

Health, sustainable diet and agriculture

Background:

Unhealthy environments, climate change, and poor diet are major contributors to both chronic and acute illnesses. Changes to the way we produce our food, and the type of food we eat, are urgently required for both human and planetary health.

Current status

Diet and Health

Malnutrition is the number one risk factor in the global burden of disease. Overall, at least one in three people have a poor-quality diet.¹ 795 million people have insufficient food and between 2 and 3 billion people suffer from nutrient deficiency. Around 2 billion people worldwide have excess calories in their diets, but paradoxically may also lack nutrients.²

There is an ongoing global transition towards unhealthy diets characterised by excess calories, high proportions of highly refined processed foods, large amounts of animal protein, and decreased intake of fresh fruit, vegetables and legumes: the so-called 'Western Diet'.

Unhealthy dietary patterns are a risk factor for poor health, both directly and by contributing to obesity. There are established links between the 'Western Diet' and increased rates of type 2 diabetes, hypertension, coronary heart disease, metabolic syndrome, respiratory conditions, cancer, osteoarthritis, and reproductive, gall bladder, and liver diseases.³ There is also emerging evidence of a causative relationship between poor diet, mood disorders and dementia.⁴

Agriculture, the environment, and health

Unhealthy diets are just one way in which food systems impact human health. Food systems also affect human health by damaging our environment. Agricultural activities occupy nearly half of the earth's land surface, and account for 70% of human fresh water use. They drive deforestation, desertification and biodiversity loss, and are responsible for around one third of global greenhouse gas (GHG) emissions.⁵

The majority of food-related GHG emissions are related to agricultural activities, with deforestation, nitrous oxide emissions from soils, and enteric fermentation (gases produced by cattle and sheep) being the main contributors. Preproduction activities (eg manufacture of fertiliser and animal feed) and post-production stages (food processing, transport, refrigeration, packaging, retail and domestic management) also contribute substantially to GHG emissions.⁶

The food system is also a significant source of pollution affecting human health, including nitrate and phosphorus from chemical fertiliser and feedlot run-off, pesticides, heavy metals, and endocrine disrupting chemicals. The food system is the second leading cause of outdoor air pollution, including nitrogen-based air pollution and emissions from transport.³

Animal agriculture contributes disproportionately to the environmental effects of the food system. Per unit of protein, animal products use significantly more land and fresh water, and emit more GHGs, than plant based foods. Beef has a particularly high impact, due in part to the low efficiency of converting 'feed input to food output'. It is estimated that only 1 percent of gross cattle feed calories and 4 percent of ingested protein are converted to human-edible calories and protein, respectively.⁷ Per gram of edible protein, ruminant meats (beef and lamb), produce around 250 times more GHG emissions than legumes.⁸

Deforestation to make way for pasture and cropland for animal feed is a leading cause of GHG emissions and biodiversity loss. Currently 33% of all arable land on earth is devoted to feed production for livestock, and grazing occupies 26% of ice-free land.⁹ Livestock, particularly when intensively farmed in industrial feedlots, is a source of zoonotic infections, and the widespread use of antibiotics in animal agriculture and aquaculture is a major factor in the development of antibiotic resistance.

Ocean ecosystems, a significant source of food for much of the world's population, are under threat from climate-change related acidification and warming, overfishing, and pollution. Nitrates entering waterways (primarily agricultural run-off from feedlots and fertilisers) result in algal blooms and hypoxic dead zones. Aquaculture now provides half of the seafood consumed by humans, and aquaculture facilities share many of the environmental impacts of land-based animal rearing facilities, including pollution, disease, and antibiotic resistance. There are increasing levels of concern about plastic debris in the ocean, and the potential for plastic nanoparticles to enter the food chain.¹⁰

Wastage of food exacerbates the environmental impact of the food system, and also contributes directly to GHG emissions through the release of methane. Worldwide, it is estimated that one third of food is wasted at various points of the production chain.¹¹ The use of crops for biofuels also decreases the amount of food available for human consumption.

The health of farmers and other agricultural workers is affected by occupational hazards such as exposure to pesticides, airborne substances, and zoonotic diseases. Mental health is a significant issue, related to the stresses of operating in a complex and uncertain environment, with unpredictable climatic conditions and financial pressures.

How did we get here?

The 'green revolution' of the second half of the twentieth century saw a focus on increasing agricultural yields by the widespread use of irrigation, fossil fuel-based inputs such as fertilisers and pesticides, and the mechanisation of agriculture. These technologies, and government policies, favoured a limited number of crops such as corn, soy bean, rice and wheat. The focus of agriculture changed to the production of large monocultures of such 'commodity crops.' These crops tend to be energy dense and nutrient poor and are typically grown to supply the livestock and food processing industries, rather than as food for people.⁹

Increasing food yields in this way, though initially a bonus for human health, has now resulted in a range of negative environmental and health effects. They include the environmental damage described above, the adverse health impacts of the processed food and meat industries, and loss of dietary diversity. There are also social effects related to small scale

farms becoming less viable, resulting in increasing inequality in rural areas, and large-scale migration to cities. In many countries, food security has been adversely affected.⁸

Where are we going?

Pressure on food systems will continue to increase. The world population is expected to reach 9.7 billion by 2050, and rising incomes in some parts of the world are likely to increase the demand for meat and dairy products. The Food and Agriculture Organization of the United Nations (FAO) has calculated that in order to meet the demand for food in 2050, annual world production of crops and livestock will need to be 50 percent higher than it was in 2012. Land and water resources are already stressed, and climate change is already affecting food production in many parts of the world.¹²

According to the Climate Council, Australia is considered one of the most vulnerable developed countries in the world to the effects of the changing climate. Food production is affected by the increased rates of extreme weather events, such as floods and droughts. More insidiously, climate change and rising levels of atmospheric CO₂ have been associated with a reduction in both yield and nutritional value of food.¹³

Our current food systems are unsustainable. They are destroying the resources and ecosystems on which they ultimately depend, which, ultimately undermines human health as human health and the environment are inextricably linked.

Given the extent and complexity of the problem, action is required simultaneously on many fronts.

Producing food sustainably requires moving to systems that minimise chemical inputs and use resources efficiently. 'Diversified agro-ecological systems' employ a number of strategies to achieve these aims but have been shown to achieve outputs similar to, or better than, industrial agriculture, and at the same time are able to retain soil carbon, support above and below ground biodiversity, and are more resilient to environmental stress.¹⁴

Promoting sustainable patterns of food consumption is vital. The world cannot support the rising demand for animal products, and it is essential for human and planetary health, and long-term food security, to move towards plant-based diets. There is increasing public interest in nutrition, and the benefits of eating food that is local, seasonal and sustainably grown. Rebuilding local food networks has been identified as a key strategy in reforming the food system to be more sustainable, equitable and resilient.⁸

Scientific research has demonstrated the health, environmental and economic benefits of shifting diets. For example, Springman et al, in 2015, calculated that transitioning toward more plant-based diets that are in line with standard dietary guidelines could reduce global mortality by 6–10% and food-related greenhouse gas emissions by 29–70% compared with a reference scenario (based on FAO projections) in 2050.¹⁵

The Australian scene

In Australia, 58% of the land area is used for agriculture, primarily for livestock grazing (54% of the total land area).¹⁶

Agricultural activities account for around 20% of total GHG emissions, with the greatest contributions coming from enteric fermentation and deforestation.¹⁷

Australia is currently the only developed nation amongst the top ten global deforestation countries, and the majority of clearing is for pasture.¹⁸

Australians have the highest rates of meat consumption in the world: 90kg per person per year, or 250g per day.¹⁹

Over 60% of Australian adults are overweight or obese. Obesity and poor diet are disproportionately seen in Australians who are socio-economically disadvantaged.²⁰

Less than 4% of Australian adults, and less than 1% of children, aged 2–18, eat the minimum recommended serves of fruit and vegetables. Over one third of total energy intake comes from discretionary foods (foods high in calories but low in nutritional value).²⁰

In Australia, discretionary foods account for over one third of the overall diet-related life cycle water use, energy use, carbon dioxide equivalent and land use.²¹

Conclusion

Considering the intersections between food production, the environment, and health, human society urgently needs to work towards three main goals:

1. The ability to provide all human beings on the planet with food that is affordable, nutritious, and culturally acceptable.
2. Minimising adverse environmental effects of food production by transitioning towards sustainable management of existing agricultural land, regenerating degraded lands, and avoiding where possible further clearing of native forests and grasslands. The use of pesticides, insecticides, antibiotics, synthetic fertilisers, and other environmental pollutants must be minimised. These measures are likely to have the additional benefit of reducing agricultural related greenhouse gas emissions.
3. Improved resilience of agriculture and food systems to adverse weather events as significant and irreversible changes to the climate are already occurring. Furthermore, effective urgent action to mitigate climate change is required to reduce detrimental impacts on food production.

Achieving the necessary changes will involve a coordinated approach, integrating not only the agriculture, food processing and distributing industries but also agricultural science, climate science, public health, marketing and economics. It will involve making significant changes to complex systems.

The medical profession has a clear role to play in educating the public and policy makers about the multiple benefits of shifting diets towards nutritious and sustainable food.

Position

If our society is to achieve a food system that nourishes humans whilst doing minimal damage to the environment, four clear priorities emerge:

- The development of strategies for food production that minimise environmental and direct human health impacts and maximise the diversity and nutritional value of food.
- An overall decrease in the amount of meat that is produced and consumed.
- A decrease in the amount of highly processed food that is produced and consumed.
- A reduction in food waste.

Policy Recommendations

- DEA supports a coordinated intersectoral approach to food policy that integrates public health, climate change mitigation and environmental protection.
- The Australian government should prioritise research into, and transition towards, farming methods that will allow the nation to achieve a resilient and sustainable agricultural sector capable of producing nutritious food whilst minimising environmental impacts.
- DEA recommends continuing adoption of strategies that minimise the environmental effects of animal agriculture, within the context of an overall assessment of the amount of animal agriculture Australia can and should support.
- Preservation of the water resources on which agriculture depends must be a priority. In particular, coal and gas mining industries have significant environmental impacts including depletion and pollution of water resources.
- DEA urges appropriate government regulation and oversight of fishing and aquaculture industries with the aim of preserving the health of the ocean environment.
- DEA recommends support for programs that nurture the physical and mental health of rural and indigenous communities who manage the land.
- DEA recommends widespread introduction of measures to reduce food waste at all levels of the food system. This should include:
 - Addressing the current trend for increasing portion sizes, which have an adverse effect on human health through encouraging overeating.
 - Addressing the supermarket standards for size and appearance of produce that result in the wastage of large quantities of produce that do not meet standards.
 - Measures to reduce the environmental effects of food packaging, particularly plastics.
 - Research into the potential for plastic contaminants in food to adversely impact human health.

Recommendations to assist dietary change

A transition from a diet containing large amounts of animal products and ultra-processed foods with high levels of unhealthy fats and sugars, towards a balanced and diverse diet based around whole grains, legumes, vegetables, fruits, nuts and seeds, is imperative for both health and environmental reasons. To achieve this transition, DEA supports the following:

- Health promotion aimed at reducing unhealthy levels of consumption of meat and other animal products in the Australian population.
- The provision of information regarding plant-based alternatives for individuals who choose to reduce or eliminate animal products from their diet.
- Mechanisms for food pricing and access, which reflect negative externalities such as adverse health or environmental impacts and facilitate consumption of healthy, sustainable food choices.

- Hospitals and health services should purchase and supply healthy and sustainable food for staff and patients. This includes encouraging food from local sustainable sources, offering more plant-based menu options, serving no processed meats, and phasing out deep-fryers. Use of bottled water, sweetened beverages, and excessive packaging should be minimised.
- Medical and nutrition curricula should incorporate nutrition, food sustainability, biodiversity and environmental health and the interaction between these.
- Medical students and doctors also need to be aware of environmental and societal factors that contribute to obesity and poor health, in addition to dietary and lifestyle choices.
- National dietary guidelines should incorporate specific information about sustainable food choices in order to support both health and sustainable food production.
- Local governments should support community access to local farmers and food distribution networks where possible, and the establishment of urban farms and community gardens.
- Kitchen gardens and cooking classes in primary schools should be encouraged, as they are important in establishing healthy dietary attitudes early in life and reducing the growing trend towards childhood obesity, as well as increasing an understanding of nature.

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