Member Lecture – 22 February 2024

Food sustainability
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Questions answered post-lecture

Q1 We import tons of vegetables, but meat can be raised by local farmers. Meat production is always put down but there are massive airmiles associated with fruit and veg? Are there comparators between these food types?

Home-grown produce constitutes the largest source of food for the UK, accounting for approximately 60% of its domestic food consumption by economic value. This includes grains, meat, dairy, and eggs. However, it's essential to note that the UK produces over 50% of the vegetables consumed domestically, while only 16**%** of fruit is grown within its borders[1]. The value of UK agricultural production was £25.8 billion in 2014, reflecting the significance of the agriculture and food manufacturing sectors.[1] As a general guideline, vegetables imported even from distant parts of the globe are often more sustainable than local meat products[2].

According to various sources, meat and dairy products tend to have a higher carbon footprint, water footprint, and land use than plant-based foods. However, the impact also depends on how the food is produced, transported, and consumed. For example, some vegetables may have a lower impact if they are grown locally and seasonally, rather than imported from far away or grown in greenhouses. [1,2,3,4] One way to compare the impact of different food types is to use a climate change food calculator, such as the one developed by the BBC. This tool allows you to select various food items and see how much greenhouse gas emissions they generate per serving, per year, or per kilogram. You can also see how your diet compares to the average diet in your country or region.[5] Here are some examples of the emissions generated by different food types, according to the BBC calculator:

- One serving of beef (85g) produces 6.04 kg of CO2 equivalent, which is equivalent to driving 19.6 km in a car or charging 732 smartphones.
- One serving of chicken (100g) produces 0.69 kg of CO2 equivalent, which is equivalent to driving 2.2 km in a car or charging 84 smartphones.
- One serving of cheese (30g) produces 0.59 kg of CO2 equivalent, which is equivalent to driving 1.9 km in a car or charging 72 smartphones.
- One serving of rice (150g) produces 0.18 kg of CO2 equivalent, which is equivalent to driving 0.6 km in a car or charging 22 smartphones.

- One serving of potatoes (200g) produces 0.08 kg of CO2 equivalent, which is equivalent to driving 0.3 km in a car or charging 10 smartphones.
- One serving of tomatoes (80g) produces 0.05 kg of CO2 equivalent, which is equivalent to driving 0.2 km in a car or charging 6 smartphones.

As you can see, meat and cheese have a much higher impact than rice, potatoes, and tomatoes. However, the impact of vegetables may vary depending on the season and the origin. For example, tomatoes grown in a heated greenhouse in winter may have a higher impact than tomatoes grown in a field in summer.[678]

Source(s)
1. United Kingdom Food Security Report 2021: Theme 2: UK Food Supply ...
2. British food and farming at a glance - GOV.UK
3. Climate change food calculator: What's your diet's carbon footprint? - BBC
4. Environmental Impact of Meat: The Best and Worst Options for the Planet ...
5. Less meat is nearly always better than sustainable meat, to reduce your ...
6. Climate impact of meat, vegetarian and vegan diets
7. Climate change food calculator: What's your diet's carbon footprint? - BBC
8. Interactive: What is the climate impact of eating meat and dairy?

Q2 What percentage difference (of food waste) can be made by individuals compared to what could be done if the food industry was better regulated?

By making conscious choices, individuals can reduce waste. Meal planning can avoid overbuying and wasting perishable items. Storage practices enable safely stored food to extend its shelf life. Portion control allows this by serving appropriate portions to minimise leftovers. Understanding expiration dates by knowing that use-by and sell-by dates are not always strict deadlines; you should assess food quality before discarding. Donating excess food by sharing surplus food with local food banks or shelters. While individual efforts can have influence, the overall impact depends on collective action. [1234]

When looking at this issue for Food Industry Regulation, there is a requirement for better instruction which can significantly reduce food waste at various stages. Production regulations can encourage efficient farming practices, minimising losses due to crop damage or spoilage. Processing and distribution having strict guidelines can ensure safe handling, storage, and transportation. Retail with its regulations can prevent overstocking and incentivise donations of unsold but edible food. Labelling can reduce confusion and prevent premature disposal. Supply chain management with improved coordination can minimise waste during distribution. Industry-wide efforts have the potential to make a substantial impact.

Individuals by adopting mindful practices, can potentially reduce household food waste by 20-30% or more [2]. If the food industry were better regulated, the impact could be even greater, potentially reducing waste at every stage of production, distribution, and consumption.

Source(s)

1. Food Waste - Harvard T.H. Chan School of Public Health
2. General food law | Food Standards Agency
3. Key regulations | Food Standards Agency
4. Food and feed law: legislation update June 2023 - GOV.UK

Q3 Deforestation and land usage are cited as reasons to go vegan, but what about the impact of pesticides and herbicides used in ever larger quantities and the effects of plastic packaging of veg?

Pesticides and herbicides have an impact on wildlife. These chemicals can drift outside the intended spraying area, affecting non-target organisms. Soil and water contamination from pesticides can pollute the land and water sources, affecting their quality and harming soil-living organisms. Runoff from fields can carry residues into watercourses, affecting aquatic ecosystems. Health Risks from pesticide exposure can cause acute and chronic wellbeing problems for humans, animals, and aquatic life. Balancing considerations and minimising pesticide use is crucial, it is essential to offset this with the need for efficient food production and reducing food spoilage [123456].

Plastic Packaging and their carbon footprint show that plastics have a significant carbon footprint due to their production, use, and disposal. They contribute approximately 1.8 billion tonnes of carbon emissions annually. The longevity of plastics show that they take hundreds of years to break down, and their persistence in the environment poses challenges. Plastic waste affects marine wildlife, damages soil, and poisons groundwater. Plastic pollution harms biodiversity, both on land and in oceans. It affects birds, aquatic animals, and mammals. Plastic packaging can block waterways, clog sewers, and create breeding grounds for disease-carrying insects. Recycling and repurposing plastics can reduce their environmental impact. However, exploring alternatives to plastic packaging is crucial for sustainability [1234].

Veganism, vegetarianism, and environmental choices show that deforestation and land usage are critical considerations. It is essential to recognise the broader impact of our choices. Using a holistic approach, the aim is to reduce harm to animals and the environment. Considering both pesticide use, and plastic waste is part of this comprehensive approach, consumers can make informed choices by supporting sustainable practices, advocating for reduced pesticide use, and opting for eco-friendly packaging.[56789]

Source(s)

1. Effects of pesticides on our wildlife | Policy and insight
2. Pesticides: Impacts on Agriculture Productivity, Environment, and ...
3. Climate impact of plastics | McKinsey
4. Everything you need to know about plastic pollution
5. How does plastic waste affect the environment? - EHN
6. Why Is Plastic Packaging Bad for the Environment? - noissue
7. Plastic packaging | WRAP
8. Worldwide pesticide usage and its impacts on ecosystem
9. Pesticide use around world almost doubles since 1990, report finds

Q4 Some products come with a choice of packaging - Coke could come in glass or plastic bottles or cans. Is there data on the 'nicest' forms of packaging from the point of initial resource consumption versus the recycling possibilities?

When looking the initial resource consumption and recycling possibilities we must consider reusable vs. single-use packaging. This has been shown in a comprehensive study by Zero Waste Europe.[1] Regarding reusable packaging, most studies favour reusable packaging as the most envi-

ronmentally friendly way. Reusable containers, such as glass bottles or durable plastic containers, tend to perform better in terms of resource consumption and waste reduction.[1] Single-use options (like plastic bottles or cans) contribute significantly to municipal solid waste. While recycling is essential, it is not a complete solution. Reuse systems offer a more sustainable alternative.[1]

There are many factors Influencing the packaging impact which play a crucial role. Transport and reusable packaging often perform better when considering transportation impacts. The initial production of reusable containers may require more resources, but their extended lifespan offsets this. The more times a container can be reused, the better its overall impact. End-of-life and proper recycling or disposal matters for both single-use and reusable options.[12] When looking at bottles, glass is infinitely recyclable, but its initial production requires more energy than plastic. Reusing glass bottles significantly reduces their overall impact. Plastic bottles have a lower initial production impact but suffer from poor recycling rates. Improving plastic recycling is crucial .Aluminium cans are highly recyclable, but their production involves significant energy use. Reusing aluminium cans can enhance their sustainability. Deposit Return Schemes (DRS) are where consumers return containers for a refund, encourage reuse. They have been successful in some regions. Pooling Systems, sharing containers (like milk bottles) can reduce waste and resource consumption. Standardisation and the use of common sizes and shapes help reuse and recycling. [12]

While single-use packaging may seem convenient, reusable options (especially glass bottles and durable containers) have a lower overall environmental impact. Supporting reuse systems and advocating for better recycling practices are essential steps toward a more sustainable packaging future.

Source(s)

1. REUSABLE VS SINGLE-USE A review of PACKAGING - Zero Waste Europe
2. Reusable containers aren’t always better for the environment than ...

Q5 Why don’t children learn about nutrition / basic cooking and food at school anymore?

The topic of nutrition and basic cooking skills in schools is essential for children's well-being and lifelong habits and may be lacking in some areas. Where there is an increased focus on academics, many educational systems prioritise subjects like maths, science, language, and arts. As a result, non-core subjects, including nutrition and cooking, may receive less attention. In addition, there is standardised testing pressure. Schools often face pressure to improve test scores, leading them to give more time to tested subjects. Budget constraints causes problems with resource allocation. Limited budgets may force schools to prioritise core subjects over extracurricular activities or specialised programs. Also, there are issues with facilities and equipment. Setting up cooking classes requires proper facilities, equipment, and trained staff, which can strain school budgets. Unfortunately, there is an overall lack of qualified teachers with specialised knowledge. Teaching nutrition and cooking effectively requires educators with ability in these areas. Finding qualified teachers can be challenging. Teacher training schools may not provide adequate training for teachers to deliver effective nutrition and cooking education. Parental responsibility has a role in this, with a shift in accountability. Some argue that teaching nutrition and cooking is primarily a parental responsibility. Schools focus on academics, while parents should impart life skills at

home. Varied home environments also must be considered as children come from diverse backgrounds, and their exposure to cooking and nutrition at home differs significantly. There is a continuous changing of food culture. Looking at fast food and convenience, the prevalence of this type of food has shifted priorities away from home cooking and nutrition education. Processed foods reduce the need for cooking skills. Health and well-being impacts of this are rising childhood obesity rates which highlight the urgency of nutrition education. Schools can play a crucial role in promoting healthy eating habits. Understanding nutrition early can prevent health issues later in life. [12345]

Some organisations and individuals advocate for reintroducing nutrition and cooking education into school curricula. Government policymakers can influence educational priorities by emphasising the importance of life skills, including cooking and nutrition.

Source(s)

1. School education - British Nutrition Foundation
2. Cooking and nutrition in primary schools | TheSchoolRun
3. How Children Develop Unhealthy Food Preferences
4. Brain Food: Exploring the Connections Between Nutrition and Learning ...
5. Should all school kids in England learn cooking? - BBC Newsround

Q6 Singapore has limited space and grows using vertical hydroponic systems – can we copy this?

Vertical hydroponic systems have gained popularity due to their high efficiency and space-saving benefits. They are a type of vertical farming where crops are grown in stacked layers. These systems use hydroponic techniques, which means plants grow without soil, receiving nutrients directly through water. In Singapore, Sky Green Farms pioneered vertical hydroponics. Their facility consists of over 100 towers, each 9 metres tall, growing vegetables using sunlight and stored rainwater [1.] These systems are efficient, using significantly less water compared to traditional soil-based farming.

All vertical hydroponics systems are active hydroponics. They have a submersible pump in a reservoir which delivers water and nutrients through tubes and valves. In tower systems, water is pumped to the top of a large cylindrical PVC pipe with indentations along its side. Plants are placed in these indentations, allowing their roots to access water and nutrients. The tower design saves space and promotes efficient nutrient delivery, resulting in higher yields. There has been a surge in interest in vertical hydroponics and urban farming in the UK. Companies like Vertical Horizon Hydroponics offer sustainable grow towers made from premium recycled materials. These towers save water, produce high-quality food, and can be used both domestically and commercially. Other UK-based initiatives include sunlit vertical farms and home hydroponics kits by adapting these systems to local conditions, the UK can benefit from increased yields, reduced water usage, and year-round fresh produce. Singapore's limited space and vertical hydroponics success serve as inspiration, the UK can certainly adopt similar systems to enhance food production sustainably. [123456789]

Source(s)

1. 11 Vertical Hydroponics Systems And Designs For Super Efficiency Freaks!
2. Vertical Horizon Hydroponics Ltd. Sustainable grow towers online UK

3. 9 best home hydroponics kits | The Independent | The Independent
4. ‘It’s not as carbon-hungry’: UK’s largest sunlit vertical farm begins ...
5. Singapore-based Hydroponics Company Launches Turnkey Commercial Farming ...
6. Hydroponics and Urban Farming - Greenology Singapore
7. Hydroponics Singapore - Eco-friendly Vertical Farming by Vegtical Green
8. 6 Best Vertical Hydroponic Systems (2021) - Heavy.com
9. The Best Vertical Hydroponic System for 2023 (Comparison & Alternatives)

Q7 Do we know how many councils don't compost food waste?

The current situation shows that food waste collection has one of the lowest capture rates in England, with only about 10% of waste being recycled. Half of the councils in England offer food waste collection alongside garden waste. However, due to budget constraints, many councils struggle to support or expand food waste collection services. While exact figures for all UK councils may vary, it is estimated that 97% of households in the UK do not compost food waste, even if council collection facilities exist. Figures provided by 326 English local authorities to waste reduction body WRAP for 2018/2019 shows almost half – 160 councils, covering 11.7 million households – do not provide any food waste collections for their residents.[1234] The Environment Act 2021 mandates that recyclable household waste, including food waste, must be collected separately from other household waste. Food waste itself must be collected at least once a week. Local authorities are adapting to these changes by auditing their current arrangements, reviewing contracts, and considering the practical implications of separate food waste collection. Progress is being made, there's still room for improvement in food waste recycling across UK councils. Efforts to enhance food waste collection and composting are crucial for a more sustainable future.

Source(s)

1. Food waste in England - Environment, Food and Rural Affairs Committee ...
2. The UK does not compost enough - 97% don't - Business Waste
3. The case for keeping co-mingled collections while boosting food waste ...
4. Changes to food waste collection and recycling: What actions do ...

Q8 What pressure can be put onto local authorities to provide food waste bins to those living in flats? Our council won't provide these to flat-dwellers.

Encouraging UK local authorities to provide food waste bins for residents living in flats involves a combination of strategies. Raising awareness among residents about the benefits of food waste recycling and the impact on the environment. Encouraging community members to advocate for food waste collection services by engaging with local authorities, attending council meetings, and taking part in campaigns. Collaborating with environmental organisations such as WRAP (Waste and Resources Action Programme) to promote food waste reduction and recycling initiatives. These organisations can provide ability, resources, and guidance to local authorities on implementing effective food waste collection systems. The Environment Act 2021 mandates separate collection of recyclable household waste, including food waste. Local authorities must follow this requirement. Residents can advocate for prompt implementation of these regulations and hold authorities accountable for their obligations.[1] Educational programs within communities, emphasising the importance of food waste recycling. Clear instructions to residents on how to use food waste caddies, liners, and communal is paramount. [2] Financial incentives can be explored

for local authorities to invest in food waste collection infrastructure. Highlight long-term cost savings associated with reduced landfill waste and increased recycling rates.

Engagement with waste management companies to design efficient and cost-effective food waste collection systems. Collaboration on pilot projects to show the feasibility and benefits of providing food waste bins in flats. Residents should be encouraged to sign petitions requesting food waste collection services. After all public pressure can influence local authorities to prioritise this essential service. [1234]

Source(s)

1. Household food waste collections guide | WRAP
2. Changes to food waste collection and recycling: What actions do ...
3. Bin information for residents who live in flats
4. Councils face rolling out food waste collections to millions ... - ITVX

Q9 The domestic waste figures are nothing compared to supermarket waste which is factored into consumer prices. Are supermarkets encouraging waste?

Supermarkets play a significant role in the food supply chain. Unfortunately, they are not immune to food waste. Ugly food campaigns, which encourage shoppers to choose imperfect produce, have had mixed success. Some consumers still avoid so-called "ugly" produce, leading to increased store waste and decreased sales. Additionally, supermarkets often prioritise profit margins, sometimes at the expense of people and the environment. This system has become synonymous with waste. [1234] As food prices rise and the cost of doing food business increases, this cost is likely to grow further. In 2022, consumers expected to pay more at the grocery store, and manufacturers anticipated raising prices as well. Supermarkets factor in various costs, including waste management, when setting prices. Food waste contributes to these costs. By reducing food waste, supermarkets can mitigate unnecessary expenditures, potentially leading to more stable or even lower consumer prices.[5]

Raising awareness among consumers about the impact of food waste is crucial. Advocacy efforts can encourage supermarkets to adopt more sustainable practices, such as better inventory management, donation programs, and efficient supply chains.

Source(s)

1. Can Retailers Solve The Issue of Supermarket Food Waste? - FoodPrint
2. Ethical Supermarkets | Ethical Consumer
3. Tackling Rising Food Prices and Food Waste in 2022 - ReFED
4. Food waste trends survey 2021 | WRAP
5. Which supermarket is the most sustainable and how can you tell? | The Independent

Q10 How will climate change affect the data we've seen today and food production in general?

The global food system significantly contributes to greenhouse gas (GHG) emissions. These emissions occur at every stage, from agricultural production to processing, distribution, retailing, home food preparation, and even waste. Unsustainable practices in food production have led to

deforestation, biodiversity loss, and pollution. These effects negatively change human well-being. As climate change intensifies, it will further challenge food production systems. UN Sustainable Development Goal 2 – No Hunger (SDG2) aims to ensure sustainable food production and resilient agricultural practices. Climate change threatens food security by altering growing conditions, affecting crop yields, and increasing the frequency of extreme weather events. To achieve SDG2, we must balance food production with environmental conservation and adapt to changing climates. There is a need to reduce environmental impacts with essential mitigation measures being essential. Transitioning to plant-based diets: Reducing meat consumption lowers GHG emissions. Minimising food waste and efficient supply chains and consumer awareness play a crucial role. Improving crop yields using sustainable practices can enhance productivity while reducing emissions. Feeding a growing population sustainably under climate change is a significant challenge. Agriculture contributes up to 30% of human caused GHG emissions, making it critical to balance food security and environmental impact. [12345]

Source(s)

1. Food sustainability: problems, perspectives and solutions
2. 2030 Development Agenda: Reducing Food Loss and Waste for SDG2
3. What impact does food production have on climate change? | World ...
4. Climate change and sustainable food production
5. https://doi.org/10.1017/S0029665112002947

Useful links and resources for further reading

Get portion wise! - British Nutrition Foundation

Food for Free - a fantastic feast of plants and folklore | Richard Mabey | Nature Writer, Author & Journalist

Our World in Data – Useful search site for research and data to make progress against the world's largest problems.

Food sustainability – Our World in Data

Food carbon footprint – Our World in Data

Forthcoming WEA courses by Lee Armon

Nature, Ecology and Permaculture: Introduction to Environmental Sustainability (Q00012765) – 6 sessions, starting 11 March (in-person – Plymouth)

NCFE Certificate in Understanding Climate Change and Environmental Awareness (Q00013927) – 29 sessions, starting 9 April (online and in-person)

Planned

Greener Guide to Better Living – keep an eye on the website!