

CITIES AND CIRCULAR ECONOMY FOR FOOD

BRUSSELS, BELGIUM



ELLEN
MACARTHUR
FOUNDATION

CONTENTS

EXECUTIVE SUMMARY	2
1. BRUSSELS' UNIQUE ASSETS	3
2. URBAN AND PERI-URBAN FOOD PRODUCTION	5
3. URBAN FOOD CONSUMPTION	8
4. ORGANIC WASTE AND FOOD BY-PRODUCTS	10
5. INVESTIGATING THE BENEFITS OF A CIRCULAR ECONOMY FOR FOOD IN BRUSSELS	12
APPENDIX	15

EXECUTIVE SUMMARY

BRUSSELS, Belgium

Brussels is located in the heart of Belgium. A multicultural, mid-sized city home to many European institutions, Brussels also has a strong agricultural profile. Several initiatives that leverage surrounding farmland to supply local products are producing significant amounts of food. While demand for healthier food products is rising and organic farming is growing, local farming practices are still heavily reliant on chemical fertilisers and pesticides posing a risk to Belgium's soil health. Organic waste is still generally incinerated, however, in 2015 organic waste started to be collected and several options for valorisation are being explored.

In Brussels, a circular economy for food would see peri-urban farmland supply regeneratively produced food, the prevention of food waste, and the valorisation of organic waste. By transitioning to such a system, Brussels would benefit from economic savings worth millions, and improved health, farmlands, and environment.

THE CITY OF BRUSSELS CAN HARNESS THE THREE AMBITIONS DESCRIBED IN THE CITIES AND CIRCULAR ECONOMY FOR FOOD REPORT:

- 1) Source food grown regeneratively, and locally where appropriate
- 2) Make the most of food
- 3) Design and market healthier food products

THE FOLLOWING ASSETS COULD BE LEVERAGED TO BUILD A THRIVING CIRCULAR FOOD SYSTEM IN BRUSSELS:



A CIRCULAR ECONOMY REDESIGN IN BRUSSELS REPRESENTS A USD 130 MILLION+ OPPORTUNITY TO BUILD A REGENERATIVE FOOD SYSTEM.

The following benefits could be achieved in a scenario where 30% of Brussels' food basket was produced locally using regenerative practices, 50% of waste was prevented, and 50% of all remaining organic waste is converted into high quality compost.



ECONOMY

USD 95 million

worth of food being saved every year



HEALTH

USD 34 million

in reduced health costs due to lower pesticide use with wide adoption of regenerative farming practices



SOIL HEALTH

USD 11 million

in avoided degradation, and **USD 8.6 million** in recovered value of nitrogen and phosphorous



ENVIRONMENT

61,000 tonnes

GHG emissions reduction worth **USD 6.9 million** to society, and **23.4 million m³** of freshwater saved

¹ All benefits are calculations by the Ellen MacArthur Foundation, see Appendix for further details



1. BRUSSELS' UNIQUE ASSETS

As the political capital of Europe, Brussels sits at the heart of European policymaking and represents a 'stable community' city archetype that could prove the ideal testbed for new circular economy for food policies and practices.

BRUSSELS' PERI-URBAN DEMOGRAPHICS²

	Population	1,198,726
	Population growth rate	<1% ³
	Population density in Brussels-Capital Region	7,430 persons/km ²
	Peri-urban population (Flemish and Walloon Brabants)	1,539,595
	GDP	USD 86 billion
	Income per capita	USD 72,000

Note: For the scope of this analysis, the Region of Brussels-Capital is considered the urban area, while the surrounding Brabants (Flemish Brabant in the North and Walloon Brabant in the South) define the peri-urban area

Brussels is a high-income, well-connected city at the heart of Europe, with a relatively small and stable population. It is a city of diplomacy and lobbying, and the home of many European institutions.

² BISA (2018) Brussels Institute for Statistics and Analysis. Key figures for the Brussels-Capital Region

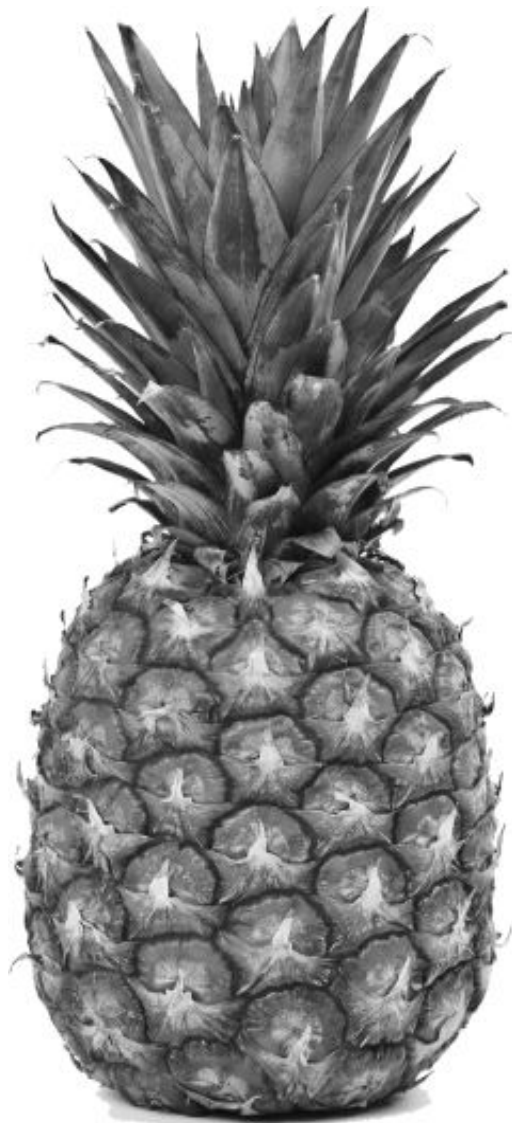
³ United Nations, The world's cities in 2016 data booklet (2016)

Brussels' unique assets include:

ECONOMIC ACTIVITIES: Brussels is an economically attractive region, and one of the richest in Europe. Services are the dominant economic activity (93% of GDP vs. industry 7%), comprising finance and insurance, public administration, and specialised technical/scientific activities. The food production industry is relatively small, representing less than 1% of annual revenue in Brussels. It accounts for around 300 businesses and 4,000 jobs, including bread/patisserie/biscuits (69%), chocolate and confection (12%), and meat processing (8%).⁴

Brussels is a political hub, hosting several important European institutions (e.g. European Commission, European Parliament) and international institutions (e.g. NATO). While Brussels is a wealthy city, there is a significant income disparity amongst its residents and very high unemployment in certain neighbourhoods.⁵

GOVERNANCE: Brussels has a complex multi-layered governance system comprising of one region, two communities, 19 councils, and hundreds of public institutions. There are two official languages in Brussels (French and Dutch). Its geography and complexity require effective dialogues and high levels of cooperation between different parties.⁶



⁴ IBSA (2018), *Activite economique*, <http://ibsa.brussels/themes/economie#.XG2PgpP7Ro4>

⁵ CPCP (2008), *La situation socio-economique de la région Bruxelles-Capitale*; IBSA (2018), *Mini-Bru 2018*

⁶ BECI (27th November 2017), *Gouvernance à Bruxelles : mission impossible?*

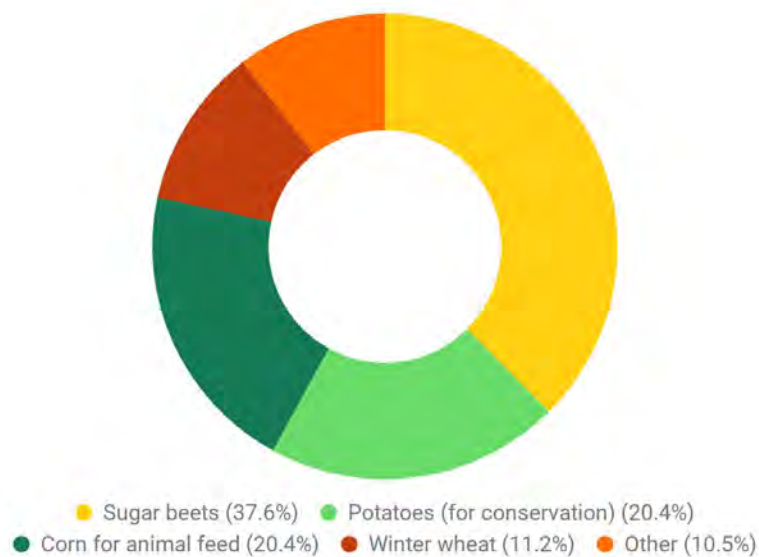
2. URBAN AND PERI-URBAN FOOD PRODUCTION

Nearly half of Brussels' peri-urban land is dedicated to agriculture (41% of Flemish Brabant, 57% of Walloon Brabant).⁷ The main agricultural products in the peri-urban area are crops (mostly cereals, animal feed, potatoes, and sugar beets) (Figure 2), dairy, and animal products (mostly beef, pork, and chicken).

Directly to the west of Brussels is the 'Pajottenland' culture region which harbours 25% of Belgium's fruit trees, which mostly produce pears and apples). The agriculture sector has seen the number of farms decrease (with small farms particularly disappearing) and an increase in both exploitation size (e.g. in hectares or in number of animals) and in yield (e.g. in tonnes per hectare).

Farming is increasingly dominated by large agribusinesses in Belgium.

Figure 1. Major crops produced in the Great Brussels area in 2016. Source: Statbel, Chiffres agricoles, 2017



Agricultural practices are for the most part conventional in the peri-urban area, with a high rate of fertilisers used (Figure 2). Regenerative agriculture is practically nonexistent.⁸ While organic farming is developing in the peri-urban area, it is smaller than in other Belgian provinces. More generally in Belgium, organic farming has been growing steadily in the last ten years. The number of organic holdings has been growing by 9% every year, with a marked growth in the southern part (Wallonia) and today it represents 6% (800km²) of the total agricultural land (Figure 3).⁹

⁷ StatBel (2017), *Chiffres agricoles*.

⁸ Imagine Magazine, *Agroecology in action* (2018)

⁹ StatBel, *Agriculture biologique, Nombre d'exploitations en Flandre et Wallonie (1997-2016)*. Accessed 20th November 2018. <https://statbel.fgov.be/fr/themes/agriculture-peche/agriculture-biologique#figures>

Figure 2. Synthetic fertiliser use in Belgium is double the world average.¹⁰ Data for 2016, source: World Bank

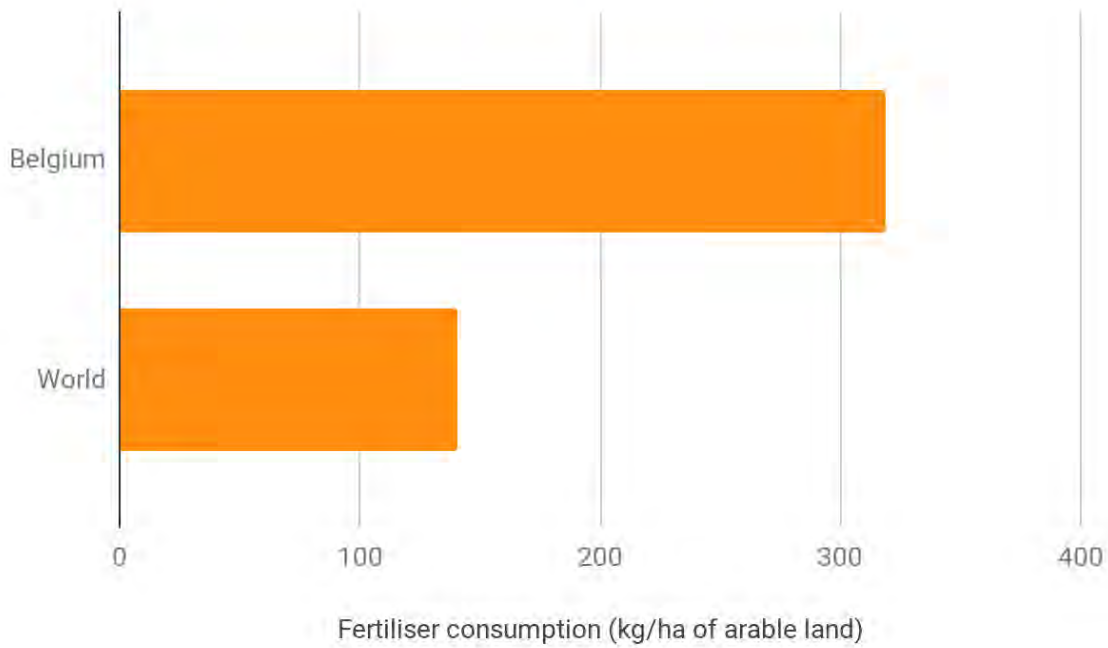
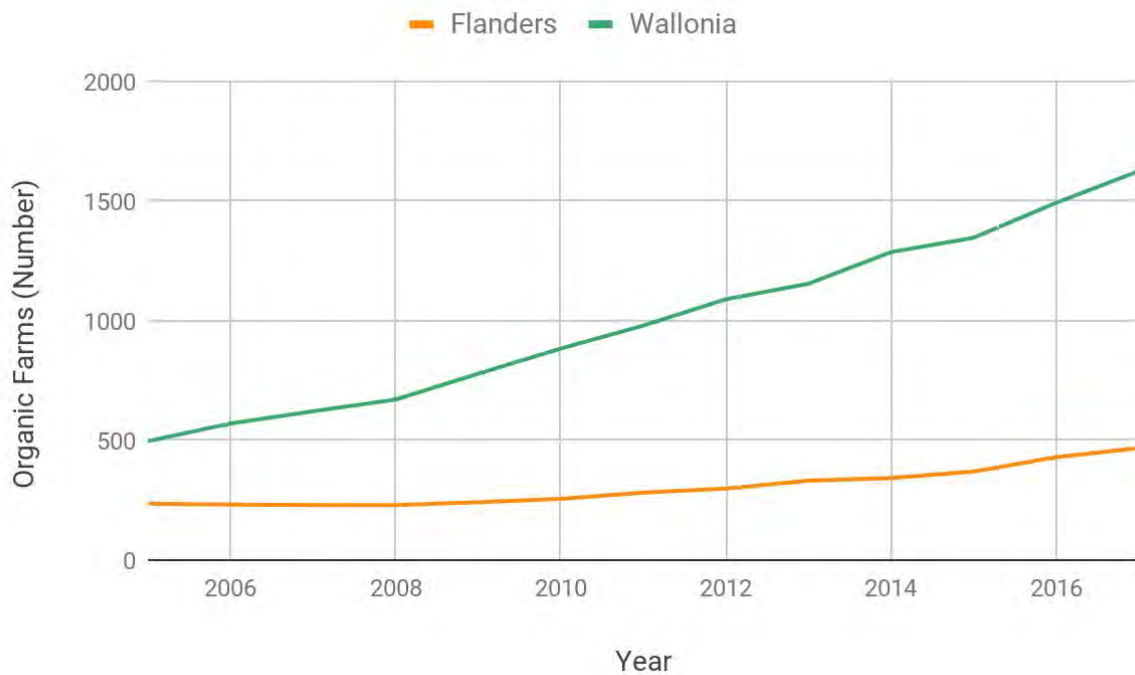


Figure 3. Growth in number of organic farms in Flanders and Wallonia, [#], Belgium, 1997-2017. Source: StatBel



¹⁰ 280 kg per hectare in Belgium. The World Bank, Fertilizer consumption (kg per hectare of arable land) (Accessed 20th November 2018), <https://data.worldbank.org/indicator/AG.CON.FERT.ZS>

Food policies:

Current food policies are looking to supply Brussels with healthier and seasonal products, and at the same time innovating and shortening supply chains.

The GoodFood Strategy, adopted in 2015, sets ambitions for feeding Brussels with local, seasonal, organic and fairtrade products. These are expressed through quantified targets for 2020 and practical commitments that are fully approved by the government and taken by stakeholders across the food value chain. For example, some business associations committed to publish an annual survey on the % of Belgian produce sold in their members' stores.¹¹



Figure 4. Ambitions of GoodFood Strategy Brussels for the Brussels-Capital Region

Brussel LUST, launched in 2017, promotes the adoption of innovative and short food supply chain (i.e. 'Korte keten' in Dutch) activities to farmers located in the peri-urban area, supporting them to find market opportunities in Brussels.¹² They inform food producers about the potential market for local and/or organic products in Brussels and how they can respond to this. Company visits and inspirational tours with producers who have already focused on this market are organised. In addition, a mapping of the various possible marketing channels will be achieved, in order to identify opportunities, gaps and bring supply and demand into contact with each other. Finally, attention is given to the logistics aspect of the project.

¹¹ <https://www.goodfood.brussels/>

¹² <http://www.steunpuntkorteketen.be/>; Provincie Vlaams-Brabant, Brussel Lust (2018), <https://pers.vlaamsbrabant.be/brussel-lust-start-op-63>;



3. URBAN FOOD CONSUMPTION

With strong initiatives already in place and a growing trend towards high fruit and vegetable consumption, Brussels is well-positioned to achieve the ambitions of a circular economy for food, if the underlying agricultural principles are adopted.

HOW MUCH DO PEOPLE IN BRUSSELS SPEND ON FOOD? 12% of average household income is spent on food.¹³ with Brussels' citizens consuming an estimated 800,000 tonnes of food every year.¹⁴ Food represents a smaller part of their total consumption budget in 2018 than it did in the past (e.g. 15% in 1987).¹⁵ More generally in Belgium, people are spending less on meat and more on fruit and vegetables. Belgians are actually one of the biggest eaters of fruit and vegetables in Europe.¹⁶

WHAT PROPORTION OF THAT FOOD SPEND IS IN RESTAURANTS? 63% of household food spend is in stores such as large retailers, markets and small businesses vs. 36% in restaurants.¹⁷

WHERE DO PEOPLE BUY THEIR GROCERIES? Large retailers account for approximately 70% of food sales for households.¹⁸ Although supermarkets dominate the scene, during the last few years the sales through more direct channels, ('circuits courts,' in French) have boomed.

¹³ Statbel, EBM (2018)

¹⁴ Consumption of 783,000 tonnes: 427,000 tonnes for households (Borlotti, A., De Muynck, S., Kampelmann, S., et al. (2018), *Potentiel des biodéchets collectables en Région de Bruxelles-Capitale*) and 356,000 tonnes for restaurants, canteens, etc. (based on waste ratios)

¹⁵ Institut Bruxellois de Statistique et d'Analyse (2017), *Enquête sur le budget des ménages*, <http://lbsa.brussels/themes/revenus-et-depenses-des-menages#.XG2KIJP7Ro4>

¹⁶ Eurostat (2015), *The fruit and vegetable sector in the EU — a statistical overview*, https://ec.europa.eu/eurostat/statistics-explained/index.php?title=The_fruit_and_vegetable_sector_in_the_EU_-_a_statistical_overview#Consumption

¹⁷ RDC Environnement (2014), *Inventaire et analyse des données existantes en matière d'offre alimentaire en Région de Bruxelles-Capitale*. Estimations RDC sur base de données Statbel régionalisées 2012

¹⁸ Bruxelles Environnement & Bruxelles Economie et Emploi (2015), *Stratégie GoodFood – Vers un système alimentaire durable en région de Bruxelles-Capitale*

CONSUMING FOOD GROWN LOCALLY: there is no data available to indicate the destination of the food produced in the Brabants, so it is not possible to determine the proportion that goes into Brussels.¹⁹ As stated by Joséphine Henrion from Brussels Environment, “Brussels is like a black box for Flemish Brabant farmers, and the project Brussel LUST is aiming to ease the access of the Brussels market for them”.

However, there are indicators that the flow of produce from Brabants into Brussels is very small, even in categories of food that are grown locally in great quantities. For example, the production of apples and pears in the peri-urban is 10 times what Brussels consumes (i.e. 150,000 tonnes per year), yet 60% of these fruits are still imported. This is confirmed by supermarkets claiming that only 55% of the apples they sell are Belgian.²⁰ When it comes to organic food, the trend is even stronger: for example, only 7% of organic fruit consumed in Brussels comes from Belgium.²¹

Brussels is in a good position to pull the lever “source food grown regeneratively and more locally” by using the GoodFood Strategy that is already in place. Although with differences among income levels, there is overall a rising demand from Brussels’ citizens and an increased awareness from retailers for food products that are local, healthy, respect producers, and respect the environment.²² Practically, this trend is borne out by data:

- Between 2014 and 2016, the revenues from direct-to-consumer channels from local farmers have increased by 76% in Brussels.²³
- Short food supply chain farmers are booming: 15% of farmers are now using a direct-to-consumer model in the Flemish Brabant, which increased by . nearly 70% in the last six years.²⁴
- Spend on organic food has more than doubled in the last 10 years in Brussels.²⁵

Innovative platforms and business models:

Several Belgian initiatives are leading the way in creating new routes to market, shorter supply chains and reconnecting producers to consumers:

- MiiMOSA: A crowdfunding platform, active in Belgium and France, exclusively dedicated to drive investments towards better ways of doing agriculture and producing food.²⁶
- GASAP (Groupes d’Achat Solidaires avec l’Agriculture Paysanne): A network of citizens which group themselves with organic (agroecological) producers to ensure a direct supply (transparency) and guarantee the demand for the producer.²⁷
- BEES coop: A participative supermarket where the customer is at the same time owner and worker at the supermarket.²⁸

¹⁹ Bruxelles Environnement & Bruxelles Economie et Emploi, Agroecology Laboratory of ULB (2018), *Evaluation de la production agricole primaire professionnelle en Région de Bruxelles Capitale*

²⁰ Comeos (27th July 2018), *Les supermarchés vendent surtout des produits frais belges*

²¹ Bruxelles Environnement & Bruxelles Economie et Emploi (2015), *Stratégie GoodFood – Vers un système alimentaire durable en région de Bruxelles-Capitale*

²² *Ibid.*

²³ CODUCO (Conclusions circuits courts), Bruxelles Environnement & Bruxelles Economie et Emploi (2018)

²⁴ Results from Steunpunt Korte Keten (Short Chain Support Flanders) (2015)

²⁵ RTBF (5th April 2018), *Bio: la consommation augmente, mais les producteurs n’en profitent pas forcément*,

https://www.rtbf.be/info/societe/detail_bio-la-consommation-augmente-mais-les-producteurs-n-en-profitent-pas-forcement?id=9884463

²⁶ MiiMosa, <https://www.miiMosa.com>

²⁷ GASAP, <https://gasap.be/>

²⁸ BEES coop, <http://bees-coop.be/en/>



4. ORGANIC WASTE AND FOOD BY-PRODUCTS

Today, most of Brussels' food waste ends up being incinerated. However, in 2015 organic waste started to be collected and several options for valorisation are being explored. There is still an opportunity to minimise waste in the first place and develop a circular approach to food waste.

In Brussels, most green waste is composted individually or sent to composting centres or for anaerobic digestion, whereas food waste is for the most part incinerated (97%) along with other municipal waste. However, a small fraction (3%) is collected separately through the 'orange bags' scheme that Brussels started in 2015, or composted in gardens and community composts (~200 tonnes per year).

FIGURE 5. RESIDENTIAL COLLECTION AND TREATMENT²⁹

	Tn treated per year	Collection scheme	Treatment type and output
Separate collection of organic waste	5,000	'Orange bags' scheme - Established in 2015 - Weekly collection	Sent to an anaerobic digester plant located 125 km away, in Ypres
Municipal waste, organic fraction	121,000	'White bags' (organic waste constitutes around 50% of municipal waste)	Incinerated on the outskirts of Brussels at Bruxelles-Energie ³⁰

²⁹ Interview with Project Phosphor team

³⁰ Bruxelles-Energie, <https://www.bru-energie.be/EN/>

Momentum is being built towards making the most of food in Brussels:

Current organic waste streams flowing from households, restaurants, markets, and public institutions are now well understood thanks to a comprehensive study from the Université Libre de Bruxelles (ULB), which also presented potential scenarios for an organic waste infrastructure.³¹

The best scenario presented by ULB for organic waste would reinforce decentralised composting (i.e. encourage more composting by individuals and neighbourhoods) and set up a centralised treatment for the remaining organic waste. Depending on the area, organic waste would be collected and treated differently:

- In high-density areas of the city (i.e. hyper-centre and public institutions) organic waste would be collected in fixed containers and treated in an anaerobic digestion plant.
- In lower density areas of the city there would be a door-to-door collection of organic waste using mobile containers, followed by treatment in a centralised composting unit.

Alongside these proposals for organic waste collection and treatment, food waste initiatives are growing and targets set by the GoodFood Strategy are expected to amplify that trend.

Food waste prevention and nutrient cycling initiatives:

DREAM and Bourse aux Dons: DREAM is a project that collects around 1 tonne per day of unsold fresh fruit and vegetables from places such as the early morning market of Brussels (MABRU) and redistributes them to food banks for donations. The digital platform Bourse aux Dons facilitates the matching process between donors and receivers.³²

Opération Phosphore: is a research-action project that aims to set up an ambitious organic waste management system in Brussels. They identify the organic flows and collaborate to present scenarios for the city, while learning from their living labs that are already testing solutions.³³

Wastewater in Brussels:

Nearly all wastewater is collected and treated in Brussels. Three-quarters of the volume goes through a high-quality treatment process (wet weather, biological, and sludge treatment) in the north of Brussels, while a quarter still undergoes insufficient treatment in the south.³⁴

FIGURE 6. SEWAGE COLLECTION AND TREATMENT

	Million m ³ treated per year	Current treatment type	Outputs
Sewage	143	Three-quarters through high-quality treatment (Aquiris), ³⁵ one-quarter through insufficient treatment	5,500 tonnes of technosand, ready to use for construction bricks, biogas, one-fifth of electricity needed for the facility, and effluent returns to river

³¹ Borlotti, A., De Muyck, S., Kampelmann, S., et al. (2018), *Potentiel des biodéchets collectables en Région de Bruxelles-Capitale*

³² Brussels Environment, *DREAM – Projet ISP de récupération et de distribution des invendus de fruits et légumes*,

<https://www.goodfood.brussels/fr/contributions/dream-projet-isp-de-recuperation-et-de-distribution-des-invendus-de-fruits-et-legumes>

³³ Operation Phosphore, <https://www.operation-phosphore.brussels/>

³⁴ Brussels Environment (2018), *Epuraton des eaux usées*,

<https://environnement.brussels/etat-de-lenvironnement/rapport-2011-2014/eau-et-environnement-aquatique/epuration-des-eaux-usees>

³⁵ Aquiris: the Brussels-North Wastewater Treatment Plant, brochure, https://www.aquiris.be/en/telechargement/Aquiris_brochure_EN.pdf

5. INVESTIGATING THE BENEFITS OF A CIRCULAR ECONOMY FOR FOOD IN BRUSSELS

Note: All calculations for the following benefits are based on estimated global benefits applied to the region. See City Analysis Guide for further details on the factors used to calculate the estimated benefits.

SCENARIO A

What if 30% of the food available to the citizens of Brussels was produced in the peri-urban area using regenerative practices?

DETAILED DESCRIPTION

Around 50% of the peri-urban land around Brussels is dedicated to agriculture. According to a study from Wageningen University, this 1,500 km² area could meet the food needs of more than 90% of Brussels citizens, or 40% of Brussels' urban and peri-urban population.³⁶ There is no easy way to determine exactly the proportion of food produced in the peri-urban area that currently goes into Brussels, but there are indicators that it is very small, even in categories of food that are grown locally in great quantities.

The practices used on this agricultural land are mostly conventional (only 6% of land in Belgium is organically cultivated, and this is concentrated in the south;³⁷ less than 1% is classed as regenerative agriculture)³⁸ and heavily reliant on the use of synthetic fertilisers (i.e. synthetic fertiliser use here is twice the world average).³⁹ Soil is particularly at risk in Belgium where nearly all soil types under cropland indicate a decrease in soil organic carbon.⁴⁰

There is already momentum towards a better food system in Brussels. The demand for fresh, locally grown produce has increased over the past decade, resulting in a rapid acceleration of sales from local farmers and direct-to-consumer channels (e.g. 76% increase in revenues between 2014 and 2016, although still marginal).⁴¹ In addition, the City of Brussels adopted its GoodFood Strategy in 2015,⁴² setting ambitious quantified targets and practical commitments for 2020. One of these targets is to source 30% of the fresh fruit and vegetables consumed by Brussels' citizens from the urban and peri-urban areas by 2035. If such a policy was extended to the whole food basket and done in a way that ensures regenerative practices are used, the following benefits could be achieved.⁴³

³⁶ van Dijk, W., et al. (2017), *Closing the life cycle of phosphorus in an urban food system: the case Almere (NL)*, Assumptions of the study: 1. The food basket includes meat and dairy products, which represent 90% of the land requirement (animal feed), 2. Only 300 km² are needed for plant-based products (65% cereals, 15% sugar beet, 10% fruit, 10% potatoes and vegetables), 3. 15% of the food basket is still imported (e.g. coffee, exotic fruit)

³⁷ StatBel (2018), *Chiffres Clés de l'Agriculture*

³⁸ *Imagine Magazine* (2018), 'Agroecology in action'

³⁹ 280 kg per hectare in Belgium. World Bank, Fertilizer consumption (kg per hectare of arable land), <https://data.worldbank.org/indicator/AG.CON.FERT.ZS>

⁴⁰ Meersmans, J., et al. (2010), *Spatial analysis of soil organic carbon evolution in Belgian croplands and grasslands, 1960–2006*

⁴¹ CODUCO (Conclusions circuits courts), Bruxelles Environnement & Bruxelles Economie et Emploi (2018)

⁴² Bruxelles Environnement & Bruxelles Economie et Emploi (2015), *Stratégie GoodFood — Vers un système alimentaire durable en région de Bruxelles-Capitale*

⁴³ Assuming an unchanged food basket

BENEFITS**HEALTHIER CITIZENS****USD 31 million**

in health costs could be saved each year due to lower pesticide exposure, cleaner air and water, and decreased microbial resistance

**AVOIDED SOIL DEGRADATION**

Soil health could be enhanced by replacing synthetic fertilisers with organic alternatives, leading to an estimated **USD 11 million** of cost savings every year from avoiding soil degradation

**CLIMATE CHANGE MITIGATION**

42,000 tonnes of greenhouse gas emissions would be avoided each year

**WATER SAVINGS**

Over 21 million m³, equivalent to half of the city's residential consumption of drinking water, could be saved every year due to healthy soils having a higher water retention capacity

SCENARIO B

What if Brussels reduced its avoidable food waste by half?

DETAILED DESCRIPTION

If half of the avoidable food waste was prevented, namely 12,500 tonnes,⁴⁴ USD 91 million could be saved each year based on the local market value of food.

BENEFITS**ECONOMIC****USD 91 million**

Worth of food spend avoided based on the market value of food

**HEALTHIER CITIZENS****USD 2.8 million**

worth of health savings due to avoided negative impacts from food production

**CLIMATE CHANGE MITIGATION**

18,750 tonnes of CO₂ emissions prevented, equivalent to the amount of carbon sequestered by 23 million trees per year

**WATER SAVINGS****2.4 million m³**

of freshwater saved, worth USD 1.4 million in terms of societal costs

⁴⁴ Bruxelles Environnement (8th March 2018), *Le gaspillage alimentaire*, <https://environnement.brussels/thematiques/alimentation/enjeux-et-impacts/le-gaspillage-alimentaire>

SCENARIO C

What if Brussels collected and processed half of all remaining organic waste into high-quality compost?

DETAILED DESCRIPTION

Apart from better food sourcing, Brussels can build from the foundation of already established decentralised composting strategies, such as Operation Phosphore, for processing residential, business, and institutional food by-products and garden clippings to generate significant benefits. Currently, 97% of Brussels’ food waste is incinerated without recovering valuable nutrients.⁴⁵ Beyond preventing avoidable food waste, Brussels could realistically divert an additional 72,000 tonnes of food waste, food by-products, and garden clippings from incineration and landfill to valorise them into compost and biogas.⁴⁶ A best case scenario for this treatment would result in the following benefits.

BENEFITS



ECONOMIC OPPORTUNITIES

USD 4.4 million
worth of avoided synthetic fertilisers*



HEALTHIER SOILS

USD 0.5 million
worth of recaptured nitrogen and phosphorous in addition to carbon that could be fed to the soil to rebuild its health and fertility

*plastic and other types of pollution must be addressed in order to make this a reality



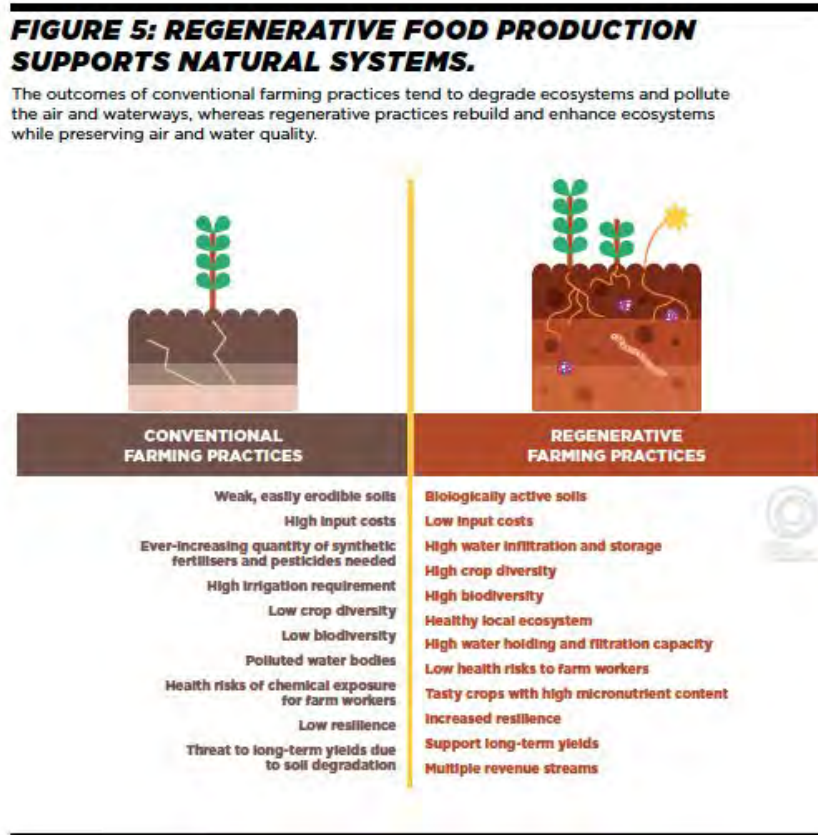
⁴⁵ Borlotti (2018)

⁴⁶ Ibid.

APPENDIX

SCENARIO A: REFERENCE DATA AND INFORMATION

- Agricultural land of 50,200 ha to produce 30% of the food basket, based on the results of Wageningen University for the city of Almere⁴⁷
- Average food value: USD 8,402 (EUR 7,310) per tonne, based on:
 - 783,000 tonnes of food consumed per year in the city: 427,000 tonnes by households,⁴⁸ 356,000 tonnes by restaurants, schools, etc. (estimated with the waste ratios of Borlotti *et al.* (2018))
 - USD 6,579 (5,724 EUR) millions of revenues by food shops and restaurants⁴⁹
- See additional *City Analysis Guide* with benefit factor table for details
- Benefits are quantified in comparison to conventional practices, as defined in the full *Cities and Circular Economy for Food* report (see figure 5 below from the report)
- Coefficients by global analysis (except from the food value, for which the local value is used)



⁴⁷ van Dijk, W., *et al.* (2017), *Closing the life cycle of phosphorus in an urban food system: the case Almere (NL)*; Assumptions of the study: 1. The food basket includes meat and dairy products, which represent 90% of the land requirement (animal feed), 2. Only 300 km² are needed for plant-based products (65% cereals, 15% sugar beet, 10% fruit, 10% potatoes and vegetables), 3. 15% of the food basket is still imported (e.g. coffee, exotic fruit)

⁴⁸ Borlotti *et al.* (2018)

⁴⁹ RDC Environnement, Bruxelles Environnement (2014), *Inventaire et analyse des données existantes en matière d'offre alimentaire en Région de Bruxelles-Capitale*

SCENARIO B: REFERENCE DATA AND INFORMATION

Assumptions:

- 12,500 tonnes of prevented food waste (i.e. 50% of current 25,000 tonnes of food waste stated by GoodFood)⁵⁰
- 71,600 tonnes of organic waste valorised (i.e. 56% of current 126,000 tonnes of food waste) based on scenario 3 of Borlotti *et al.* (2018):⁵¹
 - 15,100 tonnes going to decentralised composting (i.e. 27,600 - 12,500 = 15,100, where 27,600 is the “avoided waste” fraction)
 - 19,700 tonnes sent to anaerobic digestion
 - 36,800 tonnes treated in a centralised composting facility
- Coefficients by global analysis
- The benefits that could be made from a full valorisation of the human wastes and wastewater fraction are not considered in this scenario

Other assumptions:

- USD 1 = EUR 0.87
- Consumption of drinking water per day per inhabitant in Brussels = 96 litres

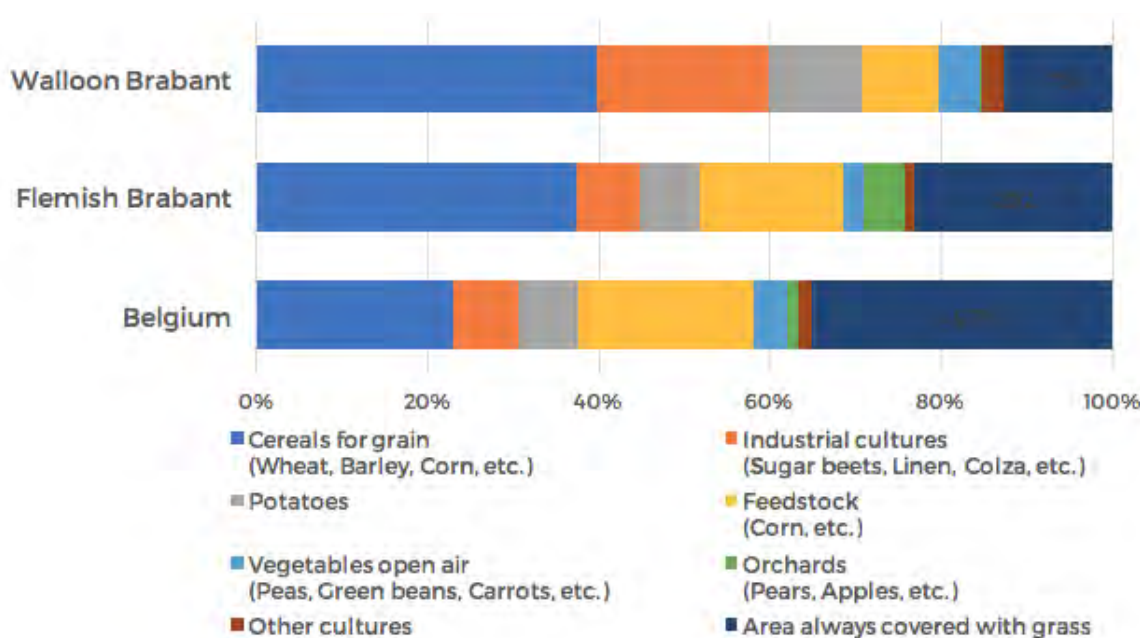
ADDITIONAL INFORMATION

Figure 7. Land use expressed as percentage of total agricultural area in Belgium and Brabant's peri-urban areas. Belgium's total agricultural area is 13,300 km², while Brabant's is 620 km² and 875 km² for Walloon and Flemish Brabant, respectively.

⁵⁰ Bruxelles Environnement (8th March 2018), *Le gaspillage alimentaire*, <https://environnement.brussels/thematiques/alimentation/enjeux-et-impacts/le-gaspillage-alimentaire>

⁵¹ Borlotti *et al.* (2018)

Figure 8. Food basket⁵² for the Brussels-Capital Region (2010).

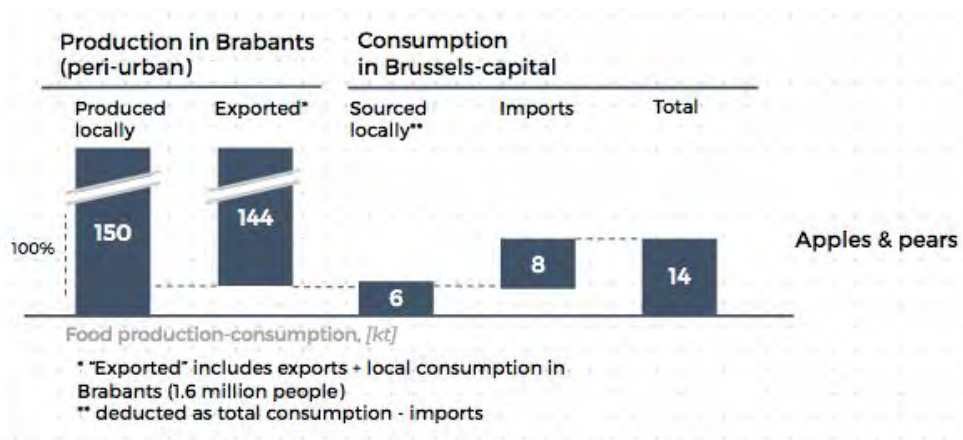
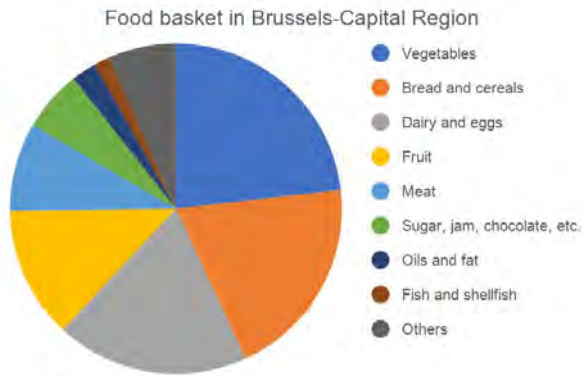


Figure 9. Local production, exports and imports, and consumption of apples and pears in Brabants and Brussels capital area, respectively. StatBel, imports/exports (2013), FAO

⁵² BATir Bruxelles, Environnement & Bruxelles Economie et Emploi (2015), *Métabolisme de la Région de Bruxelles-Capitale*

NOTE ABOUT THIS BRUSSELS CITY STORY AND THE FULL REPORT

The Cities and Circular Economy for Food (2019) report was designed to initiate a deeper exploration of the role that cities, and the businesses and governments in them, can have in the creation of a circular economy for food. It acknowledges cities as only one key driver of change among many others. It advocates the circular economy as one of several approaches that can support the development of a healthier and regenerative food system.

The focus city chapters were developed to demonstrate how cities around the world could benefit from applying the vision set forth in the report. The conclusions draw on an extensive analysis of the current regional food system, and benefit calculations are based on estimated global benefit factors applied to the local context. See City Analysis Guide for further details on the research process and factors used to calculate the estimated benefits.

The authors of this city chapter collected information from a number of articles, publications, and reports, and consulted more than 20 experts during its preparation. However, uncertainties remain within the document as the scientific understanding of the various components of a circular economy for food supply continues to evolve.

The document does not intend to provide diet recommendations or advice on food consumption, although it does highlight the role that food system players have in offering healthy foods with positive environmental impacts.

DISCLAIMER

The Brussels city story has been produced by a team from the Ellen MacArthur Foundation. The city benefit calculations use global factors supplied by SYSTEMIQ as part of the global *Cities and Circular Economy for Food* report analysis. Those were applied to the local context in order to estimate the potential benefits for Brussels in transitioning to a circular economy for food model. The Ellen MacArthur Foundation makes no representations and provides no warranties in relation to any aspect of the city story including regarding the advisability of investing in any particular company or investment fund or other vehicle. Whilst care and attention has been exercised in the preparation of the city story and its analyses, relying on data and information believed to be reliable, neither the Foundation nor any of its employees or appointees shall be liable for any claims or losses of any nature in connection with information contained in this document, including, but not limited to, lost profits or punitive or consequential damages.

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The full *Cities and Circular Economy for Food* report and Brussels city story can be found at:
<https://www.ellenmacarthurfoundation.org/our-work/activities/cities-and-circular-economy-for-food>

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The Ellen MacArthur Foundation was launched in 2010 with the aim of accelerating the transition to the circular economy. Since its creation, the charity has emerged as a global thought leader, putting the circular economy on the agenda of decision-makers around the world. The charity's work focuses on seven key areas: insight and analysis; business; institutions, governments, and cities; systemic initiatives; circular design; learning; and communications.

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