



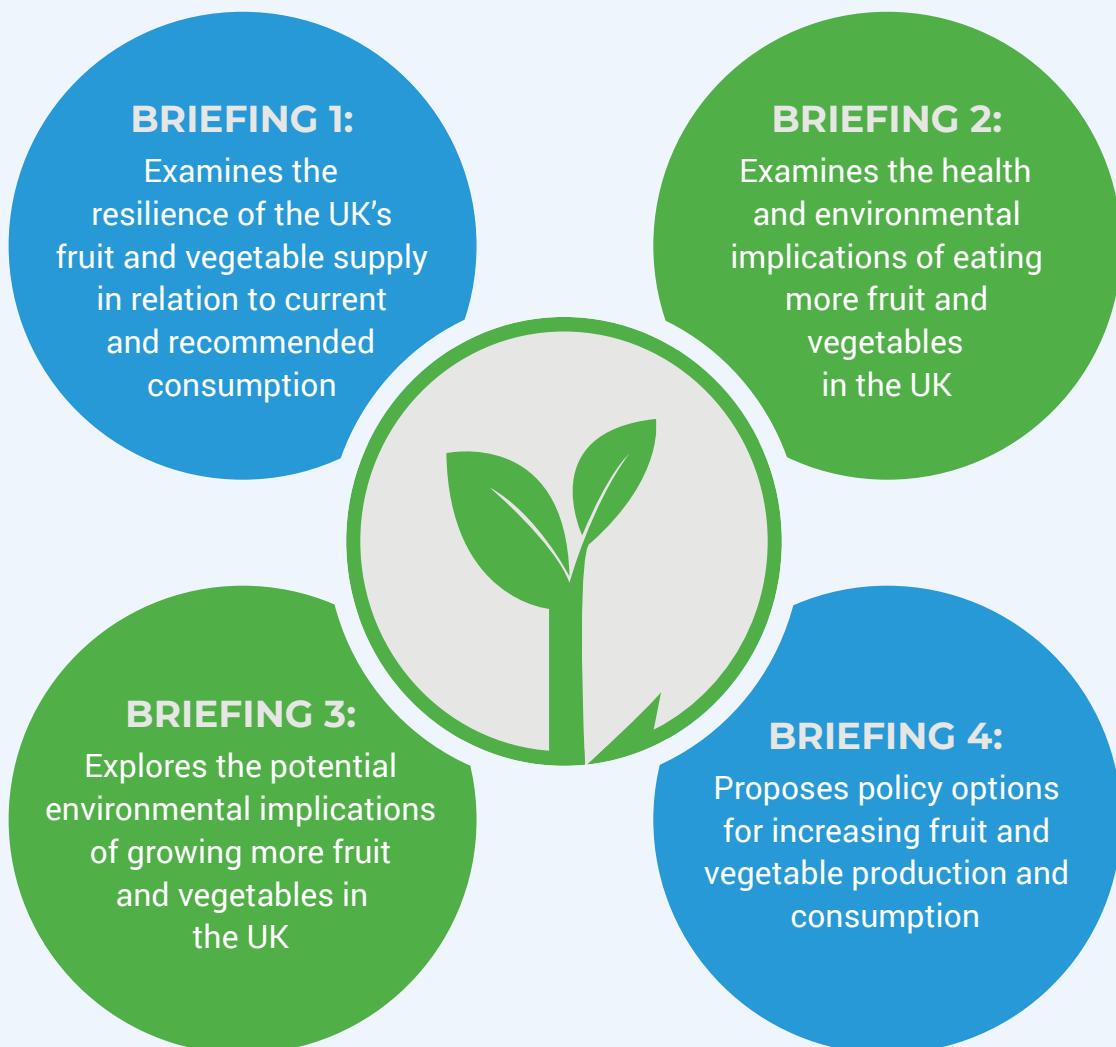
**POLICY BRIEF 2:**  
Pathways to  
Five-a-Day

# WHAT IS SHEFS?

SHEFS (Sustainable and Healthy Food Systems) is a global research programme using novel techniques to generate and synthesise evidence, and to help decision-makers create policies that deliver nutritious and healthy diets in an environmentally sustainable and socially equitable manner.

## ABOUT THIS SERIES

This series of four policy briefings draws on research conducted by the SHEFS consortium funded by the Wellcome Trust. It explores the potential health and environmental benefits of increasing our consumption of fruit and vegetables in the UK, explores the biodiversity impacts of growing more fruit and vegetables in the UK, and examines the resilience of our fruit and vegetables supply chains in light of climate change. It ends by considering the mix of policies that should be considered to support fruit and vegetable consumption and production in the food and agriculture strategies of all four UK nations.





# POLICY BRIEF 2:

## Pathways to Five-a-Day

AUTHORS: **AMBER WHEELER AND SHONA GOUDIE, FOOD FOUNDATION**

### SUMMARY

- Briefing 1 in this series showed that fruit and vegetable consumption in the UK is below the recommended five-a-day.
- This briefing shows that increasing intake to five-a-day (whilst reducing meat and sugar consumption) would lead to significant health and environmental benefits.
  - a. It would contribute seven to eight months (13%) to the NHS target to extend healthy life expectancy in the UK by 5 years by 2035<sup>1</sup>
  - b. It would contribute 10-31% to the Climate Change Committee target to reduce greenhouse gas emissions from agriculture, landuse and peatlands by 2050.
- The best pathway to five-a-day in terms of life expectancy and carbon footprint reduction is to increase vegetable intake (rather than fruit and vegetables), and for these to come from the same vegetable groups that are currently imported and home grown.
- However, increasing consumption to five-a-day would increase costs for consumers, and requires policy intervention to ensure that those on lower incomes are not further disadvantaged.
- A no deal departure from the EU is likely to lead to further price inflation of fruit and vegetables, which will disproportionately affect the ability of those on low incomes to afford a healthy diet.



This briefing paper is based on the findings of the pre-print paper 'Health impacts and environmental footprints of meeting the "5-a-day" target for fruit and vegetables in the UK: modelling study' by SHEFS researchers.



# Introduction

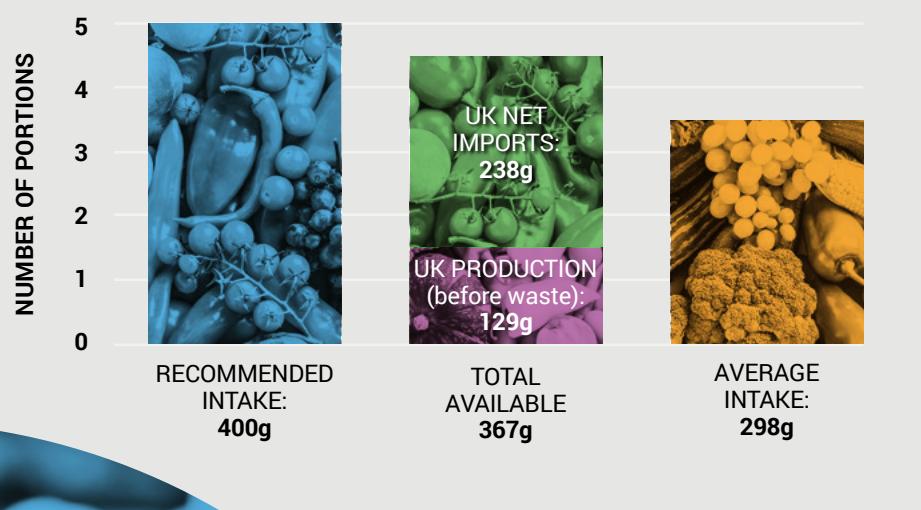
We have shown previously that in the UK we need to increase the amount of fruit and vegetables we eat to meet recommendations for health<sup>2</sup>. At least 31,000 premature deaths could be prevented every year if everyone in the UK ate the recommended quantities of fruit and vegetables<sup>2</sup>.

Vegetable production in the UK has been declining

and is currently at a 20 year low<sup>3</sup>. To meet fruit and vegetable demand, we have become increasingly reliant on imports, with the UK market currently importing 47% of vegetables and 84% of fruit<sup>4</sup>. Concerningly, a considerable proportion of these imports are from countries that are vulnerable to climate change and water scarcity<sup>2</sup>, highlighting the potential for climate change to disrupt future food supply.

**FIGURE 1:**

Number of portions of UK fruit and vegetable consumption and supply (per person per day)<sup>2</sup>



This briefing asks what the best path is to achieving five-a-day\* in the UK. Specifically, we ask if it would be better for our health and environment if the additional fruit and vegetables consumed are imported or produced in the UK. We also explore whether there could be extra benefits if the consumption comes from fruit and vegetables, rather than just vegetables. Finally, we consider the cost implications.

\*Five-a-day is looked at in this paper as a more achievable target in the short term rather than seven a day as recommended by PHE's Eatwell Guide<sup>16</sup>

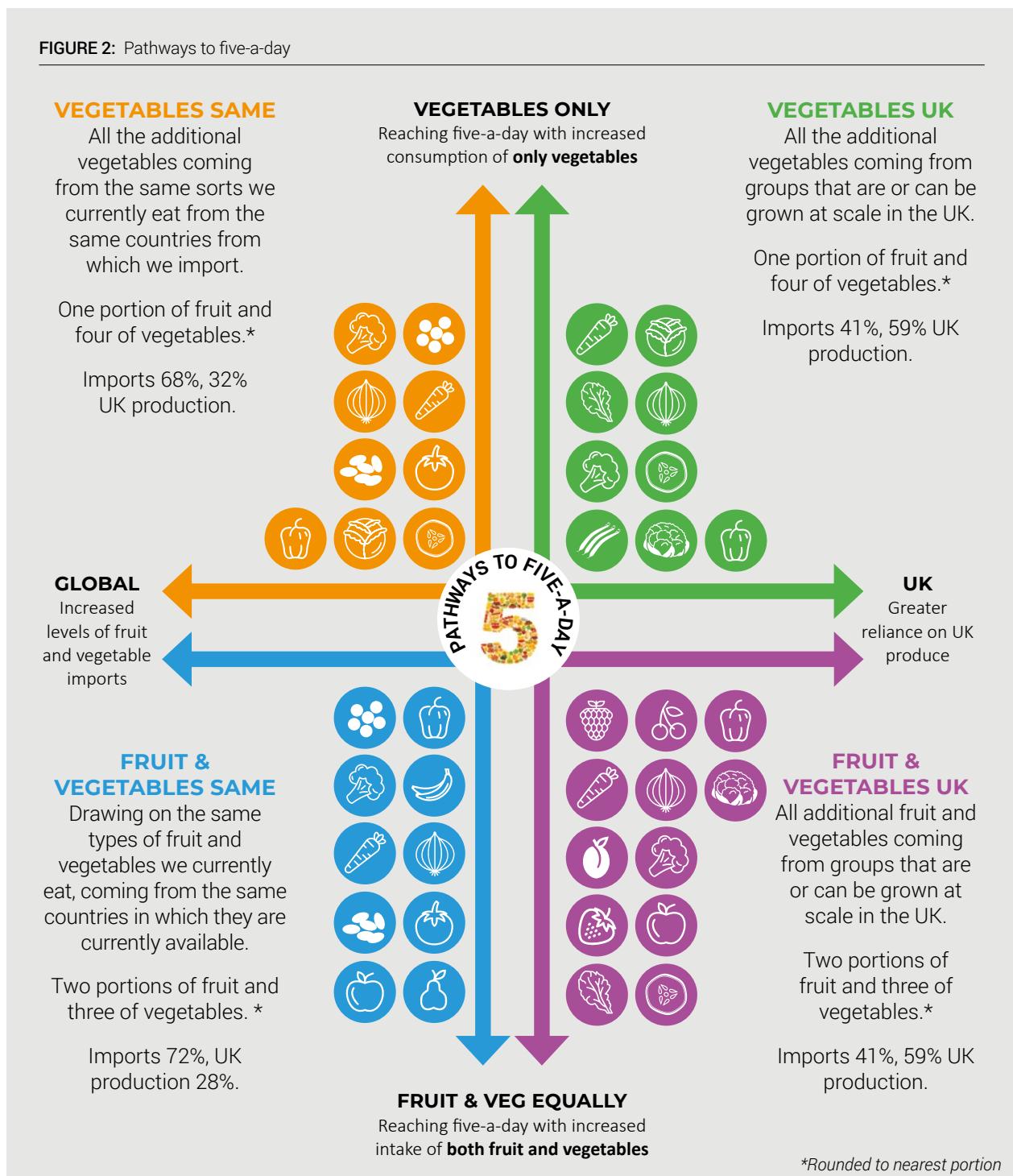


## Four pathways to five-a-day

To quantify health effects and environmental footprints, SHEFS researchers looked at four different scenarios of getting to five-a-day. In all the scenarios, diets are modified to ensure that despite increased consumption of fruit and vegetables, dietary energy (calorie) intake is kept constant.

To achieve this, consumption of fruit replaces sugary snacks and consumption of vegetables replaces meat. Pulses count for up to one portion of vegetables, and fruit juice is excluded. Costs of the extra fruit and vegetables that would be consumed are estimated using supermarket data.

FIGURE 2: Pathways to five-a-day



\*Rounded to nearest portion



# The findings: What's the best pathway to five-a-day?

All paths are better for health and the environment, than our current diets, but they are all more expensive.

## ENVIRONMENTAL IMPACT

Environmental impacts are measured in terms of Greenhouse Gas Emissions (GHGE in kg CO<sub>2</sub>eq) and Blue Water Footprints (in total litres of freshwater from ground and surface sources). They reflect the average footprints of food production in their countries of origin and include transportation.

The scenarios resulted in between 4.1-8.2% lower GHGE than current dietary patterns. Water Footprints were also lower, although marginally

(between 0.2-1% less), apart from the *Fruit & Vegetables Same* scenario that has a 0.5% greater Water Footprint due to its greater reliance on imported fruit and vegetables.

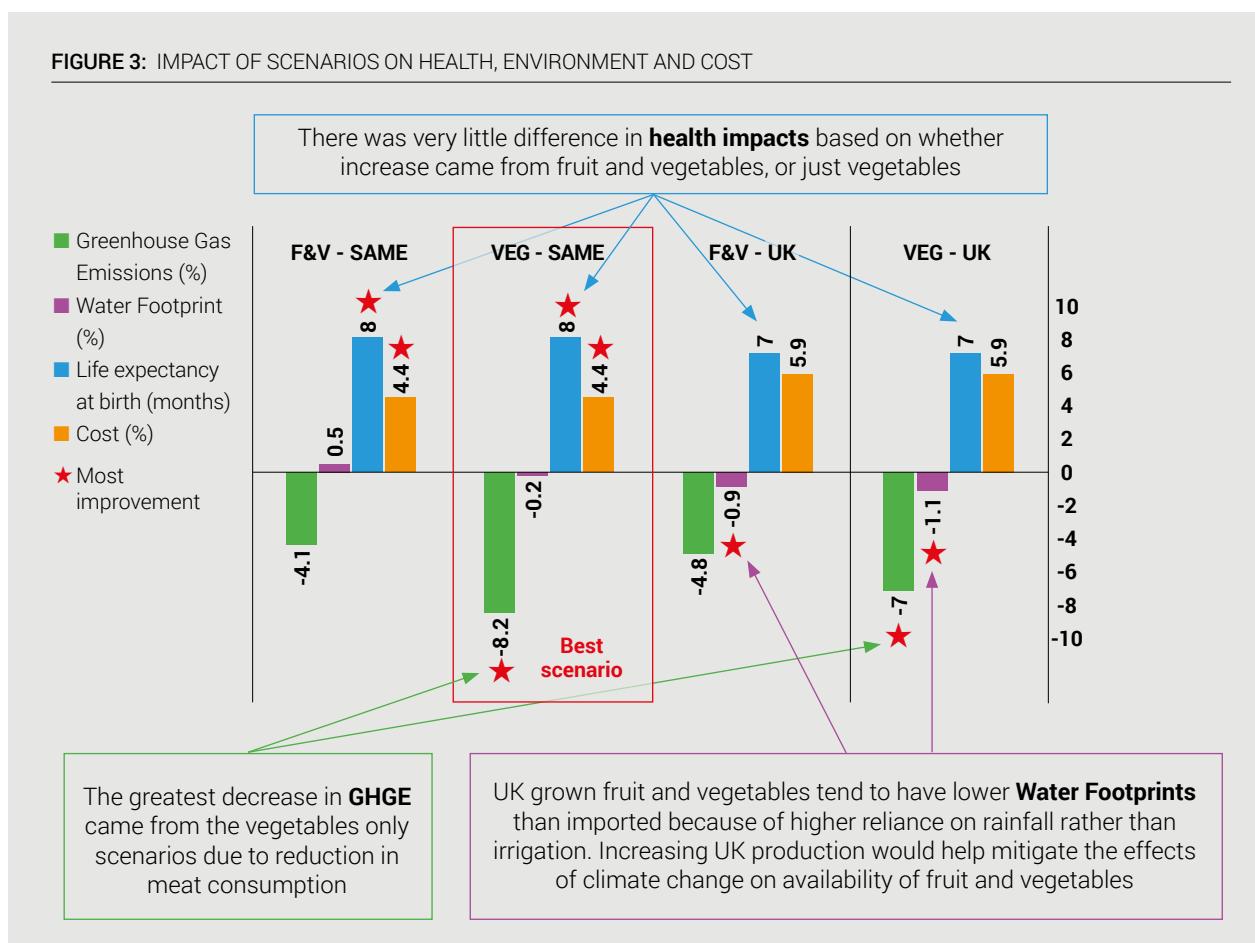
## HEALTH IMPACT

Health effects are measured in average life expectancy at birth calculated from changes in risk of dying from ischemic heart disease, ischemic stroke, type 2 diabetes and some cancers due to change in diet. In all scenarios, life expectancy at birth in the UK increases by seven to eight months.

## COST

But these environmental and health gains come at a financial cost. The cost of diets would be 4.4-5.9% higher than now, rising from the current cost of £6.78 per person a day to between £7.12 and £7.24 per day. People on a low income already struggle to afford to eat enough fruit and vegetables<sup>13</sup>. Comprehensive policy interventions are required to make consuming more fruit and vegetables affordable for lower income citizens.

FIGURE 3: IMPACT OF SCENARIOS ON HEALTH, ENVIRONMENT AND COST





## MORE IMPORT RELIANCE OR MORE UK GROWN?

Meeting increases in consumption with UK production would deliver greatest Water Footprint reduction with similar life expectancy gains and slightly smaller GHGE reduction.

## FRUIT AND VEGETABLES OR JUST VEGETABLES?

Scenarios that have increased consumption of vegetables rather than both fruit and vegetables have better environmental outcomes but similar health outcomes.

## BEST SCENARIO: VEGETABLES SAME

The best outcomes in terms of life expectancy (+8 months) and GHGE reduction (-8.2%) come from the *Vegetables Same* scenario, where the extra consumption to five-a-day comes from the same sorts of vegetables imported and grown currently. Although this does not have the best Water Footprint reduction, there is only a small difference - the *Vegetables UK* scenario is the best for Water Footprint, reducing the Water Footprint by 1.0% compared to 0.2%.



## OVERALL IMPACT ON NATIONAL TARGETS

### 1. How much could different scenarios help efforts to increase healthy life expectancy which the NHS has committed to?

The NHS Long-term Plan is for each person in the UK to gain five years of extra healthy life expectancy by 2035<sup>1</sup>. Increasing consumption of fruit and vegetables to five-a-day would contribute seven to eight months (13%) to this target. Increasing consumption to seven a day, it is estimated, would contribute nearly a year (18%).

### 2. How much could different scenarios help with the UK's carbon budget?

The Climate Change Committee says GHGEs from agriculture, land use and peatlands need to reduce from 58 MtCO2e to 21 MtCO2e by 2050. The scenarios in this briefing would decrease domestic GHGEs by 3.7-11.5 MtCO2eq, and decrease imported GHGEs by 0.6-4.5 MtCO2eq (apart from the Fruit and Vegetable Same scenario that would increase imported GHGEs by 0.7 MtCO2eq). They could therefore contribute 10-31% to this domestic target.

### 3. Help with resilience to climate change?

Globally, around 70% of available fresh water is used in agriculture, and much of it comes from unsustainable sources. Growing fruit and vegetables in areas which have plentiful and relatively reliable rainfall could be a way to reduce dependence on dwindling water resources and increase resilience to future climate change. The UK scenarios identified here would marginally reduce Water Footprints by 0.02-0.1 km<sup>3</sup> per year.



# New threats to UK fruit and vegetable production and consumption

## CORONAVIRUS PANDEMIC IMPACTS

The forced closure of the hospitality sector during the coronavirus pandemic meant that we purchased the vast majority of our fruit and vegetables from shops rather than eating out. Retailers saw a 14% increase in fruit and vegetable sales<sup>6</sup>, and there was an 111% increase in demand for UK fruit and vegetable box schemes<sup>7</sup>. We don't yet know if this resulted in net increase or decrease in consumption. However, the economic impact of the crisis on millions of households is placing new pressures on food budgets, and food insecurity more than doubled during lockdown<sup>8</sup>. In the first week of lockdown, 45% of households were worried about getting enough fruit and vegetables<sup>9</sup>.

The coronavirus pandemic has also highlighted the dependence of UK producers on seasonal workers from the EU – previously, only an estimated 1% of seasonal workers were resident in the UK<sup>10</sup>. Travel restrictions affecting these workers resulted in an emergency UK recruitment drive, 'Pick for Britain'<sup>11</sup>, backed by government. The pandemic has increased the costs of production for all fruit and vegetable growers<sup>12</sup>, most significantly from

a rise in employment costs of up to 15%. On top of this, businesses have been less able to make investments, meaning that future planting could face a downturn.

## BREXIT CONSIDERATIONS – WHAT ADDED ISSUES COULD A NO DEAL BREXIT BRING?

### 1. Labour and cost increases to UK production

At the end of the Brexit transition period in December 2020, freedom of movement between the UK and the EU will cease. A seasonal workers scheme pilot has been agreed but this covers only 10,000 labourers. The estimated seasonal labour requirement is 70,000-80,000 workers<sup>12</sup>. If an expansion of this scheme is not agreed in time, the sector is likely to face an even more challenging season and its ability to increase production will be limited. For many growers, employment is their most significant cost, accounting for 40-70% of all costs<sup>12</sup>, so factors which affect the availability of skilled labour are likely to significantly increase costs.

### 2. Price increases

The poorest 20% of UK households already need to spend 39% of their disposable income on food to meet Eatwell Guide costs, compared to just 8% for the richest 20%. The mean price of fruit and vegetables has slightly increased over the last two years (£9.39 per 1,000 kilocalories in 2019 – up from £8.88 in 2017)<sup>13</sup>. A no deal Brexit could further increase the cost of imported as well as home produced fruit and vegetables. Price inflation will

be increased by new tariffs on imports from EU countries<sup>14</sup>. Research published in 2017 shows that the implications of shifting to the World Trade Organisation's Most Favoured Nation tariffs would add to this price inflation by a further 3.1% for fruit and 4.0% for vegetables<sup>15</sup>.

Food price is a major determinant of food choice and price rises are likely to drive down consumption of fruit and vegetables, particularly in low income groups which already have the lowest intake of all.



# Conclusion

Increasing consumption of fruit and vegetables to five-a-day by replacing some sugary snacks and meat results in better environmental and health outcomes overall in all scenarios. The best pathway to five-a-day in terms of life expectancy and carbon footprint reduction is to increase vegetable intake (rather than fruit and vegetables), and for these to come from the same sorts of vegetables currently imported and home grown. We therefore need to facilitate increased vegetable production in the UK, as well as drive up demand to support people to eat five-a-day in a sustainable way.

However, all scenarios of increasing intake to five-a-day lead to higher costs for citizens. Covid-19 and a No-deal Brexit may also lead to higher costs of fruit and vegetables. Policy interventions are needed to make it easier for everyone to be able to eat more fruit and vegetables to benefit their health and the health of our planet. The fourth brief in this series will make recommendations on the actions needed by policy makers on how to achieve this.



**IN THE NEXT BRIEF, WE WILL LOOK AT LAND USE IMPLICATIONS AND BIODIVERSITY IMPACTS FOR DIFFERENT PRODUCTION SCENARIOS.**



## References

1. NHS Long Term Plan » Online version of the NHS Long Term Plan. <https://www.longtermplan.nhs.uk/online-version/>. Accessed July 10, 2020.
2. SHEFS. Is the UK's Supply of Fruit and Vegetables Future Proof?; 2020. [https://shefsglobal.lshtm.ac.uk/wp-content/uploads/2020/06/SHEFS\\_Fruit-and-Veg-Briefing-1-FINAL.pdf](https://shefsglobal.lshtm.ac.uk/wp-content/uploads/2020/06/SHEFS_Fruit-and-Veg-Briefing-1-FINAL.pdf).
3. Food Foundation. VEG FACTS 2020 IN BRIEF; 2020. [www.foodfoundation.org.uk](http://www.foodfoundation.org.uk). Accessed June 22, 2020.
4. DEFRA. Horticulture Statistics 2019.; 2020. <https://www.gov.uk/government/statistics/latest-horticulture-statistics>.
5. GOV.UK. UK becomes first major economy to pass net zero emissions law. [https://www.gov.uk/government/news/uk-becomes-first-major-economy-to-pass-netzero-emissions-law](https://www.gov.uk/government/news/uk-becomes-first-major-economy-to-pass-net-zero-emissions-law). Published 2019. Accessed June 30, 2020.
6. Food Foundation. Empty supermarkets shelves as people buy more fruit and veg before the imminent lockdown. [https://foodfoundation.org.uk/fruit\\_and\\_veg\\_affect/empty-supermarkets-shelves-as-people-buy-more-fruit-and-veg-before-the-imminent-lockdown-2/](https://foodfoundation.org.uk/fruit_and_veg_affect/empty-supermarkets-shelves-as-people-buy-more-fruit-and-veg-before-the-imminent-lockdown-2/). Published 2020. Accessed July 10, 2020.
7. Wheeler A. COVID-19 UK Veg Box Report Published 28th April 2020 Food Foundation Dr Amber Wheeler; 2020.
8. Food Foundation. NEW FOOD FOUNDATION DATA: food insecurity and debt are the new reality under lockdown.
9. Food Foundation unpublished survey data. 2020.
10. ONS. Family Spending - 2014: Reference tables - Office for National Statistics. <http://www.ons.gov.uk/peoplepopulationandcommunity/personalandhouseholdfinances/incomeandwealth/compendium/familyspending/2014-12-02/familyspending2014referencetables>. Published 2014.
11. Pick For Britain. <https://pickforbritain.org.uk/>. Accessed July 10, 2020.
12. Andersons. The Potential Implications of Covid-19 for the Costs of Production of UK Fruit & Vegetables in 2020.; 2020. <https://www.nfuonline.com/nfu-online/sectors/horticulture/implications-of-covid-19-on-cost-of-production-for-uk-fruit-and-veg-report/>.
13. Food Foundation. Broken Plate 2020 pre-publication.
14. Check UK trade tariffs from 1 January 2021 - GOV.UK. <https://www.gov.uk/check-tariffs-1-january-2021>. Accessed July 10, 2020.
15. Clarke, S., Serwicka, I., & Winters LA. Will Brexit Raise the Cost of Living? Natl Inst Econ Rev. 2017;242(1):R37-R50.
16. Public Health England. The Eatwell Guide. London; 2016.
17. Eustachio Colombo ,P., Milner ,J., Scheelbeek, P., Taylor, A., Parlesak, A., Kastner, T., Nicholas, O., Schafer Elinder, L., Dangour, A.D., and Green, R. Health impacts and environmental footprints of meeting the "5-a-day" target for fruit and vegetables in the UK: modelling study [forthcoming].



SHEFS

# FRUIT AND VEGETABLES POLICY BRIEF SERIES

[shefsglobal.lshtm.ac.uk](http://shefsglobal.lshtm.ac.uk)  
 @SHEFSGlobal

With special  
thanks to

