FINAL PROJECT REPORT

Surfood FOODSCAPES Project

Insight into residents' foodscapes in the Greater Montpellier area

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Surfood FOODSCAPES

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PROJECT PARTICIPANTS

R = Researcher; TR = Teacher-researcher; C = PhD candidate; T = Trainee; M = Metropolis actor; Coord = Coordinator; UMR = Joint research unit

• **Sylvie Avallone**, nutritionist (TR), Institut Agro Montpellier, UMR Qualisud • **Nicolas Bricas**, socioeconomist (R)(Coord), CIRAD, UMR MoISA and UNESCO Chair in World Food Systems • **Myriam Carrère**, economist (R), INRAE, UMR MoISA • **Géraldine Chaboud** (Coord), Institut Agro Montpellier, UNESCO Chair in World Food Systems • **Emmanuelle Cheyns**, sociologist (R)(Coord), CIRAD, UMR MoISA • **Damien Conaré**, Institut Agro Montpellier, UNESCO Chair in World Food Systems • **Nicole Darmon**, nutritionist (R)(Coord), INRAE, UMR MoISA • **Mazarine Girardin**, geographer (T), UMR Innovation • **Teo Juricev**, geographer (T), UMR Innovation • **Camille Lafay**, sociologist (T), UMR MoISA • **Olivier Lepiller**, sociologist (R)(Coord), CIRAD, UMR MoISA • **Julia Levêque**, sociologist (T), UMR MoISA • **Ashby Leavell**, geographer (C), Univ. Colorado, Dept. of Environmental Studies • **Jill Litt,** geographer (R), Univ. Colorado, Dept. of Environmental Studies • **Caroline Méjean**, epidemiologist (R)(Coord), INRAE, UMR MoISA • **Léa Mikolajczak**, nutritionist (T), UMR MoISA • **Beryl Muller**, agronomist (S), UMR MoISA • **Marlène Perignon**, nutritionist (R), INRAE, UMR MoISA • **Coline Perrin**, geographer (R)(Coord), INRAE, UMR Innovation • **Daisy Recchia**, nutritionist (C), INRAE, UMR MoISA • **Maria Camila Robledo Rodriguez**, nutritionist (T), UMR MoISA • **Pascaline Rollet**, statistician (R), INRAE, UMR MoISA • **Ophélie Roudelle**, project manager, Institut Agro Montpellier, UNESCO Chair in World Food Systems • **Valérie de Saint-Vaulry,** project manager, Montpellier Méditerranée Métropole (M) • **Pascale Scheromm**, geographer (R), INRAE, UMR Innovation • **Lucie Sirieix**, management science, marketing professor (TR), Institut Agro Montpellier, UMR MoISA • **Christophe-Toussaint Soulard**, geographer (R)(Coord), INRAE, UMR Innovation • **Marion Tharrey**, nutritionist (C), INRAE, UMR MoISA • **Margherita Tirriduzzi**, sociologist (T), UMR MoISA • **Simon Vonthron**, geographer (C), INRAE, UMR Innovation.

PROJECT COORDINATORS

Nicolas BRICAS nicolas.bricas@cirad.fr
Christophe-Toussaint SOULARD christophe.soulard@inrae.fr

PROJECT SCIENTIFIC ADVISORY BOARD

Hélène Charreire, geographer, Univ. Paris-Est Créteil
Julie Le Gall, geographer, ENS Lyon
Samuel Deprez, geographer, Univ. du Havre
Adam Drewnowski, nutritionist, Univ. of Washington

WEBSITE

www.foodscapes.fr

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The FOODSCAPES project was instigated by the UNESCO Chair in World Food Systems as a component of its Sustainable Urban Food Systems (Surfood) programme while being implemented by researchers from the MoISA and Innovation joint research units of CIRAD, INRAE and Montpellier SupAgro. The project was designed to analyse the impacts of urban foodscapes (food shops, markets, gardens, etc.) on people's food styles (consumption, practices and representations).

Background

Changing eating habits to achieve a healthier and more environment-friendly diet for everyone is a major current social challenge. The goal in recent years has thus been to help people make informed choices, while raising their awareness and educating them on better food options that will have a more positive impact on their health and the environment. It is now known that people's eating behaviours are not solely determined by their knowledge, intentions and sociodemographic background. They are also driven by food consumers' physical, economic and social environment. This research project focused on the links between people's eating habits and foodscapes, i.e. the extent of geographical and economic accessibility to all shops, markets, restaurants, gardens and sales outlets that provide food supplies for residents in a given area (neighbourhood, city, etc.).

Objectives

The project aimed to boost local authorities' awareness on an available lever to take action on food, i.e. urban planning. Based on the results of this research, these actors would be able to understand and account for the impacts of their land policies (e.g. urban agriculture, development of community gardens) in the development of public spaces and their commercial urban planning strategies (e.g. market and shop installations) on the diets of the people living in their area.

Research site

The research was conducted in the Greater Montpellier area, i.e. the city of Montpellier and neighbouring municipalities.[1]

Project organization

The project involves five research strands, each generally with a main disciplinary approach, sometimes supported by others:
1. Foodscapes from the residents' viewpoint–studied via a sociological approach
2. Relationships between foodscapes and residents' spatial supply practices–studied via a geographical approach
3. Community gardens and their impact on different lifestyle sustainability aspects–studied via an interventional research approach
4. Impacts of the development of online food shopping–studied via a sociological approach
5. Mont'Panier survey: relationships between foodscapes and food behaviours, involving collaborations between researchers of the previous research strands and thus via an interdisciplinary approach.

1. Assas, Baillargues, Beaulieu, Castelnau-le-Lez, Castries, Clapiers, Combaillaux, Cournonsec, Cournonterral, Fabrègues, Grabels, Guzargues, Jacou, Juvignac, Lattes, Lavérune, Le Crès, Mauguio, Mireval, Montaud, Montferrier-sur-Lez, Montpellier, Murviel-lès-Montpellier, Palavas, Pérols, Pignan, Prades-le-Lez, Restinclières, Saint-Aunès, Saint-Brès, Saint-Clément-de-Rivière, Saint-Drézéry, Saint-Gély-du-Fesc, Saint-Géniès-desMourgues, Saint-Georges-d'Orques, Saint-Jean-de-Védas, Saint-Vincent-de-Barbeyrargues, Saussan, Sussargues, Teyran, Vic-la-Guardiole, Vendargues, Villeneuve-lès-Maguelone.

1. Foodscapes from the residents' viewpoint

Background. Geographical and urban sociological research has highlighted that foodscapes have immaterial, sensitive (environmental elements, including sounds, light, etc.) as well as material features (physical objects, buildings, trees, etc.). Foodscapes are • physical spaces, • practical and inhabited spaces–city dwellers move around in and use these places–and • perceived spaces. According to Nikolli *et al.* (2016), there is a multitude of foodscapes, depending on residents' personal experience with regard to the place.

Objectives and method

Research in this strand is geared towards identifying foodscape elements that are meaningful for inhabitants and have an influence on their eating habits, as well as their spatial and social relationships. Given that the relationship to the foodscape is not necessarily conscious and is also associated with routine practices and fortuitous commonplace experience, our research here was based on so-called "sensitive methods"–we organized commentated walks with inhabitants (Thibaud, 2001). The aim was to accompany them on their food shopping trips to gain insight *in situ* into their practices and use of the area. Residents also shared their views during these urban walks. We then interviewed 23 residents in 10 Montpellier neighbourhoods and asked them to draw or take pictures of their foodscape. In a second interview, we documented their comments on these photos and drawings, thereby showcasing their personal awareness of the space (from a multisensorial standpoint).
We then conducted a second survey in two low-income neighbourhoods identified as priority areas under the city policy. The configurations of these two neighbourhoods differ: one includes a cluster of low-income buildings (Petit Bard), while the other is a suburban neighbourhood in the throes of gentrification (Figuerolles). Neighbourhood associations facilitated in-depth interviews with residents and shopkeepers. In one of the neighbourhoods where an open-air market was moved and completely refurbished by the city, part of the interview queries focused on how the new market layout was being experienced.

Results

- Shopping is more than just a matter of procuring supplies, it also involves soaking up the atmosphere of a place, meeting more or less familiar people, discovering what the shops have to offer and spending time in the city. Retail outlets should not be viewed merely in terms of their commodity procurement functionality. Their layout, atmosphere and customers are also key features to consider regarding these foodscapes.

- Residents procured supplies in different ways, while being involved to different extents in public and commercial spaces. They were seeking–depending on the case–a sense of wellbeing associated with the comfort of the place (via the atmosphere, social ties, rituals or the intimacy of the place), efficiency (via the functionality of the place), solidarity, discovery and anonymity.

- This diverse range of spatial relationships depended on the places and their material and immaterial features. Some places inspired strolling and leisure (trees, passageways, benches, greenery, shade in summer, etc.) and tended to make residents feel comfortable and relaxed, whereas streamlined mobility prevailed in other more functionally flowing places (car parks, major roads, commercial routes, etc.). Yet other places enabled people to blend anonymously in their surroundings (supermarkets) or express their community solidarity (farmers' markets).

- Proximity to a shop could be regarded as an advantage from convenience, familiarity and solidarity standpoints. Yet remoteness from shops could also provide an opportunity to get out of the neighbourhood and community, to discover and live in other sometimes more mixed or anonymous physical and social spaces.

- Shopping trips were not looked at solely from a practical angle (distance, duration and difficulty), they were also opportunities for people to take advantage of their familiarity with the place, where trees, intricacies and overcrowding could impact their perception of an atmosphere. This spatial familiarity could contrast with a vision of a 'smoother, cooler and more fluid' urban environment where efficient functionality prevails.

- The distance to food shops and their practical functionality (ease of movement, storage, information, cleanliness, etc.) were therefore amongst the many elements influencing foodscape perception. Foodscapes must therefore be understood in a multifunctional way while integrating the full array of spatial relationships.

Recommendations

Urban planning policies have impacts on the tangible aspects of foodscapes. Comfort, living together or living in one's neighbourhood are influenced by these material and immaterial aspects of the places. Residents' views on their foodscapes revealed that they were not just seeking the most efficient way to find quality foods at affordable prices. Sourcing food is a part of living in and feeling at one with the city, which can take different combined forms–city dwellers shop in different places at different times while seeking different types of products and developing different spatial relationships. Urban renovation initiatives in residential areas should hence be receptive to these diverse relationships. Urban planning policies should contribute to building foodscapes that respect this diversity while not–as is sometimes the case–obliterating the familiarity and comfort features of the place to promote efficiency and flow. It is essential that users and residents participate in the design of foodscapes at the early stages of development projects so as to optimize these multiple spatial relationships.

CONTACTS
Emmanuelle CHEYNS emmanuelle.cheyns@cirad.fr
Nicolas BRICAS nicolas.bricas@cirad.fr

Sketch made and annotated by a resident

I love the colours, the market is so colourful.

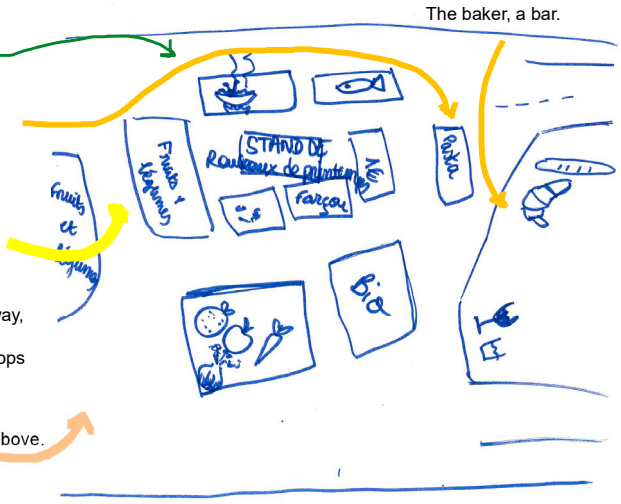
Here's the fishmonger, the guy who makes giant paella, so there are lots of smells.

Here's the Italian guy who sells *pasta* and *formaggi*.

Here's the guy who sells all kinds of trivia for a euro.

Then there's the big pedestrian walkway, and the tramway, and the rest of the medina atmosphere, the butcher's shops and big bazaars.

This is the market layout seen from above.



It's popular. I like it, I don't know why. Maybe because it reminds me of the market near my parents' house.

I like the fact that there are all types of people there buying fruit and vegetables, that there are as many families and young people as there are disadvantaged people, as well as affluent people.

I like that it's outside and lively, people are shouting everywhere, you can stroll around and it's bustling, that people go from stand to stand.

Photo taken and annotated by a resident

"I have several ways to go to the market. There's a special house on one of the routes that I always find really pretty. It makes me feel dreamy and envious because it has a bit of a Spanish feel to it–a holiday feel. Once I've passed this beautiful house, I cross the road and go from my downtown neighbourhood to Figuerolles. This picture illustrates the really cool atmosphere. There are lots of little grocery shops on both sides of the road. It's nice just to look around. You can chat and glance at things for no reason at all when you're strolling around with someone. But when it's a routine outing, even if it's just once a week, it makes a difference. If this grocery shop is closed one day because they're on holiday, it's the first thing I'll notice on the street–yet I usually never even go there. Sometimes, by habit, I may notice a terrace with pretty flowers. It's a bit like saying, "Oh yeah, that's how it is nowadays." I inherited that trait from my mother, who used to say to me: "Oh yeah, today they've closed their shutters!"

2. Relationships between foodscapes and residents' spatial supply practices

Background. Research studies on foodscapes have highlighted the presence of so-called food deserts in reference to areas where some residents cannot readily obtain healthy food at affordable prices. In the United States, these food deserts are deemed to be a public planning issue. Researchers have mapped vast areas where people are disadvantaged and shops are too remote or expensive for residents, or where supplies of fresh fruit, vegetables, meat and dairy products are lacking. FOODSCAPES is the first French study to look into this issue by analysing the retail food outlet coverage within the area and the impact of this coverage on consumers' spatial procurement practices.

Objectives and method

This geographical research strand aims to map the foodscape diversity in Greater Montpellier, characterize and model residents' spatial supply practices and identify cities' food supply levers. This research combines spatial analysis, interview and field survey approaches.

Results

- A geographic information system (GIS) was designed for the purpose of mapping food outlets in Greater Montpellier (including restaurants). Shops listed in the SIRENE and OpenStreetMap databases were checked via field surveys to obtain a reliable updated database. This initiative notably revealed that shop closures are seldom mentioned in the SIRENE database, which can lead to overestimation of the number of shops in a neighbourhood. It also showed that the quality of these databases, especially OpenStreetMap, varies between neighbourhoods and according to the types of retail outlets considered, which can lead to misinterpretations when comparing neighbourhoods.

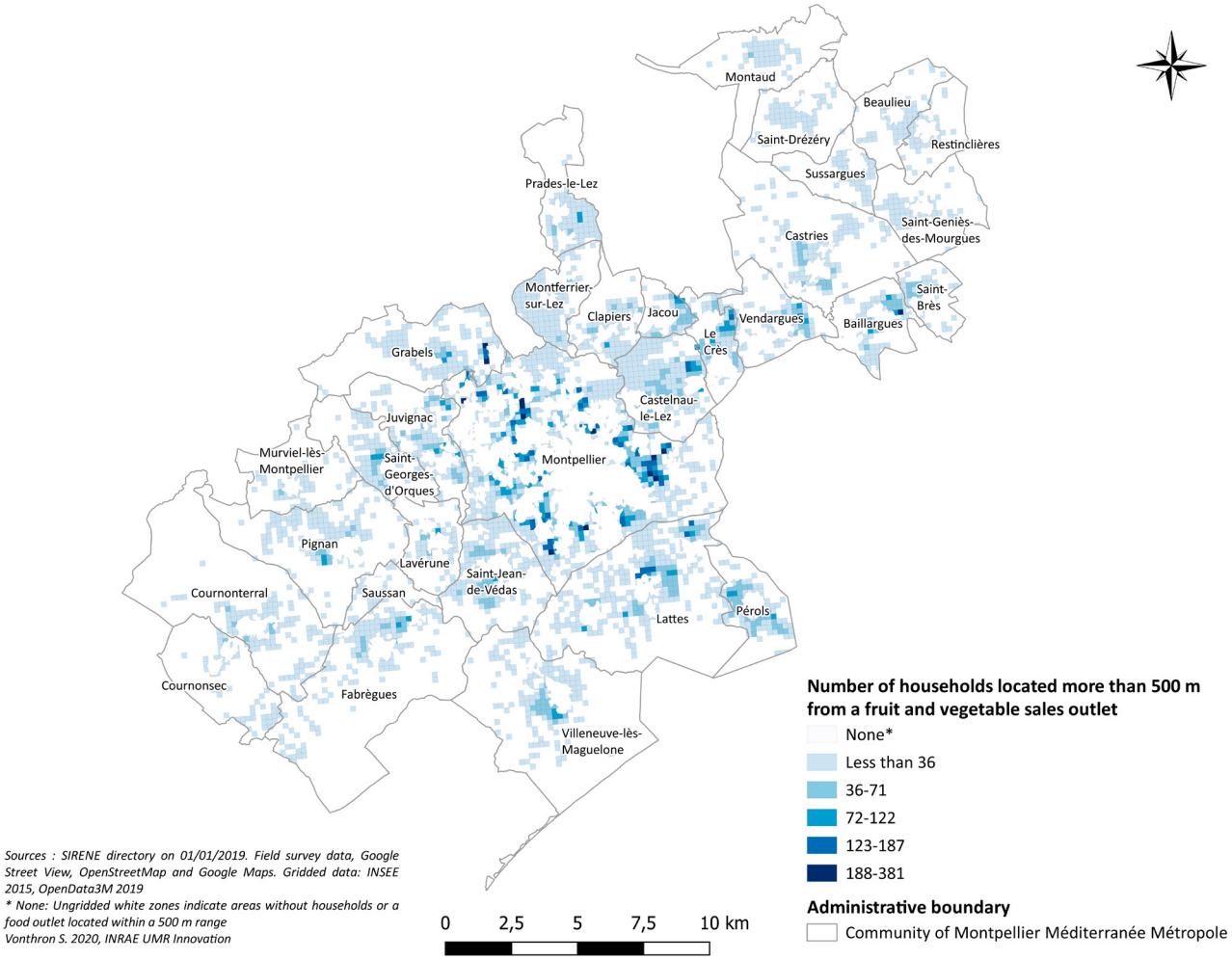
- This enhanced database gave rise to a typology of Greater Montpellier neighbourhoods, which helped distinguish different urban and periurban foodscapes according to the morphology of the buildings, food supply (density, food shop and restaurant diversity) and neighbourhood socio-demographic features.

- The maps generated revealed that the periurban communities furthest from the city core have fewer shops selling fruit and vegetables. These outlets must be accessed by car. However, the maps do not show any systematic difference between rich and poor neighbourhoods in terms of access to shops selling fruit and vegetables. Few neighbourhoods in Montpellier host shops selling fruit and vegetables and the shop types vary between neighbourhoods. Hence, in the poorest neighbourhoods, which are designated as priority areas under the city's policies, food shops selling fruit and vegetables may be found alongside multiple fast-food outlets. These neighbourhoods are not 'food deserts' but rather 'food swamps' where healthy food options are dominated by a profusion of foods of inferior nutritional quality. It is essential that residents of these neighbourhoods have access to healthy foods in local shops as they are often less mobile in their everyday lives than residents of other neighbourhoods (fewer cars and activities outside the neighbourhood).

- A 1-month analysis of food shopping trips of more than 400 households highlights the relationships between foodscape and spatial procurement practices. Households that mainly shopped in their activity spaces, i.e. around their homes and during their usual outings–without any detours–were those with access to an especially rich foodscape in terms of the number and diversity of outlets. Conversely, residents with a poor foodscape were forced to make long special trips to get the food they needed. These quantitative analyses were nevertheless inadequate to assess all foodscape features, especially those that were relevant for the residents. More in-depth interviews were therefore undertaken.

- The interviews highlighted that households often combined several food sourcing rationales. They sometimes opted for efficiency or physical accessibility, where proximity is a key factor. Other times, shopping is more specifically driven by a militant commitment (e.g. a trip to a producer), a leisurely inclination (e.g. to soak in the vibrant atmosphere of an open-air market), or a budgetary constraint (e.g. commuting to benefit from a sale), which may lead them to shop far from home. The issue of economic, social and cultural accessibility of food outlets must be considered in addition to physical accessibility. It is essential to gain insight into how

Distribution of households in the Montpellier Méditerranée Métropole area lacking a fruit and vegetable sales outlet within a 500 m range



Sources : SIRENE directory on 01/01/2019. Field survey data, Google Street View, OpenStreetMap and Google Maps. Gridded data: INSEE 2015, OpenData3M 2019
** None: Ungridded white zones indicate areas without households or a food outlet located within a 500 m range*
Vonthron S. 2020, INRAE UMR Innovation

different residents use and perceive foodscapes so as to prioritize public interventions.

- The analysis of the retail food supply scene in a range of different neighbourhoods in Montpellier and satellite communities (Malbosc, Saint-Martin, Courreau, Sussargues and Saint-Drézéry) revealed that food shops not only have an economic role, but also a social and cultural role. They contribute markedly to the image, atmosphere and life of the neighbourhood. They foster the use of public spaces while being touted as local services in public actors' discourse. Yet the aim of preserving local food outlets is sometimes hard to achieve or beyond the scope of public action. Shops are primarily considered as being in the private sphere. Food is not a common focus of urban planning and remains an emerging issue (Brand *et al.* 2017).

Recommendations

Based on the GIS designed within the FOODSCAPES project, local authorities could look into creating an observatory of food shops to provide open access to regularly updated data. This kind of observatory may be found in other French metropolitan cities. Increased awareness on households and neighbourhoods that do not have access to local shops offering healthy food could help shape social and urban planning policies.
Our targeted analysis of different neighbourhoods enabled us to identify direct and indirect levers via which public actors could bring about foodscape changes. The municipality could steer the food supply by regulating the occupancy of public spaces (creating markets, authorizing–or not–food trucks or restaurant terraces, etc.), while also retaining ownership of certain commercial premises in a bid to preserve food

shops. Finally, it could impact shopper footfall rates through the development of public spaces and its transport policies.
Moreover, our surveys have shown that meetings between food system actors (shopkeepers, caterers), consumers and public stakeholders could help jointly define the sought foodscape and priority development actions. These thematic meetings on food could take the form of neighbourhood meetings or street walks to discuss issues on the ground. They could be particularly beneficial in neighbourhoods without food shops and in those where urban development operations are planned. They would help ensure that the planned developments take into account residents' expectations regarding changes in food shops and their accessibility (range, layout of surrounding public areas, transport and parking policies).

Publications

– Girardin, M., Perrin, C., Vonthron, S., & Soulard, C.T. (2021). What levers do municipalities have to shape foodscapes? *So What?* 17, 1–4. (read the policy brief)

– Muller, B., Bricas, N., Vonthron, S., & Perrin, C. (2021). Mapping inequalities in access to food outlets in Greater Montpellier. *So What?* 16, 1–4. (read the policy brief)

– Vonthron S., Perrin C., & Soulard C.T. (2020). Foodscape: A Scoping Review and a Research Agenda for Food Security-Related Studies. *PLOS ONE*, 15 (5). https://doi.org/10.1371/journal.pone.0233218

CONTACTS
Coline PERRIN coline.perrin@inrae.fr
Simon VONTHRON simon.vonthron@supagro.fr

Changes in foodscape patterns in Saint-Drézéry

Sources: OpenStreetMap France, Gilbert Doumergues (local historian, Saint-Drézéry); layout and credit: M. Girardin, 2019

3. Community gardens and their impact on different lifestyle sustainability aspects

Background. **Community gardens are booming in cities in industrialized countries. The findings of several studies suggest that they have many health benefits for community gardeners, including promoting fruit and vegetable consumption, physical activity, social bonding and mental wellbeing. Studies conducted so far, however, have been based on declarations while also being cross-sectional, i.e. focused on studying gardeners at a given time, eventually comparing them with simultaneously monitored non-gardener controls. Yet the design of these cross-sectional studies precludes the assessment of causal links, so they have not revealed causal relationships between access to a community garden and the adoption of sustainable healthy lifestyles. JArDinS has been the first study aimed at assessing changes in gardeners' lifestyle changes and their sustainability triggered by their first year of involvement in a community garden, considering three sustainability dimensions.**

Objectives and method

Novice members of a community garden were recruited on a voluntary basis in Montpellier in 2018 (n = 75). Participants were interviewed when they first became involved in the community garden (T0) and then 1 year later (T1). Meanwhile, participants in the Mont'Panier study (see Strand 5 page 15) who did not garden, but had a community gardener-like profile (matched by age, gender, household structure and income and the typology of the residential neighbourhood) were recruited for comparison (control group). Changes in lifestyle and their sustainability possibly induced by the first year in a community garden were studied according to the three following sustainability aspects: 1) health/social features–estimated by the nutritional quality of food supplies, participant's level of physical activity, body mass index (BMI), and views on their mental wellbeing and social isolation; 2) environmental features–estimated according to the environmental impact of food supplies, food waste awareness and attachment to nature; and 3) economic features–reflected by household food expenditures, purchases from major food distribution chains and the contribution of harvested garden produce to the household food budget.
To measure these different data, the participants: 1) collected their food receipts and listed all food supplies that entered their household over a month (purchases, donations and harvests); 2) wore an accelerometer (ActiGraph) around their waist for 9 days to measure their physical activity and sedentariness; and 3) filled out several online questionnaires (wellbeing, isolation, food waste awareness, attachment to nature).
Qualitative interviews were also conducted at T1 with 15 gardeners to gain insight into the effects of this first year of gardening on lifestyle sustainability.

Results

- Data collected for 66 gardeners and 66 non-gardener controls were compared. The average age of novice gardeners participating for the first time in a community garden in 2018 was 44 years old. An overwhelming majority of them were women (76%), childless (72%) and with a high educational level (76% with a university degree).

- Community gardens were not located alongside buildings. The gardeners walked or cycled to them (73%, average commute time: 9 min) or commuted by car or public transport (27%, average commute time: 21min).

- At T0, the two groups (gardeners and non-gardeners) were not completely identical–gardeners had a slightly lower educational level and BMI and members of their households ate out less frequently than those in non-gardener's households.

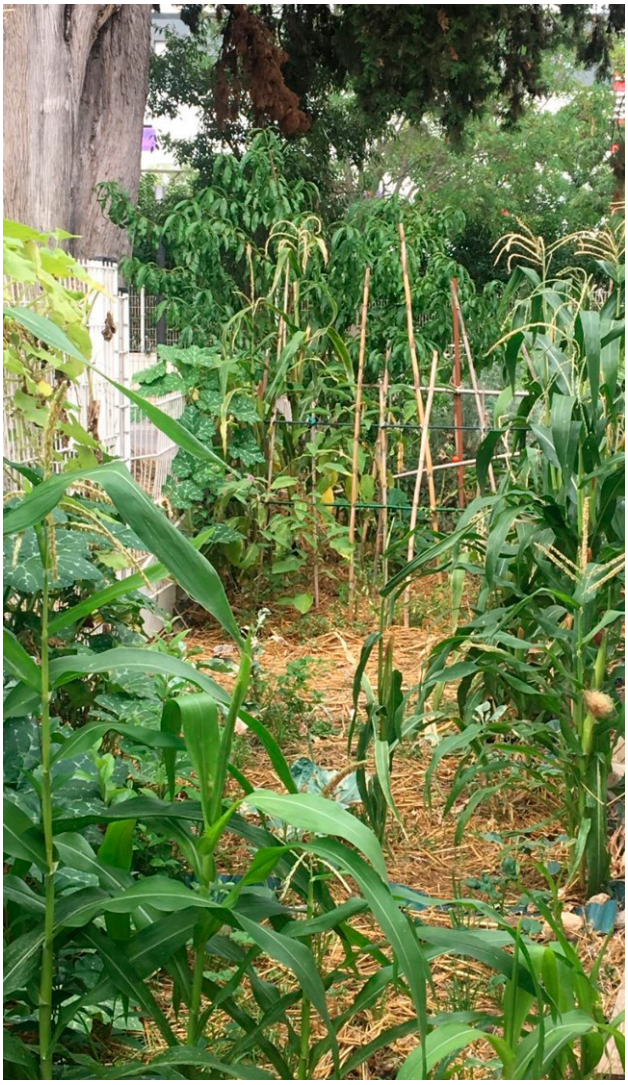
- After accounting for these differences at T0 in our models, the results did not show a statistically significant change at T1 related to participation in the community garden regarding any of the measured variables.

- At T1, a year after joining the gardens, more than half of the gardeners (n = 38) had not harvested any fruit or vegetables in the garden over the survey month. For the others, the harvested quantity of fruit or vegetables represented on average only 8% of the total household fruit and vegetable supply (33.7 g/day/household member).

- The qualitative interviews provided a few elements that helped gain insight into the lack of change in the measured parameters. Some gardeners spontaneously mentioned that their awareness regarding food and the environment was already high before they became involved in the garden.

Others reported difficulties encountered, but mainly their lack of time and scant knowledge about gardening, which was discouraging for some of them. Other elements mentioned by some gardeners included the physical burden of gardening, health problems and difficulties of integrating the community garden. Sixteen gardeners left the garden between T0 and T1, yet the conclusions remained unchanged when these latter gardeners were excluded from the analyses and when the sample was limited to only gardeners who had persevered–no significant noticeable changes in the measured variables at T1.

The Petit-Bard/Pergola community garden



Recommendations

We did not observe any changes related to the first year of participation in a community garden with respect to the different variables associated with the three lifestyle sustainability aspects. These results might be partially attributable to the low community garden participation rates. The barriers that the gardeners mentioned should be dealt with to maximize the potential lifestyle benefits of the gardens, thereby facilitating the integration of newcomers and their long-term participation. This study obviously had some limitations. The hypothesis that communal garden participation may have impacted parameters other than those measured, such as the sense of peace, the pleasure of cultivation or belonging to the neighbourhood, cannot be excluded. Moreover, behaviour-changing mechanisms, particularly with regard to diet and physical activity, are relatively complex and the 1-year follow-up may not have been sufficient to detect these changes–yet a longer follow-up would likely have led to an excessive loss of participants.
At a time when many cities are planning to set up community gardens in their areas, the findings of this study highlighted the importance of considering new forms of these gardens. We recommend the following:

- Strive to set up the gardens as close as possible to residents' homes so as to minimize time and commute constraints, as well as inadequate and/or unequal access to commutes.

- Foster the participation of people who might not be naturally keen on gardening. For instance, active recruitment strategies (based on 'outreach' techniques) could facilitate the inclusion of socially isolated and/or economically vulnerable people, who are generally the hardest to enlist in prevention activities despite the fact that they could benefit by having access to a community garden.

- Encourage the involvement of professionals to oversee community gardens. The regular presence of such facilitators with practical knowledge on gardening and permaculture techniques could avoid the problem of novice gardeners getting discouraged when faced with gardening difficulties and successive failures. Their presence could also have several other benefits, such as fostering group dynamics and integration, boosting garden productivity, promoting household consumption of garden produce, etc.

- Offer more individual plots. It might sometimes be challenging to fit into a totally collective garden, which could generate tension between gardeners. Access to individual plots offers everyone the possibility of having a space that may be personalized according to the crop grown and the time available for gardening.

- The relevance of these different recommendations could be tested in a future interventional study on the impact of their implementation on gardeners' participation and their lifestyle sustainability.

Publications

– Tharrey, M., & Darmon, N. (2021). Can community gardens promote more sustainable lifestyles? *So What?* 13, 1–4. (read the policy brief)

– Tharrey, M., Sachs, A., Perignon, M., Simon, C., Mejean, C., Litt, J., & Darmon, N. (2020). Improving lifestyle sustainability through community gardening: results and lessons learnt from the JArDinS quasi-experimental study. *BMC Public Health*, 20, 1798. https://doi.org/10.1186/s12889-020-09836-6

– Tharrey, M., Perignon, M., Scheromm, P., Mejean, C., & Darmon, N. (2019). Does participating in community gardens promote sustainable lifestyles in urban settings? Design and protocol of the JArDinS study. *BMC Public Health*, 19, 589. https://doi.org/10.1186/s12889-019-6815-0

– M. Tharrey's PhD thesis in comics format (2018): "Jardins collectifs pour une Alimentation Durable et Saine. Les jardins collectifs, outils de promotion de styles de vie durables ?" (see the comics)

CONTACTS

Marion THARREY mariontharrey@hotmail.fr
Nicole DARMON nicole.darmon@inrae.fr

Institut Olga Triballat
Pour une Santé Durable

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4. Impacts of the development of online food shopping

Background. Online food buying is often assumed to be a 'dematerialized' shopping option, but this is far from being the case. This practice engenders new forms of commercial relations, yet it is very much part of the foodscape and the products traded are (obviously) tangible food commodities.

We opted to assess food e-commerce from the users' standpoint by contextualizing it in their foodscape experience. This involves gaining insight into how these online practices relate to other more traditional forms of supply.

This research is being conducted in a setting of steady growth in online commodity trade–a trend that has skyrocketed in the wake of the recent health crisis and lockdowns.

Objectives and method

This strand is focused on studying online purchasing conditions and motives (frequency, types of ordering and delivery) while also assessing the extent to which online food shopping replaces or is combined with more conventional forms of food supply. The research is based on in-depth interviews with residents who practice online food shopping.

Results

- Regarding online shopping, a distinction must be made between selection and ordering practices (ordering from a supplier or choosing from a virtual range) and order retrieval practices (drive-through grocery pickup [called *le drive* in France], delivery in residential or workplace areas, or at home).

- Online shopping does not replace but instead complements and dovetails with other food supply options.

- Alongside purchases in supermarkets and hypermarkets, drive-throughs or meal deliveries, this also concerns purchases from specialist retailers (meat, wine, preserves) or direct-to-consumer purchases from farmers.

- In this respect, online shopping should not be solely considered as a supermarket/hypermarket tool. It may also be an option for actors seeking to develop alternative means of food production, marketing and consumption.

- People's online food shopping motives are varied and not geared simply towards efficiency and time and travel savings. Online shopping also provides access to niche products, particularly from specialized suppliers.

- Online shopping does not necessarily mean increased consumption individualization, but it is the focus of new forms of collective activity (online shopping groups, online shopping to buy from alternative solidarity-oriented food networks).

Recommendations

Various grocery delivery options are available for online shopping: drive-through pickup, delivery to specific locations not linked to supermarkets, near the home, workplace or other locations, as well as home delivery. These delivery options are developing in communities that seem highly varied, and the quantitative survey (Strand 5 page 15) will help determine whether or not it concerns neighbourhoods that are less well served by shops. This trend should now be taken into account in urban development policies and it would be essential to strengthen the role of the online tools in the service of the Montpellier Méditerranée Métropole agroecological and food policy service.

CONTACTS
Olivier LEPILLER olivier.lepiller@cirad.fr
Nicolas BRICAS nicolas.bricas@cirad.fr

5. Relationships between foodscapes and food behaviours

Background. There is growing interest in environmental factors in nutrition research, particularly the geographical food supply distribution pattern, as a consequence of the historical increase in obesity rates in recent decades (Expertise collective, 2014). Although research studies abound, fairly mixed results have been reported on correlations between the foodscape features, eating behaviours and body weight (Sacks *et al.*, 2019). This could be partly explained by the fact that often only one foodscape aspect was taken into account in the published studies while the focus was primarily on eating behaviour in terms of consumption or specific food purchases, rather than on the overall diet quality (Sacks *et al.*, 2019). Moreover, these studies did not take into account the specificity of shopping venues considered to offer a more sustainable food supply, e.g. markets, organic food shops and short supply chains, despite consumers' increased reliance on these outlets (Jilcott, Pitts *et al.*, 2017). Finally, the relationship with the environmental impact of food behaviour has not yet been studied.

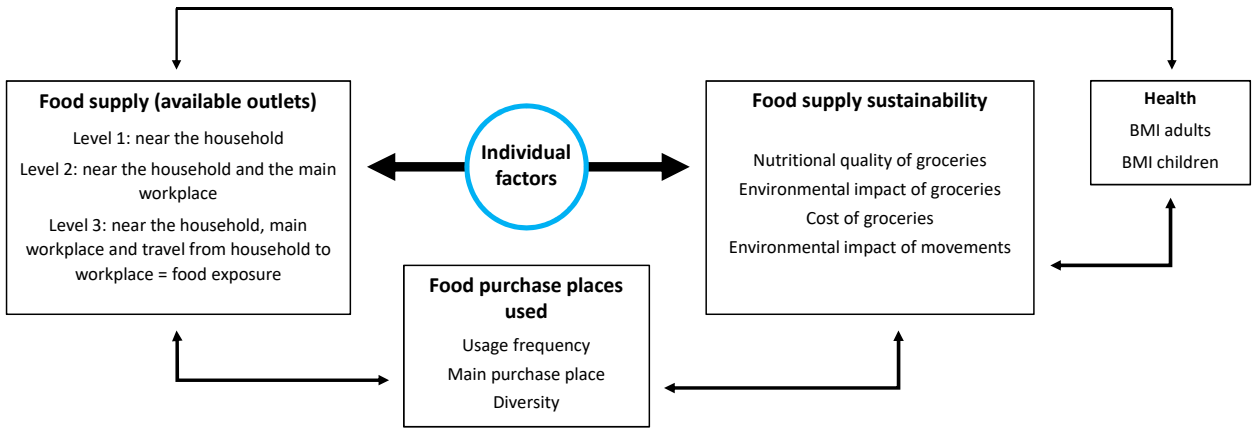
Objectives and method

This strand explored the relationship between foodscapes and the sustainability of household food purchasing behaviour. This research is based on the Mont'Panier questionnaire survey–conducted between May 2018 and January 2020–involving quota sampling of Greater Montpellier residents. Respondents were asked to answer an online questionnaire, while filling in a logbook for 1 month listing their household food supplies and collecting their food purchase receipts. This provided data on the food shopping locations visited and the food and drink items purchased, received or harvested over a 1-month period. The sustainability of actual household food supplies was estimated from nutritional, economic and environmental standpoints. The economic costs were calculated on the basis of food expenditures. The Healthy Purchase Index (HPI) scoring system developed by our team was applied to the household purchase data to assess the nutritional quality. The environmental impact of purchases is being estimated from an ADEME database estimating impact indicators for the 2,800 foods most consumed by the French population. In addition, based on the commuted data declared for each food shopping trip, the distances travelled will be calculated and converted to determine the carbon footprint.

Results

Around 740 households filled in the online questionnaire on the different types of food supply locations accessible and used (reported practices), including 462 households that provided information on their actual food supplies over a 1-month period (details on the foods purchased, expenses, purchase locations, routes and means of transport). The characteristics of the 462 sample households were similar to those of the reference (control) population (47% were over 50 years old, 44% of the households consisted of one childless adult, and 27% had an individual monthly income of less than €1,110).

Diagram of the studied relationships



- The analysis of actual food purchases showed that supermarkets and hypermarkets were frequented at least once a month by 99% of households, far ahead of grocery shops and mini-markets (48% of households) and bakeries (40%). Three quarters of households made more than 70% of their food purchases in multiline outlets (hypermarkets and supermarkets, grocery shops and mini-markets, frozen food shops). Only 8% spent more than half of their food budget in specialist outlets (greengrocers, bakeries, butchers, market stalls, producers, etc.). Although supermarkets and hypermarkets, hard discount outlets and e-commerce sites were the most dominant food supply sources–even for fruit and vegetables–household members also visited other types of shops. The weight of these additional supply sources on the food budget varied:
  - about half of all households relied heavily on supermarkets, marginally combined with other food shops
  - about a third of the households combined–to an equal extent–shopping in supermarkets and other types of stores
  - 16% relied heavily on other shops, with marginal supplies obtained in supermarkets.
  Despite the good media coverage, only 17% of people spent more than 20% of their food budget on direct or online purchases from producers or organic food shops.

- Based on the mapping of the foodscape or residents' views of it, most households did not have much difficulty in gaining physical access to the different types of food shops. About half of the surveyed households lived within 500 m walking distance of a mini-market, grocery shop and other specialized shops, and two-thirds of a bakery and one third of a greengrocer. When also taking the main places of activity of households and their movements between these places into account, a vast majority had access to a hypermarket, supermarket, mini-market, grocery shop, greengrocer, bakery or other specialized shop in their everyday living space. The daily movements of household members could thus offset the absence of shops near their homes, thereby providing access to a fairly wide range of food outlets. Access to a market turned out to be more restricted than to other shops in the vicinity of the home or in the household everyday living spaces.

- Proximity was not the only factor associated with food outlet shopping. Not all households used shops located near their homes or regular activity spaces. Visits to shops considered accessible by households varied according to the type of shop. Shopping rates in outlets viewed as accessible by households varied according to the type of shop, and were highest for hypermarkets and supermarkets, followed by greengrocers, markets and organic food shops. Otherwise less than a third of households visited grocery shops and specialized shops to which they had access. There are several reasons for this. The main reasons given by households for not shopping in organic food outlets and other shops pooled here under the term 'local' (grocery shops, mini-markets, greengrocers and other specialized shops) is that the products or prices did not suit them. For supermarkets, apart from the fact that the products were not always suitable, some people claimed they did not like this form of retailing. The main reasons given by households for not shopping in markets were the limited opening hours and a lack of time available to shop there. Hence, to foster shopping in nearby retail outlets, it is essential to be mindful of the prices, opening hours and types of products offered by these shops.

- The assessment of the relationship between nutritional quality and household foodscape indicators demonstrated that having at least one greengrocer within 1 km of home was associated with higher nutritional quality of the foods, irrespective of the socioeconomic characteristics of the households. The spatial analysis also showed that these correlations were more marked for households in southern Montpellier neighbourhoods than for those in the northern neighbourhoods. When taking the household activity space (home, main workplaces and travel between these locations) into account, we noted that having at least one greengrocer within one's activity space was also associated with a better nutritional quality of food supplies–but this only concerned low-income households.

- In the near future, we will specifically assess foodscape features having the greatest impact on the food supply sustainability. For instance, we will test the hypothesis of links between the density of food supply locations around the place of residence and the lower environmental impact of food shopping trips. Moreover, the individual factors (socioeconomic, viewpoints, etc.) involved in these relationships will be assessed to determine those that consolidate and those that mitigate the foodscape impacts on the food supply.

- Moreover, during the first lockdown in April 2020, a survey was conducted among the same Mont'Panier survey households on changes in food supply practices and their links with the foodscape. Food shopping practices during the first lockdown were diversified, with variations in shopping frequencies and purchase quantities rather than changes in shopping venues. These changes were related to the social characteristics of households and their sense of the foodscape rather than their target foodscape.

Recommendations

This study was relevant for the implementation of appropriate commercial and urban planning initiatives aimed at improving the sustainability of urban food behaviours. This includes initiatives that contribute to reducing social disparities in relation to food. The analysis findings revealed foodscape elements that could positively influence food behaviour sustainability. The results suggest, for instance, that the presence of greengrocers in foodscapes could foster healthier food consumption behaviours.

Publications

– Recchia, D., Méjean, C., Perignon, M., Rollet, P., Bricas, N., Vonthron, S., Perrin, C., & Chaboud, G. (2021). Food outlets in Greater Montpellier–physical access and consumer shopping behaviour. *So What?* 15, 1–4. (read the policy brief)

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– Recchia, D., Perignon, M., Rollet, P., Vonthron, S., Perrin, C., Tharrey, M., Darmon, N., & Méjean, C. (2020). Relations entre proximité à un marché alimentaire et approvisionnements en fruits et légumes dans l'étude Mont'Panier. E-poster presented at the Journées francophones de nutrition, 25-27 November, 2020. (see the e-poster).

– Recchia, D., Perignon, M., Rollet, P., Vonthron, S., Tharrey, M., Darmon, N., Feuillet T & Méjean, C. and the SURFOOD-foodscapes study group. Associations between food environment and nutritional quality of French households' food purchases: the Mont'Panier cross-sectional study. Submitted to the *International Journal of Behavioral Nutrition and Physical Activity*.

– Perignon, M., Vonthron, S., Rollet, P., Tharrey, M., Darmon, N., Bricas, N., & Méjean, C. (2020). Associations between food environment around home and overweight and obesity rates in French adults. Paper presented at the 4th International Conference on Global Food Security. Montpellier, 7-9 December, 2020. (see the paper)

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CONTACTS

Caroline MEJEAN caroline.mejean@inrae.fr
Marlène PERIGNON marlene.perignon@inrae.fr

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Mont'Panier survey recruitment poster

Surfood FOODSCAPES Project

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