Towards sustainable diets and planetary health: lessons from early research and knowledge gaps

In 2019, the EAT-*Lancet* commission launched a thought-provoking report proposing the "planetary health diet". The idea was to formulate a diet that is both healthy and environmentally benign in terms of limiting societies' environmental footprints. So far, however, we know far too little about how governments and other stakeholders can cost-effectively govern globalised sustainable food production and consumption systems. Our authors summarise recent research on measuring health and environmental impacts of such systems as well as related policy interventions and propose ingredients of a future research agenda.

By Jan Börner and Ute Nöthlings

Human diets and the corresponding food systems have a strong environmental impact and play an elementary role in meeting the planetary boundaries of greenhouse-gas emissions, cropland use, water use, nitrogen application, phosphorus application and biodiversity losses. Without change in dietary patterns and bio-based feedstock demand across the globe, the environmental footprint of human consumption will permanently exceed planetary boundaries and thus undermine the capacity of ecosystems to support human societies. At the same time, dietary intake is strongly associated with human health in that it has to be nutritionally adequate and limit the risks of common non-communicable diseases, i.e. diseases that are not transmissible directly among people, such as heart diseases, many types of cancer, and diabetes.

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The concept of sustainable diets integrates across these human and environmental health dimensions of dietary patterns by defining as sustainable "… those diets with low environmental impacts which contribute to food and nutrition security and to healthy life for present and future generations. Sustainable diets are protective and respectful of biodiversity and ecosystems, culturally acceptable, accessible, economically fair and affordable; nutritionally adequate, safe and healthy; while optimizing natural and human resources." (FAO, 2010)

In 2019, a planetary health diet (also called the EAT-*Lancet* reference diet) was proposed as a general dietary pattern to optimally align dietary health effects and environmental impacts considering global food system linkages. Despite the attention raised by the EAT-*Lancet* proposal, a number of critical reactions from academia and civil society pointed to considerable knowledge gaps in the way of designing food systems, or more broadly, bio-based production and consumption systems that holistically address planetary health outcomes. Here we summarise key knowledge gaps and propose elements of a research agenda that supports evidence-based decision-making towards sustainable food and biomass production and consumption systems.

Diets, health and the environment

Suboptimal dietary intake increases mortality and reduces disability-adjusted life years world-wide, with high sodium intake, low intake of whole grains and low intake of fruits being the leading dietary risk factors. For example, meta-analyses of epidemiological studies show that intake of whole grain, vegetables, fruit, nuts and fish are inversely associated with risk of type 2 diabetes, hypertension, cardiovascular diseases or early disease risk markers, as well as with disability-adjusted life years or mortality. Intake of red meat, processed meat and sugar-sweetened beverages is positively associated with such negative health outcomes. However, our knowledge remains limited with regard to how diets are systematically linked to environmental health, nutritional adequacy and human health.

Only few studies have so far explored individual dietary intakes regarding indicators of environmental health, which would allow to directly link environmental footprints of individual diets with health outcomes. A number of tools are being developed, nonetheless, to trace the footprints of aggregate consumption data back to its origins, e.g. TRASE, which stands for "Transparent supply chains for sustainable economies". TRASE enables analysts to calculate detailed spatially explicit emission footprints for agricultural production across a whole value chain from a supply side perspective. The SHARP database (Sustainable, Healthy, Affordable, Reliable and Preferable), on the other hand, adopts a demand-side perspective to inform consumers in the European Union about environmental impacts of their dietary patterns in terms of greenhouse gas emission and land use. Still, many environmental impacts of diets across the world cannot be assessed due to data gaps. As a result, researchers studying the impact of dietary behaviour on environmental health often rely on highly aggregated data and modelling approaches.

Importantly, studies linking self-selected diets and nutritional quality suggest that an environmentally friendly diet is not necessarily healthy. Clearly, dietary energy and meat intake are paramount to mitigate diet-related environmental impacts. But, net outcomes are determined by the choice of meat replacements and potential spill-over effects towards non-food consumption. Still, adherence to the planetary health reference diet was found to be inversely associated with chronic disease risk, and some country specific adaptions have already been developed. In fact, food-based dietary guidelines (FBDG) are usually country-specific recommendations of wholesome diets for populations or population groups. As such, they include general rules advising food choice taking a range of aspects into account. Although sustainability criteria are increasingly considered, not all FBDG have included such aspects yet, and there is evidence that adoption of FBDG with specific public health targets does not necessarily support environmental health. Clearly, regional and target group specificity of sustainable diets need to be more widely addressed by future research.

Effective policies lacking so far

Knowledge gaps about health and environmental impacts notwithstanding, governments, civil society and the private sector around the world are implementing policies and programmes to govern food and biomass system dynamics. Equally important in affecting these system dynamics are policies and socio-economic drivers that emerge in other sectors, such as the non-food industry, infrastructure and finance. Often, the resulting and frequently incoherent policy and incentive mix driving the behaviour of actors along all food and biomass value chains does not result in the desired behavioural outcomes.

Commonly, a distinction is made between governance of the demand versus the supply side of food and biomass systems. Traditionally, economists have argued that negative social and environmental externalities from these systems be ideally addressed by supply-side policies, such as regulations, taxes or subsidies imposed by governments. This intervention logic assumes that once food prices reflect the actual social and environmental costs of production, end-consumers will automatically adjust their behaviour towards more sustainable, though not necessarily healthier, consumption patterns. It may surprise, at first glance, that there is little empirical evidence confirming this conjecture in the context of food and biomass systems. Two separate factors may be at play. First, technological innovation in food and biomass production has to some extent enabled land users to comply with effective environmental regulations, while keeping food prices low. Second, especially in parts of the world currently witnessing the lion's share of agricultural expansion into natural ecosystems, land use and conservation policies were shown to exhibit comparatively low levels of effectiveness. As a result, supply-side interventions have so far arguably done rather little to change consumer behaviour.

Instead, a growing body of academic literature deals with the impact of consumption on production, resource use and land use patterns. Bruckner et al., for example, demonstrate how changing non-food biomass consumption patterns in the EU have resulted in an increasing land footprint of EU consumption outside EU boundaries. Popular initiatives to influence consumption choices via increased transparency in food and biomass value chains have since been promoted by both civil society and private sector organisations. However, there are limits to what can be achieved through voluntary behavioural changes informed by value chain transparency. The still small number of studies evaluating sustainability certification schemes point to highly context-specific impacts.

Some countries have instead experimented with demand-side policies, such as taxes on unhealthy food components with ambiguous results. The Danish fat tax, for example, was abandoned after two years in 2013 for diverse, including political, reasons. It was found to have had a positive, but minor, effect on public health.

So far, the academic debate on dietary health impacts synthesised above takes place largely detached from research on the effectiveness of supply- and demand-side interventions to internalise social and environmental externalities of food and biomass systems. An exception is the growing empirical literature on consumer choice architecture, which points to a series of promising and low-cost intervention options to nudge customers towards both healthier and environmentally more sustainable consumption choices. This includes, for example, traffic light labels on food packaging that indicate health and environmental risks to induce more sustainable consumption decisions.

Below we highlight key ingredients of a future research agenda that addresses gaps and missing links between the research fields summarised here.

The way forward

The scientific evidence on the current mismatch between health requirements, dominant diets and planetary boundaries is overwhelming. And yet, our knowledge about what constitutes globally accessible dietary options that minimise the environmental and social impacts of production is limited. Even less evidence exists on how globalised food and biomass systems can be governed towards providing such diets. A research agenda to overcome these knowledge gaps should address the following non-exclusive lists of challenges:

- Improve the data base linking dietary choices including non-food biomass consumption to local and global impacts in key planetary health outcome dimensions, i.e. human and environmental health as well as socio-cultural impacts.
- Improve system understanding focusing on nexus relationships between health and environmental impacts of food and biomass production and consumption.
- Build a systematic evidence base on the effectiveness of governance measures in affecting food and biomass consumption and production decisions.
- Expand analytical system boundaries to study the role of non-food economic and policy factors in driving food and biomass system outcomes.
- Improve regional and sectoral aggregation of modelling and simulation tools and the empirical basis for their parameterisation in order to inform decision-makers with policy-relevant scenario analyses.
- Mainstream the planetary health perspective in the developing context and stakeholder-specific policy recommendations and dietary guidelines.

Jan Börner is a Professor at the Institute for Food and Resource Economics & Center for Development Research at the University of Bonn, Germany.
Contact: jborner@uni-bonn.de
Ute Böthlings is a Professor at the Department of Nutrition and Food Science at the University of Bonn.
Contact: noethlings@uni-bonn.de

References: **www.rural21.com**