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Background Note

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[1] The views expressed in this paper do not necessarily reflect those of the United Nations Secretariat. The paper is reproduced as submitted by the author without formal editing.

BACKGROUND NOTE

My research relates to several conference themes, including:

- Concepts and measures of food security and nutrition;
- Connections of food security to growth, consumption and sustainability;
- Projected trends of population and food, alternative scenarios;
- Prevalence of nutritional deficiencies (caloric and/or micronutrient);
- Extent of obesity, including childhood obesity, and consequences for mortality and health, both now and in the future (as current younger generations grow older);
- Diets, nutritional habits and burden of disease.

In past work, I have analysed the health, environmental and economic impacts of dietary changes at regional and global levels, and, based on those, developed dietary scenarios that reduce diet-related mortality, improve nutritional status, and reduce environmental impacts in line with global environmental limits and targets. In my presentation, I will predominantly focus on work I have done for the EAT-Lancet Commission on Healthy Diets from Sustainable Food Systems (Willett and others, 2019).

The EAT-Lancet Commission included more than 30 researchers from different countries and disciplines. Two of its main aims were to define a healthy reference diet, and to analyse ways of moving to a food system that would stay within the environmental limits of our planet when it comes to greenhouse gas emissions, land use, water use, and biochemical flows of nitrogen and phosphorus.

For developing a healthy reference diet, we reviewed the latest evidence on healthy eating, focusing on evidence from the epidemiological literature. Based on cohort studies and meta-analyses thereof that relate changes in food intake to changes in chronic-disease mortality, we developed general food-based dietary recommendations that would minimise dietary risk factors, e.g., by eating plenty of fruits, vegetables, legumes, nuts, and whole grains, and limiting the amount of red and processed meat and excessive energy intake. In sum, the recommendations called for adopting predominantly plant-based diets, whilst allowing occasional consumption of animal source foods, which were in line with established dietary patterns, such as flexitarian/Mediterranean diets, pescatarian diets, vegetarian diets, and vegan diets.

We analysed the impacts of adopting these different dietary patterns that were compatible with the general recommendations with respect to their impacts on nutrient intake, chronic-disease mortality, and changes in environmental resource use (Springmann and others, 2018a). We found that, compared to current and projected diets, nutrient intake would be improved for most nutrients, and premature mortality from diet-related diseases would be reduced. In addition, environmental resource use and greenhouse gas (GHG) emissions were reduced in most high and middle-income countries, with greatest reductions for the more plant-based dietary patterns. In low-income countries, a diversification of diets (away from diets dominated by staple crops towards more varied diets) led to moderate increases in resource use.

To study the impacts of dietary changes, and other food-system changes, such as reductions in food loss and waste, and technological improvements at the farm level, we developed a global food system model with which we estimated the changes in food production required to produce diets that were in line with the general diet recommendations for healthy diets (Springmann and others, 2018b). By pairing the resultant

estimates of food production with country and crop-specific environmental footprints, we estimated the total environmental impact of this food-system scenario; and by reviewing the literature on planetary boundaries, we related those environmental impacts to levels of resource use that were in line with preserving the functioning of ecosystems.

Our analysis showed that simultaneous food-system changes were needed to stay within environmental limits by 2050. Those included dietary changes towards more plant-based diets, improvements in technologies and management, reductions in food loss and waste, and favourable socio-economic development. The dietary changes were particularly important for limiting GHG emissions in line with avoided global warming of more than 2 degrees Celsius, whilst the other changes contributed more to reducing land, water, and fertilizer use.

There is a strong correspondence between the food-related planetary boundaries we derived in our commission work and global environmental targets, such as the Sustainable Development Goals developed by the United Nations. Table 1 provides an overview of the correspondence, which I will develop in greater detail in the presentation.

As a practical application of the analytical framework, I will close by previewing an analysis of the health and environmental implications of adopting current food-based dietary guidelines vis-à-vis adopting the food-based recommendations developed by the EAT-Lancet Commission. The purpose of the comparison to the EAT-Lancet work is to show what progress can be made by adopting national food-based dietary guidelines and where some adjustments and improvements to current recommendations might be needed. The results suggest that it is particularly the recommendations on limiting the amount of animal source foods that need to be strengthened to create a food system that is in line with the global health and sustainable-development agenda.

TABLE 1. OVERVIEW OF GLOBAL HEALTH AND ENVIRONMENTAL TARGETS AND HOW THEY RELATE TO THE HEALTH AND ENVIRONMENTAL ANALYSIS CONDUCTED BY THE EAT-LANCET COMMISSION

Global targets	Comment	Implementation
NCD Agenda	The Sustainable Development Goal (SDG) 3.4 is to "reduce by one third premature mortality from NCDs through prevention and treatment, and promote mental health and wellbeing", which builds on the World Health Organization (WHO) "25x25" NCD target.	Imbalanced diets and weight contribute more than half to preventable causes of NCD deaths (the rest is tobacco, alcohol, and physical activity). Applying this proportion to the overall target yields a target for diet-related reductions of around 18.5%.
Paris Climate Agreement	The Paris Agreement's long-term goal is to keep the increase in global average temperature to well below 2 °C above pre-industrial levels; and to limit the increase to 1.5 °C, since this would substantially reduce the risks and effects of climate change. The goal is reflected in SDG 13 and in the plenatary boundary for climate change.	Target for agricultural emissions in line with the 2 degree target (Wollenberg et al, 2016; Springmann et al, 2018).
Aichi Biodiversity Targets	Target 5: By 2020, the rate of loss of all natural habitats, including forests, is at least halved and where feasible brought close to zero, and degradation and fragmentation is significantly reduced. The target is related to SDG 15 and the planetary boundary for land-system change.	Contribute to target by not increasing pressure to convert natural land into cropland (or pastures), in line with the food-related planetary boundary for land-system change (Springmann et al, 2018).
SDG target on water withdrawals	SDG 6.4: By 2030, substantially increase water-use efficiency across all sectors and ensure sustainable withdrawals and supply of freshwater to address water scarcity and substantially reduce the number of people suffering from water scarcity. The goal is in line with the planetary boundary for freshwater use.	Adopt the food-related planetary-boundary target of maintaining environmental flow requirements by limiting agricultural freshwater use to below 2,000 km3 (Springmann et al, 2018).
SDG target on nutrient pollution	SDG 14.1: By 2025, prevent and significantly reduce marine pollution of all kinds, in particular from land-based activities, including marine debris and nutrient pollution. The goal is in line with the planetary boundary for biogeochemical flows of nitrogen and phosphorus.	Adopt the food-related planetary-boundary target of limiting nitrogen and phosphrus application from fertilizers to 69 TgN and 16 TgP respectively (Springmann et al, 2018).

REFERENCES

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