



WHERE HAS ALL OUR FOOD GONE? Influences on the global food supply

The International Red Cross warned that the global food crisis of 2007-2008 could spark food-related conflict and violence on a scale greater than that already witnessed in global food riots.

Price rises, grain shortages, crop failures... what's happening to our global food system?

What is happening is that a number of trends have converged to stress the food system.

The food system is made up of the global supply chain — from farming, through food processing to consumption, all connected by transportation links. Failures in this system show up as increasing prices.

Why this is important is because food is one of the most basic of human needs and is a critical element for communities that seek to make themselves more resilient to the changes now evident around the world.

In this SFFA discussion sheet we explore some of the influences affecting our food supply.

THE SCALE OF THE CRISIS

In the early years of the Twenty-first Century, it is becoming apparent that the world confronts a growing challenge to feeding its six billion people — a number expected to increase to around nine billion by mid-century.

The affordability of food is now a factor in both developing and industrialised countries, and the nutritional value of food is under increasing scrutiny as its role in pandemic disorders such as obesity gains more attention.

Then there's climate change, with its potential, according to the Intergovernmental Panel on Climate Change and Australia's CSIRO, to cause a major shift in the areas that are viable for food production.

Whatever the reason that people cannot obtain sufficient food, or cannot afford that on offer, the result can be devastating for them and their family's wellbeing.

Unaffordability means cutting back on family meals, which increases the probability of poor nutrition and declining health. Without their health, people cannot make the effort needed to improve their standard of living and quality of life. The greatest numbers affected are less-affluent people, especially those in urban areas in less-developed countries, according to the FAO, however people in the more industrialised countries are also affected.

Food grown in a region and sold at grower's markets is a more secure source of nourishment in situations where food distribution may be disrupted. Local food systems increase community resilience.



A global food crisis could be the first major, ongoing impact of climate change.

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By 2025, 1,800 million people will be living in countries or regions with absolute water scarcity, and two-thirds of the world population could be under stress conditions.

The situation will be exacerbated as rapidly growing urban areas place heavy pressure on neighbouring water resources.

www.fao.org/nr/water/issues/scarcity.html

THE TRENDS

Oil prices & security of supply

The global food system is heavily reliant on a continuing supply of oil-based fuels for:

- production of synthetic fertilisers, pesticides and other agricultural inputs
- farm mechanisation
- processing of food into food products
- production of food packaging
- transportation of food by ship, road, rail and air.

With such a substantial reliance, it should come as no surprise that food prices increase in proportion to the price of oil.

The peaking of oil extraction

Peak oil describes the peaking of global oil extraction, after which the oil supply starts to decline as demand continues to rise, forcing up prices for a diminishing resource.

Peak oil, as it becomes apparent, is likely to increase the cost of anything using oil-based products in their manufacture, processing or transportation. This includes food because the global food system is heavily reliant on oil.

A rough date for the peaking of the oil supply is put at around 2015, but some commentators say it has already occurred but is not yet noticeable. Even though future oil finds are expected, they are unlikely to be large enough to halt the trend to declining supplies.

Solutions proposed include:

- improving urban agriculture on the fringe of our cities, including the legislative protection of existing city fringe farmland
- encouraging and improving the productivity of food production in home and community gardens
- introduction of aquaponic systems¹ ² which combine vegetable and fish production in a single unit in urban areas
- promoting the production, processing

1 www.aquaponics.com.au

2 www.ecocityfarm.com

and distribution of foods within the region (known as 'local food') to the extent that is practical^{3 4}.

DIVERSION OF FOOD TO BIOFUELS

In 2007-2008, the diversion of grains from the global food market into the fuel tanks of the world's vehicle fleet, as biofuels, created severe price rises for humanity's basic foods. It also led to some countries restricting grain exports and triggered food riots and social unrest in at least 32 countries. At the same time, demand for other foods pushed up their prices. Only the onset of economic recession in 2008-2009 slowed this drastic rise in grain prices.

The reason for the shortfall in grain supplies was that more money could be made by using grains to produce biofuels such as ethanol, methanol, and biodiesel. These are manufactured from crops such as maize, sugar cane, vegetable oil and soybean. In 2007⁵, an estimated 25 per cent of the US corn crop went to biofuels rather than to food. Food-to-fuel diversion was said to have become the leading cause of deforestation in the Amazon basin and in Indonesia, where huge areas of forest have been burned and cleared for palm oil plantations.

A rapid move to third-generation biofuels, produced from algae in fuel farms, is proposed if we are to avoid a repetition of the food-to-fuel dilemma.

CLIMATE CHANGE AND FOOD SUPPLY

A regional or a global food crisis is likely to be an early and ongoing impact of climate change. Global warming is expected to bring changes to prevailing weather patterns and rainfall regimes, changes that are likely to include a warmer atmosphere, regional drying and an increased incidence of drought, along with — elsewhere — heavier rainfall and flooding.

Projections by the Intergovernmental Panel on

3 www.pacific-edge.info/journalism/society/urbanfood.html

4 www.pacific-edge.info/journalism/food/local_food_bb.html

5 *Time*, November 2007.

Climate Change ⁶ indicate:

- increases in crop productivity due to the development of a more equitable climate, and the boost to plant growth from higher levels of carbon dioxide in the atmosphere, in higher latitude regions of the world, with temperature increases between one and three degrees celsius but with decreases in some regions beyond a three degree rise
- that — according to the CSIRO and others — reduced rainfall and increased evaporation will reduce the availability of fresh water (rainfall and stream flow) in southern and eastern Australia by 2030; declining agricultural and forestry productivity is projected, exacerbated by drought and more severe and frequent bushfire, and accompanied by changes to native ecological systems which have limited capacity to adapt to climate change.

The 2007 farm water crisis in the Murray valley demonstrated the potential for farm productivity to decline, in drought conditions, to the point that it threatens the food supply.

While global warming might improve the viability of some crops in new areas, the overall expectation is for reduced crop yields.

FOOD AND NATIONAL SECURITY

The *Sydney Morning Herald* (7 January 2009) report on a 2007 Australian Defence Forces (ADF) analysis, *Climate Change, the Environment, Resources and Conflict*, disclosed Defence concerns that climate change could become a 'threat multiplier', leading to increased conflict over food and resources in the Pacific and elsewhere. It also warned of failure of Pacific region states; a shift in South East Asian fishing grounds and increased illegal fishing in Australian waters; refugee flows from the Pacific islands; and increasing severity of extreme weather events (cyclones, storms). The paper also warns of the potential for conflict over polar oil and gas deposits as

⁶ IPCC: *Climate Change 2007 - Impacts, Adaptation and Vulnerability; Summary for Policymakers*

the Arctic ice cap continues to melt.

In general, the ADF warnings are similar to those of other military and strategic policy organisations in other countries that point to climate change as a multiplier of internal political instability, border incidents and, potentially, conflict over resources such as water and food.

SUSTAINABILITY OF THE FOOD SYSTEM

The distance that food is transported, its 'food miles', is commonly taken as a measure of food sustainability, especially of the food industry's contribution of greenhouse gases emissions that lead to climate change due to the use of oil-based fuels. As the CERES assessment, *Food Miles in Australia*⁷ points out, however, food miles is only a single element in any assessment of the sustainability of a food product or food system.

As well as food miles, any true measure of food sustainability would take into account:

- the type of agricultural inputs and their impact (fertiliser and agricultural chemicals, whether synthetic or organic)
- energy consumed by farm machinery (oil fuels) and by the warehouses that food is stored in prior to delivery to the retailer (consumed mainly as electricity for refrigeration and lighting), plus that consumed in food transportation, as well as that consumed by refrigeration and lighting by the supermarket or retail premises
- energy and water used in food processing and the production, transportation and processing of food packaging
- the volume of water embodied in the growing and processing of food (known as 'virtual water' or 'embodied water')
- energy consumed in home refrigeration prior to consumption and energy and water consumed in its home or commercial (cafe or restaurant) preparation

⁷ www.ceres.org.au

AN IDEA TO TRY — transportation, food miles and recyclability

1. When you next shop at the supermarket, list the country or Australian state of origin of the products you bought (look for the country of origin label).
2. For each product, work out the distance from point of origin to point of consumption to calculate the total food miles for your basket of shopping.
3. Repeat this exercise when shopping at an organic food store.
4. Calculate the difference, if any, for the distance the food has been transported to the supermarket and the organic food store.
5. On your next visit to the shop, see if there are equivalent products produced closer to where you will consume it.

Remember — food miles is only one indicator of the sustainability of the food supply.

PACKAGING AND RECYCLABILITY

1. Identify what type of packaging the food you have brought at the supermarket and organic food store is sold in (cardboard, plastic etc).
2. From your council, find out what types of materials are collected for recycling.
3. Compare the numbers in triangles on the bottom or on the label of your food products and identify which your council will collect for recycling.
4. For those products in non-recyclable packaging, seek alternatives in recyclable packaging, or unpackaged, when next at the supermarket or organic food store.



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- energy and water consumed in dealing with food and packaging wastes (including landfill and recycling).

This is known as lifecycle analysis because it takes into account full resource costs over the life of a product. It has been estimated that close to 50 percent of an average household's water consumption comes through food choices. If eating it in restaurants and cafes is included the estimate exceeds 50 percent⁸.

THE FRESH WATER SUPPLY — A DRYING RESOURCE

Fresh, clean water is necessary to agricultural production, however declining supplies worldwide are becoming a limitation on agricultural production. This is due to:

- climate change and drought
- overpumping of aquifers (underground water)
- contamination of ground and surface water resources.

In Australia, agriculture consumes 60 to 70 per cent of our fresh water resource.

Our water resource also has to supply sanitation, industry, cities and towns and the environmental flows that sustain rivers and lakes and their ecologies.

Farm-produced foods have high embodied (virtual) water. This is the volume of water used for irrigation and food processing. Foods grown in home and community gardens have less embodied water because of the reduced scale and carefully directed irrigation. This has led to the proposal that urban dwellers who grow food should have a water allocation in the same way that farmers do^{9 10}.

8 *Secure and Sustainable Food Systems for Victoria*, Victorian Eco-Innovation Labs, Melbourne University 2008

9 www.holmgren.com.au (*Garden Agriculture: A Revolution in Efficient Water Use*)

10 <http://www.gopetition.com.au/petitions/allow-water-for-produce-gardens-in-victoria.html>

Other solutions include:

- organic and improved conventional farming to increase soil water retention and soil carbon sequestration
- planting of crop varieties adapted to drier conditions
- water harvesting on farms through innovative approaches such as the Keyline system¹¹, and the harvesting and storage of rainwater in private residences and apartment blocks, as well as from municipal land and from municipal buildings
- greywater and blackwater (treated sewage) processing for agricultural, irrigation and industrial use.

LAND DEGRADATION

Soil erosion, compaction, contamination, salinity and the pollution of waterways all reduce the productivity of farmland. Land degradation is a long-term problem in Australia although measures are being taken by farmers and governments to reduce it.

THE VULNERABILITY OF URBAN FOOD

In the event of an emergency, such as a pandemic or disruption to the food transportation system, Australia's supermarkets hold only a few week's supply of food, assuming no panic buying. In the UK, the figure is around three days food supply on the shelves.

Research published in the Medical Journal of Australia in 2007 raised concerns about "... the concentration of Australia's food supplies, with supermarket outlets being dominated by two main chains. This situation potentially renders Australia more sensitive to logistical hitches if a crisis were to arise..."

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11 www.keyline.com.au