The Future of Food to Tackle Climate and Health – Reflections from COP26

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Context

The recent COP26 meeting that took place in Glasgow, UK, from 31st October to 12th November 2021, set a target to secure global net zero emissions by 2050 and keep warming to below 1.5 degrees centigrade from pre-industrial levels^[1]. To deliver against this target, countries have pledged to phase out coal, curtail deforestation, speed up the switch to electric vehicles and encourage investment in renewable energy.

Fossil fuels are rightly a focus of COP26 pledges, given that they are major contributors to greenhouse gas (GHG) emissions and are responsible for eight million deaths per year globally due to air pollution^[2]. Yet, mention of one other sector with a substantive GHG footprint was conspicuous by its relative absence from national pledges – that is, food production.

Agriculture is the second largest contributor to overall GHGs, accounting for up to 35% of emissions, 57% of which are due to meat and dairy, 29% from plant-based food and 14% from products not intended for consumption, like cotton and rubber^[3]. Despite this, discussions on the climate impact of food production, and meat and dairy in particular, were notably few in number at Glasgow.

Potential Impact from Tackling the Food Carbon Footprint

When considering what each of us can do to tackle climate change, a 2015 analysis of individual actions to reduce carbon footprints, published in the Lancet, found that the single most impactful change that individuals can make is to adopt a wholly plant-based diet^[4]. Other dietary shifts with notable benefits for the environment include reducing overall consumption of calories^[5] as well as reducing food waste^[6].

In recent years, campaigning on these issues has intensified, although the desired goal of promoting more climate-friendly behaviour has yet to be achieved. It is currently estimated that a whopping third of all food purchased in the western world is still wasted by consumers^[7].

Together, these facts point towards a scenario of unacceptable inefficiency – consumers are purchasing an excess of some of the most environmentally damaging foods, which they subsequently waste, rather than consuming them to meet their nutritional needs.

Trends in Animal and Plant-Based Protein Demand

Awareness of the impact of food production on the environment should help us better direct our efforts towards finding solutions to improve food production efficiency and promote plant-based diets. While some progress has been made on the latter demand-side issue, this has so far proven insufficient to create the speed and depth of behaviour change that COP26 targets require.

For example, recent research shows that while knowledge and concerns about the environmental impact of food are increasing, particularly among the young, actual eating habits are heading in the wrong direction^[8,9]. It now seems that more, rather than less, meat is being eaten, even while the numbers of individuals professing to follow a plant-based diet has risen (albeit, from a low baseline). This fact, in combination with projected population growth (up to 10 billion people by mid-century)

and a transition to more meat-heavy western diets in many regions of the world^[5], implies that far more must be done to promote environmentally friendly food choices.

Figure. 12-month moving average for monthly total transactions for raw beef

Source Sainsbury's shoppers 2017-2020. World Resources Institute^[9]

Pledges and Progress at COP26

So, what actions are being taken in response to COP26 pledges that can turn the tide on food-related emissions?

One of the most ambitious, potentially impactful and relevant pledges to food production at COP26 was that targeting methane emissions, a gas with around 21 times more global warming potential than carbon dioxide^[10]. The Methane Gas Pledge, adopted by 90 countries, set a goal to decrease methane emissions by 30% by the year 2030^[11]. This is particularly relevant to food given that livestock and rice production are significant sources of methane^[12].

Further ambitious commitments to promote more sustainable diets have also been made at the national level. For example, the UK's Government's Climate Change Committee expressed a need to reduce the amount of meat consumed by the UK population by 20–50% to reach net zero by 2050^[13]. Similar recommendations have also been outlined in the recently published UK National Food Strategy, in which authors propose a 30% reduction in meat consumption over the next ten years^[14].

Although a meat tax has been widely discussed as a potentially effective way to achieve this target, this approach risks regressive consequences, such as penalising poorer households and attracting public disapprobation^[15]. Instead, National Food Strategy authors suggest “nudging consumers into

changing their habits while investing in methane-reduction projects and the development of alternative proteins”^[14]. Promisingly, research into exactly how to execute these nudges for optimal efficacy is growing^[16], with evidence showing that changes to the composition, availability and placement of food, together with modifications to marketing practices, can all have a significant impact on which foods are ultimately chosen by consumers^[17].

Encouragingly, it is not only Governments that are taking action to promote sustainable diets, but the private sector, too, has contributed. For example, one of the most ambitious, the furniture company IKEA of Sweden, has pledged to become carbon positive by the year 2030 and, as one of the largest food outlets globally, have also promised to ensure that half of food purchased in-store is plant-based by 2030^[18].

Sustainable pledges have also come from far more unlikely sources, including the fast-food chain Burger King, who have publicly predicted that 50% of the burger patties they sell will be plant-based by 2030^[19]. Similarly, Starbucks coffee has added plant-based milk Oatly to its selection as part of a broader sustainability push^[20].

Such actions are important given that the food service industry dictates what is eaten by the public to a large extent. As a result, change in population-level dietary behavior is unlikely to happen in the long-term without the cooperation of restaurants, supermarkets, food delivery companies, suppliers and manufacturers.

Public Health Considerations

There is growing evidence from a Public Health context, issuing from a legacy of research on the topic of obesity, that arming individuals with the necessary dietary information and education, without providing the requisite tools or environments conducive to change, rarely leads to improvements in food choices.

It is now widely accepted that our choices are predominantly influenced by the context in which they are made and, particularly with regards to diet, our behaviours do not represent the end point of a rational decision-making process. As such, many major behaviour change theories and models advise targeting automatic, non-conscious drivers of food choice. This approach is broadly known as ‘nudging’ and is increasingly seen as successful in shifting lifestyle behaviours^[21].

Public Health research shows that there are strong overlaps in the recommended dietary changes needed to improve individual as well as planetary health. The rise in the global prevalence of chronic diseases has seen no slowdown in recent years, driven largely by increasingly sedentary lifestyles and unhealthy diets. For example, a recent pilot study by the World Obesity Federation and RTI International estimated that national economic impacts of overweight and obesity are projected to double by 2060 if urgent action is not taken by political and public health leaders around the world^[22].

One solution to the chronic disease problem is widespread adoption of more wholefood plant-based diets, meaning that the very same foods can benefit both health and the climate. Interestingly, when it comes to encouraging consumers to adopt this diet, a recently published study demonstrates that highlighting either issue, via labelling of food, can play a modest role in shifting choices, and that there may even be a synergistic effect of combining messaging about both health and environment ^[23]. This single study illustrates the currently unrealised opportunity to piggy-back upon years of existing insights into how to promote healthier diets.

From a public health perspective, it is neither necessary nor feasible to eliminate all meat and animal-based protein sources entirely from the diet. The Rose Principle describes how greater benefits can be realised by encouraging small changes in diet across a large segment of society, rather than encouraging drastic changes in the few who consume most of a particular 'high risk' food^[24]. From the perspective of promoting plant-based diets, this implies that intervention efforts should be geared towards encouraging many people to reduce their meat intake by small amounts, rather than identifying heavy meat consumers and targeting these individuals with intensive change interventions.

Prior estimates of different reduction scenarios show that a 75% reduction in the amount of meat consumed in the United States (i.e., from a baseline of around 110kg per person per year to 30kg per person per year), would result in a 27% reduction in land use, 31% reduction in water use and a 46% reduction in GHG emissions. To note, this 75% reduction goal would mean consumers are still eating 7kg more meat per person per year than is recommended by nutritionists for optimal health (at 23kg per person per year) and is the equivalent of each US citizen still consuming approximately 5 quarter pound burgers per week, on average ^[10].

Such statistics illustrate the point that the change required does not amount to a draconian curbing of individuals' rights to enjoy the food that they like, but instead involves many individuals making small shifts in the quantity of meat that they are consuming over time.

Given that those who enjoy eating meat may be reluctant to reduce their consumption to support an abstract and impersonal goal like tackling climate change, one of the most promising approaches to create the population shift that we need is to find viable meat substitutes that are far less damaging for the environment. Technological innovations are evolving rapidly to support this approach, including the likes of cell cultured meat and seafood, fermentation processes for protein production and hybrid meats. These alternatives to animal proteins are touted to become available before the end of the decade if not earlier ^[25].

How Can We Achieve the Targets?

As Governments, the private sector and individuals start to work towards the adoption of more sustainable diets, the question remains as to what trajectory of change can we expect. Below, we outline three potential scenarios that could eventuate.

A rapid shift could be seen if there is widespread and persistent adoption of alternative protein sources. Many have predicted rapid growth in the market for meat alternatives, accounting for much of the hype surrounding these products, and reflected in valuations of the businesses responsible for their manufacture^[26].

This model of behavioral substitution also has precedent, echoing the approach taken for tobacco harm reduction: In the fight against tobacco use, the single most impactful intervention to date has been widespread availability of an array of reduced risk nicotine delivery products such as e-cigarettes and snus, which have led to dramatic reductions and even elimination of smoking in countries such as Sweden and Norway^[27]. Key to this success was the wide range of alternatives and easy availability of reduced risk products. With a numerous innovations in food development now on the horizon, it is feasible to see this scenario also play out in the food space.

However, growth in meat alternatives from a very low baseline must be considered in the context of the entire protein market, where meat products still dominate. For example, In the United States, retail sales of plant-based meat alternatives rose by almost one-quarter to USD \$770m in the twelve months up to August 2018. Whilst this is impressive, it must be noted that retail sales of U.S. meat were valued at USD \$200bn in the same year and are also growing^[28].

Novel proteins not only need to compete with meat on a range of parameters important to consumers – taste, price, convenience – to ensure they are integrated into habitual diets, but also need to overcome some unique barriers to scale from the consumer perspective. Namely, the perception that they are highly processed ‘Frankenstein’ foods with an unproven safety record. Businesses working to bring these meat alternatives to market must consider the role that human psychology will play in their adoption if they are to successfully grow their sales consistently overtime.

A slow but steady shift is another possible scenario, echoing the pathway paved by plant-based milk alternatives, such as Oatly^[29]. We have witnessed a substantial shift in milk consumption within a period of relatively few years – a direct example of the Rose Principle in action - attributed in large part to providing consumers with a wide range of choice and better alternatives to dairy milk^[30].

Conversely, the current situation, with rising levels of background meat consumption^[8], could remain, with little shift towards climate friendly and healthier alternatives and a waning of consumer interest in novel proteins over time. Even worse would be the adoption of meat alternatives in addition to background levels of meat consumption, meaning that more overall is being consumed, and no substitution is happening at all. This scenario could be perpetuated by active pushback and lobbying from those companies with interests in maintaining mass production and sales of meat products.

Moreover, there is also real risk of introducing further inequities in health and wellbeing, with elimination of cheap mass-produced meat being replaced by highly processed meat alternatives, whereas higher-end, nutrient-dense and more expensive meat products could remain, albeit becoming prohibitively expensive for most people.

The evolution of a whole new stream of protein sources could be an incredible opportunity to purposefully engineer win-win products for both health and climate. As such, care is required to make sure that this opportunity is not squandered by developing of foods that yield very few benefits to individual health yet hijack the 'green halo' to promote sales by misinforming consumers. Adding environmental labels that quantify impacts of each food, alongside nutritional labelling, is one way to ensure transparency and keep companies accountable to their promises. However, this type of labelling only serves these goals if it is first noticed, and then understood, by consumers, meaning content, design and placement must be carefully considered and informed by the research evidence.

Conclusion

A shift in how we obtain protein from our diets, away from intensive farming and fishing, towards cleaner sources, be they animal or plant-based, will form an essential part of the solution to achieving the pledges formalised following COP26^[31]. This can be achieved through many different approaches including reduction, substitution, reducing the frequency of consumption, blending into hybrid products, and without the necessity of a complete eschewal of animal-based products.

The new paradigm of 'planetary health', which focuses on the interdependence of human health, animal health and environmental health, will greatly facilitate meeting the ambitious and near-term targets set.

The inter-generational differential in both intention and action with regards to dietary change must be carefully addressed and handled for the world to stand a greater chance at reducing GHG emissions and help turn intentions into a sustainable food future, be that the sustainability of our climate or health, or preferably both in unison.

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