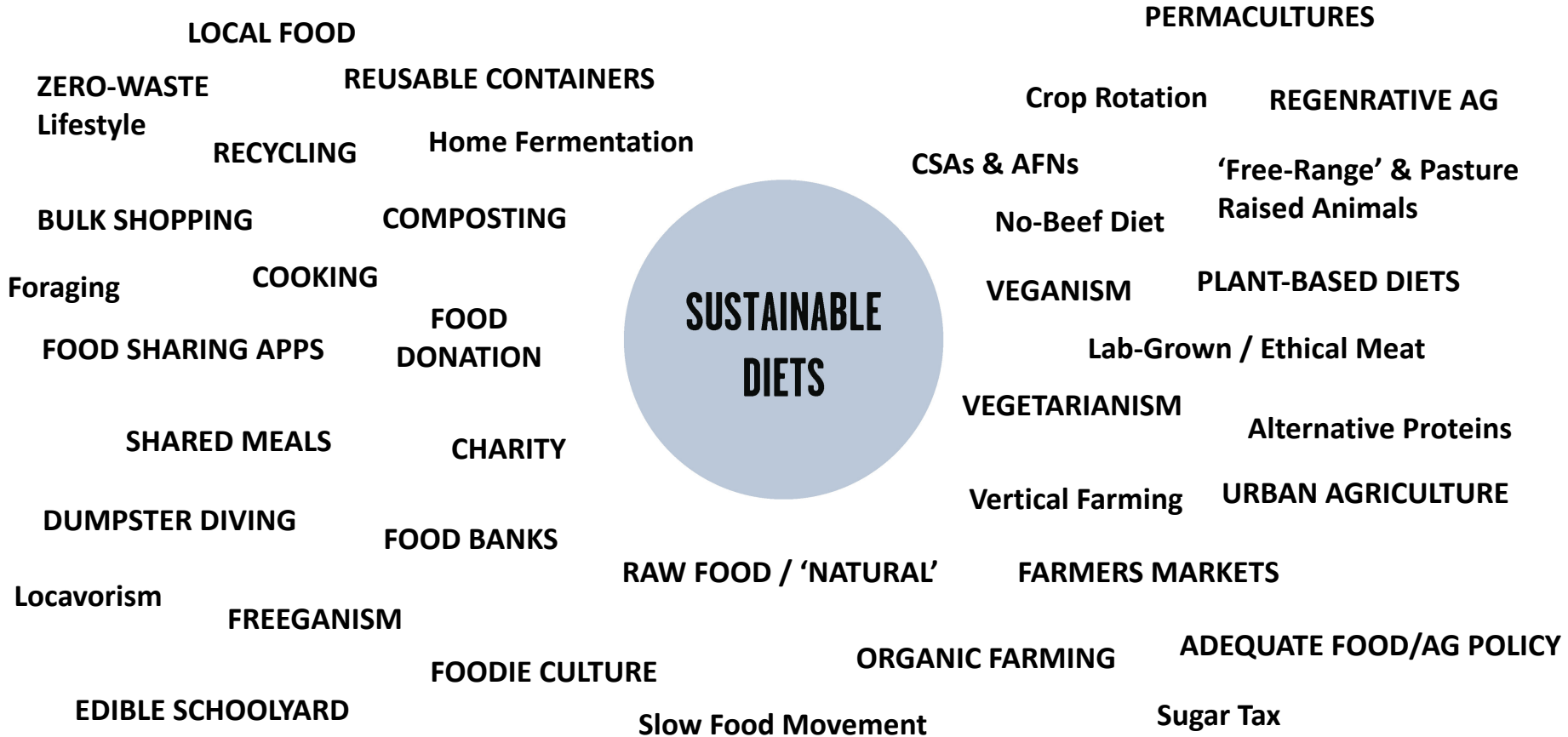
Artificially 'cheap food'

Outdated Agricultural Subsidies

Exploitation of Labour

Food/Animals as Commodity

Solutions?



'Complexity of Factors Behind a Deceptively Simple Term'



Source: Sustainable Diets, Mason & Lang, 2017

WHAT ARE THE SPATIAL & URBAN IMPLICATIONS?

HEALTH

safety; nutrition; equal access; availability; social status/affordability; information & education

SOCIAL VALUES

pleasure; identity; animal welfare; equality & justice; trust; choice; skills (citizenship)

ECONOMY

food security & resilience; affordability; efficiency; fair competition & returns; decent working cond. fully int. costs

QUALITY

taste; seasonality; cosmetic appeal; fresh (where appropriate); authenticity

GOVERNANCE

sci & tech evidence base; transparency; democ. accountability; ethical values (fairness); internat aid & devel.

ENVIRONMENT

climate change; energy use; water; land use; soil; biodiversity; waste reduction



Image: Conceptual Devices, Antonio Scarponi



LOGISTICS ?

RETAIL ?

STORAGE ?

PREPARATION ?

CONSUMPTION ?

DISPOSAL ?

WASTE MANAGEMENT?

MAKEOVERS OF THE FRANKFURT KITCHEN

FRANKFURT KITCHEN



1911

1921



1931

1941



1951

1961



1971



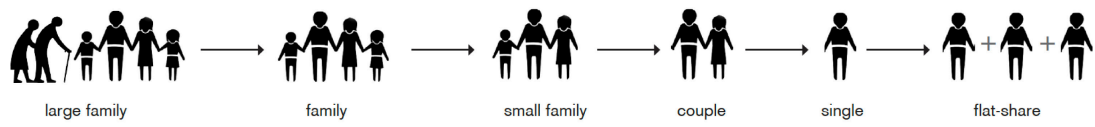
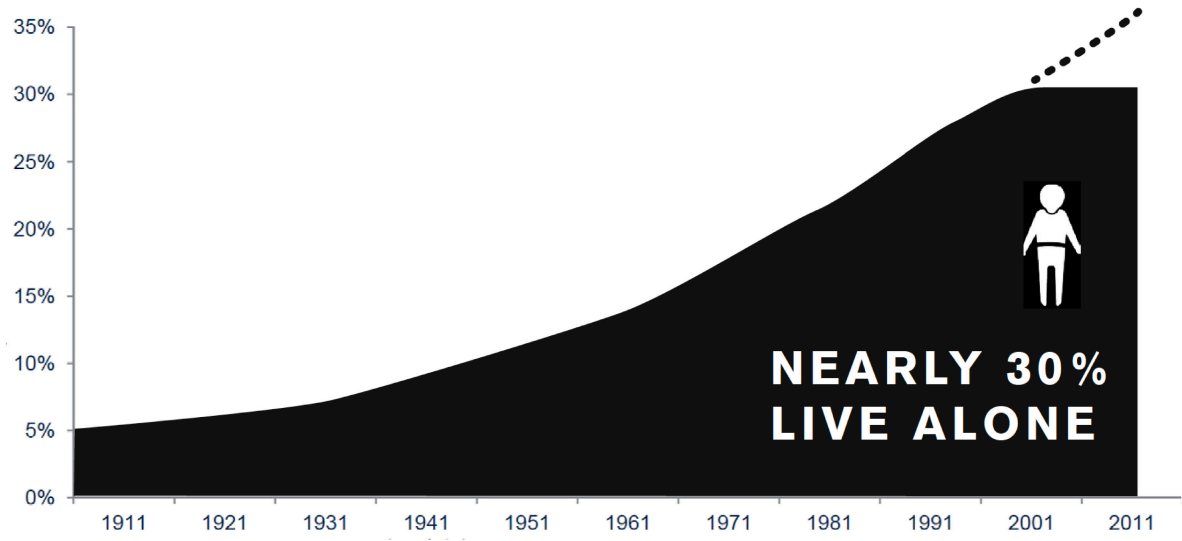
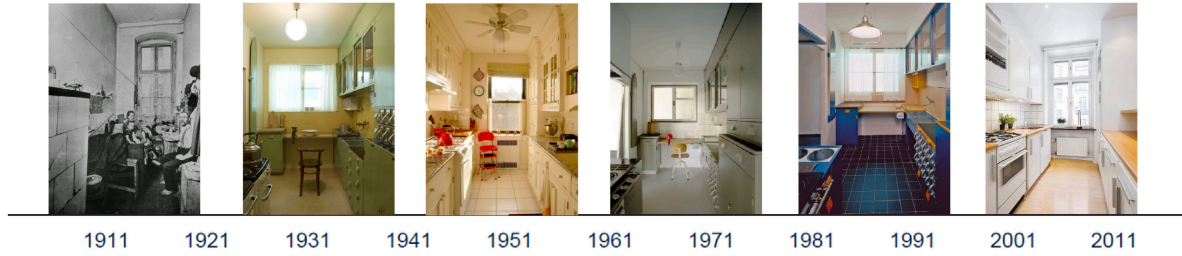
1981

1991



2001

2011





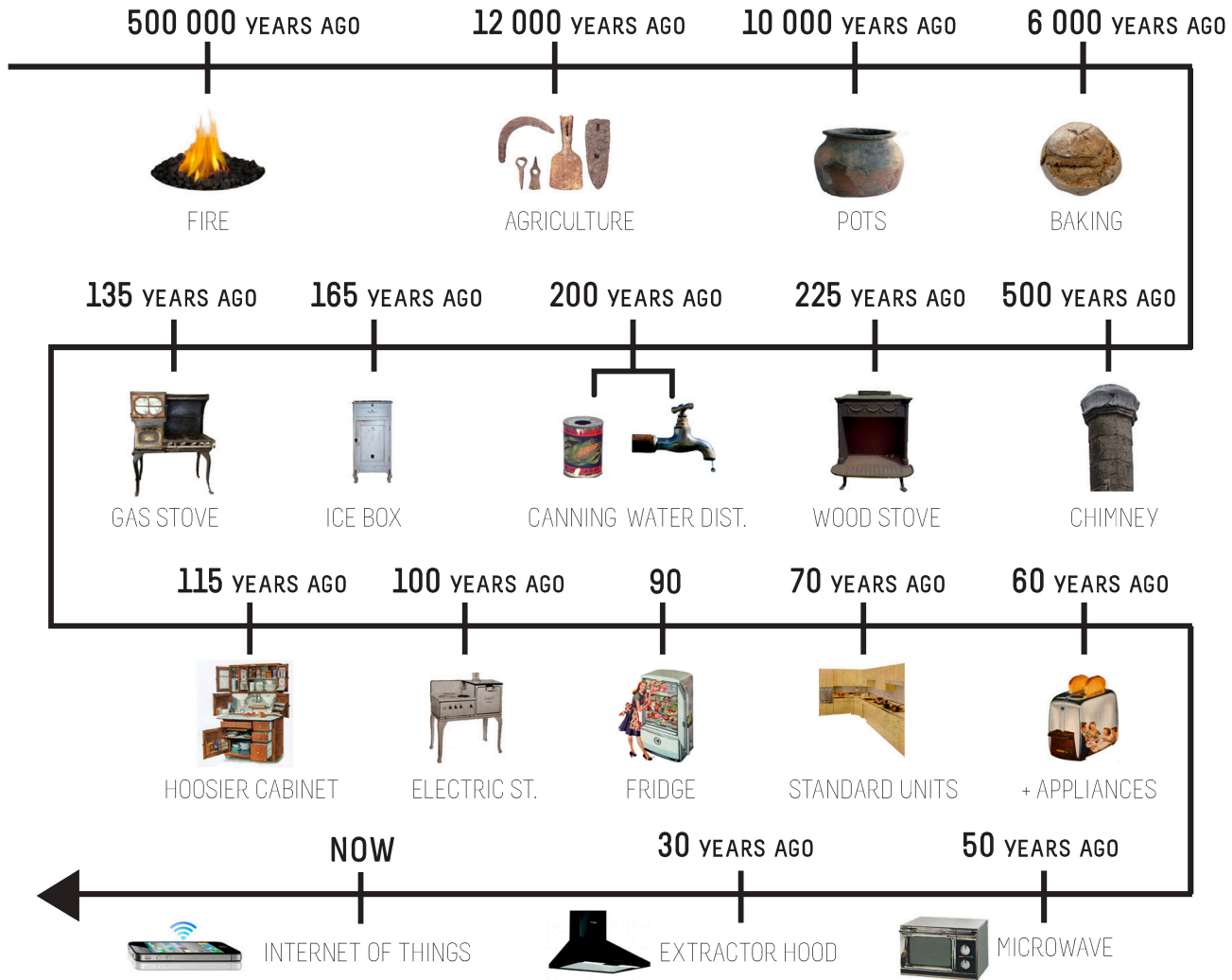
DEMOGRAPHIC CHANGES



ENVIRONMENTAL CHALLENGES



TECHNOLOGICAL POSSIBILITIES



NEW TECHNOLOGIES SHAPING OUR BEHAVIOURS:



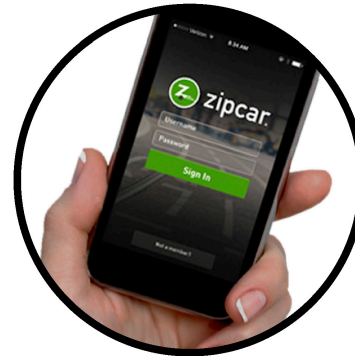
shopping

COMMERCIAL - DOMESTIC



sociability

PRIVATE - SOCIAL



sharing options

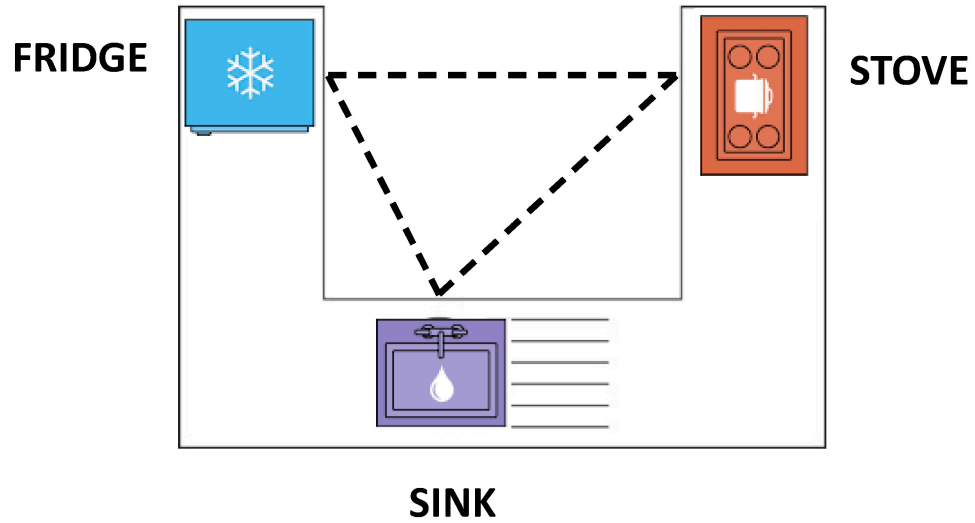
ACCESS - ORGANISATION



transactions

PAYMENT - ever so easy

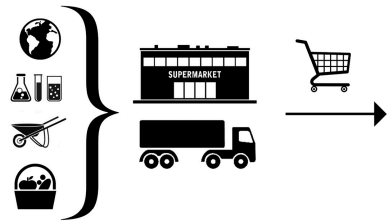
20th CENTURY KITCHEN WORK TRIANGLE



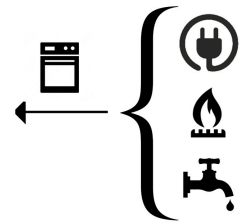
THE KITCHEN IS...



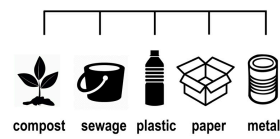
FOOD
SUPPLY
CHAINS



HOUSING
HOME



MAINS
RESOURCES

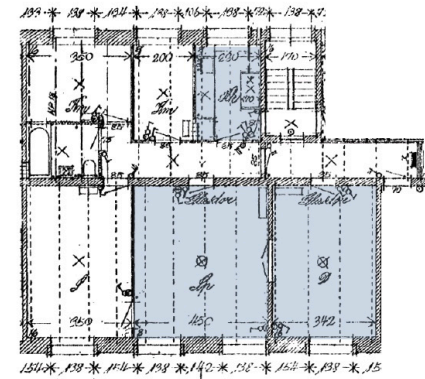


WASTE
MANAGEMENT

CHANGES AT HOME

1930: THE ORIGINAL APARTMENT

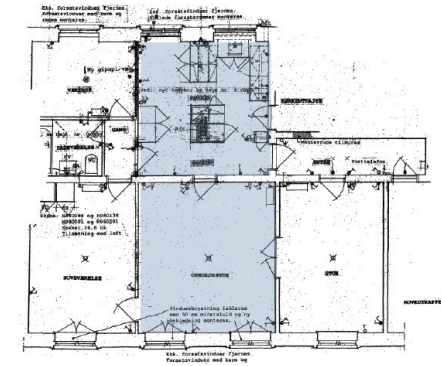
The largest central room in the apartment is a generous dining room (facing the street). It is served by a practical work kitchen towards the courtyard. For the special occasions, that guests were invited into the home, they even used the adjacent sitting room.



- kitchen
- +
- dining room
- +
- sitting room
- +
- 3 bedrooms

1993: MODERN FAMILY APARTMENT

63 years later the layout was revised: the hallway eliminated, the kitchen merged with the adjacent sn room to form a cosy everyday dining area. The big cen room could now become a living room with couch and a television set, and possibly still used at special times for festive family meals.



- kitchen-dining
- +
- living room
- +
- 3 bedrooms

2015: PRESENT-DAY FLATSHARE

The layout hasn't been changed for the past 20 years, however the use of the apartment is completely different today: Our apartment is home to 4 people of 4 nationalities. Each room is a separate private unit, while the infrastructure in the middle is shared. The kitchen/dining area now acts as a casual meeting point, while it is also the only social area in the apartment.

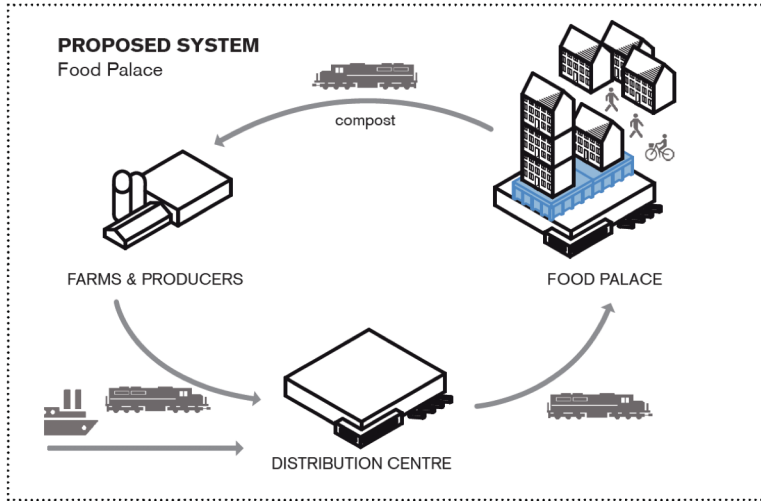
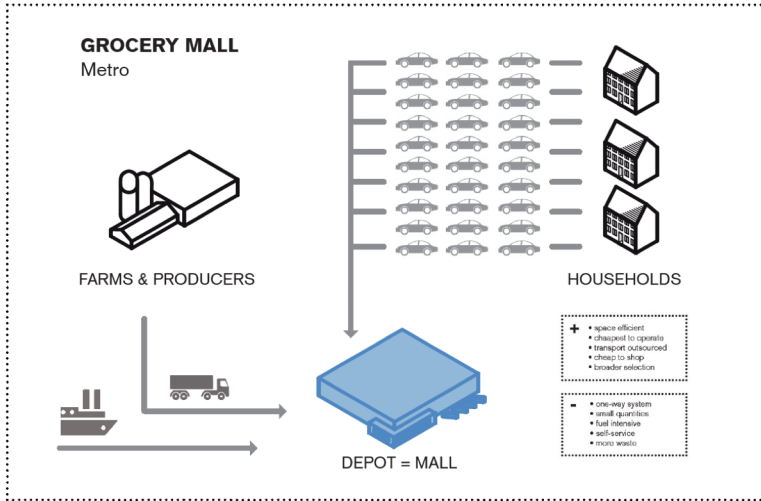
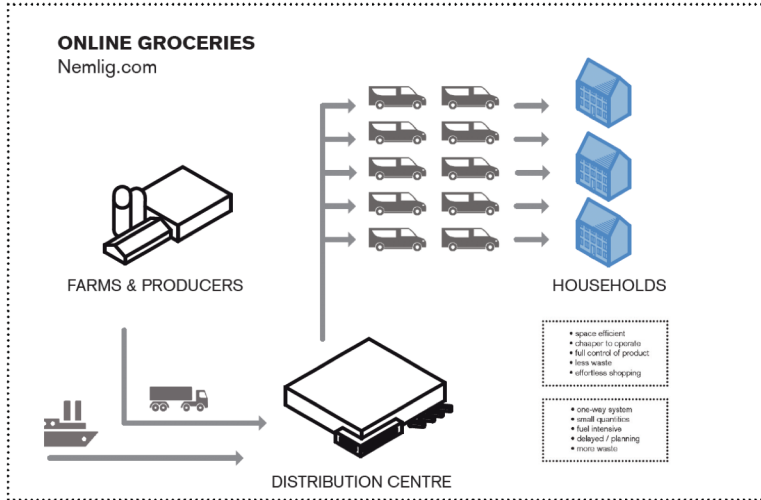
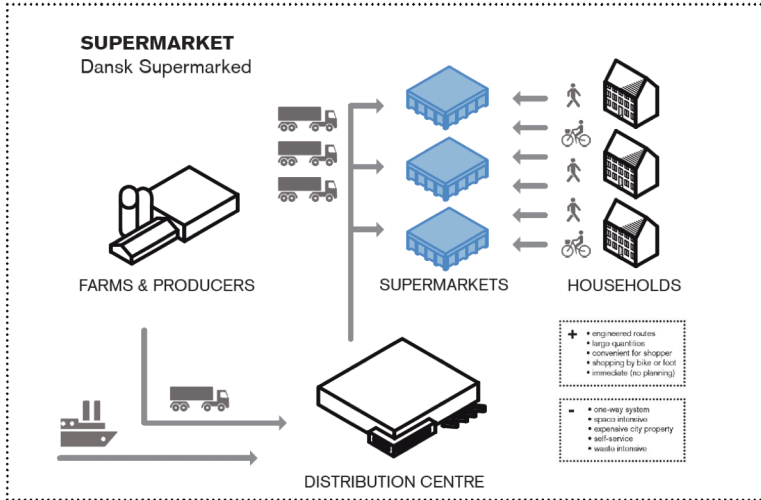


- kitchen-dining
- +
- tenant #1
- +
- tenant #2
- +
- tenant #3
- +
- tenant #4



Various Common Food Logistic Systems in Copenhagen

Comparing common Danish food retailers' logistics systems helped me to discover several unexpected qualities.





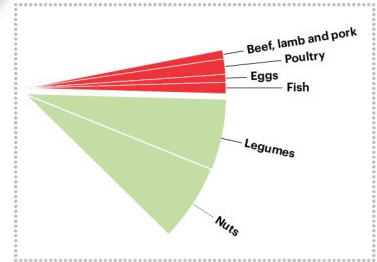
Read more: EAT-Lancet Commission (2019)

Target 1 Healthy Diets

Healthy diets have an optimal caloric intake and consist largely of a diversity of plant-based foods, low amounts of animal source foods, contain unsaturated rather than saturated fats, and limited amounts of refined grains, highly processed foods and added sugars.

	Macronutrient intake grams per day (possible range)	Caloric intake kcal per day
Whole grains Rice, wheat, corn and other	232	811
Tubers or starchy vegetables Potatoes and cassava	50 (0–100)	39
Vegetables All vegetables	300 (200–600)	78
Fruits All fruits	200 (100–300)	126
Dairy foods Whole milk or equivalents	250 (0–500)	153
Protein sources		
Beef, lamb and pork	14 (0–28)	30
Chicken and other poultry	29 (0–58)	62
Eggs	13 (0–25)	19
Fish	28 (0–100)	40
Legumes	75 (0–100)	284
Nuts	50 (0–75)	291
Added fats		
Unsaturated oils	40 (20–80)	354
Saturated oils	11.8 (0–11.8)	96
Added sugars		
All sugars	31 (0–31)	120

Table 1
Scientific targets for a planetary health diet, with possible ranges, for an intake of 2500 kcal/day.



Target 1

Healthy Diets

Healthy diets have an optimal caloric intake and consist largely of a diversity of plant-based foods, low amounts of animal source foods, contain unsaturated rather than saturated fats, and limited amounts of refined grains, highly processed foods and added sugars.











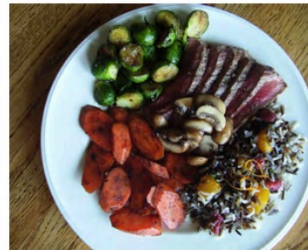
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AT WHAT LEVEL / WHERE TO INTERVENE?

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Food Access

Is it appropriate to use surplus food to feed people in hunger? Short-term Band-Aid to more deep-rooted problems of poverty¹

Professor Martin Caraher, City, University of London and Dr Sinéad Furey, Ulster University²

- There has been a rise in campaigning and attention focused on food waste in the domestic home setting and across industry in terms of production, manufacturing, distribution and retailing.
- At the same time, the proliferation of food banks and more general emergency food aid across the UK has been identified by the problem of household food insecurity.
- Calls for action to reduce food waste and reduce food insecurity have led to recommendations for enhancing systems to increase the redistribution of surplus food for emergency food aid either as a solution to food insecurity.
- Our analysis of the benefits and drawbacks of the use of surplus food to feed hungry people highlights how this practice undermines calls for direct action to both reduce the production of surplus food and to address systemic drivers of food insecurity and ensure the right to food.
- Recommendations call for civil society and policymakers to focus on systemic solutions to both food waste and household food insecurity as separate entities.
- While the redistribution of surplus food for emergency food aid provides immediate relief to the individuals, there is a need to ensure that it addresses food insecurity.
- There is evidence from other countries that the use of surplus food for emergency food aid 'bandwidth' longer and where governments not to address the gap between income and food costs.

1. Objective and scope

This paper explores the interlinking of two critical issues, where the redistribution of surplus organic, vegetable and livestock food is being put forward as a solution to meeting the food needs of food insecure people. This is an issue which has been subject to much press to 'domestic' attention, which have argued that the 'banish food redistribution' is not an effective way to reduce problems associated with poverty and food, nor access food production (1, 2). Nevertheless, in recent years, in the context of increased attention on the sheer volume of food wasted across the UK every year and the recent food insecurity reporting by food charities in the UK, there has been calls to enhance and expand the practice of using surplus food to feed hungry people. How can we do this?

¹The term for the food banked Collaboration (Food Bank) was suggested by NCI, Ireland in our ongoing research.

²The authors wish to acknowledge and thank David Clarke (Ulster University), Barbara and Catherine (Ulster University), and James Paul (Ulster University and Food Change (University of Ulster)) for their valuable contributions to this paper.

Prof. Martin Caraher and Sinéad Furey, 2017:

Is It Appropriate to Use Surplus Food to Feed People in Hunger? Short-Term Band-Aid to More Deep-Rooted Problems of Poverty

AT WHAT LEVEL / WHERE TO INTERVENE?

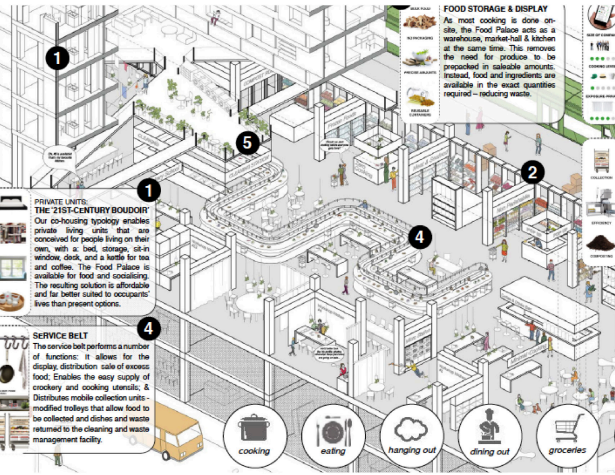
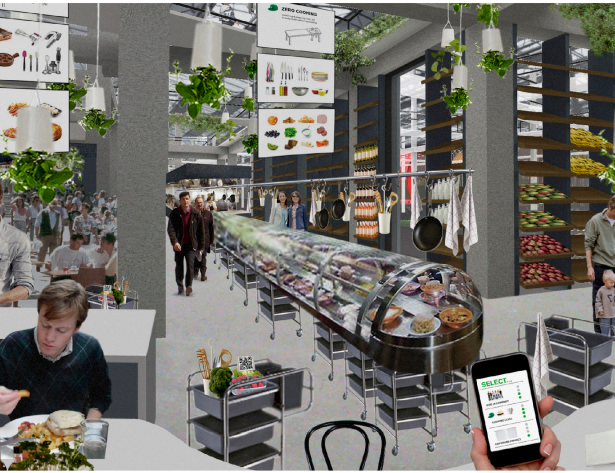
Floor M. Kroese, David R. Marchiori and Denise T. D. de Ridder, 2016:

Nudging Healthy Food Choices: A Field Experiment at the Train Station. Journal of Public Health 38.



**NUANCE, COMPLEXITY
NO SIMPLE SOLUTIONS**

DESIGN PRACTICE: ALTERNATIVE FOOD SPACES



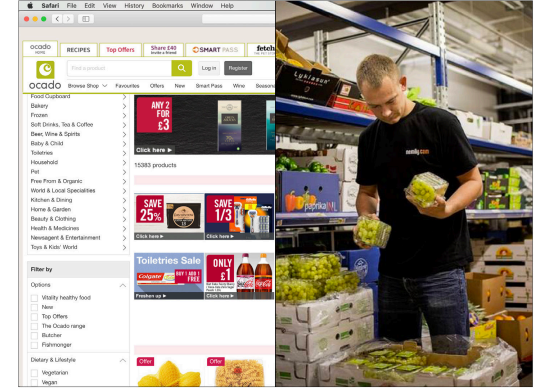
RESEARCH | Phenomenon: HYBRIDISATION OF FOOD SPACES



spatial sharing & compartmentalisation



reincorporation of growing & rotting



virtual + physical hybrid platforms



domestic-commercial blurring



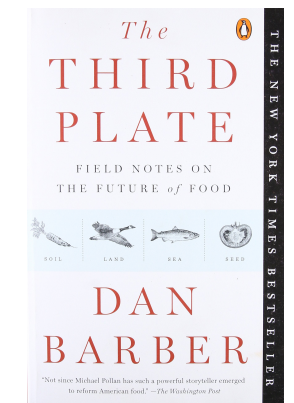
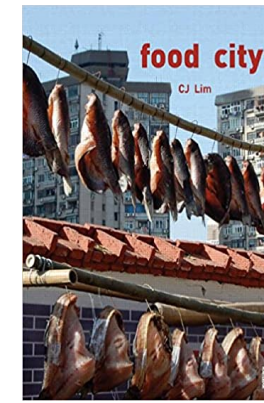
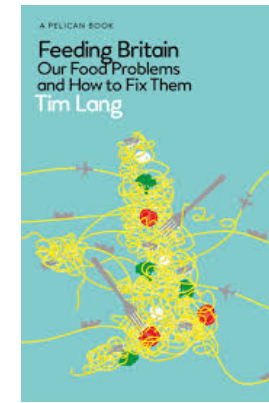
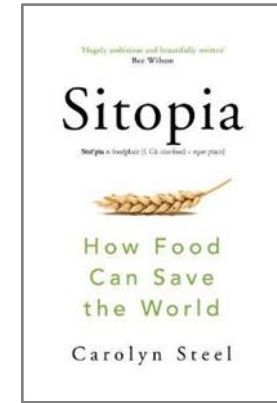
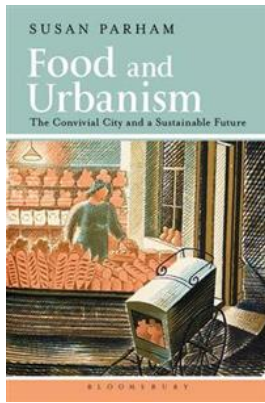
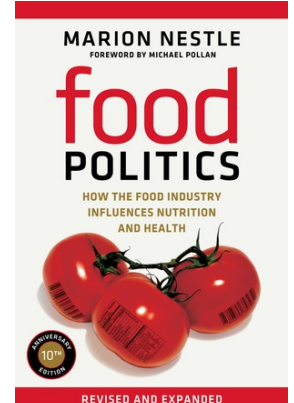
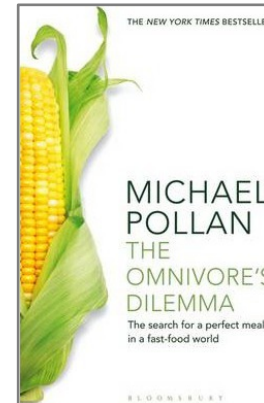
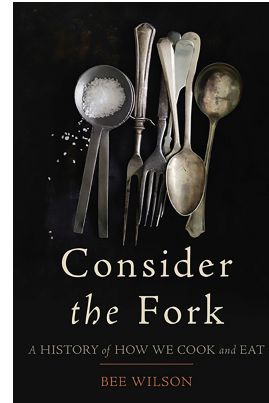
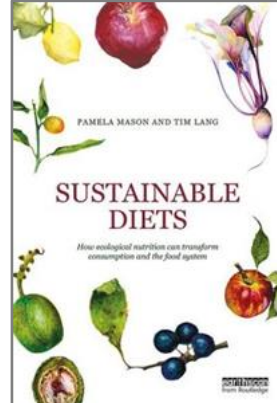
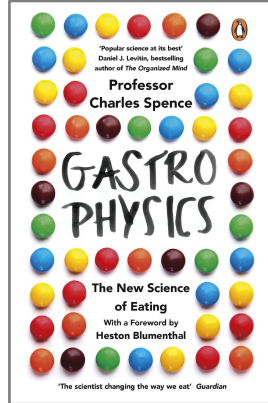
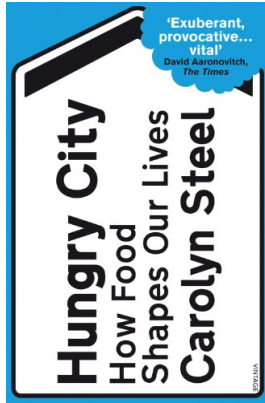
salad & buffet bars in grocery stores



cafe + seating in grocery stores

Further Literature...

Carolyn Steel | Dan Barber | Tim Lang | Bee Wilson | Charles Spence | Marion Nestle | CJ Lim | Dolores Hayden | Susan Parham | Michael Pollan



A?

Aalto University
School of Arts, Design
and Architecture

Thank you!

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KATA FODOR

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NODUS Research Group