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***Editorial***  
***Food security and sustainability in times of multiple crises***  
***Running title: Food security and sustainability in times of multiple crises***

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## **Main text**

The shock waves Russia's invasion of Ukraine has sent through global markets for food and agricultural inputs – fertilizer and fuel in particular – have put global food security in the spotlight. In addition, a series of extreme weather events and unparalleled droughts in many areas of the world have compounded the situation by threatening harvests worldwide. The number of people affected by malnutrition is on the rise, now affecting almost 10% of the world population (1). At the same time, the burden of chronic diseases related to unhealthy diets remains high, with a quarter of premature deaths globally attributable to dietary risk factors such as low consumption of plant-based foods and high consumption of red and processed meat [2]. Besides threatening people's health through various forms of malnutrition, our food system is one of the biggest drivers of the transgression of planetary boundaries, contributing around a third of greenhouse gases and occupying around half of Earth's habitable land surface, thereby driving deforestation and biodiversity loss [3,4].

The high consumption of animal-source foods in high- and some middle-income countries, plays a central role in these health and environmental crises. It contributes to ill-health and global inequities and hunger, as more than one third of global calories are fed to livestock and conversion of plant into animal calories is vastly inefficient [5]. The production of animal-source foods also occupies the largest share of agricultural land and contributes almost two thirds of the food system's greenhouse gas emissions [4]. In particular the emission of methane, one of the most potent climate pollutants, is related to the production of animal-source foods and can significantly increase the risks of crossing dangerous climate tipping points in the near-term [6].

In the 21<sup>st</sup> century, global environmental change – in particular climate change, biodiversity loss, and land degradation – poses the most fundamental risks for health, livelihoods and global food security. Dietary shifts towards mostly plant-based foods in countries with high levels of consumption of animal-based foods are therefore an integral part of reaching global environmental goals. They are also essential for realizing the Sustainable Development Goals and the triple aim of short- and long-term global food security, environmental sustainability, and better human health.

In light of these challenges, a recently published Policy Brief calls for urgent action to start aligning consumption patterns in Germany with the recommendations of the Planetary Health Diet [7]. This encompasses an increase in the consumption of unprocessed, plant-based foods, as well as a decrease in meat consumption by around three quarters and in milk consumption by more than half [8]. Concurrently, livestock numbers need to be reduced and more and diverse plant-based products cultivated. The Policy Brief has been co-authored by researchers from the fields of nutritional medicine, public health and economics as well as agricultural, sustainability, and political sciences. While written primarily with Germany in mind, the recommendations will be of relevance to most high-income countries.

Specifically, the Policy Brief recommends:

- A transformation fund to support stakeholders along the food system supply chain – including farmers, catering services and school and workplace cafeterias – to shift production and consumption towards healthy and sustainable, predominantly plant-based diets.
- Targeted fiscal mechanisms, including a value added tax exemption for healthy, plant-based foods (including fruit, vegetables, legumes, nuts and seeds, and whole grain products) and measures that move prices towards reflecting the true cost of foods: Starting with an animal welfare levy on animal-based foods to fund a transition to higher animal welfare standards and lower livestock numbers per farm and, in the mid-term, introducing levies on nitrogen surpluses.
- The strengthening of institutions that support participatory, evidence-informed, and multi-sectoral policy-making for a transformation of the food system. This includes forums for results-oriented discussion, coordination and collaboration between policymakers, the scientific community, civil society, farmers and other food system actors. It also includes scientific advisory bodies that monitor progress on a regular basis. These changes in the food system governance are pivotal to enable positive tipping points in the food system

transformation. They can prevent political deadlock, create new (sometimes surprising) actor coalitions, and thus enable a strategic sequence of food (rather than just agricultural) policy packages [9].

The nutrition community has a clear role to play in supporting this transition towards a healthier, more sustainable food system. Evidence and advice provided by nutrition researchers and practitioners are fundamental to advance and support the transformation ahead of us. Professional societies and science-based organisations like the World Cancer Research Fund International, the World Obesity Federation and others have been at the forefront of advocating for evidence-informed policies to support healthy and sustainable diets. Our collective voices are now needed more than ever – to secure a liveable, sustainable future for everyone.

### **Conflict of Interest Statement**

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