

Supplying food to disadvantaged communities in the UK: Insights for the Food Supply Chains

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ABSTRACT

Purpose

Despite the UK being ranked 6th out of 113 countries in 2021 on the Economist Intelligence Unit's global Food Security Index, there are about 10.2 million British residents living in food deserts, approximately 12% of these in deprived areas. This paper takes a closer look at the food systems in four UK cities (Plymouth, Tower Hamlets, Whitley-Reading and Brighton and Hove) and how food supply chains (FSC) can better supply food to the disadvantaged in these communities.

Design/methodology/approach

The report gathers and analyses under a systematic manner secondary data from academic literature, books, reports, online publications, government reports and local newspapers on the state of the local food systems as they are experienced by the disadvantaged in these communities.

Findings

Findings indicate that, despite the variety and uniqueness of the challenges in the four communities, the role that FSCs play within the current systems and how the principles of supply chain management could help address them are woefully underexplored.

Social and Practical implications

The findings give a better understanding of the food systems in terms of access and affordability inequalities in the UK and provides a strong basis for appropriate practical interventions.

Original/value

The paper presents one of the first studies into the role of supply chain management in food supply to disadvantaged communities in the UK by exploring existent food systems from a supply chain perspective.

Keywords: Food supply chains, Disadvantaged communities, Food insecurity, United Kingdom.

1. INTRODUCTION

With increasing global population comes an increasing need to supply commensurate food and drink. Current trends show an ensuant increase in food waste. Around 1.3 billion tonnes of food, worth about \$1 trillion goes waste annually while over 8.9% of the world's population (690 million people) are hungry – an increase of almost 60 million in the last five years (United Nations, 2021). About 750 million people were exposed to extreme levels of food insecurity in 2019 while about 2 billion did not have access to safe, nutritious and sufficient food in the same year. The present global food system generates inequalities that pose significant challenges to the environment (Breda *et al.*, 2014). Most of the global food losses and waste occurs in Europe and North-America while sub-Saharan Africa, South and Southeast Asia have the lowest (Wascher *et al.*, 2015). These regions however have the highest numbers of people suffering food poverty and insecurity. Notwithstanding, there are still many people in the global north who also suffer the perils of food poverty. In the UK for example, households being pushed into food poverty, child poverty and child mortality are on the rise while obesity in both children and adults is also increasing precipitously (O'Brien and Nisbett, 2019).

A miscellanea of people is most vulnerable to food poverty and insecurity. Around the UK, citizens and political leaders alike have increasingly recognised they have a role in reducing these inequalities (Baker and Zeeuw, 2015). Simultaneously, there has been an admission of the amount of food wasted or lost at the different stages of the supply chain (Sonnino and Beynon, 2015). Therefore, while efforts to reduce waste food continue, there is the recognition that surplus food could be redistributed to serve the emergent needs of disadvantaged groups while also reducing the overall demand on the agricultural area for food production (Wascher *et al.*, 2015).

The purpose of this paper is to take a closer look food supply to disadvantaged communities in the UK, what role, if any, supply chain management (SCM) has been identified to play in facilitating this process in academic literature in four UK communities and relevant governmental and institutional documents, and to explore opportunities for further research and practical interventions. The objective is to illustrate current supply chain challenges in these four food disadvantaged communities and provide insights for other disadvantaged communities in the UK and other developed countries. The paper starts by discussing the current state of food insecurity and poverty in the UK and the data collection and analysis process is presented. An in-depth look at the various food issues in disadvantaged communities in Tower Hamlets, Brighton and Hove (B&H), Plymouth and the Whitley ward in Reading is then discussed. Under these, the levels of deprivation, the state of the food systems and the diet-related health conditions for each community is presented. Attempts by various community groups and local governments to address prevalent challenges and their effectiveness are presented. Research and practical implications based on the analysis are then suggested for all four communities.

2. FOOD INSECURITY AND POVERTY IN THE UK

The UK is placed 6th out of 113 countries on the Economist Intelligence Unit's 2021 Global Food Security Index (EIU, 2021). This is up from 17th in 2019 (Hasnain *et al.*, 2020). On the Food Sustainability Index, the UK ranked 24 out of 67 countries in 2018 (Hasnain *et al.*, 2020) but ranked 7 out of the G20 countries in 2021 (BCFN, 2021). On the Global Food Security Index 2020, the UK maintained its 2019 position of 6th, moved up 7 places to 8th in terms of affordability and moved up to 13th with a score of 59.4 in natural resources and resilience. It

maintained its 7th position on quality and safety but dropped three places to 17th on availability of food.

Overall, it may be seen that the UK seems to be improving in dealing with its food security and sustainability challenges. Nonetheless, there are challenges that need addressing. The food system has become unhealthier over the past couple of decades, with an increase in consumption of cheap processed food (Keith, 2020) – a situation that has translated into more overweight and obese persons in the country (Dimbleby, 2021). The application of modern and advanced SCM principles have also increased the vulnerability of FSCs (Eksoz *et al.*, 2014; Sawyerr and Harrison, 2020). If food stocks within the retail sector and that of overseas food suppliers are all considered, the UK is only 30% self-sufficient in terms of land (Hasnain *et al.*, 2020). All of these have contributed and continue to impact food accessibility and affordability, especially for the disadvantaged.

Under the same vein, the notion of “food deserts” was first introduced in the early 1990s in the UK (Shannon, 2014) by “a resident of a public-sector housing scheme in the west of Scotland in the early 1990s” (Cummins and Macintyre, 2002, p. 436). It was subsequently defined by the Low-Income Project Team as “areas of relative exclusion where people experience physical and economic barriers to accessing healthy food” (Reisig and Hobbiss, 2000, p. 138). Other contemporary definitions suggested these to be areas of cities where cheap, nutritious food (such as fresh fruit and vegetables) were either of poor quality or unobtainable (Whitehead, 1998). Predominantly, the various definitions proffered for food deserts purported spatial (and sometimes financial) constraints as the major barriers to the accessibility of healthy food options. Lacking empirical basis for the prevalence and distribution of these food deserts at the time, research exploring the phenomenon in greater depth resulted in ambiguous results (Wrigley, 2002), nonetheless highlighting the complexity of the accessibility challenges beyond just physical constraints.

Policy directives pushing for improved access to healthier food (in the form of new supermarkets within easy walking distances) as the means to ensure increased consumption of fruit and vegetables produced fewer emphatic results to affirm such correlation (Bagwell, 2011; Wrigley *et al.*, 2003). Consequently, researchers have broadened the factors that contribute to food deserts to include economic, geographical, psychological and sociological (Shaw, 2006). Bowyer *et al.* (2009) proposed that the processes involved in families or individuals obtaining their food may be summarised as accessibility, affordability, awareness, acceptability and appropriateness. While for some groups, such as the older and persons with limited mobility (due to lack of private transport, expensive public transport or physical disability), the decentralisation and commodification of food retailing could be the cause of food deserts (Madgwick and Ravenscroft, 2011; Wrigley *et al.*, 2003), some ethnically minority groups found it more difficult to source all their food needs within their local areas (Bowyer *et al.*, 2009). These issues contribute to food poverty and insecurity, which Dowler and O’Connor (2012, p. 45) say refers to “the inability to consume an adequate quality or sufficient quantity of food in socially acceptable ways, or the uncertainty that one will be able to do so”.

Extending this argument, the poorest 10% of UK households need to spend about 74% of their disposable income on food to meet the costs of the Eatwell guide while 80% of adults and 95% of children eat fewer than 3.5 portions of vegetables a day (Food Foundation, 2019). 16% of adults are reported to skip meals for financial reasons. 25% of the overall UK population, 47% of those earning up to £10,000 and 27% of those earning between £10,001 and £20,000 think healthy and nutritious food is unaffordable (Corfe, 2018). For children, 3.7 million are living in households for whom a healthy diet is unaffordable and around 25% of those who do not receive free meals have gone without lunch due to affordability (Food Foundation, 2019). For such children, there is evidence that they are more likely to suffer adverse consequences on

their education (Gooseman *et al.*, 2020). All of these attest to the acute rise in food poverty and insecurity in the UK over the past decade with the reliance on food banks increasing by about 284% (pre-COVID) since 2012 (Lovell and Eatwell-Roberts, 2019).

Limited access to good quality, affordable and healthy foods have been linked to increasing rates of obesity and diet-related chronic disease such as diabetes (Shannon, 2014; Weatherspoon *et al.*, 2015; Zachary *et al.*, 2013). There is the relative abundance of highly processed, energy-dense foods and sugar-laden drinks in deprived areas (Tuomala and Grant, 2021). 90% of households in a deprived area in Birmingham, England were identified to be within 500 metres of shops that sold fizzy drinks and junk food while only 20% were within the same distance for shops selling fresh fruit and vegetables (Shannon, 2014; Shaw, 2006). The compromised diets consumed by such deprived groups in these obesogenic environments have thus been associated with the continual problem of increasing health inequalities in the UK (Wrigley *et al.*, 2003).

To address these, there has been calls for effective intervention in retail provisioning for the availability of diverse and affordable fresh produce (Wang, 2017) to address the tangible material needs as well as the intangible social needs such as culture, cooking skills, and the requisite nutritional education to promote healthy dieting (Dammann and Smith, 2009). Other propositions to dealing with these issues include the introduction of additional food redistribution channels such as discount food stores offering healthier foods at low prices, food banks, remodeling of existing stores and governmental policy interventions (such as fast food outlet zoning, banning and directives on ingredients) (Caraher *et al.*, 2009; Mair *et al.*, 2005; Ramirez *et al.*, 2017; Shaw, 2006; Weymes and Davies, 2018). Short food supply chains have also been suggested as viable spatial alternatives through farmers' market, organic vegetable box schemes, farm shops, and community-supported agriculture to bring food into the areas underserved by conventional food retail outlets (Wang, 2017; Watts *et al.*, 2005).

3. METHODOLOGY

We conducted a study of the food systems in Tower Hamlets, Brighton and Hove, Plymouth and Whitley-Reading, seeking to provide insights on food supply to the disadvantaged citizens in these communities. Secondary data is collected from local council and central government reports, academic literature on the communities, and reports and websites of community initiative groups. The data was then deductively coded in NVivo12 Pro and analyzed for each of the four communities under the themes, geographic, demographic and foodscape information, diet-related health issues, and attempts at addressing food issues. These themes had been derived from the literature review. From the analysis, the role of supply chain management in attempted interventions could be identified. Longitudinal statistics on diet-related health indicators such as childhood and adult obesity rates, and prevalence of type 2 diabetes in the communities compared to regions and the rest of England helped understand the effectiveness of interventions. Opportunities for research and practical interventions from a supply chain perspective were then identified for each community.

4. FOOD ISSUES IN DISADVANTAGED COMMUNITIES ACROSS THE UK

Communities in the UK that are most vulnerable to food poverty and insecurity include single-parent households, poorer families, adults who live alone, households in temporary accommodation and homeless people. Additionally, families with at least one member suffering from physical, dietary or mental health conditions, individuals without a car or public transport

monies, families with no recourse to public funds, and some pensioners – even though the likelihood is less relative to younger persons, also struggle with these food issues (Lovell and Eatwell-Roberts, 2019). These people, who are usually socially and economically marginalised, tend to make poor choices on food due to a variety of complex and imposing conditions (Pettinger *et al.*, 2017). Even though urban areas have higher instances of food inequality, there is growing evidence that rural households are increasingly becoming food insecure (May *et al.*, 2018). The clustering of larger retail markets and services in bigger market towns can affect food accessibility and affordability for rural residents who may only have access to limited and expensive rural buses.

To adequately capture a socio-culturally diverse perspective of food inequalities by which sustainable and nationwide solutions can be derived, this study focuses on four different communities with unique demographics, foodscapes and cultures. A comprehensive review of secondary data from published academic literature, relevant central and local government documents, charity publications, newspaper articles, among others, is done to contextualise the conditions within the four communities. Relevant demographics within each community is first discussed, followed by synthesising insights on depravity within these communities compared to their surrounding regions, the documented diet-related health issues and the attempts by the UK government, local councils and local charities and organisations to address the issues identified. From these, the research and practical implications are presented.

4.1. Tower Hamlets

Tower Hamlets is one of the most densely populated Local Authorities in London with 16,791 persons/km² (Bagwell, 2011; ONS, 2021a). It is a relatively small borough of 21.5km² that lies on the northern banks of the River Thames. As of mid-year 2020, the population was estimated to be 331,969 (ONS, 2021a), an increase of about 44,802 five years prior (Keith *et al.*, 2019). The borough has quite a diverse ethnic profile. As at the 2011 census, 43.4% of the population identified as white while the Bangladeshi community accounted for about 32%, representing the single largest Bangladeshi community in the UK (THBC, 2012).

Despite its relatively younger generation and significant diversity, the borough is one of the most deprived in England with 39% of children living in an income deprived household. In 2015, it was ranked 10th lowest out of 326 boroughs in the index of multiple deprivations (IMD) (Keith *et al.*, 2019). This improved to 50th in 2019, with only 1.4% of the borough now in the 10% most deprived areas in England (THBC, 2020a). Only two of the Borough's 144 Lower Super Output Areas (LSOA) fall into this category. LSOAs are small areas that host on average, about 1,500 residents each, requiring a minimum population and number of households to be 1,000 and 400 respectively, and a maximum of 3,000 and 1,200 respectively (ONS, 2021b). There are 32,844 LSOAs in England.

Similarly, the borough was 114th in 2019 out of 317 most deprived local authority areas in England on the IMD employment domain compared to 76th in 2015, showing some commendable improvement. Nevertheless, only 67% of the working-age population (that is, between 16 and 64 years, representing 73.26% of the local population) were in employment compared to the London average of 75% (ONS, 2021a; THBC, 2020b). More than half of the jobs in Tower Hamlets are in the financial, professional and technical sectors, but just 34% of residents are employed in these sectors (THBC, 2020b). The median household income for the borough was £29,937 in 2018 (Jabri *et al.*, 2020).

Food poverty has been a perennial challenge in the Tower Hamlets community, with poorer and larger families being the most likely to suffer this. The food retail environment in Tower

Hamlets exacerbates the harmful health impacts of food poverty in the borough. Typically, deprived areas are rife with food deserts – which are areas that are poorly served, and those with limited mobility may experience difficulties in accessing affordable and healthy food (Patterson *et al.*, 2012). Even though there are few food deserts, 97% of the area’s residents live within 10 minutes of a fast-food outlet – thereby suggesting the abundance of food swamps (Lovell and Eatwell-Roberts, 2019; Vaughan, 2011). 76% of households are within a 10-minute walk of a supermarket, retail market, bakers or greengrocers and there are 297 grocers and/or mini-markets in the community so that well over 90,000 households are within this distance to the 2214 registered food businesses in the borough (Caraher *et al.*, 2009; Vaughan, 2011). General accessibility of food can thus not be regarded as a major issue with respect to food poverty in this community even though admittedly, some of the stores have limited healthy food options (Caraher *et al.*, 2009).

4.1.1. Diet-related Health Issues in Tower Hamlets

The link between limited access to good quality and healthy foods as well as the prevalence of processed, energy-dense foods and unhealthy drinks and diet-related ill health (Weatherspoon *et al.*, 2015) is noticeable in Tower Hamlets. From a nutrient analysis, Vaughan (2011) indicated that many of the foods sold in the many fast-food outlets in Tower Hamlets were high in sodium and high in fat, particularly saturated fat. These tend to be energy-dense and contain lower quality fats, such as industrially produced trans-fats (Stender *et al.*, 2007), which though are banned in the UK, are still in use in many independent fast-food outlets. These foods are generally nutrient-poor compared to home-cooked meals or even the large franchised fast-food chains (Jaworowska *et al.*, 2013) – which are fewer compared to the independent outlets in the borough. The excess consumption of these types of foods tends to have dire health implications such as the prevalence of cardiovascular disease, hypertension, obesity and type 2 diabetes (Jabri *et al.*, 2020; Stender *et al.*, 2007). Related mortality rates are significantly higher in the borough (Caraher *et al.*, 2014).

Type 2 diabetes is very prevalent in Tower Hamlets. The borough has the third-highest rate in London with about 17,000 people diagnosed (THBC, 2019). This pattern has historically been attributed to the large South Asian population, particularly the Bangladeshi community resident in the borough, who are identified as having an increased risk of developing the condition compared to other ethnicities (Vaughan, 2011). The food choice situation in Tower Hamlets is complex (Caraher *et al.*, 2014) and cannot be tucked away with ‘quick fixes’. Interventions to turn the tide of the current trajectory in the community must be multi-faceted and engaging. On one hand, they must enhance the acceptability, desirability and convenience of affordable healthy food options, while seeking, on the other hand, to curtail the unhealthiest and unsustainable excesses of the food retail environment (Caraher *et al.*, 2009; Lovell and Eatwell-Roberts, 2019) without worsening the unemployment situation in the borough.

4.1.2. Attempts at Addressing Tower Hamlets’ Food Issues

Several local initiatives have been devised and proposed to address the diet-related challenges in Tower Hamlets (NHS Tower Hamlets, 2012; Shift, 2013; Vaughan, 2011). Caraher *et al.* (2009) highlighted the utility of providing health literacy to inhabitants on the link between diet and health outcomes and their vulnerability to type 2 diabetes, heart disease and cancer by their consumption of unhealthy fast foods. Following Mair *et al.*’s (2005) zoning prescription to deal with obesity, Caraher *et al.* (2009) also suggested the banning of fast-food outlets and/or drive-through outlets, banning of ‘formula’ outlets, banning in certain areas, quotas in certain areas either by number or shop frontage, quotas specifying density and directives specifying the distance from schools, hospitals etc. However, Bagwell (2011) indicated the likely limited

impact national initiatives undertaken by the Food Standards Agency with major fast-food chains, were going to have in Tower Hamlets. Unsurprisingly, almost a decade after the Council's implementation of policy guidelines on fast-food outlets, it is not readily obvious the interventions have significantly addressed the dietary challenges.

The Tower Hamlets Borough Council (THBC) in 2018, together with the Women's Environmental Network (WEN), established the Tower Hamlets Food Partnership that aims to reduce food poverty and improve the food system in their community. When the COVID-19 pandemic hit, the Voluntary and Community Sector (VCS) Food Hub, which supported 27 voluntary sector organisations providing fresh food and cooked meals, was set up (Harris, 2021). Three food banks operate in Tower Hamlets but this is inadequate, considering 38.99% of its residents live under the poverty line (May *et al.*, 2018). Other efforts to deal with its diet-related health problems include the piloting of a food pantry, increasing food growing spaces through Orchard projects, running of easter/summer holiday hunger programmes, provision of healthy school meals, healthy families programme, and the provision of breakfast clubs in some schools (Harris, 2021; Lovell and Eatwell-Roberts, 2019).

4.1.3. Research and Practical Implications in Tower Hamlets

Of the various interventions prescribed in the literature as discussed under section 2, the introduction of food redistribution channels (food banks, holiday programmes, free school meals, breakfast clubs), council policy interventions (award schemes), small-scale local food production (orchard projects) and the intervention in the visibility and prevalence of fast-food outlets have been used in Tower Hamlets. The THBC through its work has acknowledged the challenges in the community and invested in a variety of interventions to address diet-related health issues, particularly in its Bangladeshi community. Notwithstanding, available statistics on these health issues (see Public Health Outcomes Framework - NCMP, 2020; THBC, 2019) do not show a drastic improvement over the years. Admittedly, things could be significantly worse if not for the Council's interventions, but that more needs to be done is not in doubt. Interventions focusing on cultural and socio-economic change have been limited. Developing incentives to push food entrepreneurship away from the independent fast-food sector into other forms of employment could help reduce the rather high fast-food visibility in the borough. The social space that these outlets provide must also be dealt with either through providing alternatives or by transforming the current food offerings into healthier options. Considering the complex context of Tower Hamlets, an immersed approach at the micro-level to explore means for behavioural, social, economic and cultural change is required.

The involvement and analysis of the role of FSCs and its actors in addressing the diet-related challenges in Tower Hamlets has been woefully lacking. The elimination of waste processes, not just in the UK FSCs, but in those that supply the locals' preferred Bengali fruits and vegetables could be crucial in increasing affordability of healthy food options (Bourlakis and Weightman, 2004). An improved and well-coordinated redistribution of surplus food could further improve affordability and accessibility. The religious dimension of foods in the area cannot be overlooked. Modifying FSCs to accommodate and provision religiously appropriate food options not only in local convenience stores but in major retailers as well is needed.

Further research is also required to formulate more impactful solutions that will add to what the THBC has so far achieved. Exploring how the FSC and its actors can impact accessibility and affordability for the disadvantaged is crucial. Mapping current supply chains to identify areas of waste and the barriers and challenges to healthy, affordable and sustainable food options could help address some of the challenges (Francis *et al.*, 2008). Should new product options be developed for the disadvantaged in Tower Hamlets, researching into how newer supply chains or even existing ones can be modified to deliver these options with minimal adverse

environmental, social and economic impact will be required. Exploration of these issues could drastically mitigate the health risks in these communities considering how entrenched the fast-food culture is.

4.2. Brighton and Hove

Compared to the rest of the Southeast region of England, Brighton and Hove has high levels of deprivation, with a population that has severe problems of health needs, poverty, food insecurity and inequalities (Brighton and Hove Connected, 2016). Unemployment is 5.8% compared to 4.2% in the southeast and 5.2% nationally (Brighton and Hove Connected, 2021). Cases of homelessness and rough sleepers are on the increase. As of October 2018, there had been at least 20 reported deaths of homeless people in the city within the space of a year (The Argus, 2018). Additionally, the high-end lifestyle in the city makes living in it incredibly expensive, comparable to the standard of living in London but without the support and benefits London offers (O'Brien and Nisbett, 2019). Of all UK cities, it has one of the lowest levels of housing affordability, with the average price of a house being about 11 times the average salary (BHFP, 2018a). Social isolation also tends to exacerbate the challenges as 44,294 persons live alone in B&H while 41% of older people compared to a national 31% live alone.

Not surprisingly, the issues of poverty, inequality and unsustainability have translated into food inequalities as well. About 20% of the city's residents do not think they have enough to meet their basic living costs, including food. When beneficiaries of food banks and emergency foods suppliers were surveyed, the biggest reason identified was low income (BHFP, 2020). Meanwhile, edible food costing an average household £420 a year and £680 for families is wasted in the city (BHFP, 2012). Even though the city council owns 4,400 hectares of farmland, very little of it is used to produce food for the city. In its annual centre survey in December 2016, the Brighton Unemployed Centre Families Project found that 42% of its users had either reduced the size of their meals or skipped meals, while 62% tended to eat less healthy foods at home because of affordability (BHFP, 2018b). In 2018, the Brighton and Hove Food Partnership (BHFP) reported a 25% increase from 2014 figures on the total parcels of food distributed by the 17 food banks in the city (BHFP, 2018a). Considering the effects of Brexit, Coronavirus and ongoing Russian-Ukrainian conflict on food supply, food prices are increasing, further worsening the situation. These disproportionately affect the poorest and necessitate urgent local level intervention (O'Brien and Nisbett, 2019).

Ely *et al.* (2017) suggest that the extant configuration of food production and distribution in the city and the constraints on further development by existing infrastructures, knowledge and power relations are the result of activities that have happened for many decades – even centuries. Issues around land tenure (such as 13.9% of the National Park area being owned by 5 large estates and 40% of farmland in the same place being rented) have significantly impacted the current patterns of land use. As farmers age, younger generations inherit farming lands. Should these choose not to go into farming, such farmlands are purchased and consolidated into larger farms, or the lands get used for pasturing and exercising horses. National and local regulatory and planning policies influenced by the need for water conservation, food security concerns and maintenance of farm incomes post World War II, have all contributed to the current challenges and constraints on local food production.

4.2.1. Diet-related Health Issues in Brighton and Hove

Eating poorly is closely related to several causes of premature death and life-threatening diseases including stroke, heart disease, diabetes and cancer. These issues as well as food

insecurity and malnutrition not only disproportionately, but also regressively affect the poorest in the city (O'Brien and Nisbett, 2019), significantly contributing up to a 10-year difference in life expectancy between the wealthiest and the most deprived in B&H (BHFP, 2012). Treatment of these issues costs the city's National Health Scheme £80 million annually (BHFP, 2018a). Schools in the poorest part of B&H have less than 50% of 8-11-year-olds eating the recommended five-a-day, compared to over 90% in the wealthier areas. Thus, children in the former are as much as 12 times more likely to be obese at year 6 (10-11 years) than those in the latter.

These issues notwithstanding, national statistics on childhood obesity in England shows B&H holding steady and consistently outperforming the comparative national figures as other cities and boroughs have increased in these numbers (O'Brien and Nisbett, 2019). In 2018/19, 79% of 4- to 5-year-olds in B&H, compared to 76% in England are a healthy weight. Similarly, 73% of 10- to 11-year-olds are also of a healthy weight compared to a national 64% (Brighton and Hove Connected, 2021). There may be a myriad of factors contributing to these patterns including the collective approach to food in the city, its culture and physical activity (O'Brien and Nisbett, 2019). The next section takes a closer look at some interventions that have been adopted over the years to address food poverty and insecurity, and the associated ill-health issues in the city.

4.2.2. Attempts at Addressing Brighton and Hove's Food Issues

Many of the interventions in Brighton and Hove have been facilitated by the initiative or collaboration with the City's Council. B&H was one of the earliest cities to identify the need to address food issues (Sonnino, 2019; Sonnino and Beynon, 2015). The city developed a food strategy in 2006 that acknowledged the relationships between its food system and issues around sustainability, social equity and the health and wellbeing of all its residents (BHFP, 2006). Besides the City Council, there are a range of civil society organisations, a dynamic voluntary sector and local small businesses that have shown commitment to creating a fairer and more sustainable food system in the city (Ely *et al.*, 2017; O'Brien and Nisbett, 2019). Between 2007 and 2010, B&H was ranked among the first three most sustainable cities in the UK.

One of the earliest and most iconic efforts at addressing its local food poverty and security issues was the formation of the Brighton and Hove Food Partnership in 2003. Other interventions include the city's incorporation of food policies into its overarching citywide sectors, strategies and schemes (Sonnino and Beynon, 2015). There are many food banks which are distributed over the city, but majority are concentrated in the South-central part of the city. The north-western part of the city which also has a considerable number of deprived residents does not have any food banks nearby.

B&H has recognised the role of the FSC in the achievement of their local sustainability and food sufficiency goals. The BHFP (2018a) recognises the role its local food producers including farmers, fishermen, bakers and cheesemakers could play in ensuring environmental sustainability and they, in turn, receiving fair prices for their produce.

4.2.3. Research and Practical Implications in Brighton and Hove

B&H has proved to be a success story on many fronts and has shown leadership in dealing with its food inequalities. Residents, as well as the City Council, have shown proactiveness and have, by their actions, interventions and initiatives, provided several blueprints on how cities, not only in the UK but the world over, can address concerns over their local food systems and associated sustainability issues. Despite obesity being a national issue, trends in B&H show a promising indication towards healthier weights. The city has shown that strong interest,

leadership and participation by local governments in addressing food deserts and poverty is very effective and can provide the requisite coordination and direction for other interventions to be strategically pursued.

Nevertheless, there is yet room for improvement as 30,000 tonnes and 39,000 tonnes of food a year is wasted by businesses and households respectively (BHFP, 2018a). It is therefore important to look at addressing the causes of food waste in the local FSC and redistribute more food to the increasing number of vulnerable persons in the city. Little information is provided on the impact of fast foods in the city and how these are dealt with. It will be interesting to know if this was a challenge which has been overcome or that this was not a problem at all here. With the variety of farming initiatives in B&H, looking at the medium-sized farms, their impact on the local food supply and sustainability, the nature of supply chains leading out of these farms into the city, the percentage of the food supply that goes into the city compared to those that are shipped to the rest of the UK and internationally are all interesting areas for research.

4.3. Plymouth

Plymouth is advantageously located in the rich agricultural hinterland of the south-western English coast with access to rich marine resources. Nevertheless, very little of the food consumed by the local population is sourced from the surrounding areas or the city's ports – where some of the biggest fish-landings are made in the UK (Lewis *et al.*, 2014). This is because of the shifting away from the conventional dependence on local food production to the reliance on food from supermarkets (such as Iceland, Asda, Lidl, Waitrose, Aldi, Sainsbury, Morrisons and Tesco) who typically source their food globally. There is the presence of relatively smaller outlets such as Co-operative, Spar and Costcutter as well as stalls for fish, fresh produce and healthy ethnic foods (Miller, 2013). Catering represents the largest number of food businesses within the city, with private catering outlets being the most prevalent despite the significantly large number of public caterers.

Even though there is significant demand for local produce, there isn't adequate capacity to meet this demand both in volume and continuity (Lewis *et al.*, 2014). Notwithstanding, food producers tend to use alternative routes (such as buying groups, farmers' markets, farm shops, food cooperatives, vegetable boxes, mail orders etc) to sell directly to the public as there is no independent grocery sector in the city. Despite its inadequacy, this helps increase local food availability in the city, deepens connections between producers and consumers, and improves the local economy through the provision of cheaper food and increased employment (Taylor *et al.*, 2005).

As is with many other UK cities, there are a variety of challenges with the food system in Plymouth. 'The Future of Food in Plymouth 2014–2031' (Lewis *et al.*, 2014), bemoaned the impact of supermarkets in the city. Decline in sales of local traders, taking away of choice to shop in traditional shops, stunting of new schemes, impact on the town centre, buying up of independent convenience stores, adverse impact on employment and the creation of new taste for consumers were all part of the effects identified as resultant from the influx of supermarkets to the city.

Another challenge in Plymouth is the high levels of deprivation and this particularly manifests in the form of the existence of food deserts where access to fresh and affordable food is restricted (Pettinger and Bonney, 2016). A strong correlation between class, affluence, location in the city and access to fresh food has therefore been identified and provides some insight into the diet-related health patterns with these variables within the city (Lewis *et al.*, 2014). Those with the lowest incomes disproportionately suffer from poor nutrition and related health issues

(Kinra *et al.*, 2000; Pettinger *et al.*, 2017). Poverty is a major challenge in the city. Children aged under 16 living in poverty were 8,451 in 2015. This dropped down significantly to 6,056 in 2018 but then rose to 6,430 in 2019 and 6714 (projected) in 2020 (Department for Works and Pensions, 2021).

Additionally, there are concerns with increased exposure of children in the more deprived LSOAs and schools close to district centres to fast-food outlets, which tend to be within easy walking distance (800m) of all secondary schools in the city (Lewis *et al.*, 2014). The situation is not any better for university students, as a lot of junk food catering outlets were found around the city's university. Furthermore, despite interest in locally produced food, the existing food supply networks do not appropriately encourage new entrants into food production. There is also little incentivisation for existing small-scale producers to scale up. Meanwhile, there are almost no medium-sized producers in Tamar Valley so that local wholesalers only rely on very few large local producers and heavily supplementing these with imports into the region (Lewis *et al.*, 2014).

With these inequalities, inadequate production capacity and easy access to unhealthy foods, come the exposure of residents – particularly children, to obesogenic food environments, further worsening the dire health conditions of children living in food poverty. Some of these issues are discussed below.

4.3.1. Diet-related Health Issues in Plymouth

Obesity issues in Plymouth is not a recent phenomenon. Between 1994 and 1996, Kinra *et al.*, (2000) conducted a cross-sectional study of 20,973 children between the ages of 5 and 14 years in Plymouth. The study established an association between deprivation and childhood obesity and found the rate of childhood obesity in the city to be two and half times (5% vs. 2%) what was expected nationally. They found the prevalence of obesity increased with age and that childhood obesity was 29% (boys) to 39% (girls) higher in the most deprived group of children in Plymouth as compared with the least deprived. Over two decades later, levels of obesity and other diet-related diseases continue to rise as a steep rise in the city's residents accessing food banks further evinces an increase in food poverty (Lewis *et al.*, 2014).

For school children in reception (year R), that is, children between the ages of 4 to 5 years, the prevalence of obesity between 2007/8 and 2018/19 has increased by almost 0.8% even though the pattern has been stable without any sharp declines or inclines. For children in year 6 (who are aged between 10-11 years), there had been a 1.5% increase – almost twice what is observed in the year Rs, and the pattern over time has been more fluctuant with the lowest rate recorded in 2015/16 as 15.8%. In 2018/19, 25.8% of children starting primary school were either overweight or obese and this compares to 32.2% by the time they leave. In the former, the percentage of children who were either overweight or obese was worse than the national average of 22.6% while for the latter, the prevalence was better than the national prevalence of 34.3%.

Plymouth's National Child Measurement Programme (NCMP) Report 2018/19 further shows that for children aged 4-5 years old, the prevalence of obesity in the most deprived neighbourhoods is 3.8% higher compared to the least deprived (11.8% vs. 8.0%) – an increase of 0.5% on the prior year. For those aged 10-11 years, the difference in prevalence more than doubles to 8.4% between the most deprived and the least deprived (24.1% vs. 15.7%) even though this is a 1.0% decrease from 2017/18 (PCC, 2020a). For the adult population, 67% (compared to a national average of 61.3%) of residents over 18 years were classified as overweight or very overweight. This increase has been attributed to the more sedentary lifestyles and increased availability and affordability of high-calorie food (PCC, 2020b). These

issues have not been overlooked as many attempts have been made to improve the local food system in Plymouth, some of which are discussed below.

4.3.2. Attempts at Addressing Plymouth's Food Issues

Like Brighton and Hove, the interest and participation of the local government in addressing food insecurities is noticeable in Plymouth. In planning for the future of food in Plymouth, the authors of the 17-year plan for the City Council admitted that the city was not going to become self-reliant for food. Nevertheless, it was pointed out that the production of food through a combination of urban growing and local agriculture initiatives would help secure the city's future food supply (Lewis *et al.*, 2014). In the light of these, several groups have been formed and initiatives started, seeing that the benefits for the city are many, including the potential for job creation, especially as local food systems are valuable sources of employment and this translates into a strong and resilient local economy (Willis, 2012).

Care homes, schools and community centres in the city have involved greater numbers of people in learning new cooking skills, which has led to improved health and wellbeing (Lewis *et al.*, 2014). One of the major interventions in the city is Food Plymouth, which is a multi-sector partnership that was formed in 2010 with the support and coordination of the Soil Association and local organisations in Plymouth (Food Plymouth, 2021). Other interventions such as Grow, Share, Cook (GSC), the city's Child Poverty Action Plan 2019-2022, food banks and other successful initiatives in Efford, Devonport and East-End, CATERed, Tamar Grow Local CIC and the Plymouth Fairness Commission all evince the city's commendable commitment to addressing its food poverty and insecurity issues.

4.3.3. Research and Practical Implications for Plymouth

It is recognisable that the city of Plymouth is aware of its peculiar issues as regards food inequalities, insecurity and poverty. Despite the numerous interventions and efforts by the City Council, private groups, cooperatives, not-for-profit organisations, Plymouth University and individual residents, there has not been a significant reduction in diet-related ill health and other aspects of inequalities in the city at the macro level.

Without a doubt, the many testimonies of families and individuals whose lives have been positively impacted by Food Plymouth, GSC, food parcel distribution by food banks and other initiatives cannot be overlooked. The promise of impact from these projects are clear and the benefits of increasing and improving local food production and its supply to local retailers while strategically supplementing these with food from outside the region are undeniable. The challenge, at the moment, lies in exploring means by which current initiatives can be scaled upwards sustainably, as funding has proved to be a challenge in some of the initiatives.

With regards to SCM, not much has been done through academic research to map out the supply chains, identify wastages and opportunities by which improvement can be made to cut down on cost while expanding reach. With B&H's comparative success in dealing with some of these issues, it will be interesting to explore transferrable lessons that can be tailored for the context of Plymouth. Seeing that medium-sized farms are highlighted as almost lacking in Plymouth while these are quite dominant in B&H, exploring how small-scale farms can be incentivised to scale up may be useful. If this is not feasible, increasing the number of small-scale farms and coordinating their outputs to meet the city's demand may be beneficial in addressing the local food production gap.

There is not enough data available on food waste in the city. It will be interesting to see how much food can be redistributed locally to meet the gap in access to healthy food for the severely deprived while longer-term solutions towards providing fair-wage employment for deprived

residents is pursued. Lastly, even though observed obesity patterns have been ascribed to obesogenic food environments, there is not enough studies and data on the location of fast-food outlets, their cultural significance if any, a mapping out of fast-food outlets and juxtaposing this with the weight of children and young people in these areas etc. Like was noted in the case of Tower Hamlets, it is important to have a better understanding of why a situation is, if a longer-lasting change is to be made. Exploring the impact fast food has on employment and the social culture among pupils and young adults in the deprived areas may help in the derivation of a more holistic multi-faceted solution that will show city-wide results and reflect in the diet-related health of the city over time.

4.4. Whitley-Reading

The town of Reading does not suffer high levels of poverty, joblessness or low levels of educational achievement as it is a major commercial centre and home to several top IT and insurance companies. It was ranked, along with Oxford, for the fourth time in a row as the top-performing cities in the UK (PWC, 2021). It only ranks 2nd to London in business stock per capita with 464 businesses per 10,000 population, 2nd to London in the highest weekly workplace wages (£634 per week) and ranks 6th in the top 10 cities with the highest percentage of high qualifications (Centre for Cities, 2017).

Notwithstanding, there are high levels of inequalities, earning it the fourth most unequal city in terms of wealth (Centre for Cities, 2017). Whitley is one of the wards in Reading which this inequality is starkest. There are many low-income and single-parent-with-dependent-children households in Whitley, as well as families with at least one member having a long-term illness or disability and unemployed households with dependent children (Lloyd-Evans *et al.*, 2015). As of 2015, Whitley had the highest number of children (915) living in child poverty in Reading Borough (Reading Borough Council, 2017a). 15.2% of the ward's working-age population claim benefits compared with 9.6% across Reading and 31.6% of the children living in the ward (compared to 18.7% in the whole borough) are said to be at risk of living in poverty (Ashcroft *et al.*, 2019). As regards free school meals, 37.4% to 22.1% in Reading claim this. The pressures become significantly worse for ethnic minority communities such as the Nepali community in the Hexham neighbourhood (Lloyd-Evans *et al.*, 2015). Nevertheless, significantly more of the disadvantaged children in Whitley's main secondary school, John Madejski Academy (JMA) are from a white British background compared to the rest of Reading (Ashcroft *et al.*, 2019).

18.6% of Whitley's population, compared to 34.8% in Reading have level 4 qualifications while 30.40% compared to 17.4% in Reading have no qualifications (Reading Borough Council, 2021). Of those qualified to National Vocational Qualification (NVQ) level 3 or above, Whitley has 28% compared to 48.2% in Reading holding this qualification (Ashcroft *et al.*, 2019). Furthermore, 53.9% of all pupils in JMA are eligible for pupil premium (Ashcroft *et al.*, 2019). This compares to 28.4% in Reading, 22.6% in the South East and 29.5% in England (Ashcroft *et al.*, 2019). 37% of its working population were employed in manual occupations while 17% were in elementary occupations (Ashcroft *et al.*, 2018). The austere levels of disadvantaged in Whitley as compared to the rest of Reading reveals the weaknesses in the relationships and ensuing limited collaboration between residents and local institutions (Ashcroft *et al.*, 2019). The effects of these issues are evident in various aspects of the lives of the ward's residents including food. Only 20.2% of adults in Whitley report eating a healthy diet and the ward is seen as underserved due to the affordability and accessibility of food stores (Lloyd-Evans *et al.*, 2015; Reading Borough Council, 2018).

Morrisons is the main supermarket in Whitley but it's over a mile away from many of the parts of the ward, thereby making it difficult for those without personal vehicles to easily access it. 27.9% of Whitley's residents do not own a car (Ashcroft *et al.*, 2018). Using public transport also requires two buses from many of Whitley's streets, thereby limiting the quantities that can be purchased and making it difficult for parents (especially women) with (up to 3) young children (Ashcroft *et al.*, 2018; Lloyd-Evans *et al.*, 2015). This situation also highlights the limited choice for residents as only 8% of respondents surveyed by Lloyd-Evans *et al.* (2015) shopped at Lidl (which is inaccessible to most residents) and just 1% shopped at Co-op and local shops. Limited financial resources and digital exclusion restricts online grocery shopping and the use of taxis to access supermarkets. Besides the lack of digital and financial resources to shop online, residents seemed weary of the quality (freshness and cost deals) they would get by buying online while others also considered in-person shopping as a social activity, especially families who visited Morrisons together (Lloyd-Evans *et al.*, 2015).

4.4.1. Diet-related Health Issues in Whitley

The link between poor diet and obesity and the consequent impact on an increased risk of long-term health conditions such as type 2 diabetes, cardiovascular disease and high blood pressure are well known. In addition, morbidly obese persons are likely to experience a shorter lifespan by about 8 to 10 years. Obesity negatively affects educational attainment and mental health and heightens the risk of respiratory and musculoskeletal disorders (Reading Borough Council, 2017b).

62% of adults (aged 18+) in Reading are classified as overweight or obese, compared to a regional average of 61.5 and a national average of 62.8 (PHE, 2020). Even though 8,568 persons in Reading (representing 4.7%) have diabetes, this is better compared to 5.7% in the South East and 6.4% nationally (Reading Borough Council, 2017a). 21.7% of children in Year R are considered overweight (and obese), which is similar to the regional 21.9% but less than the national 23%. By year 6, this prevalence rises to 36.4%, significantly higher than the 31.7% in the South East and slightly lower than the national average of 35.2% (PHE, 2020).

In Whitley, 29.9% are obese (Reading Borough Council, 2021). For children, 12.5% of children in the reception year are obese, compared to the Reading average of 10%, while by year 6, this grows to 26.2% in Whitley and 21% in Reading (Reading Borough Council, 2018). As may be seen, the prevalence of obesity in Whitley is worse than that of Reading but there is not much data clearly providing reasons for these, except for only 1 in 5 residents admitting to eating healthily.

4.4.2. Attempts at Addressing Whitley's Food Issues

Unlike the other 3 communities where local councils have shown initiatives and have led and/or participated in addressing food insecurity challenges, the Reading Borough Council has not acted with much urgency in seeking to understand and intervene in the food system failures in its Whitley ward. Notwithstanding, several interventions have been attempted in Whitley to address its food-related challenges. It has however been highlighted how some of these were rather short-term in nature and were forced onto the residents, rather than engaging them to co-develop solutions. With the Whitley for Real initiative (W4R), community-led activities which used to be rare in the ward is changing (Ashcroft *et al.*, 2019). W4R was developed by the Reading Borough Council, the University of Reading and Whitley Researchers, working with various other stakeholders and the community through the Whitley Community Development Association (WCDA) (University of Reading, 2018).

Even though the wider initiative here was more focused on investigating how schools, families and the wider community can collaborate to assist young people in reaching their goals (University of Reading, 2018), it has been shown that projects such as Food4Families, the Community Café and the Secret Garden, all of which are food projects, create a strong sense of community (Brown and Ryall, 2017). Other initiatives such as Food4families, an education and development project funded by Big Lottery's Local Food scheme, and Whitley GrowAllot, which brought residents together to transform abandoned pieces of land to grow fruits and vegetables, have helped alleviate some of the local challenges. Whitley's Community Café and its Surplus Food Project continue to assist the food insecure in the ward.

4.4.3. Research and Practical Implications for Whitley

The situation in Whitley seems quite peculiar compared to Tower Hamlets, B&H and Plymouth. In its case, it is a ward forming part of a larger town which generally is performing well on several IMD indicators. However, this location has unique challenges, all of which are worse than the rest of Reading. Furthermore, being a relatively small part of Reading, there is not much data provided exclusively for the ward and its issues. For example, insights from available resources indicate accessibility and affordability as the major challenges in Whitley with the presence of relatively few food outlets and severe mobility challenges further exacerbating the situation. Notwithstanding, the town's Council does not provide any statistical data to adequately capture the nature of these challenges.

Furthermore, the prevalence of obesity in Whitley is worse than in Reading but it is not readily clear how much this is due to the consumption of fast foods or the provision of less healthy food options at homes due to inaccessibility or affordability. It would be useful to know how prevalent fast-food outlets are in Whitley, proximity to schools, homes, social venues, as well as the average distance of homes from fresh food shops and supermarkets. Mapping out of these can help provide a better perspective on the case of Whitley. Furthermore, it will be worth knowing the number of food aid service providers, if any, who have been providing their services in the ward over time. Providing information on people who access these services will also help evaluate how bad things have gotten over time (outside of the Coronavirus pandemic). In the absence of some of these data, it is quite difficult to monitor and properly evaluate the food system and its issues in Whitley and how well interventions and initiatives have fared over the period.

Of all the three other locations in this study, only Reading does not have a Food Partnership that looks to address the food issues in the town. This may be attributed to the size of the town, as it is not a city and has a significantly smaller population compared to the others. Nonetheless, an intervention that is systemised and makes a committed contribution to policy at the Council level may be the first step in instigating the needed change and addressing the massive inequalities seen in the poorer parts of the town.

Looking at the supply chain aspect of the food system in Whitley, there is almost no information on where foods sold here are sourced besides those in the supermarkets which are part of their commercial food chains. An evaluation of how the supply chain operations in the Surplus Food Project works will be useful to explore means for optimisation and expansion. Apart from the local community gardening initiatives, it will be worth finding out how much of the food consumed in Whitley are sourced from Whitley, Reading or even the Southeast of England. Understanding this, how the food is transported and distributed, and the processes involved in the supply chain will help to better identify sources of waste and potentially address the affordability challenges while exploring ways of improving accessibility.

5. CONCLUSIONS

This paper has provided a closer look at food insecurity and poverty in the UK by presenting the foodscapes in four disadvantaged communities and the various attempts at dealing with the identified challenges. The link between communities deprived of access to healthy food options and diet-related ill health is established in all four communities (Shannon, 2014; Weatherspoon *et al.*, 2015). Nonetheless, all the communities have distinctive and unique food-related challenges that need addressing. Brighton and Hove's proactiveness, excellence and success in tackling its issues are tangible and evident. For Tower Hamlets, its food issues are complex and attempts at addressing them require extensive engagement. Plymouth can learn a lot from Brighton and Hove's initiatives but may require some additional funding outside of its local Council to realise the significant changes needed. A lot more work is needed in Whitley to better evaluate the current state of its food system before any substantive and impactful interventions can be made.

The most popular interventions in all four communities were the use of food redistribution channels, and different short food supply chain projects. These were followed by various local government intervention programmes and food partnerships in all communities except for Whitley where neither food partnerships nor clear cut, targeted Council schemes had been developed for the deprived communities.

For all four communities however, very little attention has been given to the food supply chain and its role in addressing food challenges. Despite food redistribution schemes and various gardening projects being pursued in each community, there are no underlining effective supply chain strategies targeted at reducing food inequalities. Even for Brighton and Hove where some attention has been given, there is still limited information on how much of the food consumed locally is from the region, the logistics of the food chain and how surplus food could be better used.

There are therefore practical and research opportunities which have been highlighted for the communities. Firstly, mapping of FSCs to the disadvantaged in all four communities is needed to understand their current states. This will allow for comparisons to be made and facilitate best practice replication. The food system in Brighton and Hove could be a case study for a more in-depth study into the role of FSCs in addressing food-related issues. This could serve as a gold standard for replication across the UK and other European countries – albeit with relevant modifications to suit local contexts. A theoretical framework that captures the variety of interventions in addressing food insecurity and facilitates performance evaluation is urgently needed as it is increasingly difficult to evaluate the effectiveness of the various government and community initiatives beyond anecdotal accounts. We envisage to develop this framework which will be a key element of the current, ongoing project.

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