



Brighton & Hove Allotment Federation

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An Outline Business Case for Allotments in Brighton & Hove

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Context

This study was commissioned and funded by the Brighton and Hove Allotment Federation (BHAF) to examine and quantify the benefits of the allotment estate to the city's residents and to Brighton & Hove City Council (BHCC) as the landlord. BHAF has long been aware of the importance of allotments across a wide range of indicators of mental and physical wellbeing as well as of the environmental significance of allotments to bio-diversity. BHCC also acknowledges that allotments bring wider benefits, both to allotment holders and the city.¹ But a clear and methodologically robust case showing these benefits in value for money terms was lacking. This study fills that gap.

The report that follows summarises our work. It tests the hypothesis that a comprehensive assessment of value, incorporating the strategic and financial impacts of these wider benefits, would show that allotments are a net contributor to the city's finances.

We would like to thank Caroline Cerny (Obesity Health Alliance), and Beth Nicholls and Dave Goulson (University of Sussex) for offering advice to support our work.

Headline Findings

Our findings suggest that allotments make significant - if currently unrecorded - contributions towards the council's ability to deliver a number of the core commitments in the 2020-23 plan, whilst a conservative financial valuation of just a selection of these wider impacts shows that each plot benefits the city by at least £166.84 p/a (excluding the value of food produced). Overall, the council's existing allotment provision benefits the city - including wider council departments - by a minimum of £385,567 each year, alongside food worth an estimated £1.12m.

Challenges associated with the wider consideration of allotment benefits, and how this study seeks to help.

Whilst important, accommodating wider allotment benefits in a Business Case is not particularly straightforward. Although significant numbers of studies have been undertaken to evaluate benefits at individual and thematic levels, we were unable to

¹ Committee reports relating to allotments generally acknowledge sustainability and equalities benefits, for example.

find a comprehensive summary that incorporated all those benefits in one place. The available studies range in scale, scope and suitability to inform decision-making. Whilst Birmingham City Council is notable for having undertaken an in-depth evaluation of the benefits their Parks and Open Spaces provide, perhaps the majority of Local Authorities do not have the resource to pursue similar undertakings.

With the caveat that the comprehensiveness of our initial study has been constrained by both resource and availability of suitable data, in testing our hypothesis we have started the process of redressing these challenges.

The remainder of this report summarises our methodology and findings in more detail.

Stage 1 - Developing an outline Strategic Case for allotments

We undertook a literature review of existing research into benefits provided by allotments and, for ease of reference, arranged these into a framework based on Kate Raworth's Doughnut Economic model (which incorporates social and environmental economic themes). Having also incorporated relevant findings from the Brighton & Hove Allotment Strategy, we then cross-referenced the list of benefits with the council's 2020-23 Plan (and where possible within scope Departmental Plans) to identify the strategic objectives allotments can help deliver at city level.

This process suggests that allotments are particularly important in helping the council achieve its commitments to:

- Become Carbon Neutral by 2030
- Increase healthy life expectancy & reduce health inequalities
- Promote & Protect Biodiversity
- Reduce, Re-Use & Recycle, and
- Transition to a Sustainable Economy

And also contribute, or have potential to contribute towards

- A resilient, integrated water environment
- (Become) A Sustainable City
- Address the impact of poverty
- (Support) Aging Well
- Build Community Wealth
- Improve Access for Disabled People
- Increase Participation in Civic & Community Life
- Identify ways we can increase support for those struggling to afford the cost of housing
- Remain a proud City of Sanctuary

A full list of benefits and their primary associated strategic links is provided as appendix 1.

Stage 2 - Developing an initial Financial Case for allotments

We then applied the MoSCoW² prioritisation method to identify a suitable selection of benefits that would form the basis of the initial financial evaluation required to test our hypothesis.

Key considerations when choosing benefits were relevance to council priorities and suitability of associated research data (larger scale quantitative studies which compared allotment holders with controls were selected over qualitative studies of small samples etc). We also attempted to select a similar number of benefits from each of three benefit themes - Food, Environment and Health.

We then attached indicative financial values to the benefits by matching the best available research data with the most suitable and applicable financial data associated with each benefit identifiable within the limited time available to undertake our initial review.

Whilst we feel it is important to properly acknowledge the financial value allotments contribute to the city, it should be noted that our initial calculations are as conservative as possible within reason, given that:

- a) even the best sources of existing benefit research are of limited scale and applicability to financial valuation,
- b) our initial objective was to gather sufficient evidence to test our hypothesis (i.e. that allotments provide the council / city with currently unrecorded financial benefits that outweigh the CityParks Department's operating deficit),
- c) a number of valuations through necessity rely on assumptions, and
- d) we are aware of the need for the initial work to be viewed as credible by decision makers.

Our headline findings, arranged by theme, suggest that in total, the overall allotment provision in the city (assuming 2311 full size let plots) can be expected to:

Food

- Provide 481 tonnes of produce, with a value of £1.12 million
- Save the local authority from having to process over 878,000 items / 16.8 tonnes of plastic packaging and 62 tonnes of food-waste, which would otherwise cost £14,500 to dispose of.
- Reduce the city's food related carbon footprint by 1050 tonnes, at a financial value of £257,234
- Enable a water footprint saving from the 8,167 Kilolitres of water that would have been required to grow and process the equivalent produce commercially.

² (MoSCoW effectively prioritises potential features of an initial iteration by those that are Must have, Should ideally have (if time allows), Could have (if time allows) and Won't have just yet)

Environment

- Support between 4 and 54 times more bees and pollinators than other types of council managed land.
- Provide £0.54m worth of food directly attributable to allotment pollinators (included in the overall £1.12m valuation figure in the 'Food' note).
- Have a minimum token Biodiversity value of £6,934 and Storm Water Regulation value of £9,966
- Have soil that stores 578 more tonnes of carbon than grassland, with a value of £519,483

Health

- Reduce levels of self-reported stress, depression and loneliness. If access to allotments prevents just one person from suffering a Stress, Depression or Loneliness related illness, the service has potential to save local health providers and the wider economy £3408, £13,211 and £9,900 respectively
- Reduce obesity related hospital costs by £5613 p/a
- Reduce health inequalities (as health benefits are particularly impactful amongst people who are from deprived areas, unemployed, disabled and / or older).

Summary of initial valuations per plot

Dividing the figures above across 2311 plots indicates each allotment let by the council has potential to contribute a minimum of £651.34 (including) or £166.84 (excluding) food to the local economy. (Note that the total value of soil sequestered carbon has been divided over an assumed 8-year assessment period - a shorter assessment period would lead to the value attributed this benefit increasing).

Area	Benefit	Annual £Value/Plot
Food	1. Non-Pollinator Dependent Food Production	£249.33
Food	2. Reduced Waste Processing	£6.22
Food	3. Food Related Carbon Saving	£111.31
Food	4. Water use reduction (3.534 Kilolitre/plot)	
Environment	5. Pollinator Dependent Food	£235.17
Environment	6. Baseline Biodiversity	£3
Environment	7. Storm-water Regulation	£4.31
Environment	8. Carbon Sequestration	£28.10
Health	9. Reduction in BMI related hospital fees	£2.43
Health	10. Reduced Stress related Healthcare costs	£1.47
Health	11. Reduced Depression related Healthcare costs	£5.72
Health	12. Reduced Loneliness related Healthcare costs	£4.28
Total Saving		£651.34
Total Saving (Excluding Value of Food)		£166.84

A closer review of each benefit and its importance to Brighton & Hove City Council

The final part of this note looks at each benefit selected for financial evaluation in more detail, summarising our evaluation methodology, why we feel each benefit is worthy of inclusion in future council evaluations of the allotment service, and where relevant how we would suggest refining the initial financial values we have applied. Where values are provided, they refer to estimated totals across all current sites in the city.

Our sources for each benefit are attached as Appendix 2.

Where relevant the following calculations assume BHCC's allotment provision to be 2311 full plots across 81.62Ha³.

Food Benefit 1 - Locally Grown Food

Applying the findings of a detailed study of fruit and vegetables produced across 64 allotment plots in Leicester (Edmondson et al 2020) suggests that the 2311 plots in Brighton & Hove could conservatively⁴ be expected to produce a total of 358 tonnes of fruit and vegetables, and 124 tonnes of potatoes each year.

By pricing the equivalent vegetables at Asda, the annual expected produce grown on Brighton & Hove allotments can be given an indicative value of £1.12 million.

***Why is this important for BHCC?** At a high level, increased local food production mitigates growing concerns around national food security. At a local level, allotments enable people to access good quality, organic food that they may otherwise be unable to afford. For example, research undertaken to inform the Brighton & Hove Allotment Strategy found that 'In comparisons across the employment groups it appears that unemployed people perceived greater benefits than employed people in particular for accessing healthy food...(and)...saving money'.*

Access to self-grown good quality food therefore contributes directly towards the council's commitment to 'identify ways we can increase support for those struggling to afford the cost of housing' - money saved on food can help people divert finite available resource to other necessities.

How our initial financial values could be refined.

To test the findings of, and overcome the identified issues with some foods being excluded from consideration in the Edmondson et al study, a citizen science project

³ As there does not appear to be published data on the area of Brighton & Hove's allotment space in Ha (or a breakdown of BHCC's plots by size), an estimated Ha of 81.62 is calculated by dividing Birmingham's allotment space in Ha (259) by plots (7333) then applying the resulting figure to an assumed local plot provision of 2311 full sized plots.

⁴ "The mapping period in Leicester spanned July – September and so bare cultivated soil, where a crop had recently been harvested, was also frequent (58% of plots) and covered nearly 10% of the total cultivated area of the plots, so it is likely that production of some early maturing crops such as spring onions, lettuces and early potatoes, together with some over-wintering crops like purple sprouting broccoli and winter cabbage may have been underestimated as a result" Edmondson et al 2020.

could be undertaken to assess food production over a number of local plots over a full year. The simplest way to undertake this work may be to measure space allocated to plots each month, and convert this into a productivity assumption based on the yield/m² data provided by Edmondson et al where available, supplemented with locally developed equivalents where not.

Food Benefit 2 - Saved Packaging

Comparing the estimated volume of allotment grown food with equivalents purchased from a supermarket also highlighted an expected packaging saving resulting from growing food locally. Overall, had the allotment produce been purchased at the supermarket, it would have required over 1m plastic bags, wrappers and punnets.

Based on weights provided for each packaging / produce type provided by Frankowska et al (2019), this equates to approximately 16.8 tonnes of plastic waste for the local authority to process (along with almost 10 tonnes of cardboard for the retailer to dispose of).

We estimate that the reduction saves the council approximately £3,050 per year in operational costs.

***Why is this important for BHCC?** Reducing packaging waste contributes directly to the council's aspirations for sustainability (Reduce, Re-Use and Recycle), and produces a direct operational saving by reducing the volume of waste that would otherwise need to be disposed of. (The carbon saving of the packaging is included in the following section, GWP saving).*

How our initial financial values could be refined. The Council's Municipal Waste Management Strategy Summary and Action Plan states that the additional cost of waste disposal over recycling / tonne at 2020/21 prices was £107 for Landfill Disposal and £48 for Energy Recovery (at Newhaven). Unfortunately, the document does not appear to provide the comparative baseline cost for recycling a tonne of waste. It was not possible to find details of the PFI contract, or more detailed information from ESCC in the time available to the project, so a baseline figure of £155/tonne has been adopted from the ESCC waste strategy which states that the 'The average East Sussex household still creates around 995kg (almost a tonne) of waste and recycling each year... The cost of dealing with this is around £155 per household per year (as of 2013/14)'. This baseline figure has been updated to £181.66 to reflect 2020 values using the Bank of England Inflation Calculator tool. BHCC would have access to the current costs of dealing with waste, and could apply these in place of the East Sussex derived figure.

Food Benefit 3 - Global Warming Potential (GWP) Saving

Global Warming Potential is a mechanism that converts the heat absorbed by various greenhouse gases to the equivalent mass of carbon dioxide.

Studies by Frankowska et al (2019) set out the GWP for various commercially grown fruits and vegetables throughout their lifecycle⁵.

⁵ The figure Frankowska et al provide for each fruit / vegetable is broken down into its (Commercial)Production, Storage, Processing, Packaging, Transport, Retail, Household and Waste lifecycle stages. Our calculation excludes the proportion of energy used within the home due to cooking etc. as this is unlikely to differ between allotment and commercially grown foods.

By multiplying the anticipated volume and type of allotment grown food by the GWP of the equivalent product grown commercially within the UK and purchased fresh (rather than processed) from a supermarket, we calculate the equivalent Co2 saving of allotment grown food as being equivalent to 1050 Tonnes of Co2 each year.

The financial value of this saving, based on the Government's central carbon value of £245/tCO₂e figure, is £257,234.

Why is this important for BHCC? *By reducing the carbon footprint of the city's overall food consumption, allotment holders contribute towards the council's aspiration to become a carbon neutral city by 2030.*

Food Benefit 4 - Water Footprint Saving

The Frankowska et al (2019) studies also identify the water footprints of the various commercially grown fruit and vegetables through their lifecycles. Using a similar methodology to that used to calculate GWP savings (again excluding the % of water footprint that occurs during the 'Household' stage), we can calculate that producing the equivalent volume and type of fruit and vegetables commercially would require 8168 Kilolitres of water.

Why is this important for BHCC? *Reducing the city's water footprint contributes towards the council's City Plan commitments to 'facilitate change to a resilient, integrated water plan' and 'reduce, re-use and recycle'.*

How our initial financial values could be refined. Whilst we do not currently have access to comparable annual water use across Brighton & Hove's allotments, or the price BHCC is charged for water use, it is likely that the production of food on allotments represents a significant reduction on the city's water consumption - even if water used in commercially produced food occurs beyond the city's boundaries. BHCC would be able to place a financial value on this saving by comparing the volume of water used at allotments with the equivalent associated with commercial production, and applying its commercial water rate to the balance.

Food Benefit 5 - (Non-Packaging) Operational Food Waste Saving

The operational food waste processing saving offered by the allotment grown food is a little harder to estimate precisely, but if it is accepted that allotment holders are less likely to throw unused fruit and vegetables in the bin than people who buy the equivalent produce (it is easier to compost unwanted food at the allotment, and allotment holders are more likely to be in the habit of / have the means for composting) the following reasonable conservative estimate can be made.

The Frankowska et al (2019) studies give a proportion of each type of fruit and vegetable typically discarded as household waste. Wrap (2012) categorise the reasons for fruit and vegetables being discarded as avoidable (just over 50%), possibly avoidable (35.5%) or unavoidable, and show that 83% of all household fruit and vegetable waste is left for the Local Authority to deal with.

The Frankowska data enables us to estimate that 150 tonnes of the allotment grown food would ordinarily be discarded by the household, and the WRAP data suggests that the Local Authority would normally be expected to deal with 83% of this household waste. If we assume that allotment holders are unlikely to throw avoidable, but just as

likely to throw unavoidable or possibly avoidable fruit and vegetables waste in the bin for Local Authority collection, we can estimate that allotment grown food creates 62 less tonnes of refuse for the council to deal with each year than would be the case had it been commercially produced.

We estimate that the reduction saves the council approximately £11,500 per year in operational costs.

Why is this important for BHCC? *Along with the reduced volume of discarded packaging, locally grown food can be expected to provide an operational saving for the council as less waste needs processing.*

How our initial financial values could be refined. See Benefit 2

Environment Benefit 1 - Bees and Pollinators

We have focussed our initial review of Biodiversity benefits of allotments on Bees and Pollinators.

Baldock et al (2019) found that "Mean bee abundances were between 4 and 52 times higher in allotments and gardens than in other (council owned urban) land uses".

Whilst renowned bee expert Dave Goulson wasn't aware of any work that estimated the financial value allotments provide by supporting elevated pollinator populations, a study he co-authored with Nicholls et al (2020) evaluated the financial value of the insect-pollinated crops coming from Brighton & Hove allotments and home growers. Beth Nicholls kindly shared her methodology, which, when applied to our calculations on estimated food production, suggests that pollinators are directly responsible for producing £.58m of the produce currently grown on Brighton & Hove's allotments.

Why is this important for BHCC? *The council's City Plan incorporates a strong commitment to 'promoting and protecting biodiversity'. Locally food grown means the city is less reliant on "current agricultural practices, particularly those associated with large-scale, industrial farming systems, (which) are in fact one of the biggest drivers of environmental damage globally, resulting in massive loss of biodiversity" (Nicholls et al (2020).*

Baldock et al (2019) recommend that one of the primary ways in which Local Authorities can 'improve conditions for pollinators in urban areas' is to "increase the quantity of land favourable to pollinators by converting currently unfavourable land to better quality land uses (e.g., converting parks into allotments)"

Environment Benefit 2 - General Biodiversity

In 2019 Birmingham City Council completed an economic assessment to identify the 'true value of Birmingham's parks and greenspaces'.

Whilst the study only considered the financial value of allotments in terms of the food they produced, other types of council managed land were evaluated on a broader basis, which included a monetised biodiversity value. By applying the financial value / hectare attributed to the least valuable type of land in the Birmingham study (grassland), we can estimate that Brighton & Hove's allotments have a minimum biodiversity value of £6,934.

However, as the previous section on bees and pollinators indicates, the actual biodiversity value of allotment space is likely to be significantly greater than that of grassland.

***Why is this important for BHCC?** Although we recommend further work be undertaken to evaluate the true biodiversity value of allotment land, we have included this initial nominal figure as a reminder of the role allotments can play in supporting the council's commitment to 'promoting and protecting biodiversity'.*

How our initial financial values could be refined. Whilst toolkits for financial evaluations of biodiversity exist, we did not find evidence of their use in an allotment or city park (the typology where quantitative comparison of allotment biodiversity is available) context. However, a future citizen science project focussed on Brighton & Hove's allotments could fill this knowledge gap, bringing local and national benefits.

Environment Benefit 3 - Storm Water Mitigation

Adopting the Biodiversity calculation method to Storm Water Mitigation enables a minimal annual value of £9,966 to be applied to Brighton & Hove's allotment sites. Again, the calculation assumes the value of allotment space is equal to the lowest £/Ha land type of land (grassland) identified in the Birmingham study, and as such is likely underestimated.

***Why is this important for BHCC?** Although likely to be underestimated in £value, we have included this initial nominal figure as a reminder of the role allotments can play in supporting the council's commitment to 'a resilient, integrated water environment'.*

How our initial financial values could be refined. Whilst it is unlikely that the time and cost associated with undertaking a detailed assessment of the precise Water Regulation value that allotments bring to the city would render such an undertaking worthwhile, BHCC (or an external expert) is likely to be aware of whether the current grassland comparison is appropriate, or whether one of the other land typologies in the Birmingham study (or a more relevant local source) would provide a more suitable metric for evaluating this benefit.

Environment Benefit 4 - Soil Carbon Storage

The final part of our study to draw on Birmingham's methodology is a calculation of the Global Climate Regulation benefits provided by allotments. However, in this instance, rather than applying the lowest value Birmingham land type value to Brighton and Hove's allotment space, we can draw on the findings of Edmondson et al (2014), who found that as well as being 'significantly healthier' when "compared to local arable fields", allotment soil's carbon storage "properties compare favourably to those found in semi-natural habitats. For example, when compared to English lowland woodland soils and grasslands of neutral pH, SOC storage was c. 1 kg m⁻² greater"

This equates to 578 tonnes of additional sequestered carbon, with a value of £519,484.

Why is this important for BHCC? As well as the carbon benefits of locally grown food (outlined in the 'Food' section), allotment soil is especially beneficial in storing carbon, supporting the council's aspiration to become a carbon neutral city by 2030.

How our initial financial values could be refined. Our annual value per plot calculation assumes (and so divides the overall value of sequestered carbon by) an 8-year assessment period to demonstrate the contribution existing - and potentially additional - plots can make in helping the council achieve its commitment to become carbon neutral by 2030. This evaluation time scale could be increased or decreased to fit alternative assessment periods as required.

Health Benefit 1 - Reduced BMI

Public Health England data states that 49.3% of the city's 18+ population is classified as overweight or obese, whilst the NHS Obesity Related Hospital Admissions Dashboard recorded 2205 obesity related hospital admissions in Brighton & Hove in 2019-20 (excluding admissions for bariatric surgery).

Whilst testing wider health benefits of allotments, Wood et al (2015) found that the BMI of allotment holders aged 50 and above was significantly lower (an average of 25.5 kgm²) relative to a non-gardener control group (who averaged 27kgm²).

O'Halloran et al (2020) provide data on the impact BMI has on reducing the need for, and cost of hospital visits.

If we assume the majority of allotments in the city are only worked by one person (likely a very significant under-estimate), then the current allotment provision of 2311 plots would serve approximately 1% of the city population (290,395 in 2017 according to the council's 2020-23 plan). Applying that 1% to the 2205 obesity related hospital admissions recorded in the city enables us to make a conservative estimation that 22 of those obesity related admissions could be expected to be allotment holders. If we assume these 22 allotment holders are split equally between males and females, applying the 1.5 BMI reduction in the Wood study to the relevant hospital admissions costs provided by O'Halloran et al (adjusted for inflation using the Bank of England Inflation Calculator) enables us to anticipate that allotments enable hospital admission obesity related savings of at least £5613 p/a.

Why is this important for BHCC? In Brighton and Hove alone, the NHS spends close to £80 million. per year tackling diet-related diseases, and 30% of children aged 10–11 are obese (BHFP 2018). (Nicholls et al 2020)

How our initial financial values could be refined. Whilst numerous sources link allotments to reduced BMI, the Wood et al study offered the best existing quantitative measurement of impact on which to base an initial estimate of financial value. However, as testing impact of allotments on obesity was not the primary focus of the Wood study (and so did not test for causation rather than association etc), results need to be treated with some caution. A dedicated citizen science study - perhaps comparing BMIs of volunteers on the waiting list with new allotment holders over the course of a year - could provide more robust data to inform better local and national decision making.

Our working assumption that 1% of the population benefit through access to an allotment is also undoubtedly underestimated - a survey of allotment holders could

better ascertain the numbers of people working each plot directly, and also benefiting indirectly.

In addition, the scope of our initial study meant that we limited our assessment of financial benefit to reduced costs of hospital admissions. Given BHConnected identified the localised costs of obesity to the NHS as being £78.1m p/a in 2013, this initial metric is evidently just a fraction of the real cost of obesity in the city.

Health Benefit 2 - Decreased Stress & Anxiety

27.1% of the population surveyed in Brighton and Hove reported having high anxiety. The estimated prevalence of Common Mental Health Disorders (depression, anxiety, panic disorder, obsessive compulsive disorder, phobias and post-traumatic stress disorders) at the Brighton Clinical Commissioning Group is 19% (PHE Public Health Outcomes).

Hawkins et al (2013) found allotment gardeners had significantly lower stress levels than a control group who took part in indoor exercise classes, and lower stress levels than controls engaged in other outdoor activities associated with stress relief (walking and home gardening).

The reported stress reduction impact was even higher amongst allotment gardeners from areas with higher levels of deprivation. (Notably, research undertaken to inform the Brighton and Hove allotment survey showed a high proportion of allotment holders in the city (43%) had a household income of less than £15,000 a year; a figure below the minimum living wage. 38% of respondees were either unemployed (11%), retired (10%) or partially employed (17%). Unemployed respondees rated their health as the poorest of all employment groups, but rated the importance of allotments as being an important factor in their health and happiness especially highly).

Savings due to reduced anxiety and stress due to allotment gardening are likely to decrease demands on the NHS. According to the King's Fund the average health service costs to support someone with stress for people in treatment or where their condition is recognised is £1,580 (in 2020 prices). If we including lost employment costs, this brings the total to £3,408.19 per person (in 2020 prices) (Kingsfund 2008).

Why is this important for BHCC?

Stress and anxiety reduction through the promotion of allotment gardening contributes to the council's commitment to "work to prevent mental health problems and to identify and treat them as early as possible", which in turn contributes to the 2020-23 Plan commitment to 'increase healthy life expectancy and reduce health inequalities'. Access to allotment gardening means people are less likely to require care or medical attention related to stress and anxiety, and allotments provide a great asset for the council and mental health charities to utilise for social prescription. The higher stress-relieving impacts of allotment gardening on lower income, disabled or unemployed people also highlight the potential for addressing and reducing health inequalities.

How our initial financial values could be refined. Whilst existing data supports the benefit of allotments on reducing stress, and the impact stress has on local health resources, it was not possible to ascertain the direct relationship between the two within the scope of our study. Therefore, our initial evaluation assumes just one allotment holder a year avoids a stress related illness due to their access to an allotment. This assumption could be tested and refined through a dedicated piece of research (including consideration of the extent of decreases in stress and anxiety required to

reach particular thresholds in negating the need for, or reducing the extent of, associated health provider support), which would bring local and national benefits.

Health Benefit 3 - Improved mood and reduced depression

Brighton and Hove has one of the highest prevalence rates of depression in the country. 11.7 percent of adults in Brighton and Hove were on GP registers for depression 2019/2020.

Although further investigation is needed, there is robust evidence of significant reductions in depression attributed to allotment gardening. Wood et al found that allotment gardeners had a better self-esteem, reduced mood disturbance and fewer breaks in normal psychological functioning than non-gardeners.

This study is also interesting because it shows that improvements in mood have a similar magnitude regardless whether participants had been allotment gardening for long term periods or only for a short time. This means that the mood related benefits from allotments are gained even in sporadic interactions or short sessions of gardening in allotments.

It is expected that improvements in depression prevalence will lead to saved costs to NHS and council services. The average service costs per person in a year are £2,958 (2020 prices), whilst the average cost of lost employment to depression was £13,211 (2020 prices) (King's Fund 2008).

***Why is this important for BHCC?** The role allotments play in reducing depression contributes towards the council's commitment to 'increase healthy life expectancy and reduce health inequalities', reduces strain on local health providers and benefits local economy.*

How our initial financial values could be refined. As with our stress value, it was not possible to ascertain the direct relationship between the beneficial impacts of allotments on levels of depression, and the extent of impact on local health providers within the scope of our study. Therefore, our initial evaluation assumes just one person a year avoids a depression related illness due to allotments. Testing and refining the assumption through a dedicated piece of research, considering the need to establishing a clearer understanding of linkages between allotment related benefits and the thresholds and types of depression, and the mental health and care services impacted, would bring local and national benefits.

Health Benefit 4 - Decreased Social Isolation/Loneliness

The latest research by the ONS shows that loneliness impacts 7.61 % of adults in Brighton & Hove.

The beneficial role allotments can play in helping reduce loneliness and social isolation are well established, as evidenced by the National Lottery Community Fund supporting projects such as 'Growing Well'.

Wood et al (2015) found that 'the opportunities for social interaction offered by allotment gardening might be particularly important as the development of

relationships promotes social capital. Social capital increases life expectancy, while a lack of social capital embodied by loneliness has the equivalent risk to health as consuming 15 cigarettes daily and is twice as harmful as obesity' (Wood et al 2015: e341).

The positive impact allotments play in combating loneliness is most evident in the case of older allotment gardeners. Gardeners over 62 years old would be significantly less likely to feel lonely than neighbours of their age who did not have an allotment (Van der Berg 2010).

Research undertaken to inform the current Brighton and Hove allotment strategy showed that 75.7% of local plot holders agreed or strongly agreed that allotments were good places to socialise with people of different ages and backgrounds, 100% of respondents felt their allotment site was a friendly place and 72.1% felt they belonged to a community on their site (allotment strategy).

If access to an allotment only prevented one plot-holder from suffering severe loneliness that would reduce the impact of loneliness in terms of wellbeing, health and productivity of approximately £9,900 a year (Peytrignet et al 2020).

***Why is this important for BHCC?** Reducing social isolation, and so the negative mental and physical health impacts of loneliness, enables allotments to contribute towards the council's commitment to 'increase healthy life expectancy'. As older people are more likely to be impacted by loneliness, and most likely to feel the positive impacts of socialisation, allotments also support the 'ageing well' commitment.*

Reducing levels of loneliness impacts positively on demands for finite council and healthcare partner resources in the city, and the local economy.

How our initial financial values could be refined. Despite toolkits existing for evaluating financial impacts of, and dedicated projects securing national funding to tackle, loneliness, we were not able to undertake a detailed assessment of the full financial value allotments contribute locally within the scope of our study. Therefore, we have again erred on the side of caution in our initial evaluation, assuming local allotments only prevent one person a year from requiring loneliness related support.

A dedicated piece of work, likely incorporating gathering of more detailed local user data, could provide a more detailed local value, and likely form a useful contribution to the national knowledge base.

Authors

Jim Mayor has over 20 years experience of Project Management and Business Case development in a Local Government and Academic context.

Santiago Ripoll is a Research Fellow at the Institute of Development Studies at the University of Sussex. His research focuses on food systems analysis as well as ensuring social science is incorporated into public health responses.

CONCLUDING COMMENTS FROM THE BRIGHTON AND HOVE ALLOTMENTS FEDERATION (BHAF)

Why is a fuller consideration of the value of allotments important?

BHAF commissioned this study from two local experts in evaluation methodologies for estimating monetary value of public infrastructure. The aim of this study was to contribute to a clearer understanding of the social and monetary value of BHCC's allotments estate in the three domains of food, environment and health benefits. It has established that even on conservative assumptions allotments make a significant contribution to the city's finances. It also shows where allotments are contributing positively to progress in achieving many of the Council's corporate objectives. However, the majority of these benefits do not appear to have been recorded, leading to allotments being undervalued as a public resource.

The study has important implications for the way in which these kinds of benefits which cut across departmental and organisational budgets can get omitted in standard forms of accounting. BHAF recognises that amidst ever increasing budget pressures, Local Authorities must make difficult decisions on how to ensure available resources achieve best value for money. The Council's CityParks Department may well be subsidising the allotment service. But this study shows that it is subsidising other internal departments and external agencies that benefit financially and strategically from the benefits allotments unlock. We hope, therefore, that this work will stimulate further thinking among the key stakeholders about how to assess the value of allotments and reflect this in future financing.

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Appendix 1 - Allotment Benefits arranged by Theme and link to BHCC Objectives

Subcategory	Benefit	BHCC Objective
Social Economic Foundations		
Social Economic Theme - Health		
General Health	Better Perceived General Health	Increase healthy life expectancy & reduce health inequalities
	Reduced GP Consultations	
	Self-Reported Chronic illnesses	
	Reduced Acute Health Complaints	
Mental Wellbeing	Reducing behavioural issues	Increase healthy life expectancy & reduce health inequalities
	Stress reduction	
	Improved happiness / mood	
	Enhanced Self Esteem / Reduced Depression	
	Improved mental health (general)	
	Sense of identify and purpose / belonging	
	Tackling Loneliness	
	Improved sense of body image	
	Improved vigour / reduced fatigue	
	Exposure to benefits of being in nature	
Healthy Aging	Redressing Aging related issues	Aging Well
	General prevention	
	Sense of purpose	
	Physical health benefits	
	Improved Independence	
	Reduced Falls	
	Dementia Care / Reducing Cognitive Decline	
Physical Wellbeing	Self-Rated Physical Health	Increase healthy life expectancy & reduce health inequalities
	Reduced Obesity	
	Enhanced Physical Activity	
	Reduced Physical Constraints	
Environmental	Particulate pollution reduction	Increase healthy life expectancy & reduce health inequalities
	Noise pollution reduction	
Social Economic Theme - Food		
Redressing Inequality	Access to Healthier food	Increase healthy life expectancy & reduce health inequalities
	Potential to help tackle food poverty	
Healthier Diet	Access to organic food	
	Access to Healthier Food	
Social Economic Theme - Income		
Food	Saves on £cost of food	We will identify ways we can increase support for those struggling to afford the cost of housing
Social Economic Theme - Resilience		
Community	Provides a sense of community	Increase Participation in Civic & Community Life
	Provides volunteering opportunities	
National	Enhanced Food Security	Transition to a Sustainable Economy
Operational	Reduces cost of managing food waste	Reduce, Re-Use & Recycle

	Land management shared by community	Transition to a Sustainable Economy
	Re-use of waste materials (wood chippings etc)	Reduce, Re-Use & Recycle
Social Economic Theme - Jobs		
Jobs	Opportunity for Vocational Development	Build Community Wealth
Social Economic Theme - Social Equity		
Local	Strengthens bond between fathers and children	Address the impact of poverty
	Increased benefits for disabled people	Improve Access for Disabled People
	Increased benefits for unemployed people	Address the impact of poverty
	Reduced inequity related health impacts	Increase healthy life expectancy & reduce health inequalities
	Some groups less likely to access benefits associated with green spaces	Increase participation in community life
	Can support health and wellbeing of refugees	Remain a proud City of Sanctuary
	Redresses numbers of people with no access to gardens	Create and Improve Public Spaces
Global	Redresses Social Injustice	Transition to a Sustainable Economy
Social Economic Theme - Gender Equality		
Local	Increased benefits for women	Increase participation in community life
Ecological Ceilings Economic Foundations		
Ecological Ceilings - General		
Awareness	Increased Environmental Awareness	Become Carbon Neutral by 2030
Ecological Ceilings Theme - Climate Change		
Local	Urban Heat Island Mitigation	A Sustainable City
	Storm Water Regulation	
Carbon	Reduced Greenhouse Gas Emissions associated with commercial food production	Become Carbon Neutral by 2030
	Enhanced Soil Carbon Storage	
Ecological Ceilings Theme - Nitrogen Cycle		
Healthier Diet	Reduced fertiliser impact of commercially grown food	Transition to a Sustainable Economy
Ecological Ceilings Theme - Chemical Pollution		
Local	Reduced Environmental impact of food packaging	Reduce, Re-Use & Recycle
Ecological Ceilings Theme - Biodiversity Loss		
General	Reduces Biodiversity impact of commercially produced food	Promote & Protect Biodiversity
Habitat Provision	Provides a habitat for Biodiversity	
Pollinators	Supporting Pollinators	
Pesticides	Reduces dependency on food produced with pesticides	

Appendix 2: Benefit Evaluation Sources

Food

- Asda website - accessed 28th Sept 2021
- Bank of England Inflation Calculator
- Brighton & Hove Allotment Strategy
- Brighton & Hove City Council Plan 2020 to 2023
- Brighton & Hove City Council Municipal Waste Management Strategy Summary and Action Plan 2011
- Department for Business, Energy and Industrial Strategy - VALUATION OF ENERGY USE AND GREENHOUSE GAS (GHG) EMISSIONS Supplementary guidance to the HM Treasury Green Book on Appraisal and Evaluation in Central Government - 2021
- Edmondson et al - Feeding a city – Leicester as a case study of the importance of allotments for horticultural production in the UK - 2020
- East Sussex Joint Waste Strategy 2014-25
- Frankowska et al - Life cycle environmental impacts of fruits consumption in the UK - 2019
- Frankowska et al - Life cycle environmental impacts of vegetables consumption in the UK - 2019
- Nicholls et al - The contribution of small-scale food production in urban areas to the sustainable development goals: a review and case study - 2020
- Waitrose website - accessed 28th Sept 2021
- WRAP - Household Food and Drink Waste in the United Kingdom 2012

Environment

- Baldock et al - A systems approach reveals urban pollinator hotspots and conservation opportunities - 2019
- Bank of England Inflation Calculator
- Birmingham Health Economic Assessment & Natural Capital Accounts - Revealing the True Value of Council-managed Parks and Green Estate (2019)
- Brighton & Hove City Council Plan 2020 to 2023
- Carey et al - Countryside Survey: UK Results from 2007. NERC/Centre for Ecology & Hydrology - 2008
- Edmondson et al - Feeding a city – Leicester as a case study of the importance of allotments for horticultural production in the UK - 2020
- Edmondson et al - Urban cultivation in allotments maintains soil qualities adversely affected by conventional agriculture - 2014
- Nicholls et al - The contribution of small-scale food production in urban areas to the sustainable development goals: a review and case study - 2020

Health

- Bank of England Inflation Calculator
- Brighton & Hove Allotment Strategy
- BHConnected ([https://www.bhconnected.org.uk/sites/bhconnected/files/jsna/jsna-7.3.2-Healthy-weight-\(adults-&-older-people\)1.pdf](https://www.bhconnected.org.uk/sites/bhconnected/files/jsna/jsna-7.3.2-Healthy-weight-(adults-&-older-people)1.pdf))
- Brighton & Hove City Council Plan 2020 to 2023
- Hawkins et al - “Doing” Gardening and “Being” at the Allotment Site: Exploring the Benefits of Allotment Gardening for Stress Reduction and Healthy Aging - 2013

- King's Fund - Paying the price. The cost of mental health care in England to 2026 - 2008
- NHS Obesity related hospital admissions dashboard 2019-20
- NICE - Indicator Development Programme (QOF). Depression and Anxiety Disorder - National Institute for Health and Career Excellence - 2015.
- O'Halloran et al - BMI and Cause Specific Hospital Admissions and Costs: The UK Biobank Cohort Study - 2020
- Office of National Statistics - Mapping loneliness during the coronavirus pandemic - 2021.
- Public Health Outcomes Framework - Public Health England
- van den Berg et al - Allotment gardening and health: a comparative survey among allotment gardeners and their neighbours without an allotment - 2010
- Wood et al - A case – control study of the health and well-being benefits of allotment gardening - 2015