



Sustainable Diets for Healthy People and a Healthy Planet



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1

Introduction

Promoting good nutrition, health and sustainable food systems in the context of population growth, dietary transition and a changing climate is a central challenge of our time. While climate change has an impact on our diets, our food systems (and therefore our diets) also affect climate change. Food production and consumption are responsible for 19-29% of the human-induced greenhouse gas (GHG) emissions, 60% of the terrestrial biodiversity loss and 70% of fresh-water use. Animal-based foods are the main culprit (Steinfeld et al. 2006; Vermeulen et al. 2012; Tubiello et al. 2014; CBD 2015), with livestock accounting for an estimated 14.5% of GHG emissions (FAO, 2013a). By 2050, GHG emissions from food and agriculture could rise by as much as 80% due to the increased consumption of animal products (Popp et al. 2010; Hedenus et al. 2014; Springmann et al. 2016b; Tilman and Clark 2014). Indeed, food-related GHG emissions could account for half of all emissions allowed by targets for keeping the global rise in temperature to less than 2°C by the middle of the century and could exceed total permissible levels by 2070 (Hedenus et al. 2014; Springmann et al. 2016b).

Diets, meanwhile, have deteriorated globally (GLOPAN 2016), leading to an increase in non-communicable diseases (NCDs), particularly type II diabetes, coronary heart disease and some cancers (Lim et al. 2010; Tilman and Clarke 2014; Sabate and Soret 2014).



Figure 1. Environmental and health costs of current food systems and diets

Global food systems and diets: environmental and human health costs
The current global food system is leaving 795 million people hungry (FAO, IFAD and WFP 2015), two billion micronutrient deficient (FAO and WHO 2014), more than 600 million people obese and 1.9 billion overweight (UNICEF, WHO and World Bank 2016; GBD Risk Factors Collaborators 2015).
Many of the world's food systems are exceeding or approaching planetary limits and are compromising the capacity of the planet to produce food in the future. (EU SCAR 2011, Springmann et al. 2016a; Whitmee et al. 2014).
Food production and consumption are responsible for 19-29% of all human-induced GHG emissions, up to 70% of water use and more than 60% of terrestrial biodiversity loss, with animal-based foods a major contributor to these environmental changes (Vermeulen et al 2012; Tubiello et al 2014; Steinfeld et al 2006).
Current diets, with their high intakes of meat, fat, salt and sugar, pose a major risk to health, social systems and environmental life-support systems (EU SCAR, 2011, Lim et al; GLOPAN, 2016; Aleksandrowicz, 2016).
Shifts to more animal-based diets could raise agriculture and food GHG emissions by as much as 80% by 2050, making them responsible for half of all emissions allowed by guidelines for keeping the global rise in temperature below 2°C; they could even exceed total permissible emissions by 2070 (Popp et al. 2010; Hedenus et al. 2014; Springmann et al. 2016b; Tilman and Clark 2014).
Even sticking to the global carbon budget (the amount of carbon dioxide that can be emitted so as to have a likely chance of limiting the global temperature rise to 2°C above pre-industrial levels and averting the most dangerous climate-change impacts), some regions will suffer devastating effects (IPCC 2014).

Malnutrition is a universal challenge, affecting all countries in its various forms, from undernutrition, excessive weight and obesity to micronutrient deficiencies and combinations thereof. Some 795 million people are chronically undernourished (FAO, IFAD and WFP 2015), two billion are micronutrient deficient (FAO and WHO 2014), 42 million children are deemed overweight before their fifth birthday and a staggering 1.9 billion adults are overweight or obese (UNICEF, WHO and World Bank 2016; GBD 2015 Risk Factors Collaborators 2015). While income growth can reduce undernutrition, it is not always the case. Economic development, globalization, urbanization and lifestyle changes have caused major shifts towards poor diet, excessive caloric intake and low levels of exercise. The result has been a rapid rise in obesity and NCDs. The alarming pace of climate and environmental change and its effects on food systems, nutrition and health require a major rethink of how food is produced and consumed.

This paper connects the dots between sustainable food systems, dietary patterns, health, nutrition and climate change mitigation. It outlines the global frameworks and agreements on climate change, food and nutrition, exploring the many, complex ways in which diet affects climate change, and vice versa. It looks at diets that boost health and are environmentally sustainable, as well as the measures needed to steer food production and consumption in that direction, emphasizing the importance of concerted and coherent policymaking to develop sustainable food systems and diets, while safeguarding the planet.

2

Global policy framework and commitments on nutrition and climate change

The Second International Conference on Nutrition (ICN2) Rome Declaration underlines the need to address the impact of climate change and other environmental factors on food security and nutrition. Its focus is on strengthening sustainable food systems by developing cohesive public policies, from production to consumption, across sectors, to promote good nutrition and healthy, diverse diets for all (see Box 1).

Box 1. ICN2 Framework for Action recommendations on sustainable food systems and healthy diets

Recommendation 9

Strengthen local food production and processing, especially by smallholder and family farmers, giving special attention to women's empowerment, while recognizing that efficient and effective trade is key to achieving nutrition objectives.

Recommendation 10

Promote the diversification of crops including underutilized traditional crops, more production of fruits and vegetables, and appropriate production of animal-source products as needed, applying sustainable food production and natural resource management practices.

Recommendation 11

Improve storage, preservation, transport and distribution technologies and infrastructure to reduce seasonal food insecurity, food and nutrient loss and waste.

Recommendation 12

Establish and strengthen institutions, policies, programmes and services to enhance the resilience of the food supply in crisis-prone areas, including areas affected by climate change.

Recommendation 13

Develop, adopt and adapt, where appropriate, international guidelines on healthy diets.

As a follow up to ICN2, the UN General Assembly has adopted a Resolution proclaiming the UN Decade of Action on Nutrition from 2016 to 2025. Resolution 70/259 calls for greater action to end hunger and eradicate malnutrition globally and to ensure universal access to healthier and more sustainable diets for all. The Nutrition Decade provides a time-specific window of opportunity to enhance coordination and cooperation between all actors and drive integrated action across sectors to accelerate the achievement of the Sustainable Development Goals (SDGs). One of the six action areas of the UN Decade of Action on Nutrition's Work Programme is sustainable, resilient food systems for healthy diets.¹

Many of the SDGs tie into food security and nutrition, including those on poverty, health, gender equality, education, water and sanitation, responsible production and consumption, and climate change (A/RES/70/1; UNSCN 2014). SDG 2 is the most focused on hunger and nutrition, committing countries to end abolishing hunger, achieving food security and ending all forms of malnutrition by 2030. Others cite nutrition as a means of achieving other goals. SDG 3, for example, seeks to ensure health and well-being for all at every stage of life, while SDG 12 targets sustainable consumption and production patterns. SDG 13 urges countries to take urgent action to combat climate change and its effects, while acknowledging that the United Nations Framework Convention on Climate Change (UNFCCC) is the primary international, intergovernmental forum for negotiating the global response to climate change (see Box 2).

Box 2. **Sustainable Development Goals for sustainable food systems and healthy diets**

SDG 2

End hunger, achieve food security and improved nutrition and promote sustainable agriculture.

SDG 3

Ensure healthy lives and promote well-being for all at all ages.

SDG 12

Ensure sustainable consumption and production patterns.

SDG 13

Take urgent action to combat climate change and its impacts.

The UNFCCC provides a series of technical and financial support mechanisms for building national capacity for a more comprehensive and systematic response to climate change. Despite the opportunities for integrating health, nutrition and diets into the UNFCCC (Tirado et al. 2013; IPCC 2014; WHO 2014), there remains vast potential to expand the work to address nutrition-related in climate adaptation and mitigation measures.

¹ United Nations Decade of Action on Nutrition (2016-2025) (2017). Work Programme.



The Paris Climate Agreement, adopted in 2015, ushered in a new era in the global response to climate change. The Agreement aims to keep the global temperature rise this century well below 2°C above pre-industrial levels and to pursue efforts to limit the increase even further, to 1.5°C. The agreement states that the right to health will be central to national climate action and recognizes the social, economic and environmental value of voluntary mitigation actions and their co-benefits for adaptation, health and sustainable development. In this context, the promotion of sustainable food systems and healthy dietary patterns is critical to reducing emissions and meeting climate mitigation, nutrition and health goals (WHO, 2016). The Paris Agreement is the first international climate change agreement to prioritize food security. In 2016, Parties to the UNFCCC ratified the request for further health-related work under the Nairobi Work Programme (NWP) on the effects of and vulnerability and adaptation to climate change, including malnutrition, presenting a further opportunity to promote nutrition and healthy diets.

At the core of the Paris Agreement are Nationally Determined Contributions (NDCs). The NDCs lay out national plans to reduce GHG emissions and improve countries' resilience to climate change. The development of guidance on and the periodic revision of NDCs offers an opportunity for the health and nutrition communities to work to strengthen the commitments made in the NDCs with an eye to integrating food security, nutrition and the promotion of sustainable and healthy dietary patterns into climate change action plans, both from an adaptation and a mitigation point a view.

Under the UNFCCC, countries have also been developing cross-sectoral National Adaptation Programmes of Action (NAPAs) and, more recently, National Adaptation Plans (NAPs), which give countries a process by which to identify priority actions in response to their urgent need to adapt to climate change. These NAPAs and NAPs usually identify health, agriculture and food security as priority sectors, but frequently do not consider the nutritional aspects. Similarly, the Nationally Appropriate Mitigation Actions (NAMAs) to date have not explored demand-side mitigation options, such as changes in dietary patterns with a view to less GHG-intensive diets, or other changes in lifestyle, such as active transportation (UNFCCC 2015). The link between climate change and nutrition has not

received adequate attention from the international community. Only about 1% of all financing available for climate change is allocated to health and no information is available on how much of that is used to address nutritional issues.

Taking the commitments of the ICN2 Rome Declaration and the recommendations of the ICN2 Framework for Action (FFA) under the broad umbrella of the SDGs, the Nutrition Decade offers a time-specific window for concerted action on human and planetary health, through the translation, integration and implementation of commitments into national policies and climate actions.



3

Interdependence of climate change, food systems, diets, nutrition and health

3.1. Joining the dots between climate change, food systems, diet and malnutrition

Food systems and dietary patterns are key determinants of nutrition and health. At the same time, they play a significant role in environmental degradation and climate change. The global food system, spanning food production, consumption and waste, accounts for a substantial portion of the GHG emissions that are leading to climate and environmental change. Simultaneously, climate change is influencing food production, food systems, the food environment and socioeconomic conditions, and affecting dietary quality and malnutrition.

The dynamics between climate change, health and nutrition are diverse and complex. Climate change influences the key determinants of malnutrition, for example, food access, maternal and child care, access to health services, and environmental health. These determinants of malnutrition are shaped, in turn, by other socioeconomic factors that are also affected by climate change. These include income, wealth, education, social safety nets, food aid, institutional inequities, trade, economic, infrastructure, resources, political structures and the full realization of human rights. Climate-related extreme weather events can have a negative impact on diets, too. Undernutrition, meanwhile, weakens the resilience to climatic shocks and the coping strategies of vulnerable populations, reducing their capacity to resist and adapt to the consequences of climate change. The destitute and marginalized are even more affected and therefore the priority should be given explicitly and systematically to those social groups.

A combination of climate adaptation and mitigation measures and disaster risk management could lessen the threats to nutrition from climate change. Climate change adaptation is key to managing the impact of climate change on the food system, food environment, health and nutrition. Early intervention is important, as the options for successful adaptation diminish and the associated costs increase as climate change intensifies. Mitigation strategies to reduce food-related GHG emissions from the agricultural sectors and food system – such as sustainable food production, healthy dietary patterns and reducing food waste and loss – have co-benefits on climate, nutrition, human health and the environment.

3.2. Climate change and variability impacts on nutrition and health

Climate change is impacting the global food production system at a time when it already needs to respond to the challenges of a growing global population, dietary changes and urbanization (FAO, 2015). As mentioned, under the Paris Agreement (UNFCCC 2015), nearly all countries agreed to act to keep the global rise in temperature this century well below 2°C and to strive to limit the increase even further, to 1.5°C above pre-industrial levels. The 1.5°C limit is a significantly better line of defence against the worst impacts of the changing climate. The effects of CO₂ emissions aside, shifts in temperature and precipitation are set to trigger higher global food prices by 2050, with estimated increases of 3% to as much as 84%, depending on the food in question (Porter et al. 2014).

In low-latitude regions, rising temperatures and changing rain patterns could lead to droughts or flooding, damaging harvests and triggering an increase in market prices. Climate-induced food-price volatility increases food insecurity (Hertel et al. 2010). Faced with higher prices, consumers may opt to buy nutrient-poor but calorie-rich foods and/or endure hunger, with consequences ranging from undernutrition and micronutrient deficiencies to excess weight and obesity.

Climate change may also have an impact on the rates of stunting. Worst-case projections, based on high GHG concentrations, high population growth and low economic growth, estimate that the number of people at risk of undernutrition globally could increase by as much as 175 million from today's levels by 2080 (Brown et al. 2015).

Figure 2.
Number (in millions) of undernourished children younger than five in 2000 and 2050 using the National Center for Atmospheric Research climate model and the A2 scenario

Region	2010, base climate	Without climate change	With climate change	Additional no. of children undernourished because of climate change 2010–2050
Africa south of the Sahara	40.9	37.0	39.3	2.4
South Asia	77.1	50.4	51.9	1.4
East Asia / Pacific	21.9	7.8	8.2	0.4
Latin America & Caribbean	4.3	1.5	1.8	0.3
Middle East / North Africa	4.0	1.7	1.9	0.2
Europe and former Soviet Union	1.8	1.5	1.6	0.1
WORLD	150.0	99.9	104.8	4.8

Source: IFPRI (2017).

Unless action is taken to reduce global emissions, it is predicted that climate change could cut projected world food availability by about a third by 2050 and lead to an average-per-person reduction in food availability of 3.2% (99 kcal per day), in fruit and vegetable intake of 4.0% (14.9g per day) and in red-meat consumption of 0.7% (0.5g per day) (Springmann et al. 2016a). While these percentages may not sound like much, they are global averages, so some areas will be far harder hit than others.

These changes could contribute to an additional 529,000 climate-related deaths worldwide between 2010 and 2050 (Springmann et al 2016a). The effects will be felt disproportionately by the poor and most vulnerable, as they do not have the resources to adapt to new realities and already spend a substantial portion of their income on food. Furthermore, the FAO warns that unless action on climate change is taken, 35-122 million people could fall into poverty as a result of the associated negative impact on incomes in the agricultural sector. It will also have a particularly stark effect on women. Changing agricultural patterns could increase the workload for women in many regions and shift production for home consumption to foods of lesser nutritional value. Greater workloads could also reduce women's capacity to care for their families and could increase their own nutritional/energy requirement.

Climate variations, including extreme weather events, can exacerbate seasonal food shortages, with potentially serious consequences for diet quality, diversity and nutritional outcomes, especially in developing countries. The El Niño Southern Oscillation (ENSO) events in 2015-16 affected the food and nutritional security of millions of people, particularly in Eastern and Southern Africa (FAO 2016). The effects can be permanent in children who are undernourished during their first 1,000 days (Danysh et al. 2014; IFPRI 2016), as damage done during this period is irreversible. More than 80% of natural disasters are climate related and the impact on humanitarian assistance can be substantial (UNISDR, 2013). With a growing risk of extreme climate-related events, we need to better protect nutritionally insecure populations by developing nutrition-sensitive disaster risk-reduction and risk-management strategies.

3.3. Global food demand and dietary patterns – impacts on climate change and health

Global diets are the tie that binds environmental sustainability and human health. Foods differ substantially, though, when it comes to the quantity of land, water and energy needed per unit of energy and protein consumed, as well as the amount of GHG generated.

A 70% increase in total food demand is expected between 2005-07 and 2050 (FAO 2013). At the same time, dietary patterns are shifting, with more food of animal origin, including fish, being consumed (FAO 2013). According to the World Resources Institute (WRI) report entitled *Shifting Diets for a Sustainable Food Future: Creating a Sustainable Food Future*, global demand for beef is likely to increase by 95%, and demand for animal-based foods generally by 80%, between 2006 and 2050. The growth is likely to be concentrated in urban areas of emerging economies, particularly China and India (WRI 2016).

Growing global meat consumption is seen boosting food-related GHG emissions from 30% to 80% by 2050. High demand for meat products may also have profound, long-term effects on the availability and pricing of certain basic food commodities and on access to nutritionally diverse food sources (Friel et al. 2009).

Predictive studies show that if global diets change in an income-dependent way (i.e. tend to contain more animal protein), global average per capita dietary GHG emissions from crop and livestock production could increase 32% between 2009 and 2050 (Tilman and Clarke 2014). It is estimated that alternative balanced or healthier diets (e.g. Mediterranean, pescetarian or vegetarian) could reduce emissions from food production to below those of the projected 2050 income-dependent diet, with potential per capita reductions of 30%, 45% and 55%, respectively (Tilman and Clarke 2014). These studies underline the need to move towards more sustainable and healthy food-consumption patterns in the coming decades.

Red-meat consumption has declined everywhere in recent years, except East Asia, where it has risen by nearly 40% (GLOPAN, 2016), suggesting that it is possible to reduce meat consumption if the appropriate drivers are in place. This may reflect a shift in dietary pattern as countries become wealthier and prefer the 'healthier component' found in higher-quality diets. This could also reflect a substitution of red meat for other types of fresh meats, however, more in-depth analysis is required. Cutting the level of animal-sourced foods in the diets of high meat-consuming countries needs to become a key element of climate mitigation strategies (Hedenus et al. 2014; Ripple et al. 2014).²



² It is important to highlight, however, that in regions affected by severe undernutrition, where people often rely on few staple crops and poor-quality diets, higher meat intake could be nutritionally beneficial.

4

Sustainable and healthy diets

Ensuring that the planet's 9 billion people will have access to a nutritious and healthy diet, produced in a sustainable manner, by 2050 is an immense global challenge. The Intergovernmental Panel on Climate Change (IPCC)³ Fifth Assessment Report (AR5) highlighted the opportunities to achieve co-benefits from actions that reduce emissions and also improve health in high meat-consuming countries, by shifting consumption away from animal products, especially from ruminant sources, towards less emission-intensive diets (Smith et al. 2014). In very-low-income settings, however, better access to animal protein can be essential to improving nutrition for groups lacking diverse food sources.⁴

Sustainable diets have been defined as those “with low environmental impacts which contribute to food and nutrition security and to healthy life for present and future generations”. These diets are protective and respectful of biodiversity and ecosystems, culturally acceptable, accessible, economically fair and affordable, nutritionally adequate, and safe and healthy, while optimizing natural and human resources (FAO and Bioversity 2012). The more diverse the system, the higher its resilience in the face of climate change and other stressors.

In practice, the composition of a diversified, balanced and healthy diet varies according to individual needs (such as age, gender, lifestyle, degree of physical activity), cultural context, locally available foods and dietary customs. The basic principles of what constitutes a healthy diet are set out in Box 3.

Box 3. A healthy diet for adults (WHO 2015)

A healthy diet helps protect against malnutrition in all its forms, as well as non-communicable diseases (NCDs), including diabetes, heart disease, stroke and cancer. A healthy diet for adults contains:

- Fruits, vegetables, legumes (e.g. lentils, beans), nuts and whole grains (e.g. unprocessed maize, millet, oats, wheat, brown rice).
- At least 400 g (5 portions) of fruits and vegetables a day. This can save 2.7 million lives (WHO, 2008).
- Less than 10% of total energy intake from free sugars which is equivalent to 50g (or around 12 level teaspoons) for a person of healthy body weight consuming approximately 2000 calories per day, but ideally less than 5% of total energy intake for additional health benefits.
- Less than 30% of total energy intake from fats. Unsaturated fats (e.g. found in fish, avocado, nuts, sunflower, canola and olive oils) are preferable to saturated fats (e.g. found in fatty meat, butter, palm and coconut oil, cream, cheese, ghee and lard). Industrial trans fats (found in processed food, fast food, snack food, fried food, frozen pizza, pies, cookies, margarines) are not part of a healthy diet.
- Less than 5 g of salt (equivalent to approximately 1 teaspoon) per day and use iodized salt.

³ The Intergovernmental Panel on Climate Change (IPCC) is the international body for assessing the science related to climate change.

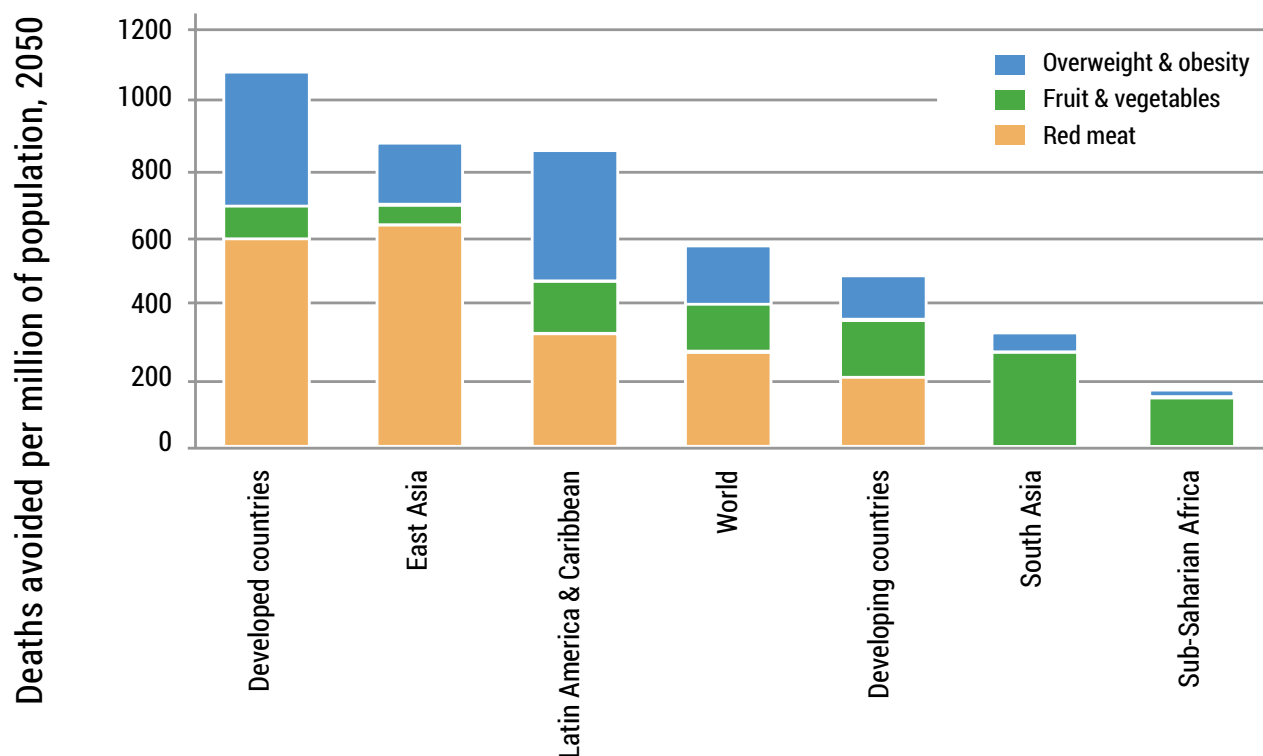
⁴ Livestock is a critical component of income and food security among the rural poor in areas affected by climate change and droughts in Sub-Saharan Africa, Mongolia and other areas of East Asia.

4.1. Co-benefits of sustainable and healthy diets

Diets can improve public health and nutritional outcomes, while also helping to reduce GHG emissions (Friel 2009; HLPE 2012; Tilman and Clark 2014; Green et al. 2015; Springmann et al. 2016b). A transition to more nutritious and diverse diets (with fewer processed foods and more fruit and vegetables) is frequently projected to result in reduced GHG emissions, as well as likely reductions in non-communicable diseases (Green et al. 2015, Milner et al. 2015). For example, if the average adult diet in the UK conformed to WHO recommendations, its associated GHG emissions would be reduced by 17% (Green et al. 2015). Further emission cuts of around 40% could be achieved by making realistic modifications to diets so that they contained fewer animal products and processed snacks, and more fruit, vegetables and cereals (Green et al. 2015).

Globally, it is estimated that transitioning to more plant-based diets, in line with WHO recommendations on healthy eating (WHO 2015) and guidelines on human energy requirements (WHO 2004) and recommendations by the World Cancer Research Fund (WCRF/AICR, 2007), could reduce global mortality by 6-10% and food-related greenhouse gas emissions by 29-70% compared with a reference scenario for 2050 (Springmann et al. 2016b). Yet, less than half of all regions meet, or are projected to meet, dietary recommendations for the consumption of fruit, vegetables and red meat, while also exceeding the optimal total energy intake.

Figure 3. Deaths avoided by following WHO and WCRF dietary guidelines for fruit and vegetables, red meat and energy intake (food availability vs. 2050 FAO projections) by region



Source: Springmann et al. 2016b.

Comparisons of omnivorous diets to more sustainable alternatives, such as Mediterranean, pescetarian and vegetarian diets, have shown the latter to reduce emissions from food production and decrease disease risk globally. Incidence rates of type II diabetes were reduced by 16-41% and of cancer by 7-13%, while relative mortality rates from coronary heart disease were 20-26% lower and overall mortality rates for all causes combined were cut by 0-18% (Tilman and Clark, 2014).

However, diets can have a low environmental impact and still be harmful to human health. Ultra-processed items high in sugars, fats or salt can have lower GHG emissions, but be less healthy than the carbohydrate-rich staple foods they displace. Similarly, while there are synergies between healthy diets and reduced emissions, cardio-protective diets are not always environmentally sustainable. For example, the consumption of nuts and fish has been associated with a reduction in the risk of cardiovascular disease (Zhao et al. 2015; Mozaffarian et al. 2012).

However, there appear to be trade-offs between the health benefits and environmental impact of increasing fish⁵ and nut consumption, which tend to have large ecological and water footprints, respectively (Downs and Fanzo 2015). We, therefore, need to look at the entire food system, especially food production, to ensure diversity increases across the board. This requires research and dedicated resources. In addition, consumers need to choose from the most sustainable alternatives (e.g. eating nuts with a lower water footprint, sustainably caught fish, or underutilized species). Educational initiatives to increase consumer knowledge and informed decision making, as well as incentives to make these foods more affordable (Downs and Fanzo 2015) and accessible will help.

4.2. Shifting dietary patterns towards sustainable and healthy diets

Strategies, policies and measures to make diets healthier and sustainable include economic intervention, changes to the governance of production or consumption, and changes to the context, defaults and norms of production or consumption. More specifically, this could involve taxing unhealthy food, subsidizing or providing economic incentives for the consumption of healthier food options, promoting collaboration and shared agreements, including sustainability in dietary guidelines, conducting public education campaigns and educational programmes in schools, and labelling among other things (Foresight 2011; Garnett et al. 2015). An example is the recent commitment on taxation and labelling made by the Government of Brazil to the Nutrition Decade.⁶

On the production front, eliminating agricultural subsidies for commodities that adversely affect human health and encourage the local production of fruit and vegetables have the potential to make healthy foods more accessible to lower-income communities, as well as support environmental goals (Foresight, 2011; Jacoby et al. 2014). The promotion of healthy diets based on the local, seasonal production of agro-ecological foods, along with the promotion of short marketing circuits, have been proposed as opportunities to increase added value and forge closer ties between farmers, consumers and the land (Jacoby et al. 2014). The development of local food chains, especially for healthy, fresh and perishable products, could facilitate the commercialization of less standardized products and reduce food waste from transport and consumption (HLPE 2014).

5 Although fish does not have a significant carbon footprint, the ecological footprint associated with unsustainable fishing practices is relatively high (e.g. overfishing, the use of trawlers, etc).

6 <https://www.unscn.org/en/topics/un-decade-of-action-on-nutrition?idnews=1684>

On the consumer side, taxing food-related emissions and creating economic incentives could make diets more sustainable and healthier (Springmann et al. 2017). Modelling studies show that the climate-change mitigation potential of pricing emissions that result from food commodities could be substantial (see Box 4). Only governments have the necessary resources and legitimacy to establish a global regulatory and fiscal framework that puts diets on a more sustainable and plant-based track (Wellesley et al. 2015).

Box 4. **Promoting sustainable and healthy diets by taxing food-related emission**

A GHG emissions tax on foods (corresponding to their emissions intensities), if properly designed, could be a powerful health-promoting climate policy affecting health improvements worldwide. Sparing food groups known to be beneficial for health -such as fruits and vegetables- from taxation, selectively compensating for income losses associated with tax-related price increases, and using a portion of tax revenues for health promotion are potential policy options that could help avert most of the negative health impacts experienced by vulnerable groups, whilst still promoting changes towards diets which are more environmentally sustainable (Springmann et al. 2017).

Positive changes in the variety and quality of diets can be brought about by innovative education campaigns that target young consumers, in particular, as well as economic incentives that align the marketing practices of retailers and processors with public health and climate goals (CGIAR 2012). Public-sector incentives for food service companies, retailers and distributors are another potential way of promoting sustainable healthy eating patterns. Such incentives can encourage the development of healthier foods and food labelling (for nutritional content, carbon and water footprints, etc) in a way that helps consumers achieve nutritional requirements while meeting environmental goals.



Food-based dietary guidelines are a key means of encouraging healthy, sustainable and climate-friendly diets. To date, only a few countries (notably Brazil, Germany, Qatar and Sweden) have included sustainability criteria in their national dietary guidelines (FAO/FCRN 2016). Broadly, the advice issued by these countries focuses on reducing meat consumption, choosing seafood from non-threatened stocks, eating more plants and plant-based products, reducing energy intake and reducing food waste. Sweden and its Nordic neighbours have emphasized the environmental impact of diet in their sustainability criteria (see Box 5). Brazil's guidelines also address the social and economic aspects of sustainability and urge people to avoid ultra-processed foods that damage traditional food cultures and health.

Box 5.**Sweden's new dietary guidelines draw on the 2014 Nordic Nutrition Recommendations and seek to tackle environmental concerns**

The Swedish Food Agency's (SFA) new dietary guidelines are based on the fifth edition of the Nordic Nutrition Recommendations (NNR, 2012) and include the SFA's evaluations of the risks and benefits of consuming nuts and raw and processed meats, along with a series of reports commissioned by the agency on the environmental impact of food production.

For the first time, the NNR included a chapter on the environmental effects of food production. This was then used in developing the Swedish guidelines, together with information on the specifics of current Swedish consumption patterns, cultural preferences and dietary challenges, to produce dietary advice on food intake that is easily interpreted by and relevant to most of the population. The advice comprises nine recommendations centering on: fruit and vegetables, fish and shellfish, exercise, whole grains, fats, dairy, meat, salt and sugar, and balancing energy intake and expenditure (i.e. eating just enough). The fifth edition of the NNR also included a comprehensive report on health, as well as the environmental impact of different food choices and how this was incorporated into the development of Sweden's guidelines.

It is important to note that most of the advances in addressing the issue of environmental sustainability in dietary guidelines to date have been made in developed countries. This reflects the fact that to date the overall environmental impact of food systems in developed countries has been worse than in developing countries (UNSCN, 2016). In turn, investment in interdisciplinary research and action to address the broader social and economic dimensions of sustainable diets is needed, especially in developing countries (FAO/FCRN, 2016).

4.3. Research and investment needs

The complexity of the determinants of sustainable diets, such as agriculture, health, and socio-cultural, environmental and socioeconomic factors, frequently makes it challenging for policymakers to understand the benefits of such diets (Johnston et al. 2014). In addition, there are technical and political challenges to developing effective metrics for sustainable diets, particularly in developing countries.

Investment in research is essential to obtain the data and evidence needed to develop sustainable and healthy diets in different socioeconomic and cultural environments and to measure their contribution to health and climate goals. The sustainability and trade-offs involved in diverse production approaches also need to be considered, in order to make sure that needs and the rights of the most marginalised people are prioritised while these choices are made. Assessing and monitoring sustainability and health outcomes requires a reliable global database of food-consumption patterns (national and regional), national health profiles, food composition, and a life-cycle analysis of global food supply, in particular, by geo-climatic region (Johnston et al. 2014).

Metrics and indicators must be developed to assess the impact of the various determinants on the sustainability of a diet and the trade-offs associated with recommendations aimed making dietary patterns more sustainable (Johnston et al. 2014). This is crucial to providing data and evidence of the co-benefits to climate and health of

sustainable and healthy diets to scientific bodies, such as the IPCC and the UNFCCC Subsidiary Body for Scientific and Technological Advice (SBSTA), and thus making the argument for it to be recognized as a priority for climate financing.

As a first step, the FAO and WHO are working on a Global Individual Food Consumption Data Tool. The goal of the online platform, which is being developed in collaboration with Bioversity International and HarvestPlus, among others, is to compile an inventory of the individual quantitative food-consumption datasets that currently exist worldwide. The aim is to share and harmonize knowledge of individual food consumption, making it possible to disaggregate food-consumption data by geographic location, age and sex – a prerequisite to effectively targeting intervention.

There is a wide range of investment options for supporting healthier and sustainable food systems, depending on typology, from large-scale infrastructure improvements to small-scale technical assistance and marketing support, consumer education and incentives (UNSCN 2016). Further investment is needed to help smallholders and farmers in developing countries transition to sustainable food systems, focusing on the effective use of natural resources and agro-ecological approaches, and take advantage of opportunities offered by urban and peri-urban farming to deliver sustainable and healthy diets.

For industrial and mixed food systems in high-income countries, investment should promote the better alignment of public policy with health, nutrition and sustainability objectives and, in particular, support fresh and specialized production rather than a small number of grains (UNSCN 2016). Policy and governance changes that incentivize healthy consumer behaviour and restrict certain industrial practices and powers are required (UNSCN 2016). There is also a need to improve the effectiveness, monitoring and accountability of investments aimed at establishing sustainable food systems that deliver healthy diets, emphasize low carbon and are aligned with commitments under the UNFCCC and the World Health Assembly, as well as monitor progress towards the achievement of the SDGs.

4.4. Need for integrated and coherent policies

The recognition that climate mitigation strategies, agriculture, nutrition and health are intertwined calls for more integrated solutions and coherent policies. The potential negative implications for nutrition of climate mitigation require greater policy cohesion via institutional and cross-sectoral collaboration at the local, national and international levels, and participatory governance mechanisms may need to be developed to ensure those policies achieve equitable outcomes. The trade-offs between climate, nutrition and economy (or other sectors) must always be addressed from a human rights perspective. Civil society needs to engage effectively on multiple levels to ensure a transparent, consensual process and create a policy environment in which climate, environmental, agriculture and health policies can be harmonised with a human rights approach.

Policies on, but not limited to, agriculture, health, food and nutrition, dietary guidance, environment, water, energy, trade, transportation and economics need to be integrated via a multi-stakeholder process to promote sustainable and healthy food systems. This will spark numerous challenges, as will bringing about behavioural change, but we should draw on both the positive and negative experiences of trying to bring about behavioural change in other

aspects of health promotion (e.g. focusing on children in terms of protecting them and as advocates for positive change).

Strategies for accelerating a shift towards less GHG emission-intensive, healthier diets should evolve from the socioeconomic and cultural context and conditions of the food system in question, and embrace government, consumers and producers. Government and policy-makers are crucial to creating the regulatory framework and institutional capacity for shifting to healthier, more sustainable dietary patterns (Wellesley et al 2015).

Global initiatives, such as the Programme on Sustainable Food Systems of the 10-Year Framework of Programmes on Sustainable Consumption and Production (10YFP), are taking steps in key areas, such as sustainable diets and food-waste reduction, and offer promising results that could provide a structure for multiple stakeholders to accelerate shifts toward sustainable consumption and production patterns. These initiatives need to be framed within the context of the UN Decade of Action on Nutrition, as well as the climate change and SDG agendas.



5

Conclusions

Developing a global food system to deliver healthy diets for a growing population, while reducing the environmental impact and reining in climate change, is one of the greatest global challenges of our time. This discussion paper comes to the following conclusions and recommendations:

Sustainable and healthy diets can bring co-benefits to the environment and to people's wellbeing and nutritional status. Dietary and nutritional considerations should be integrated into the climate-change agenda. The IPCC has highlighted the co-benefits of measures that reduce climate-altering emissions and, at the same time, improve health, for example, a shift away from the overconsumption of meat from ruminant sources in high-meat-consuming societies. A general transition to more plant-based diets could lead to lower GHG emissions and likely reductions in diet-related non-communicable diseases. In this context, it is critical to promote demand-side climate mitigation options for the agriculture and food sector, such as changes in dietary patterns towards less GHG-intensive, healthier, more plant-based diets containing more fruit, vegetables, whole grains and pulses.

Adopting food-based dietary guidelines that include sustainability criteria is crucial. Food-based dietary guidelines that include sustainability criteria are key to changing dietary patterns towards more sustainable, healthier diets. Transitioning towards more plant-based diets in line with WHO and other international dietary guidelines could decrease global mortality, shrink the global food gap and substantially reduce diet-related GHG emissions. The inclusion of sustainability criteria in food-based dietary guidelines requires a methodology for developing context-specific, healthy and sustainable national dietary guidelines.

The world needs to engage in climate actions that support nutrition. The nutrition community should engage in multi-sectoral decision-making processes that support nutrition-sensitive climate adaptation, mitigation, disaster risk reduction and sustainable development initiatives that promote sustainable and healthy food systems and diets. Nutrition should be considered in national climate-action processes under the UNFCCC, such as NAPs, NDCs and NAMAs. The nutrition community should contribute to IPCC assessments and to the work on adaptation and health (including malnutrition) carried out via the Nairobi Work Programme on the impact of and vulnerability and adaptation to climate change. Stakeholders involved in UNFCCC work on agriculture and food security should draw on support from the UNSCN and related international institutions, such as the Committee on World Food Security, to integrate nutrition and food security considerations into climate adaptation and mitigation planning and programming. The right to food and other human rights should be used as guiding principles.

Promoting sustainable and healthy diets and nutrition should be recognized as a priority for climate financing. The transition towards low-emission, sustainable and healthy food systems and diets should be a priority for climate funding and take a human rights-based approach. The most vulnerable countries should receive help to develop strategies that facilitate access to climate-change finance to enhance nutrition and ensure sustainable and healthy food systems and diets.

Investment and research are needed to bolster knowledge on sustainable and healthy diets and to spawn effective measures for shifting dietary patterns. Investment in multidisciplinary research is needed to capture the evidence necessary to affect a shift towards sustainable and healthy diets in different socioeconomic and cultural environments, particularly in low-income countries. To make sustainable diets a priority when it comes to climate funding, research efforts should support the development of metrics and indicators of the co-benefits to climate and health of sustainable and healthy diets for scientific bodies, such as the IPCC and the UNFCCC's SBSTA.

Coherent public policies are required, from production to consumption across sectors. Coherent action and innovative food-system solutions are required to ensure access to sustainable, balanced and healthy diets for all. Policy cohesion needs to be achieved via institutional and cross-sectoral collaboration, as well as good governance, and needs to be approached from a human rights perspective. Rural and urban planners need to take into account the distribution and trade of their foods, favouring local and fresh products rather than ultra-processed foods from abroad. Under the broad umbrella of the SDGs, the UN Decade of Action on Nutrition offers a time-specific window for the translation and integration of joint action on agricultural production, human health and the environment into national policies and climate actions.

The Sustainable Development Goals and the UN Decade of Action on Nutrition provide crucial frameworks for joint action to nourish the world sustainably. The delivery of the 2030 Agenda requires a reshaping of the global food system into one that is efficient, inclusive, climate-smart, sustainable, nutrition- and health-driven (IFPRI 2016). Transformed food systems should leave no one behind. Starting from a human rights based approach and investing in longer-term support to allow for the necessary transition to a more equitable food and nutrition security system is essential.

Governments, business and civil society must collaborate across sectors to implement international targets that support a transition to more sustainable and healthy food systems and diets as part of SDG implementation. Further recognition and enforcement of rights-based principles of sustainability in promoting healthy diets is needed, because human rights should be the basis from which to decide the trade-offs between environment, health, economy and other sectors. Integrated policies implemented through collaborative action to reduce climate change and its consequences, while underwriting better outcomes in nutrition and health, are critical to the implementation of the SDGs and the 2030 Agenda.





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Annex 1 - Glossary

Nutrition

Malnutrition is an abnormal physiological condition caused by inadequate, unbalanced or excessive consumption of macronutrients and/or micronutrients. Malnutrition includes undernutrition and overnutrition as well as micronutrient deficiencies (FAO, SOFI 2015).

Undernutrition exists when insufficient food intake, repeated infection and poor care practices result in one or more of the following: being underweight for age, short for age (stunted), thin for height (wasted) or functionally deficient in vitamins and/or minerals (micronutrient malnutrition) (based on UNSCN 2010).

Stunting refers to a child who is too short for his or her age. Stunting is the failure to grow both physically and cognitively and is the result of chronic or recurrent malnutrition. The devastating effects of stunting can last a lifetime (UNICEF, WHO and World Bank 2016).

Wasting refers to a child who is too thin for his or her height. Wasting, or acute malnutrition, is the result of recent rapid weight loss or the failure to gain weight. A child who is moderately or severely wasted has an increased risk of death, but treatment is possible (UNICEF, WHO and World Bank 2016).

A **food system** consists of all the elements (environment, people, inputs, processes, infrastructures, institutions, etc.) and activities that relate to the production, processing, distribution, preparation and consumption of food and the outcomes of these activities, namely, nutrition and health status, socio-economic growth and equity, and environmental sustainability (HLPE 2014).

Food security exists when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life. Based on this definition, four food security dimensions can be identified: food availability, economic and physical access to food, food utilization and stability over time (FAO 1996, 2009).

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, 2012).

A **sustainable food system** delivers food security and nutrition for all in such a way that the economic, social and environmental bases on which generate food security and nutrition for future generations are not compromised (HLPE 2014). A sustainable system would feed and nourish the world using the fewest resources possible, while improving the availability, access and utilization of food resources over time.

Climate change

Climate change, according to the IPCC, refers to any change in climate over time (decades or longer), whether due to natural processes or as a result of human activity. (The UNFCCC considers only the changes in climate that result from human activity.)

Climate variability denotes deviations of climate statistics (mean state, standard deviations, the occurrence of extremes, etc.) over a given period of time, such as a month, season or year, compared with the long-term climate statistics relating to the corresponding calendar period. Examples of climate variability include the fluctuations that occur from year to year, the statistics of extreme conditions, such as severe storms or unusually hot seasons, and conditions that result from periodic El Niño and La Niña events. Because of climate change, climate variability is seen increasing in most areas.

Vulnerability is the degree to which people, communities and the systems on which they depend are susceptible to changes in climate, and unable to cope and adapt when exposed to them. Resilience can be seen as the opposite of vulnerability.

Resilience is the degree to which people, communities and the systems on which they depend are resistant to climate change and able to adapt when exposed to it.

Adaptive capacity is the capacity of people and communities – using available knowledge, skills, resources, information, technology, services and institutions – to cope with climate-related hazards and to adapt to climate change, i.e. to anticipate and prepare for the hazard(s); to prevent or moderate the adverse effects of the hazard(s); to respond to and quickly recover from any adverse effect of the hazard(s); to adapt to stress and change and to take advantage of eventual opportunities, while maintaining or improving their situations and means of functioning compared with the period prior to the hazard(s).

Climate change adaptation refers to actions, measures and processes taken by people, communities and institutions which might ultimately reduce vulnerabilities, build resilience and enhance adaptive capacities to actual or expected changes in climate and their effects, within the broad context of sustainable development.

Climate change mitigation refers to actions, measures and processes taken to reduce the sources of, or enhance the storage of greenhouse gases.

List of abbreviations

CFS	Committee on World Food Security
FAO	Food and Agricultural Organization
FFA	Framework for Action (of the ICN2)
GHG	Greenhouse gas
GNR	Global Nutrition Report
HLPE	High Level Panel of Experts on Food Security and Nutrition
ICN2	Second International Conference on Nutrition
IFAD	International Fund for Agricultural Development
IPCC	Intergovernmental Panel on Climate Change
NAMAs	Nationally Appropriate Mitigation Actions
NAPAs	National Adaptation Programmes of Action
NAPs	National Adaptation Plans
NWP	Nairobi Work Programme
NCDs	Non Communicable Diseases
NGOs	Non-government organizations
NNR	Nordic Nutrition Recommendations
SBSTA	Subsidiary Body of Scientific and Technological Advice
SDGs	Sustainable Development Goals
SFA	Swedish Food Agency
SUN	Scaling Up Nutrition Movement
UN	United Nations
UNFCCC	United Nations Framework Convention on Climate Change
UNSCN	United Nations System Standing Committee on Nutrition
WBG	World Bank Group
WFP	World Food Programme
WHA	World Health Assembly
WHO	World Health Organization
WRI	World Resources Institute

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UNSCN vision

A world free from hunger and all forms of malnutrition is attainable in this generation

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UNSCN

United Nations System Standing Committee on Nutrition

