



SHEFS

**FRUIT AND
VEGETABLES
POLICY BRIEF
SERIES**

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POLICY BRIEF 1:

Is the UK's supply of fruit
and vegetables future proof?

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thanks to



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.

BRIEFING 1:

Examines the resilience of the UK's fruit and veg supply in relation to current and recommended consumption

BRIEFING 2:

Examines the health and environmental implications of eating more fruit and veg in the UK

BRIEFING 3:

Explores the potential environmental implications of growing more fruit and veg in the UK

BRIEFING 4:

Proposes policy options for increasing fruit and veg production and consumption



POLICY BRIEF 1:

Is the UK's supply of fruit and vegetables future proof?

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SUMMARY

- The UK's supply of fruit and vegetables and the quantity being eaten is far below the requirements needed to be healthy.
- Most fruit and vegetables on the UK market is not produced in this country. The UK supply of fruit and vegetables has become increasingly reliant on imports, particularly from countries that are vulnerable to climate change and water scarcity.
- Projected environmental changes will affect fruit and vegetables production. Global fruit and vegetable supply will become increasingly threatened without substantial adaptation strategies, especially in tropical countries.
- In order to ensure a resilient supply of fruit and vegetables, policy changes are needed to promote changes in production, trade and consumption.



This briefing is based on the findings in the pre-print paper "Resilience of UK fruit and vegetable supply: environmental threats to the supply of "5-a-day" by SHEFS researchers.



Fruit and vegetable supply compared to current and recommended consumption

We need to increase the amount of fruit and veg we eat to meet recommendations for health

WHY ARE FRUIT AND VEGETABLES IMPORTANT FOR HEALTH?

Fruit and vegetables are high in vitamins and minerals (micronutrients) and fibre, making them a key part of a healthy diet. Insufficient intake of micronutrients can increase the risk of several non-communicable diseases such as heart disease, stroke, and some types of cancers. Globally, 3.9 million deaths per year are attributable to low fruit or vegetable consumption¹, and in the UK at least 31,000 premature deaths could be averted per year if everyone ate enough fruit and vegetables². In order to maximise good health, it is therefore essential that everyone is able to afford and access sufficient quantity and variety of fruit and vegetables.

WHAT IS CURRENT UK FRUIT AND VEGETABLE CONSUMPTION?

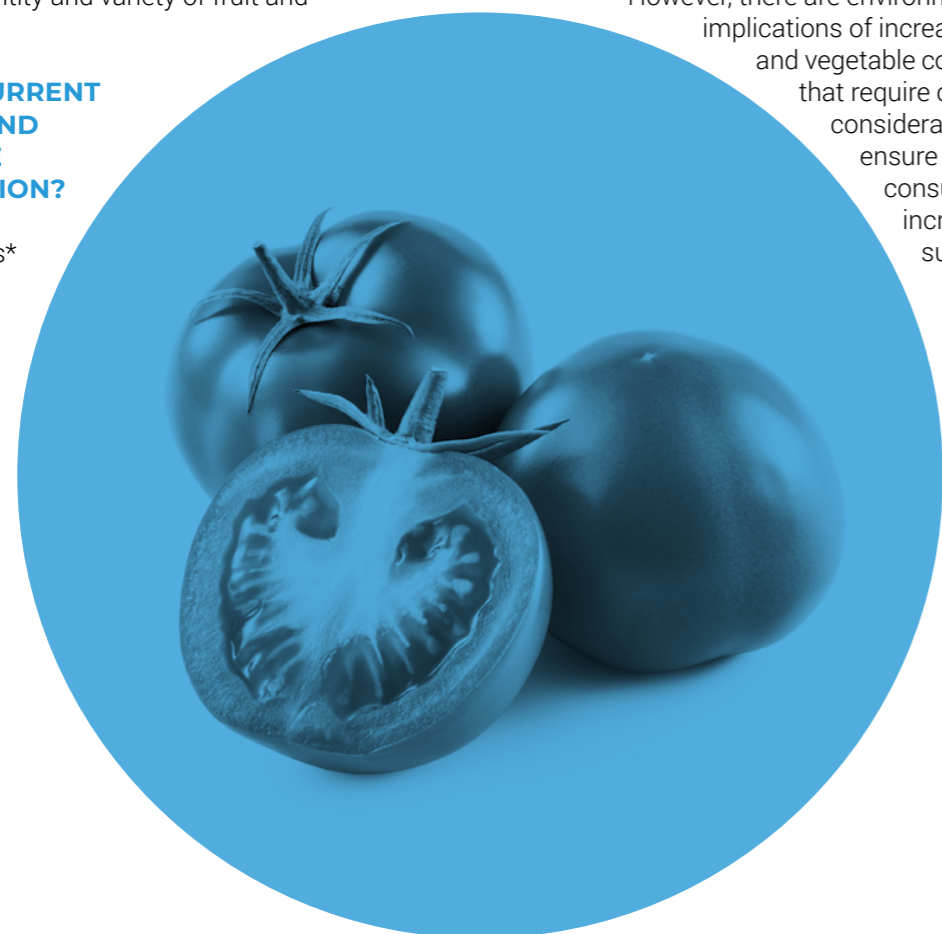
In the UK, on average adults*

eat just under four portions of fruit and vegetables per day³, which is substantially below the government dietary recommendations, captured in the Eatwell Guide, of about seven portions per day⁴. Consumption of fruit and vegetables shows strong, wealth-related differences – the highest income groups consume about 1.5 portions per day more than the lowest⁵.

WHAT CHANGES ARE NEEDED TO UK FRUIT AND VEGETABLE CONSUMPTION TO MEET HEALTH GOALS?

In order to meet dietary recommendations, promote health, and prevent disease, we need to increase the amount of fruit and vegetables we consume on average by 86% in the UK. Action must be taken to help people to change their eating habits and address the barriers that prevent people from being able to meet the recommendations.

However, there are environmental implications of increasing fruit and vegetable consumption that require careful consideration to ensure that consumption increases are sustainable.



*aged 19-64 years old



Fruit and vegetable supply is too low for everyone to meet dietary recommendations

WHAT IS THE CURRENT UK SUPPLY OF FRUIT AND VEGETABLES?

The UK currently domestically produces 35% of the total supply of fruit and vegetables (3.1 million MT/year) with net imports making up the other 65% (5.7 million MT/year). Total supply is below the amount required for everyone to meet recommendations (Figure 1), and that is before accounting for food waste: an estimated 23% of fruit and vegetables is wasted after leaving the farm^{6,7}. If everyone ate seven portions a day, the fruit and vegetable supply would need to increase by approximately 7.8 million MT/year after taking into account food waste at current levels.

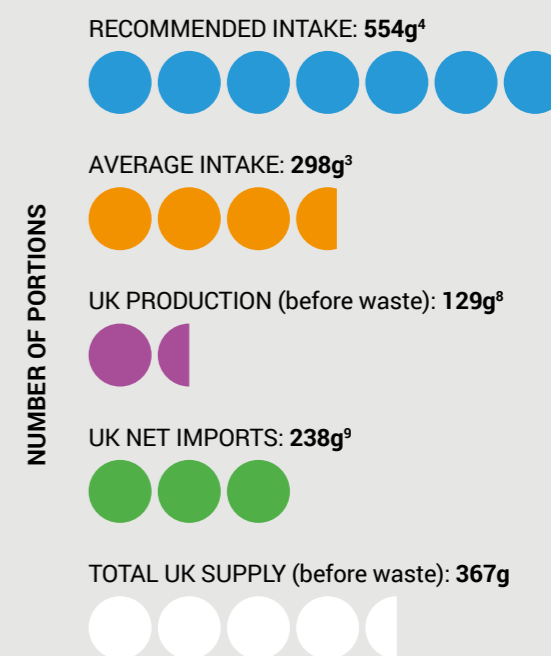
HOW DOES THIS COMPARE TO GLOBAL SUPPLY AND DEMAND?

Global supply of fruit and vegetables is 552g per person, but that is before accounting for food waste. Based on FAO estimates of food waste in different regions, the world only produces 82% of the amount recommended to be consumed (based on the five portions a day recommended by the World Health Organisation)¹⁰. If consumption were optimal there would, therefore, be a need to drive up fruit and vegetable production and supply in the UK and globally.

HOW HAVE FRUIT AND VEGETABLE IMPORTS AND CONSUMPTION CHANGED?

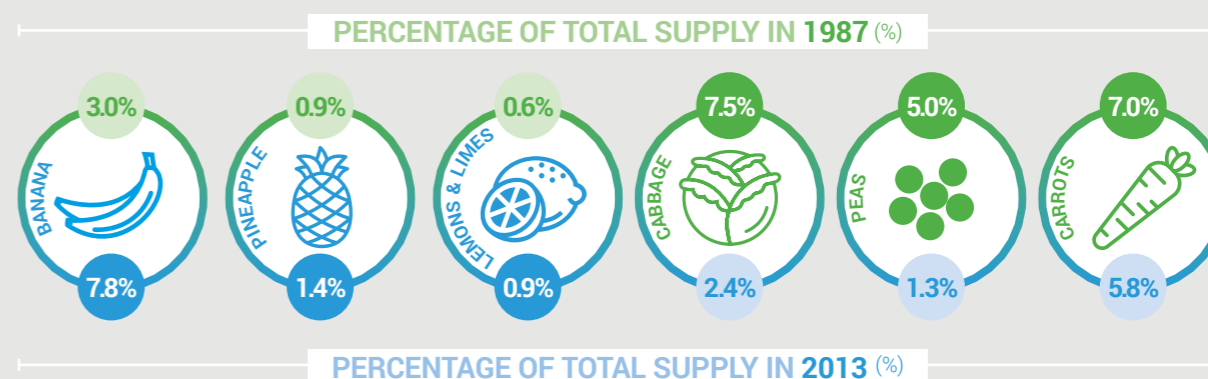
The UK has become increasingly dependent on imports of fruit and vegetables, with contribution from domestic production having decreased by

FIGURE 1: Number of portions of UK fruit and vegetable consumption and supply (per person per day)



48% between 1987 and 2013. International trade has increased the diversity of fruit and vegetable supply giving people more options to choose from and delivering the health benefits of eating a range of fruit and vegetables. Consumption patterns have also changed: for example, consumption of imported tropical fruits has rapidly increased, whilst consumption of some traditional vegetables that can be grown in the UK has declined (Figure 2).

FIGURE 2: Changes in selected fruit and vegetable supply as percentage of total fruit and vegetable supply





Environmental implications of UK fruit and vegetable imports

COUNTRIES OF ORIGIN OF IMPORTED FRUIT AND VEGETABLES

A large proportion of total UK fruit and vegetable supply comes from Europe and in particular from Spain (providing >10% of the total UK fruit and vegetable supply) and Italy (providing between 5-10%). In addition to Europe, we also import from many other countries across the world.

UK FRUIT AND VEGETABLE IMPORTS FROM WATER SCARCE COUNTRIES

The supply of fruit and vegetables from countries likely to face high to extremely high water scarcity in the near future (2040) has increased from 41% to 54% over the period 1987 to 2013. 76% of the freshwater used in the production of fruit and vegetables supplied to the UK is withdrawn elsewhere including from countries with high risk of water scarcity such as Spain, South Africa, Chile, Morocco and Israel (Figure 3). In countries where climate change has led to increasing unreliability of rainfall, more ground and surface water is being used to grow crops.

This may lead to increased water scarcity along with increased competition for water resources from

other sectors including industry and supply direct to the population.

UK FRUIT AND VEGETABLE IMPORTS FROM CLIMATE VULNERABLE COUNTRIES

Some countries are considered to be more vulnerable to climate change than others. The Notre Dame Global Adaption Initiative (NDGAIN) country index defines climate vulnerable countries based on indicators of vulnerability and readiness to adapt to climate disruptions. The UK is classified as 'least vulnerable'. In 2013, 32% of UK fruit and vegetable imports were from areas defined as climate vulnerable, a 60% increase since 1987. Figure 4 shows the climate vulnerability classification of the countries we are most reliant on for the UK supply of fruit and vegetables.

Eight out of twenty-one of these countries are classified as moderately or highly vulnerable to climate change. Graph 1 shows what proportion of different types of fruit and vegetables we import from these climate vulnerable countries. For example, the majority of tropical fruits originate in climate vulnerable countries, while leafy and root vegetables are largely from countries with low vulnerability.



GRAPH 1: Percentage of total fruit and vegetable supply from imports from climate vulnerable countries

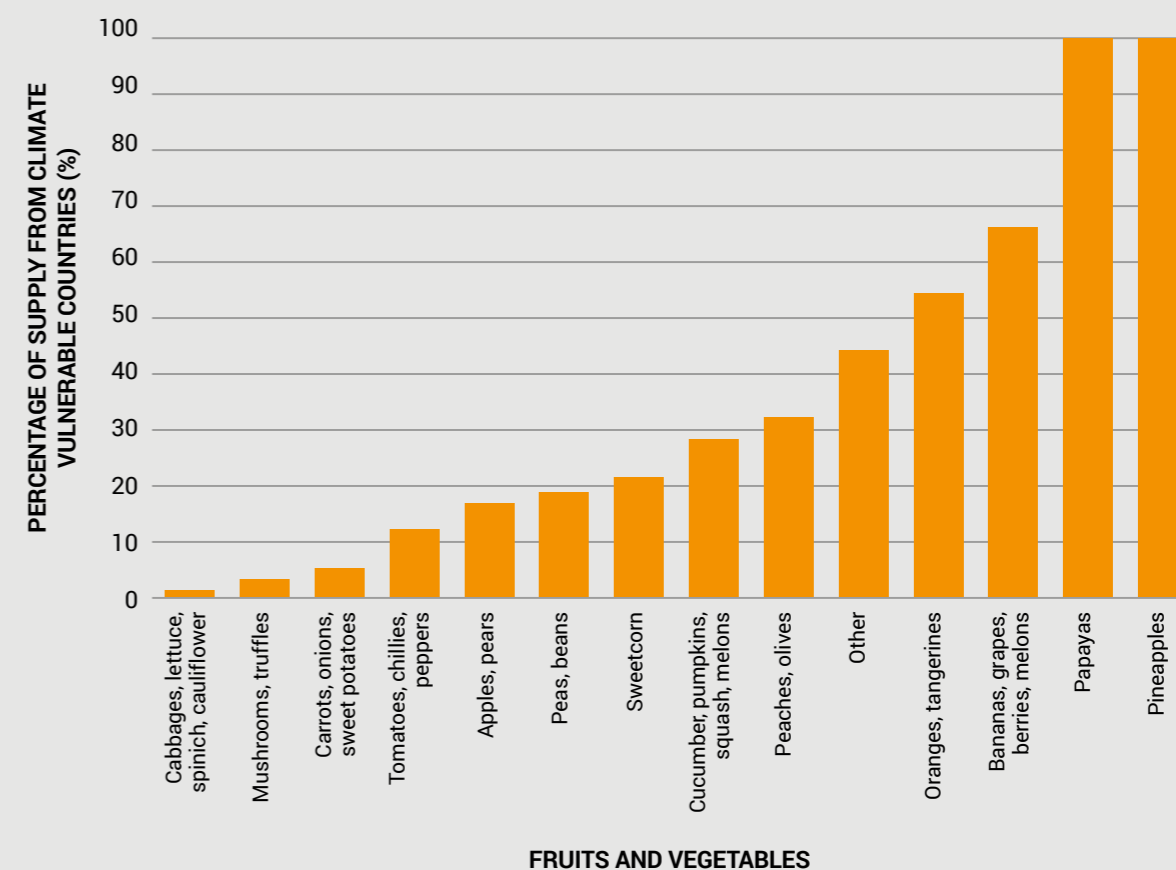


FIGURE 3: Water Stress of countries (ratio of total water withdrawals to total renewable supply, World Resources Institute) providing high proportion of UK fruit and veg supply (>1% of total supply)

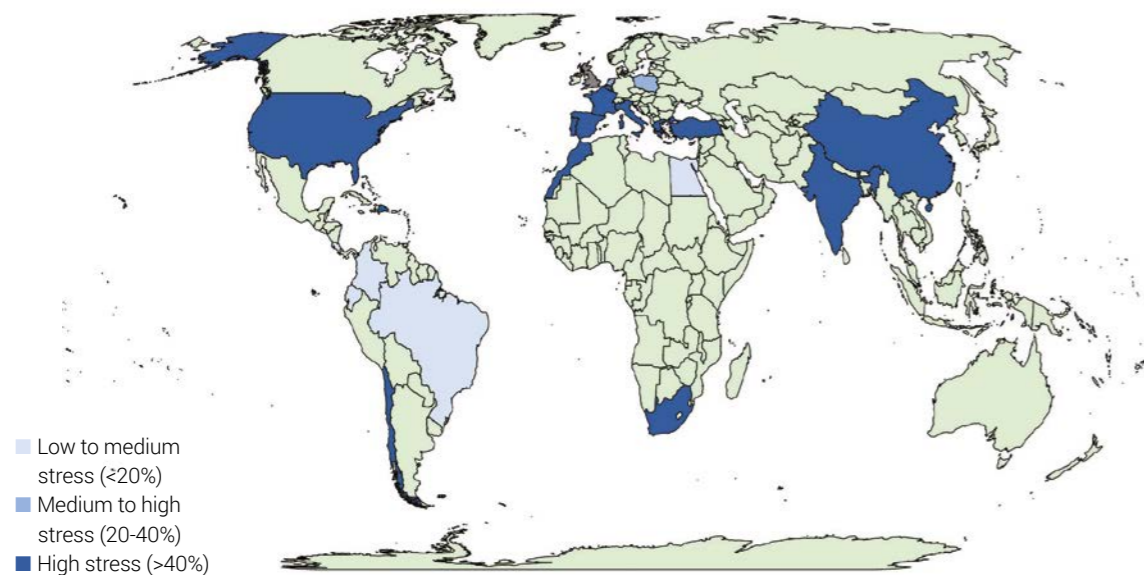
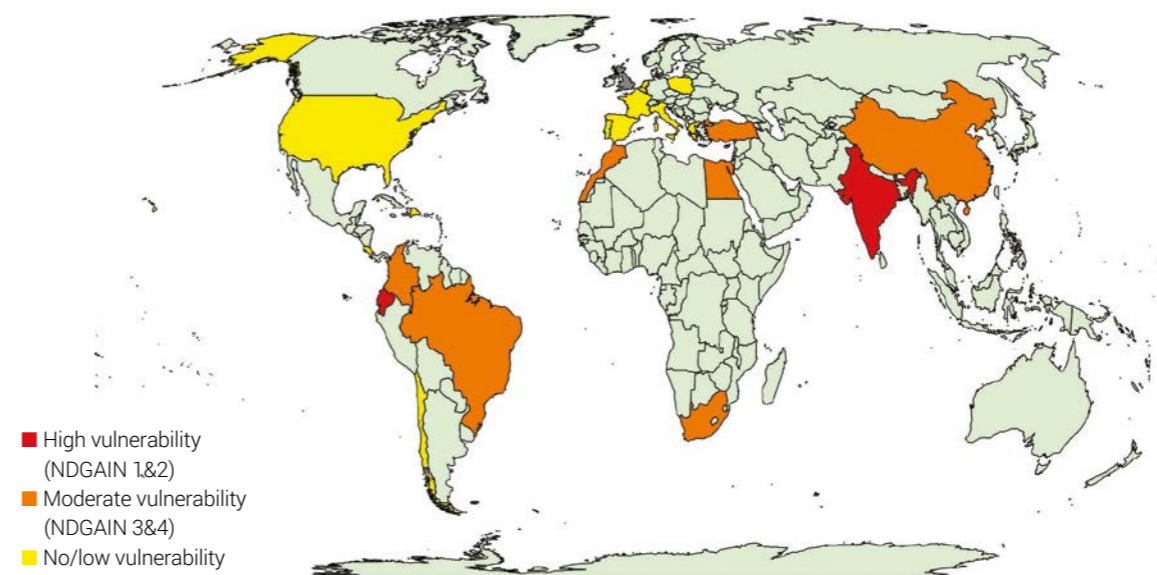


FIGURE 4: Climate vulnerability of countries (based on the Notre Dame Global Adaption Initiative (NDGAIN) country index) providing high proportion of UK fruit and veg supply (>1% of total supply)





EXPECTED CLIMATE AND ENVIRONMENTAL CHANGES WILL AFFECT GLOBAL PRODUCTION OF FRUIT AND VEGETABLES

Climate changes are expected to become more profound in the future. There are expected to be increases in temperatures and decreases in water availability, as well as other environmental changes.

The number of hot days, minimum and maximum daily temperatures and length of the rainy season all substantially affect the potential to grow certain crops in different places and deliver good yields. In many hot climates a further increase in temperature will reduce yields as it pushes temperatures further above the optimal range for crop growth. Whilst increased carbon dioxide (an important greenhouse gas) in the atmosphere could stimulate faster crop growth, it can also reduce vitamin and mineral concentrations in crops, including fruits and vegetables¹¹. Furthermore, rising temperatures will increase ground-level ozone formation which could reduce crop growth, and can cause visible bruising which reduces market value. Climate change can also increase crop losses and damage due to pests, pathogens, fungi and weeds. Other changes such as land degradation, deforestation, water salinity and biodiversity loss are also expected to increasingly affect global fruit and vegetable production.

Models suggest that climate induced changes to fruit and vegetables availability would be one of the largest drivers of climate-related deaths by 2050¹².

“Climate change can also increase crop losses and damage due to pests, pathogens, fungi and weeds”

WHAT THIS MEANS FOR THE UK

A growing reliance on imported fruit and vegetables, particularly from water scarce and climate vulnerable countries, could jeopardise the resilience of our supply chains. Ongoing climate and environmental changes are already putting increasing pressure on global agricultural production¹³ and are predicted to further threaten fruit and vegetable supply. Declines in yields could result in sudden decreases in availability and potentially strong price fluctuations on the UK market. Of the total fruit and vegetable supply to the UK, 26% is imported from countries that are moderately vulnerable to climate change. Another

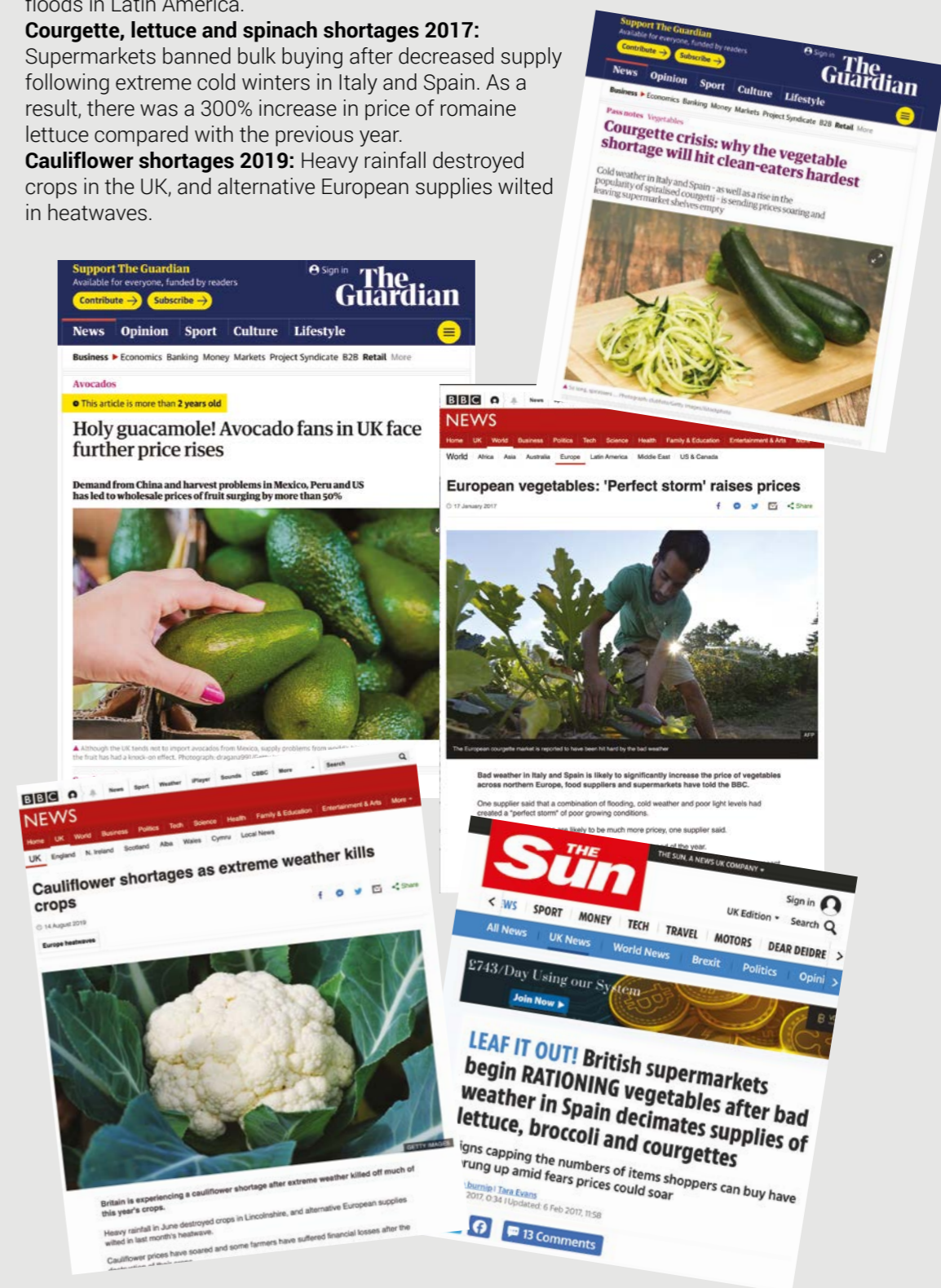
6% is imported from countries that are highly or extremely vulnerable to climate change, and will likely face fruit and vegetable yield losses in the near future, if no action is taken. Climate induced reduction in yield will particularly affect subtropical areas where much of our fruit comes from. Several recent fruit and vegetable shortages demonstrate these effects (Box 1). With average fruit and vegetable intake already below recommended levels, decreased supply and increased price could be highly unfavourable for population health. This would likely have greater impact on lower income households who already have lower consumption.



BOX 1

Examples of shortages of fruit and vegetables in the UK

- **Avocado shortage 2017:** Prices surged more than 50% related to droughts in California and floods in Latin America.
- **Courgette, lettuce and spinach shortages 2017:** Supermarkets banned bulk buying after decreased supply following extreme cold winters in Italy and Spain. As a result, there was a 300% increase in price of romaine lettuce compared with the previous year.
- **Cauliflower shortages 2019:** Heavy rainfall destroyed crops in the UK, and alternative European supplies wilted in heatwaves.





Conclusion

Current supply and demand of UK fruit and vegetables is insufficient to meet requirements for health, and climate change will further threaten supply in the future due to our current reliance on imports from climate vulnerable countries.

Future briefs in this series will explore the health and environmental impacts of increasing fruit and vegetable production and consumption, and will make recommendations on the policy changes needed to promote changes in consumption, production and trade to ensure resilience of the UK fruit and vegetable supply.



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