

Why is 'Food Security' now such an important health issue?

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The relationship between the exponential increase in international travel and transport, from the second half of the 19th Century, and health may seem tenuous to some. This review article seeks to explain why this link is now such an important issue.

The means, distances, speed and volumes of food transport have changed dramatically over the last 50 years, driven in large part by international free trade agreements and the quest by companies to maximize profits. This has had food security implications both good and bad for producers and for consumers. For example, in the UK, there is greater volume, choice and availability of certain food products. However, in poorer countries where many of these products are grown, food production for their own local communities has been compromised and importing foods for themselves is something they cannot afford.

The United Nations named 2014 the 'International Year of Family Farming', stressing the importance of food local production¹. This emphasises the need to address the problems of global food security when there are pressures from population growth, urbanisation and loss of fertile land for food crops. Food security risks are also increasing with climate change and this is emphasised in the recent United Nation's 2014 report from the Intergovernmental Panel on Climate Change as one of its 5 key concerns².

What is Food Security?

Food security is not merely about everyone having enough food to eat but comprises several components. Fig 1 shows the dimensions as described by the Food and Agriculture Organisation (FAO) of the United Nations³. Countries with large populations, much

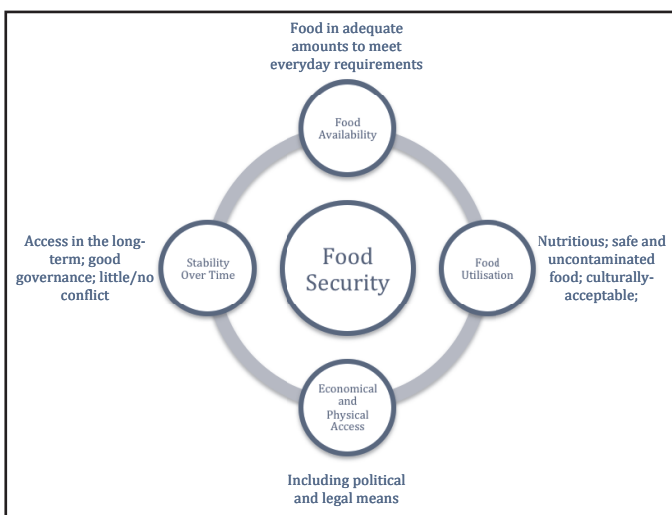


Figure 1
Dimensions of Food Security

urbanisation and with limited farming can be 'food-secure' and countries producing a lot of food may be 'food-insecure'. This is in part because much food is exported from poorer countries with limited financial resources to richer countries⁴.

Why is Food Security a Global Health Issue?

More than enough food is produced worldwide to feed the world's population⁵. Yet, there remain many who are undernourished, mostly in developing countries due to uneven distribution (Fig 2)³. Areas at highest risk are in Africa and South Asia. Africa has more countries at extreme risk but there is a much larger population in South Asia leaving more individuals at risk⁶. Poor global distribution of foods contributes to this food insecurity.

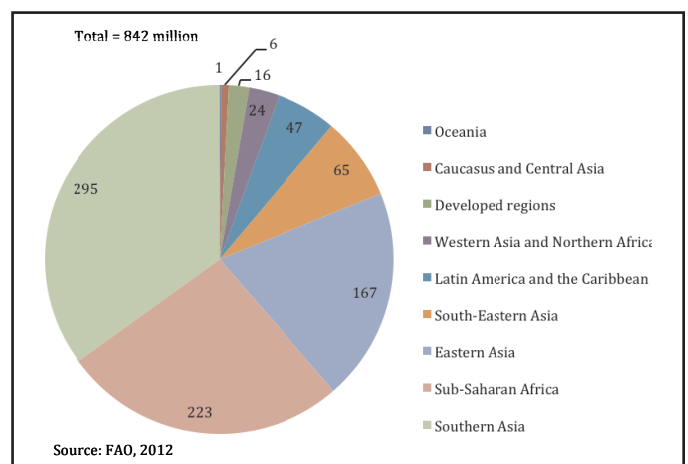


Figure 2
Undernourishment by Region in 2011-2013 (millions)

Currently the overall numbers of undernourished persons globally are decreasing (Table 1)³ but the pattern is very uneven between and within different countries.

Years	Number of undernourished persons (million)	Percentage of undernourished persons (%)
1990-1992	1015	19
2000-2002	957	15
2005-2007	907	14
2008-2010	878	13
2011-2013	842	12

Source: FAO, 2012

Table 1
Numbers of the world's undernourished persons

Why is ‘Food Security’ now such an important health issue? continued

It is projected that the world population will rise to 9.1 billion by 2050 and 10.1 billion by 2100⁷. In order to support these numbers, food production in all sectors will need to increase by 70% before 2050⁸.

Adequate nutrition is needed for the body to function normally at cellular, organ and whole body levels. Being undernourished increases the risk of illness and death from infectious diseases⁹. In children, adequate nutrition is even more important because it has many health and social implications in later life (Table 2)⁹.

Short-term	Long-term
Mortality	Adult size
Morbidity	Intellectual ability
Disability	Economic productivity
	Reproductive performance
	Metabolic and cardiovascular disease
Source: Black R, 2008	

Table 2
Consequences of undernutrition

On a global scale, nutrition, health and agriculture are intimately linked (Fig 3)¹⁰. When food producers are undernourished this lowers their productivity due to poor health resulting in smaller yields of crops and livestock and also smaller personal incomes¹⁰. In Africa, the HIV / AIDs pandemic has led to a two-third loss in the agricultural labour force⁵.

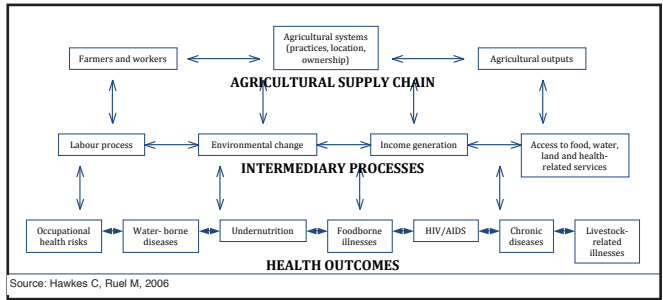


Figure 3
Links between agriculture and health

It must be remembered that ‘malnutrition’ includes those who are overweight, obese or micronutrient deficient⁹. This is notably in the ‘Western world’ but is also becoming a problem in developing countries where infectious diseases complications are more likely⁵. To achieve global food security, we need to eat food that is culturally acceptable, nutritious, sufficient but not excessive in quantity. Changes in food choices and habits are needed worldwide not just in developing or more developed countries⁹.

What are the main food security challenges?
There are many pressures affecting food security in all

countries. However, much of the current focus is on the developing world where 70% of poorer populations are living in rural areas dependent on agriculture for their livelihood¹¹. Climate change making weather unpredictable (e.g. droughts and floods) is leading to poor harvests and changing patterns of diseases⁴.

Globalisation
This may be seen as good for economic development, made possible through improved transport and use of modern transport and other technology. Better communications enable the spread of ideas, international trade and investments. This can be an opportunity for increasing income through agricultural exports and investments. However, globalisation can harm stable communities, more so in rural areas and in previously sustainable environments⁴.

High labour costs in richer countries have encouraged transnational companies to support farms in developing countries but some also take over farm management. For example, in Mozambique, many hectares of land that used to belong to local farmers have been taken over¹². Small-scale farmers are most vulnerable as they are unable to compete with cheap prices given to producers made possible through government subsidies, tariffs and trade restrictions⁴. Large companies may also purchase or manage land in developing countries for non-food resources such as mineral extraction, ethanol production, biofuels and logging which reduces land available for the locals to grow food for themselves. Transporting these products for export requires transportation contributing to increased greenhouse gases, pollution and climate change⁴.

These changes in farming practices based on maximising production leads to monoculture replacing traditional polyculture (Fig 4). Also, small farmers may not be aware of the implications of genetically modified crops which use seed engineered

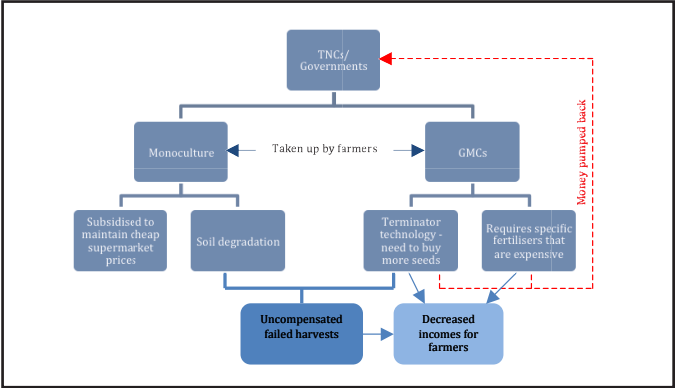


Figure 4
Detrimental effects of monoculture and GMCs

to be infertile so as to control contamination of other nearby crops. This means new seed has to be bought every year at extra expense to the farmer rather than using their own taken from previous crops⁴.

The 'Green Revolution Initiative'

This began in the 1960s when subsidies and investments were made for research to boost agricultural yields through intensive farming because there was a perceived threat of famine in the Western world. This gave more financial security for farmers but resulted in a surplus of some foods (especially milk, butter and cheese). This initiative spread to developing countries, such as India, where similar methods were introduced¹³. Intensive farming methods improved production but at a price (table 3). Usually it was larger farms that took up these methods because they had greater access to irrigation and credit. Smaller, often tenant, farmers had to compete with the lower prices for crops set by large farms in conjunction with retail outlets as well as higher rents asked for by landlords due to increased value of and demand for land⁴. This displaced farm workers who often move to cities where they lack skills to obtain new jobs. This 'revolution' was effective in its short-term aim but sustainable farming methods need to be established to ensure long-term food security.

Green Revolution	Implications
Outcomes	
High yield, intensive farming	Fast cash, surplus of foods Soils leached of nutrients and micro-organisms Infertile land Dependent on chemical fertilisers
Chemical fertilisers	Quick replenishment of soils Extra spending of farmers' earnings Fertiliser runoff
Heavy machinery	Decreased hard labour, increased efficiency Disruption of natural soil structure Destruction of topsoil Loss of jobs
High yielding variety crops	Focused on staple crops: rice, maize and wheat More resilient crops to pests Higher yield, reaching maturity in shorter time Drop in food prices – allows for expenditures to be spent on other nutrients, like protein Displaced traditional crops high in micronutrients

Table 3
The Green Revolution

Food Waste

It is unsurprising but the scale of this is huge. An estimated one-third (1.3 billion tonnes) of food is wasted every year¹⁴ (fig 5). In more developed countries this is mostly at the supermarket and consumer level. Food waste disposed of into landfill sites contributes to greenhouse gas emissions. While a certain percentage of food waste is inevitable, a high proportion is unnecessary¹⁴.

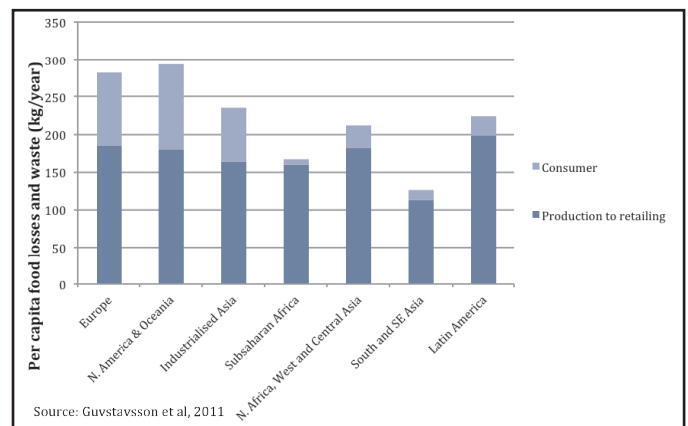


Figure 5
Food waste by region

Food Safety

Around 30% of the population in developed countries is affected by foodborne disease and in developing countries it causes 1.2 billion deaths annually¹⁵. This is likely to be underestimated, as many cases are unreported. Foodborne illnesses can quickly spread internationally through modern day fast travel. Food contamination can also occur through the use of chemical fertilisers or pesticides and the long-term effects of this are often uncertain⁴.

What Measures can be put in place to Help Ensure Food Security?

The United Nations set as one of its Millennium Development Goals a target of halving the proportion of individuals suffering from hunger by 2015³. There has been some success but this goal is likely to fall short by 1%. Many countries have difficulties accurately monitoring these changes (Fig 6)³. Some

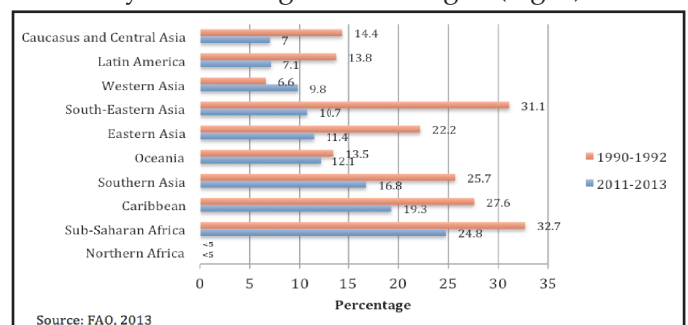


Figure 6
Changes in undernourishment by region

Why is ‘Food Security’ now such an important health issue? continued

countries having reached this goal remain vulnerable. A Lancet series on maternal and child nutrition uses a classification of strategies¹⁶ including ‘nutrition-specific’ and ‘nutrition-sensitive’ interventions. Nutrition-specific interventions directly influence nutrition, whereas nutrition-sensitive interventions cover a wide range of factors that underlie determinants of nutrition. The interventions in Table 4 have been adopted from the ‘Scaling Up Nutrition movement’, an initiative set up to curb malnutrition¹⁷.

Nutrient-specific	Nutrient-sensitive
Treating severe malnutrition	Agriculture
Biofortification and micronutrient supplementation	Clean water and sanitation
Treating severe malnutrition	Support for resilience
Changing diet habits	Education
Reducing food waste	

Table 4
Possible interventions to achieve food security

Nutrition-specific Interventions

The ideal form of nutrition for infants is breastfeeding. Everyone should be encouraged to breastfeed exclusively until 6 months of age and understand the benefits of it¹⁸. These benefits include:

- Naturally building up an infant’s immune system
- Direct breastfeeding rids the worry of contamination
- Breast milk composition provides the optimal nutrition
- Breast milk is free

Mothers must be aware of the need to start appropriate weaning by 6 months of age because this is when many infants otherwise become vulnerable to malnutrition.

Those who are micronutrient deficient are considered to be malnourished. This is more of an issue in developing countries and can be approached by fortification of foods or providing supplements. Fortification of staple foods prior to distribution allows a large proportion of the population to be reached. Crucial micronutrients for children are zinc and vitamin A and supplements have been shown to reduce mortality in children¹⁸. During pregnancy, an adequate intake of folic acid is essential.

Controlling malnutrition also involves treatment, especially for those suffering from severe forms¹⁷. Acute malnutrition (wasting) can be successfully

reversed. Chronic malnutrition (stunting) can also be reversed but only up till to 36 months of age¹⁹. ‘Treatment’ by health care professionals should only encourage use of ingredients that are locally available after the child has gone home.

Changing Dietary Habits

Local healthy food production can help improve the sustainability of local farming and contribute to reducing climate change. Agriculture is estimated to contribute 10-12% of greenhouse gas emissions²⁰ mostly from livestock releasing methane and nitrous oxide and world-wide there has been a large increase in meat consumption at the expense of vegetables especially in middle-income populations. Not only is this bad for the environment but it is also detrimental to health as saturated fats increase the risk of cardiovascular disease and obesity²¹.

More practical uses of food waste can be employed. Localising food production can reduce food waste and keeping production closer to home means there is less chance of food spoiling before it reaches the consumer as well as less need for expensive storage during transport¹⁴. Co-operation between farmers and distributors can reduce surplus of food saving time and costs¹⁴. Farms that mainly sell crops to supermarkets with their own regulations on weight and presentation can pass on what is rejected to the local population or sell it at markets for extra income¹⁴. Excess produced for human consumption could be used as animal feed instead of discarding it⁵. Food waste from households can be composted and used as soil fertiliser²².

Nutrition-sensitive Interventions

Localisation encourages individuals to grow their own foods and buy or sell produce locally⁴. This is often cheaper, encourages a sense of community and money spent will be more likely to remain within the local area. It means less ‘food miles’ and fewer preservatives since these products will not need a long shelf life.

Small-scale farmers need support¹⁷. These farms are usually more sustainable due to traditional farming methods using natural organic fertilisers, crop rotation and fallow periods to allow soils to replenish⁴. Small farms tend to be more labour intensive and provide local employment. In general, more investment and research needs to be dedicated to agriculture to find ways of farming in a more sustainable and efficient way¹³.

Clean water supplies and sanitation is vital in developing countries to ensure food security¹⁷. Access

to water for irrigation is important and small-scale irrigation systems such as low-cost water pumps can be more effective and less expensive to run.

The relationship between wars, human conflicts and food security is very important¹⁷. Food 'safety nets' or 'baskets' have been proposed as a short-term measure to try to protect the poor from economic shocks and social unrest. At the same time, increased local knowledge about the basics of health, sanitation and horticulture can assist populations to fend for themselves to some extent at times of crisis²³.

Education is central to all the interventions that have been mentioned. It brings individuals a sense of self-worth, increases the chance of survival and provides skills that bring opportunities for future employment.

Conclusion

Governments should be looking generations ahead and recognise the need to find ways of managing resources. Food is essential for survival. Investment in agriculture, especially small farms, is required to keep communities above the poverty line and prevent famine.

Key Messages

- Food security is multi-dimensional, including access, availability, utilization and stability.
- There are more than enough food calories to feed the world's population, the problem lies in inequities between countries.
- Projected population growth is a great pressure on food security.
- Health and agriculture are intimately linked; both effecting each other.
- Problems facing food security are vast, much of it due to globalization.
- Food safety affects both developed and developing countries and is a public health issue needing attention.
- Political unrest and lack of governance have a profound influence on the state of food security.
- Small-scale farmers need to be supported for the sake of their local communities as well as for their security and standard of living.
- Nutrition-sensitive and nutrition-specific interventions can be employed to ensure food security.

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