CITY REGION FOOD SYSTEM TOOLKIT

Assessing and planning resilient and sustainable city region food systems

Examples: Defining the CRFS boundaries

Brief description	Examples of CRFS boundaries in pilot city regions, and detailed explanations of how the CRFS boundaries were defined in Antananarivo (Madagascar), Medellin (Colombia), Toronto (Canada), and Utrecht (Netherlands)
Expected outcome	Stakeholders are aware of the CRFS areas in other project contexts and how they have been defined, which may provide them with ideas.
Expected output	
Scale of application	Project level
Expertise required	Project management; mapping/GIS
Examples of application	-
Year of development	2022 and 2015
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Relevant CRFS Handbook modules; related tools, examples and activities	CRFS Handbook: Define the CRFS module.

Full description and justification

The first part of the document set out examples of CRFS areas of pilot city regions in the first phase of the CRFS programme (Lusaka, Zambia; Kitwe, Zambia; Medellin, Colombia; Toronto, Canada; and Utrecht, Netherlands). This is helpful to enable to cities to compare city region boundaries between different contexts, and see how they can vary in terms of size and characteristics.

The second part of the document provides detailed explanations of the options and criteria used to determine CRFS boundaries in Antananarivo (Madagascar), Medellin, Toronto, and Utrecht. Different criteria have been used in each city region. Reviewing how the task has been carried out in practice across several contexts can help inform the decision-making elsewhere.

1   Comparison of CRFS boundary definition in different cities

1.1   Colombo, Sri Lanka

The Western Province or "Western Megapolis" region is a new, very recent, administrative unit for regional economic development in the Western Province. This administrative unit will replace that of Colombo Metropolitan Region and explicitly refers to city region development, although it does not yet address food issues. The megalopolis area will be the most suitable territorial area when (food system) land use planning is concerned.
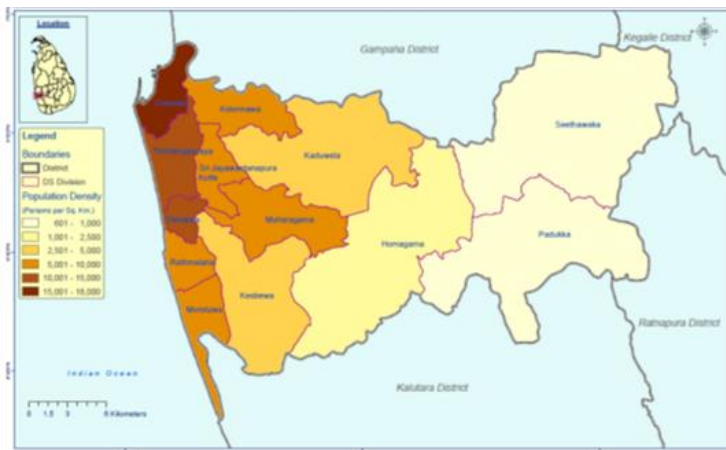

Figure 1: Colombo CRFS

1.2   Lusaka, Zambia

For Lusaka, the city region was defined taking into account nearby production areas for main commodities consumed in the city, including fruits & vegetables, livestock (beef, poultry, pork), dairy products and fish. The city region thus involves Lusaka province and its neighbouring districts, an area that had already been identified as a new future area for joint development planning.
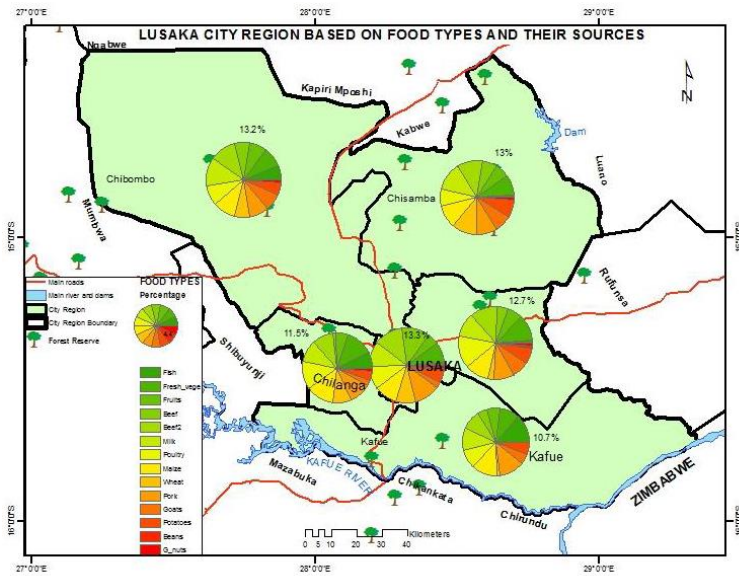
Figure 2: Lusaka CRFS

1.3   Kitwe, Zambia

In Kitwe, the city region was defined to encompass the city of Kitwe and its adjoining food production areas, including the districts of Chambeshi, Kalulushi, Luanshya, Mufulira and Ndola, mainly situated in the Copperbelt province. It is acknowledged that the city region is dependent on complementary food supply from more distant areas for specific agriculture and livestock/poultry products.
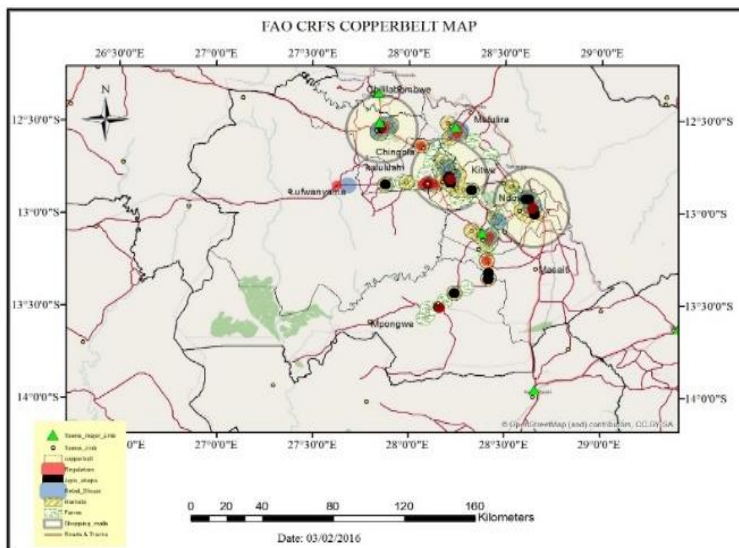

Figure 3: Kitwe CRFS

1.4   Medellin, Colombia

The city region is defined as a group of 31 municipalities in the Province of Antioquia, that according to different criteria play a key role in the food provisioning of Medellin City and the surrounding Aburra valley: i) food provisioning: municipalities contributing more than 1% to food flows reaching wholesale markets in Aburra valley; ii) food production: municipalities contributing more than 1% of the total provincial food production; iii) proximity: municipalities in the Aburra valley with any

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agricultural production; iv) areas of agricultural expansion, v) municipalities with an important political role in territorial governance.

See section 2.2 below for a detailed explanation of boundary options for the Medellin CRFS.
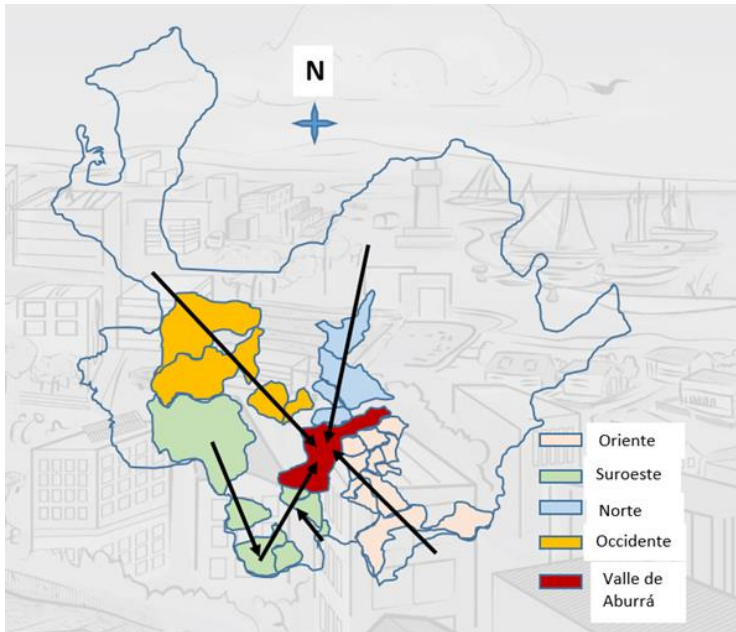

Figure 4: Medellin CRFS

Quito, Ecuador

The Province of Pichincha is identified as the most appropriate scale of the city region. The three rings in the image identify the degree of self-sufficiency consumption of food for the given territory (ring). It compares total food consumption (by weight) of the population in the given territory for specific products with actual production in that area. Consumption figures are based on household consumption data multiplied by population figures. Production data are based on data from agricultural census. The calculation does not account for any food imports or exports. The second ring was identified as the city region as it includes key production areas, major food processing industry and allows for cross-jurisdictional planning coordination between the city of Quito, surrounding municipalities and the Province.
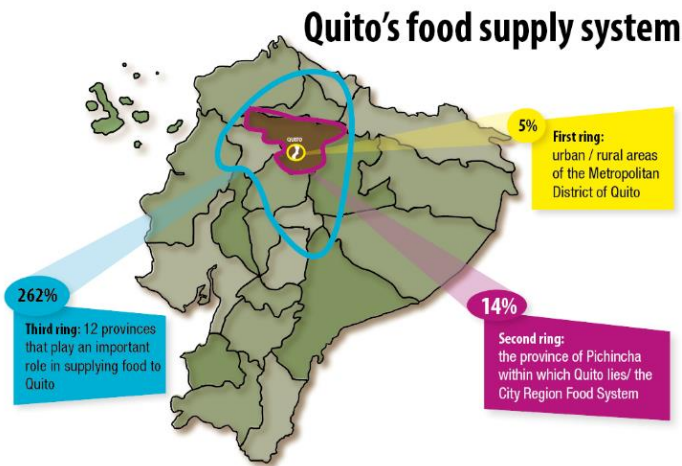
Quito's food supply system

5% **First ring:** urban / rural areas of the Metropolitan District of Quito

262% **Third ring:** 12 provinces that play an important role in supplying food to Quito

14% **Second ring:** the province of Pichincha within which Quito lies/ the City Region Food System

Figure 5: Quito CRFS

1.5 Toronto, Canada

The city region encompasses the Greater Golden Horseshoe area: Toronto city + surrounding peri-urban and rural region. This area is a recognised territorial area, and as such data exist for this area and joint land use and regional planning is already taking place.

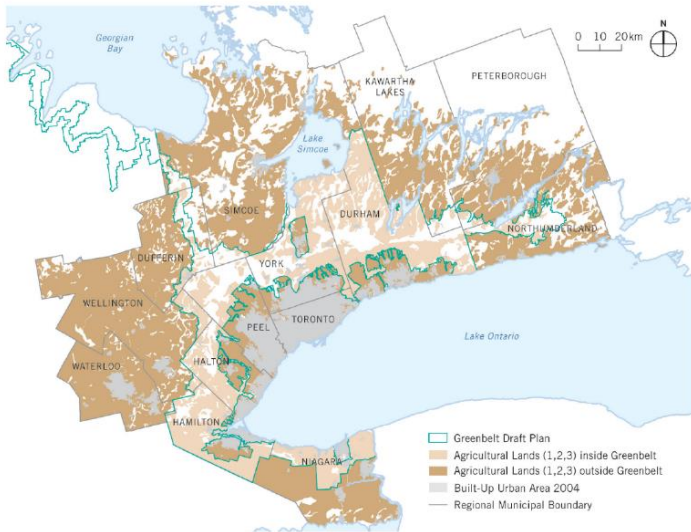See section 2.3 below for a detailed explanation of boundary options for the Medellin CRFS.

Figure 6: Toronto CRFS

1.6 Utrecht, Netherlands

The city region is defined as the U10 region, which is an inter-municipal platform of the city of Utrecht and 9 neighbouring municipalities which whom Utrecht already collaborates in other policy areas.

See section 2.4 below for a detailed explanation of boundary options for the Utrecht CRFS.
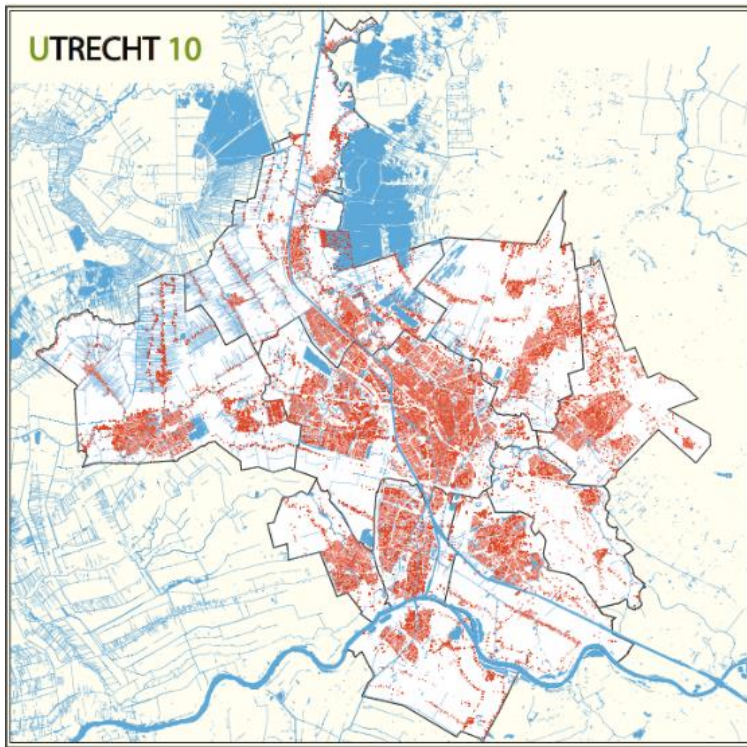
Figure 7: Utrecht CRFS

2 Detailed explanation of boundary options in selected city regions

2.1 CRFS boundary setting in Antananarivo, Madagascar

To define the boundaries of the Antananarivo CRFS, a map was produced showing the main production basins for seven key commodities: leafy vegetables, potatoes, milk and dairy products, tomatoes, eggs, chicken, and onions. This map was layered over a map showing administrative boundaries, with 'communities' as the spatial reference unit, as shown in Figure 8.
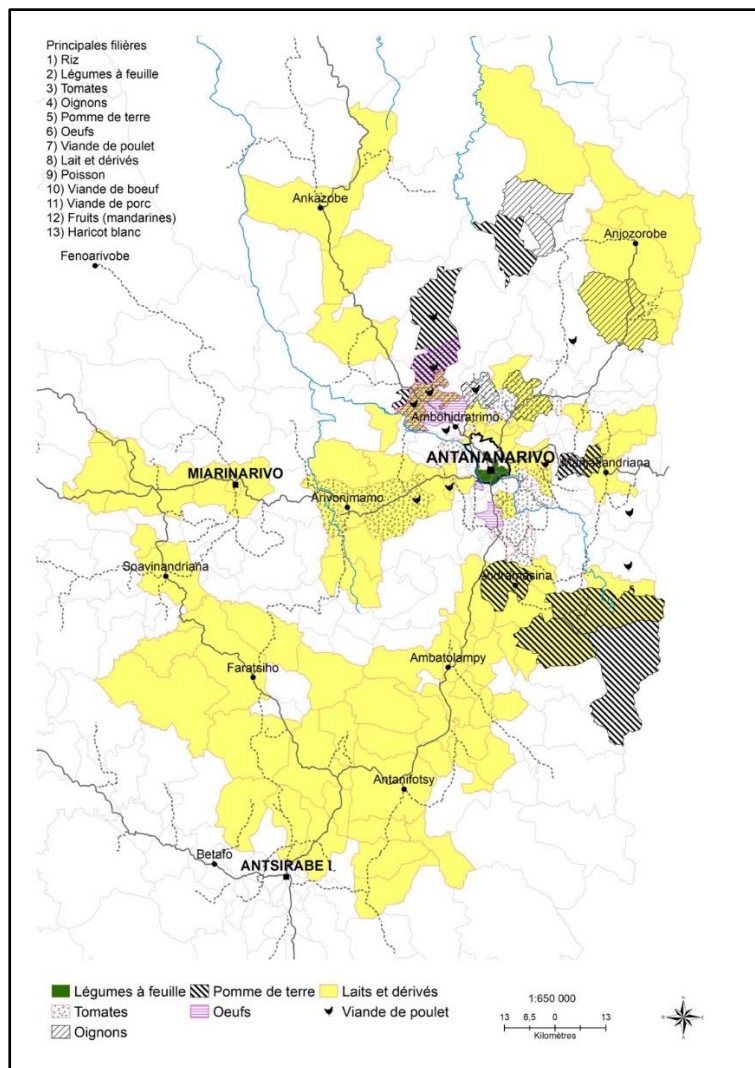

Figure 8: Production basins of key commodities and administrative boundaries

In parallel, data from three sources were combined to produce a map of the Antananarivo urban area, with a radius of 35km from the centre, as shown in Figure 1. The data sources were:

a) the urban masterplan for the Antananarivo metropolitan area;

b) the water and sanitation infrastructure masterplan for the metropolitan area;

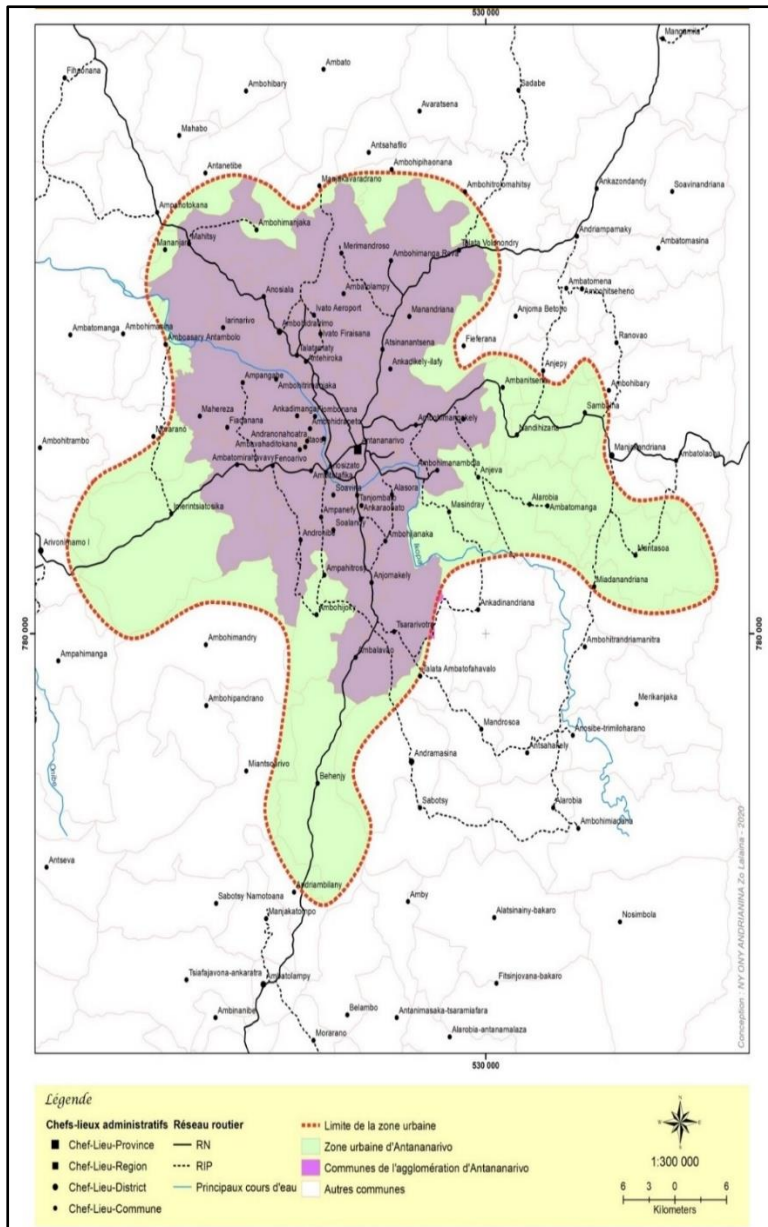c) the localization of food industrial infrastructure.

Figure 9: Urban area of Antananarivo

The map of key commodity production basins and the map of the urban area were then combined, resulting in a new map showing the CRFS boundary (Figure 9).
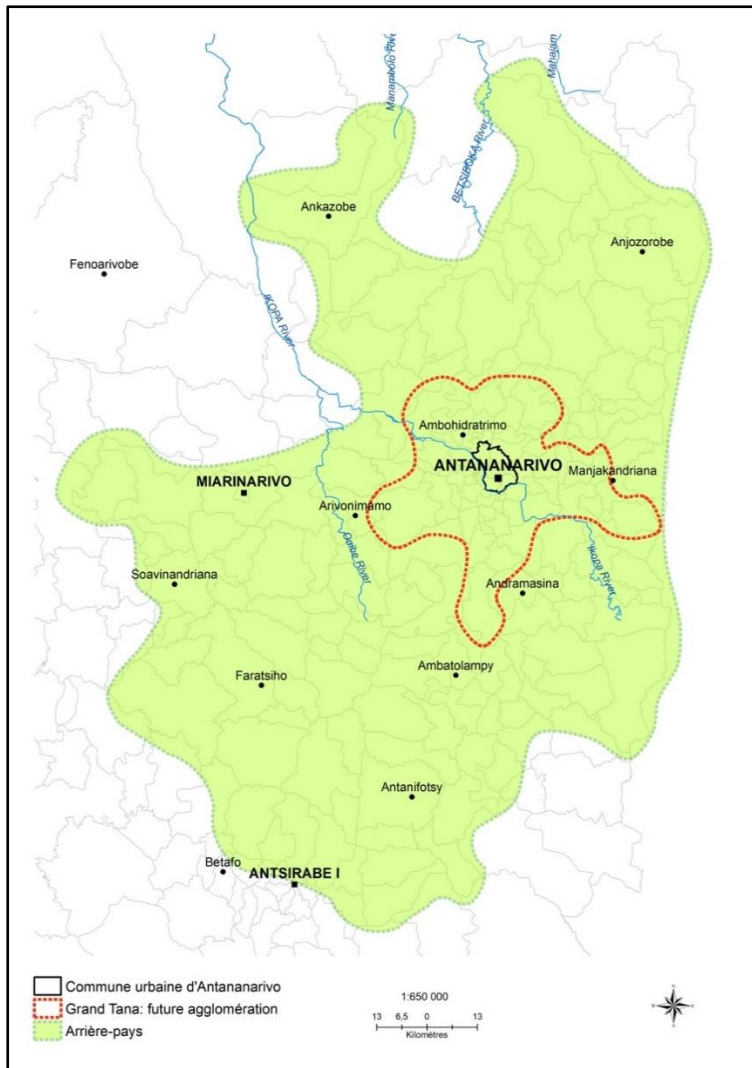
Figure 10: Boundaries of the Antananarivo CRFS

2.2 CRFS boundary setting in Medellin, Colombia

For defining the CRFS boundaries of Medellín (Colombia) and the surrounding Aburrá valley, a specific, localised set of criteria was elaborated that takes into account the importance of smaller municipalities in the province of Antioquia for the Medellín regional food system. The CRFS boundary definition built on the availability of detailed information on food flows in the Antioquia province.

The city region for Medellín is defined as a group of 31 municipalities in the Province of Antioquia, that according to different criteria play a key role in the food provisioning of Medellin City and the surrounding Aburra valley:

i. Food provisioning: municipalities contributing more than 1% to food flows reaching wholesale markets in Aburra valley;
ii. Food production: municipalities contributing more than 1% of the total provincial food production;
iii. Proximity: municipalities in the Aburra valley with any agricultural production;
iv. Areas of agricultural expansion (this is related to the importance of the western *Occidente* subregion, which is conceived as an area of agricultural expansion within the overall development of the Antioquia department and that is increasingly serving as a foodshed for the growing urban area of the Aburrá Valley. It includes the municipalities with the highest levels of agricultural activity),
v. Municipalities with an important political role in territorial governance.
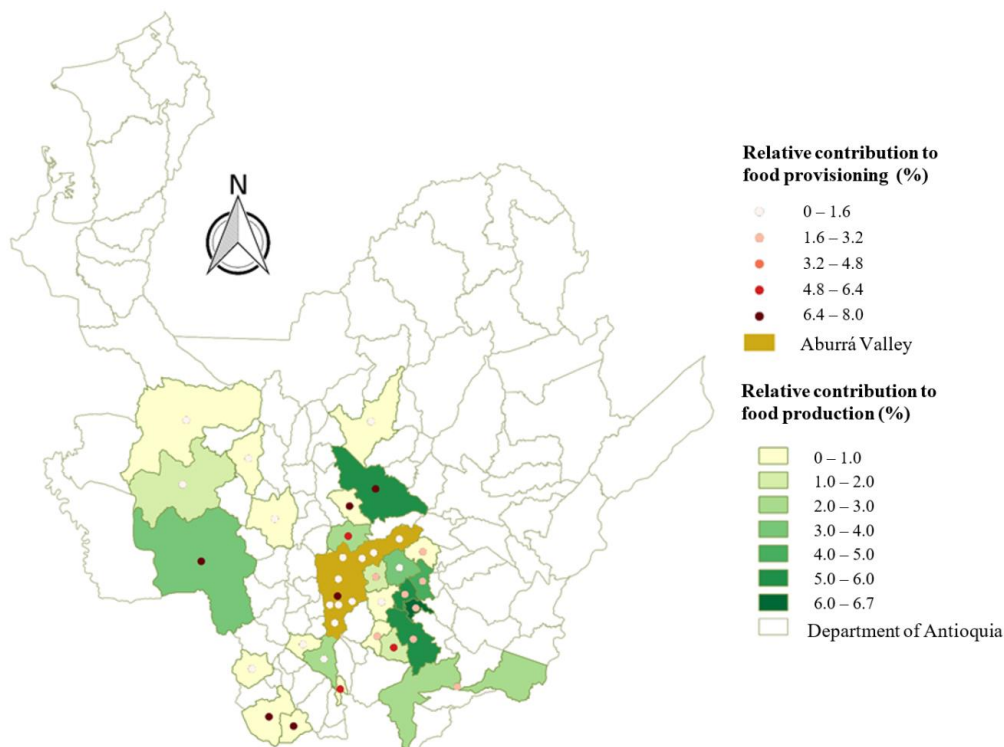

Figure 11: The City region food system of Medellín, Colombia (Source: FAO)

Overall, the Department of Antioquia contributes nearly 30% of the total food supply of the Aburrá Valley. The 31 municipalities that are part of the City Region Food System of Medellín and the food producing territory, represent an area of approximately 2,550 Km2 and produce about 70

commodities totaling 670,440 tons in 2013. Figure 2. below indicates the contribution of the 31 individual municipalities (that make up the Medellín CRFS) to the overall food supply.
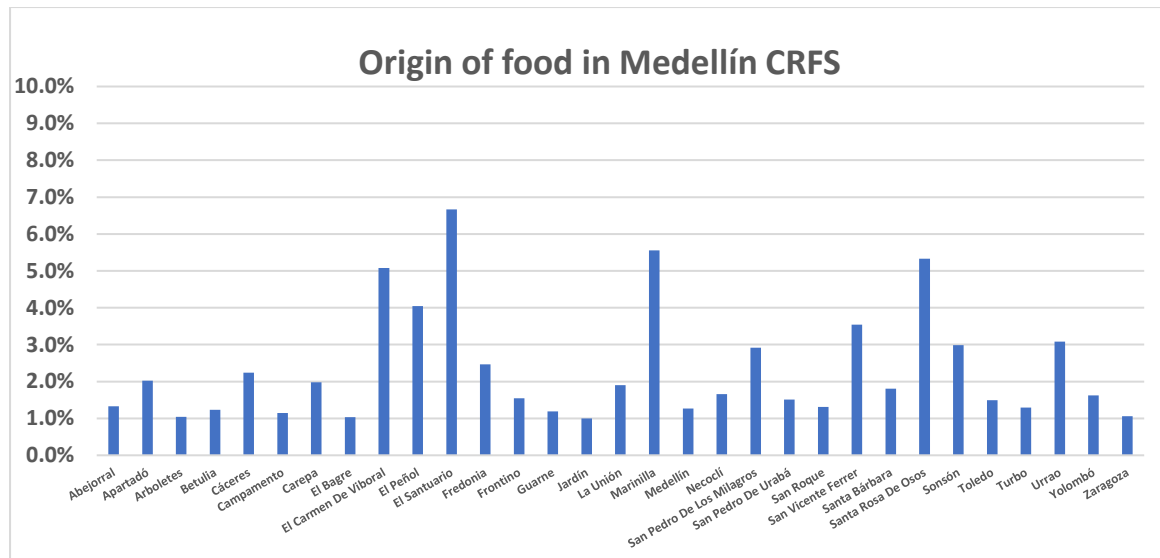

Figure 12: Contribution of local production (per municipality) in Antioquia to food in Medellín (Source: FAO)

2.3 CRFS boundary setting in Toronto, Canada

Three possible areas were identified: the Greenbelt, Golden Horseshoe and the Greater Golden Horseshoe (GGH).
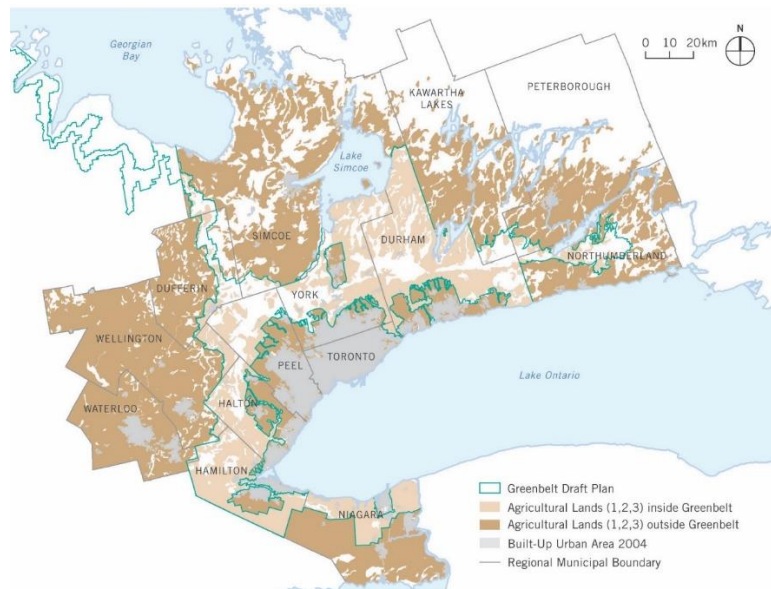

Figure 13: The Greenbelt

Figure 14: The Golden Horseshoe

Figure 15: The Greater Golden Horseshoe

The three options were compared with respect to: policy availability and applicability; relevance for agriculture, the environment, the economy, society; the level and longitudinality of existing data; number of date sources; and the applicability of census data.

Item	Greenbelt	Golden Horseshoe	Greater Golden Horseshoe
Policy availability	Yes; several	See GGH	Yes; Places to Grow
Policy applicability (for changing context)	Yes; currently proposed to expand into some of the other areas	See GGH	Focus of policy development and action currently
Relevance (agricultural)	Key policies that only apply to farms in this area; less homogeneous data and policies if full agricultural area is also considered ("whitebelt")	Covers a larger agricultural area, though not all that are in market distance of GH	Addresses key agricultural areas with relevance to urban markets
Relevance (environmental)	Includes key watershed, conservation areas (a designated environmental protection zone)	Has important impact on environmental goods in the area, studies from David Suzuki Foundation evaluate these	Has important impact on environmental goods in the area, studies from David Suzuki Foundation evaluate these

Relevance (economic)	Has specific economic issues related to frozen farm assets (limiting market for land sales); generally closest area to key urban market in GTA, as well as significant agricultural areas (Holland Marsh, etc.), has specific supports from Greenbelt Fund to build agricultural business success, agri-tourism, supportive policies, etc. Note that recently Greenbelt has been funding projects across the province too.	Has a significant impact on Canada's economy based on percentage of population; also has much of the best soil in Canada, increasing its relevance as a food shed over other lands; similar agricultural lands to Greenbelt, but more complete (includes whitebelt)	Has a significant impact on Canada's economy based on percentage of population; also has much of the best soil in Canada, increasing its relevance as a food shed over other lands; similar agricultural lands to Greenbelt and Golden Horseshoe, but more complete
Relevance (social)	Less of a socially defined area; social issues on either side of Greenbelt border are fairly similar, all peri-urban	More relevant and complete as the peri-urban and sprawl area is result of population growth and creates increased commuter distances for urban jobs (a social impact); numbers available from census, corresponds to CMAs	More relevant as sprawling areas is result of population growth and creates increased commuter distances for urban jobs (a social impact); numbers available from census, corresponds to CMAs
Level of existing data	Excellent collection of reports, analysis, etc.; upcoming expansion of area will render these inaccurate	Excellent reports from the Golden Horseshoe Food and Farming Alliance	Excellent reports from the Golden Horseshoe Food and Farming Alliance which has now shifted attention to the GGH so current research focuses on the wider area
Longitudinality of data	Data available since the Greenbelt's inception; crosses municipal borders: Stats Canada and Ag. Census data are challenging to use in this region (borders not contiguous with CMAs)	Corresponds to municipal borders, matching Stats Can and Ag. Census regions, has been producing reports for several years	Corresponds to municipal borders, matching Stats Can and Ag. Census regions, new research underway, DSF report for environmental goods
Number of sources for data	David Suzuki Foundation,	David Suzuki Foundation,	David Suzuki Foundation,

	Greenbelt Fund reports, Dollars and Sense with other foundations	Greenbelt Fund reports, Dollars and Sense with other foundations, Stats Can and Ag. Census data, detailed reports from Planscape and others	Greenbelt Fund reports, Dollars and Sense with other foundations, Stats Can and Ag. Census data, few reports available as data collection is underway now by GGHFFA
Applicability of census data (does it cut across census lines)	crosses municipal borders: Stats Canada and Ag. Census data are challenging to use	Corresponds to municipal borders, matching Stats Can and Ag. Census regions, has been producing reports for several years	Corresponds to municipal borders, matching Stats Can and Ag. Census regions

Table 1: Pros and cons for different definitions of the Toronto city region food system boundaries

Although each approach has merits, the Golden Horseshoe or the expanded Greater Golden Horseshoe hold more relevance for this study, with greater policy impact from a focus on the Greater Golden Horseshoe. The Greenbelt area does not correspond to municipal, economic (food market) or agricultural boundaries, so access to this data and the use of census material would be challenging. Both the GH and GGH correspond to census regions. In addition, agricultural lands have been demonstrated to exist on both sides of the Greenbelt boundary, with similar access to urban markets and growing populations. An agricultural economy would encompass these areas as well, and would be based more on transportation and infrastructure options rather than environmentally sensitive areas. Finally, the Greenbelt area may expand soon, and old reports based on the initial boundaries will be outdated.

Excellent work is available from the Greater Golden Horseshoe Food and Farming Alliance on the Golden Horseshoe and is now underway for the larger area. The material comes from a range of sources, including environmental impact reports from the David Suzuki Foundation (including Greenbelt focused and more recently GH focused reports). From the point of view of input to policy development, this area also seems to be receiving important attention with a coalition of urban and rural actors. In all cases, although Toronto and the GTA was left out of the last agricultural census, separate reports exist from various sources, in particular from Toronto Food Strategy and the Toronto Food Policy Council at Toronto Public Health.

The Greater Golden Horseshoe seems to offer the best data, the most policy relevance, and integration with ongoing important work by the GGHFFA. However, some important work (for instance, environmentally focused reports from the Greenbelt Fund) does not correspond to the area but should nonetheless be addressed and included. Moreover, it was anticipated that a comprehensive data set for this area would be available. Unfortunately, as some jurisdictions refused to give permission for access, this did not happen in the end. This points to the need for caution in assessing resources and setting the research parameters.

Overall, a combination of areas with a principal focus on the Greater Golden Horseshoe will probably best address the needs for the City Region Food System Assessment for Toronto.

2.4   CRFS boundary setting in Utrecht, the Netherlands

Different studies use different boundaries for the city region. As a general rule, an area of 30 to 100 kilometres around the city centre is included, depending on the local context and the type of city.

Several possibilities for the definition of the Utrecht City Region for the purposes of this project were identified. These are:

1. Utrecht municipality
2. The region 'U10': Utrecht municipality with 9 other neighbouring municipalities
3. Utrecht province
4. Stadsgewest Utrecht (urban region)
5. Grootstedelijk agglomeratie Utrecht (large urban agglomeration)
6. A specific region defined by local food marketing initiative 'Lekker Utregs'

Province of Utrecht

A specific advantage of using the province as boundary for the city region is that data are readily available on this level (disaggregated by municipality). Also, the province has published (or is about to publish) a range of documents on the status and trends of agriculture developments. An example is the 'landbouwverkenning Provincie Utrecht tot 2015 (LEI, 2011). This document is based on data from the Central Bureau of Statistics (CBS) and the LISA (national register for employment).

Figure 16: Map of the province of Utrecht and its 26 municipalities

U10 Region

U10 is a network of 10 municipalities around the city of Utrecht. Looking at the province it *excludes* the municipalities of Amersfoort, the region 'Gelderse Vallei' (including the municipalities Utrechtse Heuvelrug, Veenendaal, Renswoude, Eemnes, Baarn, Soest, Woudenberg), and the municipalities Montfoort, Oudewater, Wijk bij Duurstede, De Ronde Venen. As mentioned earlier the U10 region largely overlaps with the region of 'Lekker Utregs', a marketing initiative for local food products. The U10 municipalities are:

• Bunnik (Werkhoven, Odijk)	• Stichtse Vecht (Loenen, Maarssen, Breukelen, Tienhoven, Kockengen, Oud-Aa, Loenen a'd Vecht)

• De Bilt (Bilthoven, Groenekan, Maartensdijk)	• Utrecht
• Houten (Schalkwijk, t Goy)	• Vianen
• IJsselstein	• Woerden (Kanis, Kamerik, Zegveld, Harmelen)
• Nieuwegein	• Zeist (Den Dolder)

The U10 region functions as a network of municipalities with the goal to improve cooperation on economic affairs, residential areas, spatial planning, mobility and accessibility, and the social domain (Gemeente Utrecht, Afdeling Onderzoek, 2013).

Lekker Utregs

Stichting Lekker Utregs is an initiative that aims to promote consumption of locally produced food. The Stichting promotes food producers from the region: the entire province of Utrecht, with the exception of north-western part of Utrecht and the region Eemland/Gelderse Vallei. Lekker Utregs used the following considerations for defining the region: on the north of the Province of Utrecht, there are towns and villages that are oriented more towards cities such as Amersfoort, Amsterdam and Hilversum. To the east, the hills of the Utrechtse Heuvelrug form a natural boundary; towns and villages beyond the Heuvelrug are considered to be oriented more towards cities such as Veenendaal, Ede, Wageningen, and Arnhem (interview project team with Louis de Jel, Lekker Utregs). To the south, the river Kromme Rijn forms the natural boundary of the region. To the west, the grasslands, the villages and towns are largely orientated on Utrecht city (this is somewhat arbitrary). Also see the document 'Reglement Keurmerk Lekker Utregs' (2012).

After weighing different options, the CRFS assessment project team decided to select the *U10 region* (hereafter referred to as the 'Utrecht Region') as study area for the Utrecht city region food system assessment. The Utrecht Region consists of the municipalities of Utrecht and 9 neighbouring municipalities: Bunnik, De Bilt, Houten, Ijsselstein, Nieuwegein, Stichtse Vecht, Woerden, Vianen and Zeist.

The rationale for choosing U10 as boundary for the Utrecht City Region, is based on the following:

1. **Data availability and ability to aggregate municipal data:** Many data sets and statistics are disaggregated at national, provincial and municipal level. The Utrecht Region follows municipal boundaries.
2. **Level of connectivity:** The Province of Utrecht is home to different larger cities, including the cities of Utrecht and Amersfoort with its respective surrounding areas. Other parts of the Province are more focussed on cities in neighbouring provinces (Amsterdam, Rotterdam, Ede and Wageningen). The Utrecht Region is concentrated around the municipality of Utrecht, and there are very strong connections, in terms of flows of people, employment, goods and services, between the different municipalities in the region.
3. **Influence of the city and ability to take policy actions:** U10 is an existing network of municipalities that already takes joint decisions and implements (policy) actions. Several member municipalities (Zeist, De Bilt, Bunnik, Houten and Utrecht) indicated interest in joint food system work.

On this basis, the U10 region was selected as the most appropriate city region with sufficient data availability and potential for generating food policy processes at territorial scale.

Table 1 below gives a more detailed overview of the considerations applied for the different city region options outlined.

Table 2 Overview of options for delineating the Utrecht City Region

Item	Utrecht Municipality	U10 region	Utrecht Province	Stadsgewest Utrecht	Grootstedelijke agglomeratie	Lekker Utregs (project based)
Policy context	Low: municipal boundaries do not include larger food production areas	Relevant: U10 is a network organisation, although it does not have a specific jurisdictional mandate; common themes are discussed at network level and the level of individual municipalities.	Relevant: the province has various instruments to influence its agenda on agricultural development, in relation to environment, economic development. systems. However, the role of Utrecht in these decision-making processes is limited.	Low: Does not have its own institutional body.	Low: Does not have its own institutional body.	Low: Lekker Utregs is a local non-administrative/non-governmental initiative. Project boundaries do not fully coincide with municipal boundaries.
Policy interest	High: there is strong interest from the municipality of Utrecht on the theme of food, in relation to other policy themes (like health).	Low: agriculture land-use remains one of the largest land-uses in the region, but food and regional food systems do not yet seem to be high on the agenda of U10. There is interest from some member municipalities to start working on this.	High: several policy documents, strategy documents highlight the potential and importance of urban agriculture, multifunctional agriculture, and regional food.	Low: Not known	Low: Not known	Difficult to judge: unsure whether Lekker Utregs has sufficient organisational capability/networking capability to influence policies.
Relevance (agricultural potential)	Very low: there are hardly any agricultural areas in the municipality.	Reasonable: Remaining presence of dairy farming, and to a lesser degree fruit farming, albeit low	High: agricultural diversity (compared to U10 region) is higher, although agriculture in the Utrecht province has also a strong	Reasonable: there is substantial agricultural land in the region.	Low : area is made up of the municipality of Utrecht and Stichtse Vecht, and agricultural land-use is limited.	Reasonable: there is substantial agricultural land in the region covered, but again with a strong presence of dairy farming,

Item	Utrecht Municipality	U10 region	Utrecht Province	Stadsgewest Utrecht	Grootstedelijke agglomeratie	Lekker Utregs (project based)
		diversity of food production systems.	representation of dairy farming.			and to a lesser degree fruit farming.
Relevance (environmental)	Reasonable: city greening (though not necessarily through multifunctional agriculture) is an important interest with regards to public health.	Reasonable to high: Land-use, agriculture, and environment are strongly linked in this region. Environmental concerns are management of the fragile grass peat lands in the west of the region and water tables, compaction of soils, as well as nature and agricultural landscape conservation,.	Very high: Land-use, agriculture, and environment are strongly linked in this region. Environmental concerns include height of water tables, agricultural pollution of ground- and surface water (nitrogen, pesticides), compaction of soils.	Reasonable to high: Land-use, agriculture, and environment are strongly linked in this region. Environmental concerns are management of the fragile grass peat lands in the west of the region and water tables, compaction of soils..	Reasonable: city greening (though not necessarily through multifunctional agriculture) is an important interest with regards to public health.	Reasonable to high: Land-use, agriculture, and environment are strongly linked in this region. Environmental concerns are management of the fragile grass peat lands in the west of the region and water tables, compaction of soils.
Relevance (economic)	Low to reasonable: food system services, specifically distribution, retail, but also research and development around food and food systems provide a relatively small share of employment.	Reasonable: current and potential future role of food system services, production, processing, distribution, retail, to provide employment	High: on provincial level, the economic contribution of food system services is higher compared to smaller regions, stronger representation of food production. Some specific food production sectors are under strong economic stress.	Reasonable: current and potential future role of food system services, production, processing, distribution, retail, to provide employment	Low to reasonable: food system services, specifically distribution, retail, but also research and development around food and food systems provides a relatively small share of employment.	Reasonable: current and potential future role of food system services, production, processing, distribution, retail, to provide employment
Relevance (social)	High: Utrecht municipality will see continued population growth, and a relative	High: idem as for Utrecht Municipality	Reasonable: strong relations exist between people and places in the region, in terms of work,	Reasonable: strong relations exist between people and places in the region, in terms of work, growth, housing,	Reasonable: strong relations exist between people and places in the region, in terms of work, growth, housing,	High strong social relation between different food system actors are supported.

Item	Utrecht Municipality	U10 region	Utrecht Province	Stadsgewest Utrecht	Grootstedelijke agglomeratie	Lekker Utregs (project based)
	young population, with high degree of ethnic diversity. Increasing consumer demand for more sustainable food. Large variety of social initiatives.		growth, housing, mobility. No clear link with food systems however.	mobility. No clear link with food systems however.	mobility. No clear link with food systems however.	
Level of existing data	High; data are collected for municipal boundaries; several municipal institutions have data, also national and provincial institutes collect data on municipal level.	High; data are collected for different municipalities in U10; several municipal institutions have and publish data, also national and provincial institutes that collect and analyse data on municipal level.	High	High	Reasonable: the boundaries not always overlap with municipal boundaries.	Low: for data, the region does not overlap with administrative boundaries. Lekker Utregs did carry out some studies for the city of Utrecht.
Presence of historical data	High, longer term data collection for health, economy, less for consumption of local/regional food.	High, idem as for Utrecht Municipality.	High, specifically for agriculture	High: boundaries overlap with municipal boundaries.	Reasonable: see above.	Low: see above
Number of sources for data	High; although different for different themes. Also national studies and publications.	Reasonable to high: availability of a range of data sources and publications on food related issues. Larger cities (such as Utrecht) tend to have more data.	High: the provincial boundaries are used by the province itself but also by other research organisations	Low to reasonable: although boundaries overlap with municipal boundaries, there have been few publications or other data sources for this region.	Low to reasonable: although boundaries overlap with municipal boundaries, there have been few publications or other data sources for this region.	Low: see above