A trans-disciplinary approach to scaling community voices for place-sensitive policy-making through places and practices of food

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Abstract: Using the lens of places and practices of food this project explored a mixed methods approach for scaling lived experience across city-scale data to expose intangible features of community spaces. By layering analysis of places and practices of food onto spatial data on deprivation and fuel poverty, this research aimed to contextualise invisible dynamics of a community through visible patterns of urban fabric. King's Hedges (Cambridge) and Dogsthorpe (Peterborough) as case studies, community reviews of foodplaces on Google Maps were used to gain a better understanding of 'intangible' qualities of the physical place. The research proposes strategies for engaging local communities in environmental policy making, and ways to leverage and visualise non-invasive mixed data to support this. The research suggests following implications for policy: the inclusion of data sources curated by stakeholders and lay persons (such as Google Maps listings and reviews) to identify voices of local community; re-consideration of administrative and physical boundaries as an optimal way to define a 'place'; prioritisation of local grocery stores and takeaway places in planning; and more active engagement with local organisations like Foodbanks to foster community participation to respond to the climate crisis, resilience and increasing inequality in cities.

Keywords: community, places of food, place-sensitive policy, food poverty, fuel poverty

1. Introduction

The cost of living crisis and the growing inequality in cities in the UK manifests in increased risk of fuel poverty and food poverty. Households in deprived communities face tangible challenges such as 'heat or eat' decisions as well as intangible pressures such lack of economic opportunities or hidden costs of poor quality housing stock. These have considerable impact upon wellbeing as well as the effectiveness of urban sustainability approaches. The pressures on households can limit receptiveness to sustainability initiatives and effectiveness of environmental policies in such communities, especially when the intangible aspects of deprivation are not recognised or accounted for. Local policy makers may take for granted that they know their community but, there can be misconceptions.

Food offers a unique lens to explore the invisible and intangible aspects of community relationships. It is well known that food impacts the environment and wellbeing at many levels. Environmental sustainability of domestic food procurement depends on several factors such as the provision of places of food in the neighbourhood (including vegetarian and vegan options available), allotments, local housing conditions and kitchen layouts – and household income.

The essential nature of food, and in turn food procurement and places of food, can also reveal insight into the intangible pressures and relationships in a community. This study explored the use of community reviews of places of food on Google Maps as an alternative to gain a better understanding of these 'intangible' qualities of the physical place, 'placeness', environmental sustainability and community relationships. This community-based method could help to identify key actors and places in the community for environmental policy consultation and implementation and to ensure different voices in communities are heard.

The research asks: How can we identify and engage previously overlooked community members in environmental policy-making and 'levelling up'? How do foodplace reviews reveal perceptions and temporalities of 'placeness'?

More specifically, this study tested a method for layering evidence from models, data science analysis of spatial data, and community experience. Using a spatial frame of reference enables sharing and comparing data across these layers of evidence in a manner accessible to stakeholders beyond academia. Previous research has explored the use of locations from such data to identify food deserts in cities by looking at distances to nearest fresh food stores (Hubley, 2011; Jiao et al. 2011)[1, 2], or used customer ratings to track tourism hotspots (Mathayomchan and Taecharungroj, 2020)[3]. However, these listings also capture written reviews from customers that can provide knowledge on these places of food, and in turn insight into the community and its relationships. Listings for food outlets, shops, and local businesses on popular mapping services such as Google Maps offer a source of publicly available, non-intrusive data that is generated by the community and local entrepreneurs.

This study addresses two of the themes of the Where We Live Next program: 'The voices, spaces, and scales of environmental governance' and 'The relationship between businesses and communities in local sustainability approaches'. This paper explores strategies for identifying and engaging local communities in place-sensitive policy making, and ways to leverage and visualise non-invasive mixed data to support this approach.

The paper is structured as follows. Section 2 presents a literature review. The methodology and the case studies are described in Section 3. Section 4 reports the findings using: 1) spatial and model data, and 2) Google data on places of food. Section 5 concludes.

Two neighbourhoods were selected case studies: King's Hedges in Cambridge and Dogsthorpe in Peterborough. This paper focuses on King's Hedges and a similar analysis on Dogesthorpe is available at: https://eeci.github.io/home/docs/projects/energyplanning/wherewelivenext/).

2. Literature Review

The Current Landscape of Research on Foodscapes

A recent review by Vonthorn et al. (2020)[4] extensively examine foodscape literature along four methodologies: '(i) *Spatial approaches* use statistics and spatial analysis to characterize the diversity of urban foodscapes and their impacts on diet and health, at city or neighborhood scales; (ii) *Social and cultural approaches* at the same scales show that foodscapes are socially shaped and highlight structural inequalities by combining qualitative case studies and quantitative surveys of food procurement practices; (iii) *Behavioral approaches* generally focus on indoor micro-scales, showing how consumer perceptions of foodscapes explain and determine food behaviors and food education; (iv) *Systemic approaches* contest the global corporate food regime and promote local, ethical, and sustainable food networks.'

This is an excellent summary of papers until 2020, spanning purely physical approaches to more systemic studies traversing social, spatial, and temporal scales. These are broadly consistent with approaches used for analysing environments across other dimensions (fuel poverty, health, welfare, etc.) more broadly. A recent article by Middlemiss (2020)[5] on fuel poverty uses the idea of 'lived experience' as a way of

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[1] Hubley, T.A. (2011). Assessing the proximity of healthy food options and food deserts in a rural area in Maine. *Applied Geography,* 31, pp. 1224–1231

[2] Jiao, J., Moudon, A.V., Ulmer, J., Hurvitz, P.M., Drewnowski, A. (2012). How to Identify Food Deserts: Measuring Physical and Economic Access to Supermarkets in King County, Washington. *Am J Public Health*, 102, pp. 32–39.

[3] Mathayomchan, B., Taecharungroj, V. (2020). "How was your meal?" Examining customer experience using Google maps reviews. *International Journal of Hospitality Management*, 90, 102641.

[4] 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), 0233218. doi: 10.1371/journal.pone.0233218.

[5] Middlemiss, L. (2020). Energy poverty: Understanding and addressing systemic inequalities. In: *Inequality and energy* (pp. 99-114). Academic Press.

understanding poverty changes over time, and to identify intersections of systemic inequalities across data sets, which would also imply looking for intersections across both methods and dimensions of well-being.

In general, the bulk of the literature on foodscapes have established relationships with health and deprivation. For example, in a longitudinal study spanning 18 years (1990-2008), Maguire et al. (2015, 2017)[6, 7] tracked takeaway food outlets and supermarkets in Norfolk UK using telephone directories. They found that the density of takeaway outlets significantly increased in more deprived areas and had the greatest increase in takeaway food outlet density across the study period. Another study by Vogel et al. (2017)[8] surveyed 839 mothers with young children in Hampshire, UK regarding main food shops, amongst other frequented spaces. Cross-sectional food outlet data were overlaid onto these spaces. They study suggests relationship between education and unhealthy food environments.

An interesting debate emerging from the literature is the influence of urban planning and urban design on foodscapes, and how it can then influence health outcomes. There are two scales here: one of physical geographies and accessibility and the other of changing landscapes over time.

Physical Boundaries
The Food environment assessment tool (Feat) is a notable study by the Communicating Diet and Activity Research (CEDAR) and the MRC Epidemiology Unit at the University of Cambridge (2013-2019). The study maps food retail access across the UK at a neighbourhood level and is designed to support planning decisions, facilitate cross comparisons across neighbourhoods, and target health interventions. The underpinning objective is to provide evidence for the relationship between diet and health. The premise being that our dietary behaviours are influenced by the exposure to food environments. In one of their early papers Burgoine and Monsivais (2013)[9] test this hypothesis by surveying commuting routes of a sample of adults (~2600 aged 29-60) in Cambridgeshire. Their findings suggest that workplaces and commute routes account for foodscapes and hence dietary behaviour (or exposure to food outlets). Therefore, characterizations of foodscapes based solely on residential foodscapes can lead to incorrect estimations.

A recent study by Ferrant (2021)[10] presents an agentic framework and fieldwork in two mixed neighborhoods (one gentrifying, one working-class suburban) in the Paris metropolis. They map food outlets in the two neighbourhoods. They present an interest finding with regards to boundaries of foodscapes. Their study finds that immigrants consider a wider reach across the metropolis, considering prices and food types across the wider city, whereas native residents center on the neighbourhood and proximity. This study is another example of how putting boundaries on neighbourhoods can lead to incomplete or misrepresentation of the relationship between food, people, and space. Another study of Greater Montpellier by Recchia et al. (2021)[11] finds that proximity is not at all the sole factor influencing food shopping patterns, and that prices, products, and opening hours play a role. In their surveys Vogel et al. (2017)[12] create activity maps of the surveyed populations and not limit their study by neighbourhoods. Thus, they are able to generate individual geographies that reflect where people spend time and thus understand their access to food.

[6] Maguire, E. R., Burgoine, T., & Monsivais, P. (2015). Area deprivation and the food environment over time: A repeated cross-sectional study on takeaway outlet density and supermarket presence in Norfolk, UK, 1990–2008. *Health & Place*, *33*, pp. 142-147.

[7] Maguire, E. R., Burgoine, T., Penney, T. L., Forouhi, N. G., & Monsivais, P. (2017). Does exposure to the food environment differ by socioeconomic position? Comparing area-based and person-centred metrics in the Fenland Study, UK. *International Journal of Health Geographics*, *16*(1), pp. 1-14.

[8] Vogel, C., Lewis, D., Ntani, G., Cummins, S., Cooper, C., Moon, G., Baird, J. (2017). The relationship between dietary quality and the local food environment differs according to level of educational attainment. *PloS one*, 12(8).

[9] Burgoine, T., Monsivais, P. (2013). Characterising food environment exposure at home, at work, and along commuting journeys using data on adults in the UK, *International Journal of Behavioral Nutrition and Physical Activity*, 10(1), pp. 1-11.

[10] Ferrant, C. (2021). An Agentic Approach to Food Access and Acquisition: The Case of Mixed Neighborhoods in the Paris Metropolis, *City & Community*, 15356841211007758.

[11] Recchia, D., Méjean, C., Perignon, M., Rollet, P., Bricas, N., Vonthron, S., ... & Chaboud, G. (2021). Food outlets in Greater Montpellier–physical access and consumer shopping behaviour. *HAL*.

[12] Vogel, C., Lewis, D., Ntani, G., Cummins, S., Cooper, C., Moon, G., Baird, J. (2017).

Time Dynamics and Change

Roe at al. (2016)[13] propose seven foodscape character types use an adapted Landscape Character Assessment (LCA) and observational analysis from the city of Newcastle upon Tyne, in the UK: (1) fast food takeaways, (2) ethnic/exotic restaurants and shops, (3) local and artisan food, (4) allotments, (5) supermarkets, (6) social (pubs, cafes), and (7) food forage. They suggest that these categorizations are useful for understanding dynamic and changing interactions between people, food, and space in cities. They emphasize 'change' and 'dynamics', with consumers playing an active role in shaping foodscapes. Data and accurate mapping of foodscapes is a challenge, especially with respect to secondary versus primary data, and due to heterogenous streams of public data now available through IoT.

A study by Wilkins et al. (2017)[14] recognized the importance of tracking food environments accurately, especially in the context of using the data to design policy instruments for urban design. This study validates two sources of secondary food environment data: Ordnance Survey Points of Interest data (POI) and food hygiene data from the Food Standards Agency (FSA), against street audits across 52 Lower Super Output Areas in England. They find that secondary sources such as POI and FSA data is consistent and accurate. A similar mapping should be done with public online data for quality assurance. Like our use of online data, the POI and FSA also require significant data cleaning.

Yuan and Crookes (2019)[15] mined 3 million Yelp restaurant reviews and found that consumer view on 'location' has different meanings/associations with fast food versus independent restaurants with the latter reflecting the characteristics of the places the restaurants are situated. The potential of public data in this area is still largely untapped across the literature. A space syntax study by Lin and Karimi (2015)[16] assessed fast food outlets in London and Tokyo and found them to be highly associated with through movement (flow) patterns, rather than to movement (destination points). At the neighbourhood scale, clusters of fast food outlets operate by adjacency, as well as across junctions, to maximize visibility.

Placemaking and Food

Ellery and Ellery (2019)[17] argue for the importance of placemaking, community empowerment, and community sense of place to produce social benefit in communities. In a recent study Ellery et al. (2021)[18] present a community-engaged placemaking model that has the potential of producing a sense of place that is both stronger in nature and develops faster: "*an individual's sense of place may take longer to develop, or may not be very strong, if the experiences in the new place are not meaningful or memorable to the individuals themselves*".

There are only few studies that look at the role of food places in placemaking. Feagan (2017)[19] for example, focuses on the identification of issues of 'place', variously described as the 'local' and 'community' in the local food systems literature. Yet places of food, and pubs in particular, have had an important place in British communities. The study of Raleigh (2020)[20] on community owned pubs shows how pubs act as social hubs at the heart of local community in deprived areas and as foodbanks during the pandemic. Fletchall (2016)[21] frames beer-drinking as a placemaking practice. In the study of Montana's craft breweries, they argue that craft breweries play a significant role in contemporary place-making: they offer visitors a 'real' place to go and experience that community alongside the local

[13] Roe, M., Sarlöv Herlin, I., Speak, S. (2016). Identity, food and landscape character in the urban context, *Landscape Research*, 41(7), pp. 757-772.

[14] Wilkins, E. L., Radley, D., Morris, M. A., Griffiths, C. (2017). Examining the validity and utility of two secondary sources of food environment data against street audits in England. *Nutrition journal*, 16(1), 1-13.

[15] Yuan, X., Crooks. A. (2019). "Assessing the placeness of locations through user-contributed content." *Proceedings of the 3rd ACM SIGSPATIAL International Workshop on AI for Geographic Knowledge Discovery.*

[16] Lin, G., Karimi, K. (2018). Spatial patterns in mass consumption: The fast food chain network and its street patterns, clusters and impact on street safety. In: *24th ISUF Int. Conf. Book of Papers* (pp. 1401-1012). Ed. Univ. Politècnica de València.

[17] Ellery, P, J., & Ellery, J. (2019). Strengthening community sense of place through placemaking. *Urban Plann.*, 4(2), 237–248.

[18] Ellery, P.J., Ellery, J., Borkowsky, M. (2021). Toward a Theoretical Understanding of Placemaking. *Int. Journal of Com. WB* 4, pp. 55–76.

[19] Feagan, R. (2007). The place of food: mapping out the 'local' in local food systems. *Progress in Human Geog.*, 31(1), pp. 23–42.

[20] Raleigh, J. (2022) *The people's pub: A critical conversation with the communities reclaiming and reimagining their local*, MPhil thesis, Cambridge: University of Cambridge/Department of Architecture.

[21] Fletchall, A. M. (2016). Place-making through beer-drinking: Montana's craft breweries. *Geographical Review, 106*(4).

population, "*to be in a place*", arguing that breweries are what Massey (1994)[22] means by "*meeting place,*" as "*articulated moments in networks of social relations and understandings. . .*".

Zukin et al. (2017)[23] analysed over 1,000 Yelp restaurant reviews to look at race, class, gentrification and general perception of the neighbourhood focused on Brooklyn, US. They talk about 'food gentrification' and argue that the cumulative effect of reading Yelp reviews intensifies, or contradicts, the positive or negative perceptions of neighborhoods. They argue that Yelp is a "*language of power*" and any comments on neighbourhoods in the Yelp reviews, "*continually redraw cognitive maps of consumer choice*", which affects economic investment in the area and how gentrifying neighbourhoods are framed.

Food Swamps and Food Deserts
It is worth defining 'food swamps' and 'food deserts' here as they are commonly used in food poverty literature in the UK. A 'food desert' is seen as an area that is poorly served by food shops and where people without adequate transport or with limited mobility may struggle to access a good range of healthy, fresh and affordable food items.

'Food swamps' can be described as areas with a high density of food outlets, such as kebab shops, selling high-calorie fast food and food with poor nutritional status, in particular hot takeaway meals. Since 2014, there has been an increase of around 29% in the amount of food eaten outside the home in the UK and it is argued that people with the greatest exposure to takeaways are almost twice as likely to be obese as those who are least exposed to such food outlets (Fenn, 2019)[24]. 'Food swamps' of fast food and other unhealthy food outlets are more common in deprived neighbourhoods and may be a predictor of obesity rates, even more so than 'food deserts'.

Gaps
Local places of food and their role on placemaking in suburban areas is an under-researched area in the UK. 'Food swamps' are generally perceived negative from public health point of view but their perception by the local communities has not been much studied.

Methodologically, most studies on domestic food procurement and places of food still operate within the silos of quantitative mappings versus behavioural studies. As a result, there is a lack of systemic understanding of consumer needs, practices, and behaviours against the distribution of foodscapes, food access and environmental sustainability of domestic food procurement.

3. **Methodology**

3.1 Research Methods

Using the lens of places and practices of food this project explored a mixed methods approach for scaling lived experience across city-scale data and models and to expose intangible features of community. The transdisciplinary methodology of this study brought together model outputs, spatial data, and community knowledge, which was collected via foodplace reviews and interviews. By layering analysis of places and practices of food onto spatial and model data on deprivation and fuel poverty this study aimed to contextualise invisible relationships and dynamics of a community through visible patterns of urban fabric. King's Hedges (Cambridge) and Dogsthorpe (Peterborough) as case studies, the research methodology included:

1. An analysis of records and reviews of places of food on Google Maps in order to gain a better understanding of 'intangible' qualities of the physical place and community dynamics.

[22] Massey, D. (1994). *Space, Place and Gender*, Minneapolis: University of Minnesota Press.

[23] Zukin, S, Lindeman, S., Hurson, L. (2017). The omnivore's neighborhood? Online restaurant reviews, race, and gentrification. *Journal of Consumer Culture*, 17(3), pp. 459–479.

[24] Fenn, S. (2019) *Food deserts and food swamps in Cambridge*, Cambridge: Cambridge Food Poverty Alliance, 11 p.

Quantitative spatial methods were used to identify trends in distribution and type of foodplaces, and a text analysis provided insight into community experience of these places.

2. Layering the analysis of places and practices of food onto spatial data on deprivation and fuel poverty.
3. Site visits to King's Hedges and Dogsthorpe in March-April 2022.
4. An interview with Margaret Saner who is the CEO of Cambridge Foodbank, in order to better understanding of the lived experience of households in food poverty.

Model outputs on fuel poverty and inequality from a spatial modelling tool provided insights into how the area of study related to wider trends within the city. This background data layer was used to contextualise the analysis of the local community through places of food. Records of foodplaces was collected through the Google Places API, and quantitative spatial methods were used to identify trends in distribution and type of foodplaces, while text analysis provided insight into community experience of these places.

The restaurant review narratives revealed: the type of foodplace, menu, ratings, photos, and opening times. The reviews include keywords (e.g. 'local', 'community') and could be linked to other reviews of different venues rated by the same reviewer. Fig. 1 shows an example of the Metadata collected from the Google Places.

	A	B	C	D	E	F	G	H	I	J	K
1	lat	long	name	rating	review_coun	keywords	opens	closes	location	label	price
2	52.2320583	0.1234321	CafÈ Camtov	4.6	240	takeaway, di	07:30	16:00	King's Hedge	cafÈ	1
3	52.2275095	0.1270504	Diamond Keb	4.6	274	takeaway, di	16:00	23:59	King's Hedge	turkish resta	1
4	52.2301743	0.1260884	Arbury Kebal	4.4	79	takeaway, di	16:30	23:59	King's Hedge	kebab shop	NA
5	52.2326792	0.1223927	Select & Sav	4.3	6	in-store shop	07:00	19:45	King's Hedge	convenience	NA
6	52.2247747	0.1278732	Budgens	3.8	395	in-store shop	07:00	21:59	King's Hedge	supermarket	1
7	52.224642	0.1278749	Les Ward	4.8	27	in-store shop	08:00	17:00	King's Hedge	greengrocer	NA
8	52.2248192	0.1279745	The Art of M	4.7	46	delivery, in-s	07:00	16:00	King's Hedge	butchers	NA
9	52.2245486	0.1279336	Anchor Fish I	4.5	88	curbside pick	12:00	21:30	King's Hedge	fish and chip	NA
10	52.2245486	0.1279336	Dorringtons	4.3	56	in-store shop	07:30	16:00	King's Hedge	bakery	2
11	52.22473	0.1282441	Golden Crow	4	50	delivery, take	16:30	21:59	King's Hedge	chinese take	NA
12	52.2298801	0.1366876	Flaming Wol	2.8	146	delivery, driv	12:00	21:59	King's Hedge	chinese take	NA
13	52.2298801	0.1366876	Tesco Expres	3.7	60	in-store shop	06:00	22:59	King's Hedge	supermarket	1
14	52.2326833	0.1354192	Daily Bread (	4.7	31	in-store shop	09:00	17:20	King's Hedge	health food s	NA
15	52.2346468	0.1295224	Box CafÈ	3.8	6	takeaway, di	08:00	17:00	King's Hedge	cafÈ	NA
16	52.2276744	0.1447581	JSG Exotic Fc	4.2	33	in-store shop	09:00	19:00	King's Hedge	indian grocer	NA
17	52.2276744	0.1447581	Golden Hind	3.9	1299	chain pub, ou	11:00	23:59	King's Hedge	pub	1
18	52.2270844	0.1454456	Co-op Food	3.1	23	in-store shop	07:00	22:00	King's Hedge	convenience	NA
19	52.6021549	-0.2304227	SPAR Wellar	3.9	28	in-store shop	07:00	23:00	Dogesthorpe	convenience	1
20	52.6015027	-0.2328324	Subway	4.2	164	no-contact d	07:00	20:00	Dogesthorpe	sandwich sh	1
21	52.6003384	-0.2359487	Bluebell Plai	4.4	151	takeaway, m	11:30	21:00	Dogesthorpe	fish and chip	1
22	52.5965955	-0.2405539	Tesco Expres	3.7	41	in-store shop	07:00	23:00	Dogesthorpe	supermarket	1
23	52.596369	-0.2415021	Blue Bell Inn	4.1	79	outdoor seat	12:00	23:00	Dogesthorpe	pub	2
24	52.5956283	-0.2412841	The Pantry	4.7	78	takeaway, di	07:30	14:30	Dogesthorpe	cafÈ	NA
25	52.5935057	-0.2354242	The Elm Tree	3.9	127		16:00	22:00	Dogesthorpe	pub	1
26	52.5929928	-0.2342086	Elmfield Gro	5	5		07:30	10:00	Dogesthorpe	asian grocery shop	
27	52.5929928	-0.2342086	Seafood Fish	4.4	79		17:00	21:30	Dogesthorpe	fish and chips	
28	52.5929816	-0.2341963	Best One Xpr	3	1		08:00	21:00	Dogesthorpe	convenience store	
29	52.5944259	-0.2309506	Premier	4.7	9	in-store pick	07:00	20:00	Dogesthorpe	convenience store	
30	52.5945193	-0.2309768	Sais	5	4	in-store shop	07:00	21:00	Dogesthorpe	convenience store	
31	52.5947968	-0.2304642	Coffee Tap	4.4	52	outdoor seat	08:00	16:00	Dogesthorpe	cafÈ	1
32	52.5949293	-0.2301783	Nite Bite	4.2	70	delivery, take	16:00	23:00	Dogesthorpe	pizza delivery	
33	52.5948564	-0.2303424	Ak Food Stor	0	0	in-store shop	08:00	23:00	Dogesthorpe	convenience store	
34	52.594991	-0.2300633	Fishy Busine:	4.3	116	delivery, take	12:00	21:00	Dogesthorpe	fish and chip	1

Fig. 1 Example of collated Metadata from the Google Places in King's Hedges.

The use of Google Maps and Google Places data carries its own caveats and considerations. For this research a sample of data from Google Maps has been manually collected, taking a random sample of ten reviews for each food related establishment in the study areas. This is labour intensive and not easily scalable; however this data can also be accessed programmatically via a paid-for Application Programming Interface (API). Use of this API could allow for the spatial analysis here to be easily conducted in an automated fashion for any neighbourhood of interest. There are however a few considerations about the ethics of using this data – it may contain sensitive personal information including reviewers' names. For the purposes of this research data sampled has been anonymised. People who submit reviews have to agree to Google's terms and conditions that data will be publicly available and may be viewed or used by any user of Google products – however this is not as rigorous a level of consent as that commonly required in academic research.

An important assumption in our analysis of Google Places review data is that the people who leave reviews can be taken as representative of the customers that frequent these places. In reality this won't always be true, for example those who do not use Google Maps or smartphones are less likely to leave reviews and this could exclude some groups such as elderly vulnerable people. Another issue is that some shop owners may try to encourage regular customers to leave positive reviews, which could distort ratings. Nonetheless this wouldn't necessarily detract from the analysis of local communities through place of food, as these sorts of relationships between locals and places of food offer insight into the local community.

3.2 Case Studies

King's Hedges (Cambridge)
Despite its fast growing economy, Cambridge has been ranked as one of the most unequal cities in the UK (gini index 0.46). It is estimated that 11.5% of Cambridge households are struggling to heat their homes and as this is directly linked to the risk of food poverty, it suggests that 11.5% of Cambridge households are at risk of or may be experiencing energy and food poverty [25]. The Index of Multiple Deprivation (IMD) indicates that King's Hedges is one of the most deprived neighbourhoods in Cambridge. King's Hedges is located to the North of Cambridge city centre (within 10 min bus ride). King's Hedges has extensive green spaces and an excellent pedestrian and cycling network. It has a population of over 9,000 and the neighbourhood contains a large proportion of the city's Council housing and affordable private rental housing (see Fig. 2).

Fig. 2 Housing and green spaces in King's Hedges, Cambridge.

King's Hedges is relatively well served with fresh produce shops, takeaways and cafes (see Fig. 3) but it is one of the neighbourhoods where the highest number of food voucher users reside in Cambridge, with a significant increase (with 70%) from 2013 to 2017, and where most school children receive free meals in Cambridge. Overall, Cambridge is below the average for overweight children but Kings Hedges has one of the highest rates of child obesity in Cambridge.

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[25] Gupta, K., Towards a collaborative action plan, Food poverty in Cambridge (Cambridge Food Poverty Alliance, 2018), 62 p.

Fig. 3 Places of food in King's Hedges: Camtown café (left) and Budgens grocery store (right).

Dogsthorpe (Peterborough)

Dogsthorpe in Peterborough is ranked as one of the top 10% of deprived areas in England and it is estimated that one third of the families in Dogsthorpe lives in poverty. Dogsthorpe has a population of 9,500 residents and it is located to the North of Peterborough city centre (within 10 min bus ride). The neighbourhood has the highest crime rate in Peterborough, and it is also the area with the highest child poverty in the city (Dogsthorpe child poverty seen as 'significant and enduring factor' by the Council). Dogsthorpe was mainly built in the 1960s with a high proportion of Council housing (see Fig. 4) and the master plan characterised by wide streets and traffic corridors.

Fig. 4 Housing in King's Hedges, Peterborough.

Dogsthorpe is identified as one the most urgent food poverty areas in Peterborough, with organisations like Family Action Food Club operating in the neighbourhood, weekly 70 families coming to their free cooking classes and with an increasing demand. Dogsthorpe has a number of small grocery stores and fast food restaurants (see Fig. 5).

Fig .5 Places of food in Dogsthorpe: Seafood Fish Bar (left) and Premier grocery store (right)

The following section reports the findings on King's Hedges, Cambridge. Similar analysis of Google Places, Census and Energy Model Data for Dogesthorpe, Peterborough, is available at:
https://eeci.github.io/home/docs/projects/energyplanning/wherewelivenext/

4. Findings

4.1 Spatial and Model Data on Deprivation and Fuel Poverty

Fuel poverty and food poverty are closely intertwined, and households at risk of fuel poverty are likely to be at risk of food poverty too. Food poverty data is not publicly available at local scale, but national statistics and energy modelling data do offer a fine scale local view of fuel poverty. Fig. 6 shows ONS figures for fuel poverty in Cambridge and Fig. 7 shows modelled energy efficiency of homes in the different neighbourhoods of Cambridge. Fig. 6 shows that Cambridge exhibits considerable disparity in terms of levels of fuel poverty even from neighbourhood to neighbourhood. Levels of fuel poverty in King's Hedges are above the national average and higher than much of the surrounding areas.
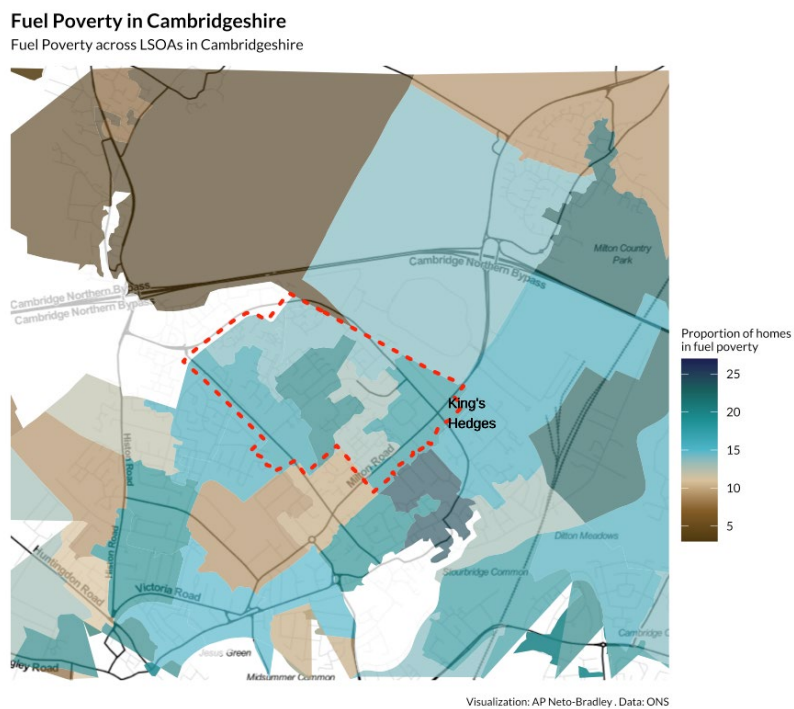

Fig.6 Fuel Poverty statistics from ONS showing variation in proportion of homes at risk of fuel poverty across Cambridge.

Fig. 7 shows that the energy efficiency of homes in King's Hedges is a little worse than for most of the neighbouring wards in Cambridge (although better than homes in surrounding villages to the north), as well as above the typical efficiency of around 150 kWh/m²/year of new energy efficient homes. This suggests these households are not only at greater risk of fuel poverty but also live in housing that is less efficient to heat, resulting in a compounding of inequality.
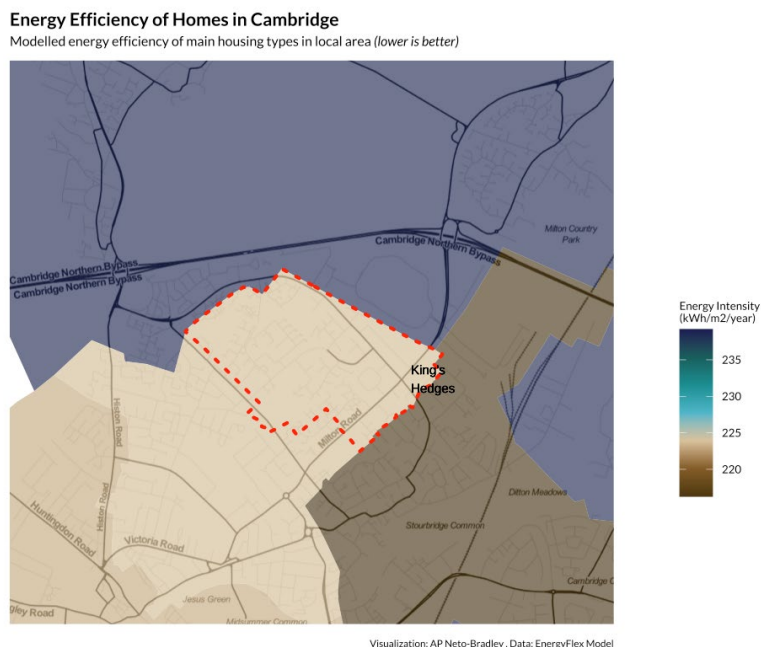

Fig. 7 Modelled Energy Efficiency (Energy Intensity) of Homes in Cambridge for main housing types in the area.

4.2 Google Map Data on Places of Food

Information about places of food in King's Hedges is publicly available through platforms such as Google Maps, and includes a rich source of community created data in the form of reviews. In King's Hedges there are three predominant types of foodplaces listed on Google Maps, these are food shops which sell ingredients or food products to be prepared at home, cafes and restaurants which may serve food to be consumed on premises (although during Covid-19 pandemic these may have offered takeaway and delivery), and finally fast food takeaway places which offer convenient food to be delivered or taken home to eat (see Fig. 8). These takeaway and fast foodplaces are what would typically characterise a food swamp often selling nutritionally poor food.
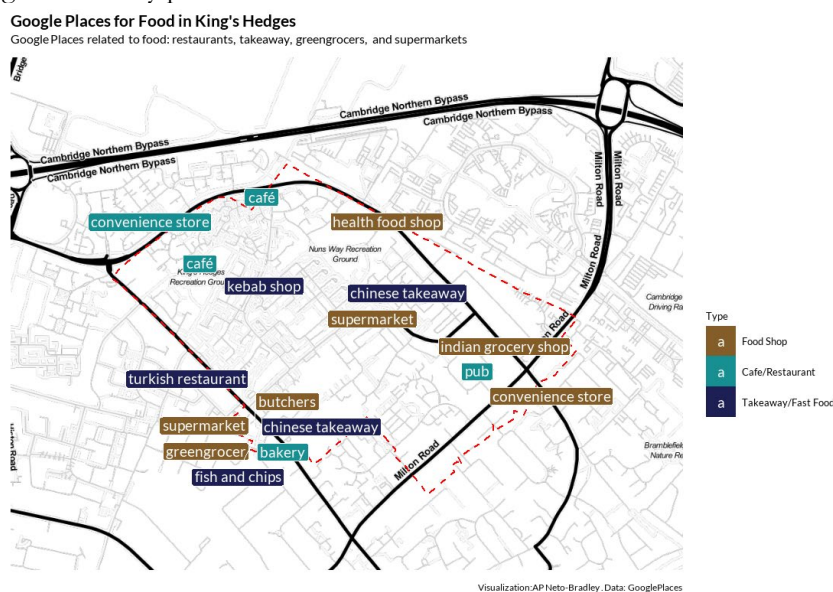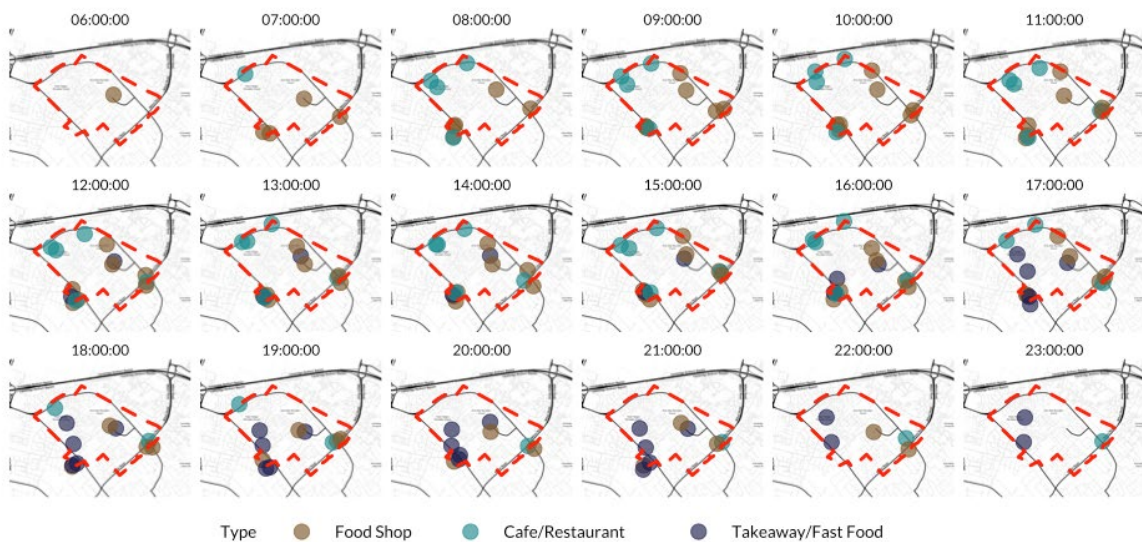

Fig. 8 Overview of foodplaces on Google Maps within King's Hedges.

The Google Maps data provides insight into the temporality of these places of food. Simply considering the listed opening hours for the different food establishments reveals a spatio-temporal pattern that characterises the neighbourhood as a place and community. Fig. 9 shows the daily pulse of food in King's Hedges: how during the early morning and working hours of the day most of the establishments open are cafes and restaurants or food shops such as butchers, bakeries, or local grocers. Many of these places are on the main road around the northern edge of King's Hedges. But between 4 and 7pm there is a distinct transition with these food shops and cafes on the periphery closing and takeaway and fast-food type restaurants opening inside the neighbourhood such that by 8pm the majority of foodplaces open in King's Hedges are takeaway restaurants. The food landscape of the neighbourhood differs during working hours and evenings, becoming what may be described as a 'food swamp' at night.

This temporal pattern may reflect the needs of the community who live in King's Hedges. Several reviews for fast food restaurants highlight their convenience for residents who work late and irregular hours, one local resident noted in a positive review for a kebab truck: "*been to all the vans in the area as I work all hours and it's far the very best about.*"


Fig. 9 Google Places for food in King's Hedges, showing the daily pulse of food in this neighbourhood.

So where do the locals go? Fig. 10 shows the distinction between the places of food reviewed more frequently by neighbourhood locals, versus reviewers from out of town. Just as seen in Fig. 9 with the spatio-temporal pattern of opening hours, Fig. 10 shows that there is a spatial pattern across King's Hedges between places reviewed by people who live in the neighbourhood versus those who are visitors to Cambridge or not local. Places away from the main ring road and in the centre of King's Hedges are more frequently reviewed by local who live in the area, whereas places along the ring road have fewer reviews from locals, and more reviews from out of town visitors.

Reviews of Google Places for Food in King's Hedges

Who is reviewing places - provenance of reviewers

Neighbourhood Local — Out of Town

Proportion (%)   ·   0   20   40   60
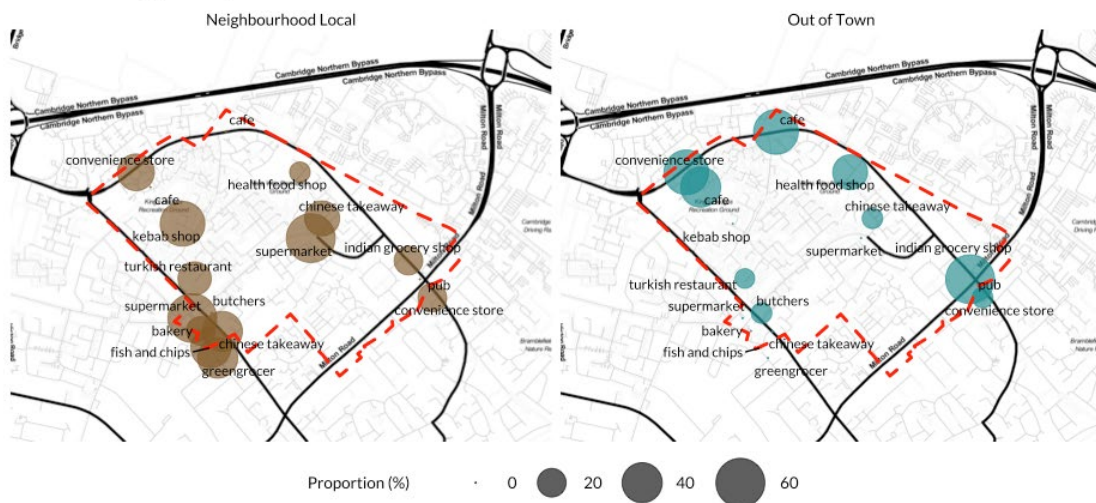
Visualization: AP Neto-Bradley . Data: Google Places

Fig. 10 Provenance of Reviewers on Google Maps foodplaces in King's Hedges, distinguishing between the reviewers from the local neighbourhood (left), and those from outside the city (right).

This is also interesting in terms of what types of places of food are reviewed by locals versus non-locals. Takeaways and fast food places, convenience stores and local supermarkets that are located predominantly in the inner part of the neighbourhood away from the ring road are popular with locals. More specialised food shops as well as restaurants close to the main road and the ring road are more popular with those who are not local.

What this reveal is that local community boundaries do not match those of the administrative boundaries. In terms of policy making an important implication is that neighbourhoods should not be simply defined by administrative boundaries, indeed in the case of King's Hedges our data shows that there are two distinct and differently experienced areas. The 'inner world' of the local community, which seems to be rarely visited by non-locals, and the outer edge on the main road with services and specialty ingredients rarely visited by locals. Google Maps data reveals these patterns of experience and differences in the perceptions of the neighbourhood, which together can help identify and characterise zones of experience.

The experience of the neighbourhood is not the same for everyone, even if they are locals. From the inferred gender of reviewers of foodplaces on Google Maps, the gendered differences in experience of the local area can also be explored in a non-intrusive way. Fig. 11 shows the female to male balance amongst the reviews sampled, while Fig. 12 shows the differences in ratings given by male and female reviewers. In Fig. 11, it is interesting to note that reviews for the greengrocer and health food shop have a greater proportion of female reviewers, while fast food takeaways and the pub's reviews are predominantly by male reviewers. Some places appear gender neutral in reviewer gender and these include the supermarkets and one of the cafes.

Fig. 11 Gender balance of the Google Places Reviewers for foodplaces in King's Hedges.

While gender balance in reviewers reveals more male and female clientele, the ratings given by male and female reviewers offer additional insight into how these places are experienced by different genders. Fig. 12 shows how female reviewers can have markedly different experiences of places when compared to male reviewers. For example, in the case of the kebab shop, Chinese takeaway and the convenience store on the eastern crossroads where male reviewers give significantly higher ratings than female reviewers. Delving into the reviews themselves can reveal some of the factors behind these differences. For example, female reviewers at the kebab shop felt unsafe late at night and unwelcomed by the staff, one reviewer noting, "*Aggressive and rude owners - Got verbally abused as I walked away*". While fast food and takeaway places play a role in shaping the place and community, they are primarily visited by men at later hours and are not representative of the place and community as experienced by women and children.
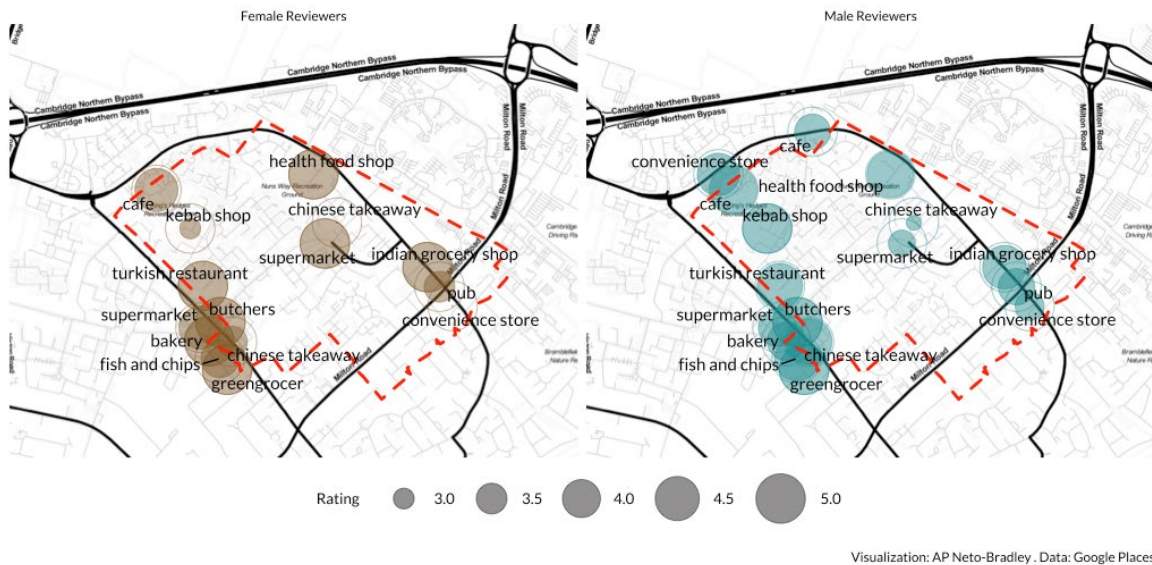

Fig. 12 Gendered differences in Google Places Review ratings for foodplaces in King's Hedges.

Applying qualitative data analysis to the reviews themselves, coding reviews according to themes addressed, provides another dimension of analysis when considered alongside patterns of time and reviewer provenance and gender. Fig. 13 shows the frequency qualitative coding tags associated with reviews for foodplaces in King's Hedges, namely 'Friendliness', 'Regular Customers', 'Good Price', and 'Ethical/Sustainability'. There are interesting similarities and differences in pattern of inner and outer zones of experience to be found when compared to reviewer provenance.
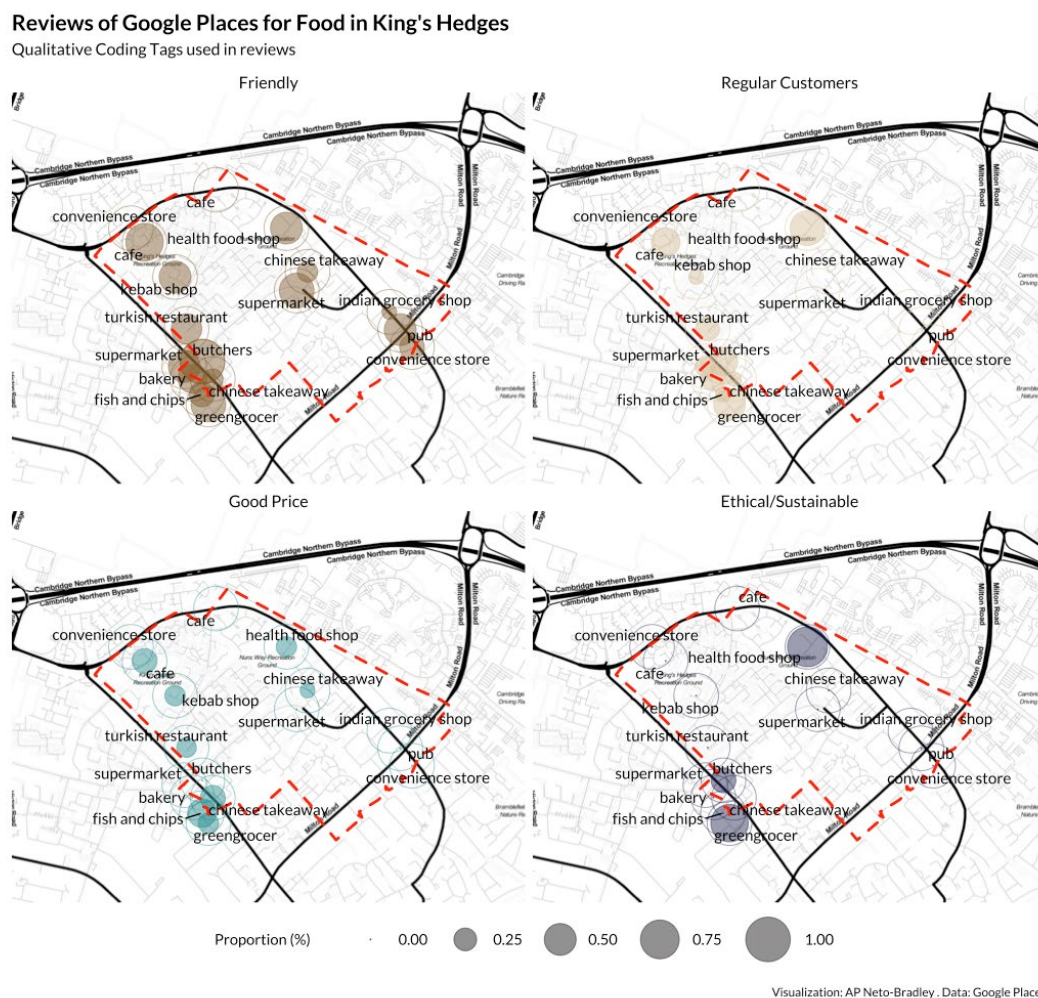

Fig. 13 Frequency of coding tags applied to Google Places Reviews from places of food in King's Hedges.

Mentions of good prices, friendliness as well as being a regular customer tend to feature more in places frequented by locals, such as the takeaway and fast food shops as well as the local supermarket. However, an interesting intersection this analysis shows is of non-local sustainably minded people who seem to travel regularly to King's Hedges to shop at the health food store and greengrocers and leave positive reviews about price and friendliness in a similar manner that locals do for fast food outlets and their local supermarket even if they were considered more expensive than supermarkets.

4.3 Community Perspective: Cambridge Foodbank

Margaret Saner who is the CEO of Cambridge Foodbank was interviewed for this study in March 2021. Her insights helped to get a better understanding of the lived experience in households at the intersection of food and fuel poverty in Cambridge and the challenges facing them. Cambridge Foodbank opened in 2010 and currently supports over 10,000 people, the demand constantly increasing. The Foodbank has 6 outlets in Cambridge, one of the busiest in Arbury, next to King's Hedges. It is worth noting that since 2015 the use of Foodbank in Cambridge has increased with 125%, compared to population increase of 10%.

January and February are the busiest months for the Foodbank, as during winter months the households face increased energy costs and especially those households who are on prepaid energy meters have no way to mitigate their energy costs over the course of the year. For those households do not have any financial reserves, any unexpected costs like a dentist payment or their car breaking down will put them at the risk of food poverty. Despite being in employment, a living wage may just not adequate in a city like Cambridge, but social support network is essential for families, restricting their chances to move out.

Most people who use Cambridge Foodbank identify themselves as 'low-income' households. Single people are the most common user group, such as single parent families that are mostly headed by women, but there is also a large proportion of single men, some are divorced and not used to cooking, some ex-service men or people who have lived with their elderly parents who have passed away. There is pride among the users, and they do not necessarily use the closest Foodbank outlet (for example, some prefer to drive all the way to new development in Northstowe near Cambridge where they are not recognised) and some female users do not want their husbands to know that they come to the Foodbank.

Margaret Saner sees as the main problem intergenerational poverty where the use of Foodbank has become normalised and the same families keep on coming back. The challenge is how to break out of this cycle where the use of Foodbank is seen as acceptable way of life. There are users like single parents in their twenties with several children and breaking out of poverty is difficult. She says it is important to understand first why people are getting into this situation. There are underlying cultural prejudices towards learning and education in some communities ('boys will not like you if you study', 'uncool learning') that need to be addressed and school children need to see examples of professional careers, not necessary University based, but very hands-on jobs. Support for keeping the families together is very important and would help to address food poverty as double income reduces the risk to poverty.

The other issue is housing. Council home does not come with carpets, curtains, or white goods. There are cases where households do not have appliances to cook with. It is costly to put on the carpet, or remove it when moving out. The Foodbank sometimes issues food parcels meant for homeless to those households that do not have white goods or appliances in their kitchens. When families are re-housed in Council housing in new developments like Northstowe, they sometimes arrive with very little and only have 'basic shell of a house' and lack support network in the new neighbourhood, including women escaping from domestic violence or rehoused households from the surrounding villages. New housing may be more energy efficient, but it often has a larger surface area which in fact increases the energy bill. Basic telephone and internet tariffs are another high cost. There is dependence on phone use, sometimes out of necessity such in the case of home-schooling, so a free broadband or certain data allowance, and provision of laptops for children in low-income families would help to address both the risk of food poverty and domestic digital inequality.

Margaret Saner emphasises that Cambridge Foodbank focuses on *how* to eat rather than *what* or *when*. They do not judge people's eating habits. She does argue, however, that vegetable and fruit provision in a local grocery store needs to be good if people are to buy them, also in low-income neighbourhood, and that having a local grocery store does not yet mean people can afford it. For example, Trumpington Meadows in Cambridge (a new development with affordable housing provision) has a supermarket (Waitrose) but lower income people do not use it, making the area a 'food desert' for them. It is also important to consider planning requirements. Cambridge Foodbank wanted to open a community grocery store in Trumpington Meadows but the location had been earmarked for 'cooked food' outlet and it could only accommodate a fast food restaurant. Allotments can sound like an attractive solution to address food poverty but in reality, most households affected by food poverty do not have the time for allotments, although this with no doubt would have benefits of children.

The interview with Margaret Saner showed how rich information local organisations have on the communities where they operate. This knowledge is largely unharvested. Yet it could help policy makers to formulate more place-based environmental policies, understand heterogeneity of the communities and that their self-representation may be different from how policy makers see it (i.e., they see themselves as low-income, not poor working households and most of them are working).

5. Conclusions

Looking at environmental sustainability and 'placeness' through the lens of food, the research suggests following implications for policy:

1. **This pilot study demonstrates how the inclusion of data sources curated by stakeholders and lay persons in the form of Google Maps listings and reviews includes the voices of local community and members underrepresented in traditional fora**. This non-invasive and freely available source of community created data, supported by quantitative spatial and modelling data, can help policy makers to gain a better understanding the lived experience in the neighbourhood, to identify priority groups (e.g. single mothers, single men, local entrepreneurs) and where the groups can be reached (e.g. local kebab shops, cafes), and to foster community participation to respond to the climate crisis, resilience and increasing inequality in cities.

2. **Administrative and physical boundaries may not be an optimal way to define a 'place'.** 'Outer worlds' and contrasting 'inner worlds' of the neighbourhoods were observed in both case studies - not necessarily visible in the physical fabric but clear in intangible community aspects. The 'inner world' foodplaces are rarely visited by non-locals. On the other hand, some residents in these deprived areas may not leave the 'inner world' very often and in the absence of pubs, local takeaway may be the only social and communal place they use.

3. **There is a temporal element to this 'placeness'**. Even those neighbourhoods that have high frequency of foodplaces turn into blank corridors out of opening hours and then again into 'food swamps' in late hours. Yet the late opening hours are appreciated by the community members who are working on late shifts (e.g. cab drivers). The increase in the gig economy will increase the need for places where workers without permanent workplace can eat and rest outside normal working hours.

4. **The importance of grocery stores and takeaway places in local community should be acknowledged in planning new developments.** It is noticeable how positively the foodplaces are reviewed: fast food outlets and very modest grocery stores regularly get 4/5-star reviews. There is loyalty to local places, supported by reviews by regular customers. The reviews focus on quality, portion sizes and friendliness. Despite the poor reputation of 'food swamps', the reviews indicate their appreciation and important role in the community. The analysis reveals the 'pride in local places' that is called for in the UK government's 'levelling up' policy. Yet foodplaces are often missing in new developments: are we building unsustainable neighbourhoods that are not only 'food deserts' based on private car use (that food poor households may not have) but also 'food hinterlands' depriving communities of their social, entertainment and gathering spaces?

5. **Policy makers should engage more actively with local community organisations like Foodbanks.** Local organisations have a deep understanding of the community and its housing conditions, as seen in the interview with Cambridge Foodbank CEO Margaret Saner. These community organisations have an overview that policy makers, or the residents themselves, may lack. Yet this knowledge is largely unharvested. The involvement of local organisations as 'non-traditional' research partners should also be encouraged by Research Councils and other funding bodies.

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