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Feast or Famine – issues in feeding the world's population

A fair share?

Food has never before existed in such abundance, yet the focus of the UN Food and Agriculture Organisation's World Food Day in October 2010 was 'Feeding One Billion Hungry'. There are now 1.02 billion malnourished people in the world, an increase of 105 million hungry people in 2009 alone. This means nearly one-sixth of all humanity is suffering from hunger. Most vulnerable are the rural and urban poor, women, and those suffering from a catastrophe, which ranges from earthquake to civil war. Ironically the world's most food-insecure and hungry people are often directly involved in producing food!

Hunger is not distributed evenly around the planet. The majority of the hungry live in developing countries, but hunger also occurs in the industrialised world, especially in large urban centres. FAO hunger statistics started in the 1960s, when 878 million people were recorded as hungry. Despite some successes in reducing world hunger, especially in China and India, undernourishment has increased continuously since 1995–97, with a significant 'spike' in 2008/09 following the onset of the current economic and financial crisis:

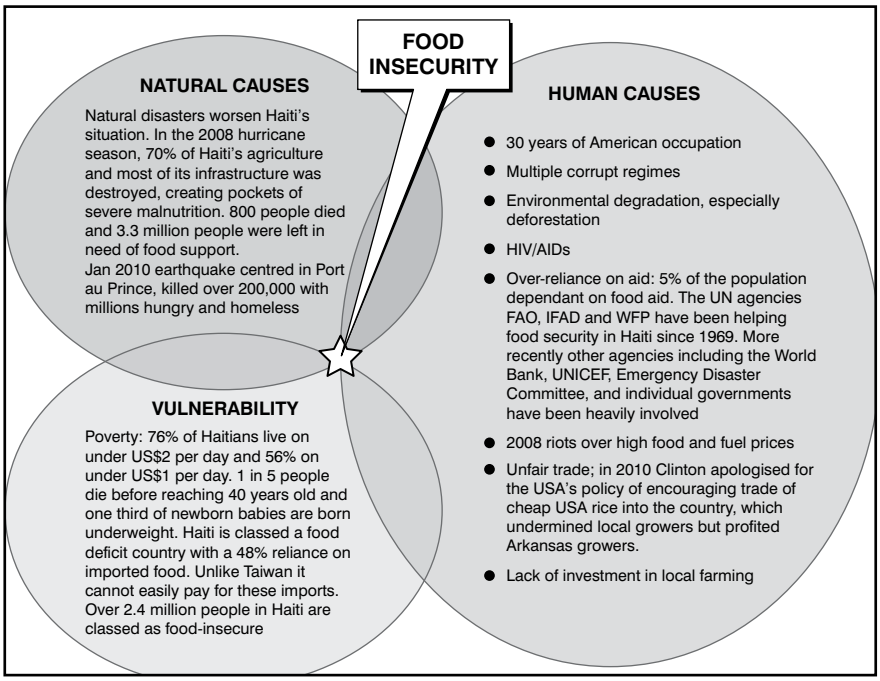
- Sub-Saharan Africa has the highest prevalence: 265 million, or 1 in 3 people.
- Asia and the Pacific has the highest total number: 642 million
- Latin America and the Caribbean: 53 million
- Near East and North Africa: 42 million
- Developed countries: 15 million

Food security encompasses both feast and famine, and is measured by the availability and nutritional status of food in a place, and whether the people living in that place can access and utilise it (Figure 1).

Figure 1: Basic definitions from the FAO and WHO

- **Food insecurity**: 'Exists when people lack access to sufficient amounts of safe and nutritious food, and therefore are not consuming enough for an active and healthy life. This may be due to the unavailability of food, inadequate purchasing power, or inappropriate utilization at household level.'
- **Undernourishment or chronic hunger:** The status of persons, whose food intake regularly provides less than their minimum energy requirements. The average minimum energy requirement per person is about 1800 kcal per day.
- **Overweight and obesity** are defined as abnormal or excessive fat accumulation that causes a health risk measured by the body mass index (BMI), a person's weight (in kilograms) divided by the square of his or her height (in metres). A BMI of over 25 is overweight, whilst 30 or more is obese.

Figure 2: Categorising the causes of food insecurity



What are the factors that help explain this uneven distribution?

Since the Second World War, global food production has increased to the point that we are now producing more than enough food to adequately feed every human being. Figure 3 shows the complex physical and human factors that help explain why access to food varies . The success of local food producers is a key factor in determining whether a place will experience feast or famine . On a larger scale, food prices remain high especially in developing countries, linked with the global economic crisis which has compounded the situation since 2007 by causing job losses, deepening poverty and hence vulnerability. This rapid rise in food prices is called a 'food spike'.

How can we weigh up these complex factors affecting food security ? One graphical method is to adapt a model originally created by Degg for the causes of natural hazards and disasters (Figure 2). The size of each of the circles may be made proportional to the relative importance of more natural and more human created causes. Since 1992, the proportion of short and long-term food crises that can be attributed to human causes has more than doubled, rising from 15 to over 35%.

Case studies of feast and famine

Case study 1: Haiti: famine

The first case study is of a country beset with long term or chronic food issues exacerbated by natural disasters and over dependence on

outside aid. Long before the biggest natural disaster in Haiti's history shook Port-au-Prince in January 2010, this Caribbean nation of 10 million struggled to feed and shelter its rapidly growing population. More than a million Haitians relied daily on international food aid, and the capital sprawled with shanty-towns built by unemployed farmhands who had migrated to the city in search of work. Haiti is the poorest nation in the Western Hemisphere, but its history is very different: under French rule in the 1700s, it was the wealthiest colony in the New World. World attention has led to the UN creation of a High Level Food Security Task Force. This is another chapter in the long history of outside aid, such as the WFP Food for Work Programmes, school children meal schemes, HIV/AIDs and TB relief, de-worming programmes, and rations to 1.1 million in urban food insecure areas.

Case studies 2 and 3: a comparison of Kenya (famine) and Taiwan (feast); the role of networks, globalisation and markets

Global network theory can help explain why the best-connected places attract concentrations of wealth, opportunity and choice. Places that are excluded from networks are more likely to experience food insecurity due to poor incentives for local farmers to produce, as well as difficulties in accessing global food markets. Taiwan is an example of a place that has eradicated food insecurity as it has become better connected within the global economy, whereas Kenya is an example of place where food insecurity has increased as it has become increasingly removed from the global economy.

At the end of the Second World War Taiwan was poorer than Kenya. However, Taiwan's government, helped by US aid, forced through a land reform programme which boosted output in its sub-tropical climate. Able to borrow to invest, Taiwan's farmers generated a surplus to invest in industry, and increased productivity released labour from the land to work in factories. The transition of Taiwanese industry from low-cost mass production to high-tech information technologies, well connected in the world economy, enables Taiwan to buy all the food it needs on the world market, now inviting the problems of feast rather than famine. The prevalence of obesity and overweight in Taiwan are 19.2% and 30.5% in men, 13.4% and 21.3% in women.The country's rapid economic growth is called the 'Taiwanese miracle'.

Kenya contrasts in these ways:

- It retains a combination of large landowners producing cash crops for the world market, such as tea, and subsistence farmers who in many cases do not own their own land.
- Restrictions on land ownership and the inefficiencies of small-scale, low-tech production inhibit the productivity gains seen elsewhere in world agriculture.
- Exclusion from trade blocs, such as the EU, means that even larger-scale, more efficient Kenyan producers can't compete with highly subsidised European producers in world markets.

Figure 3: Factors influencing food security

Population increase: 9 bn by 2020, so global demand for food, feed and fibre will probably double.	The **food transition** of emerging economies copying western style, resource-intensive eating habits, especially India and China. By 2050 demand for meat may have increased by 85%, hence less land for direct food crops.	**Competition** is increasing for land and water from our sprawling urban settlements In 2000, nearly 2 billion people lived in cities; by 2030, this figure will have more than doubled.	**Land degradation**: since the 1950s new techniques encouraged **intensive farming,** especially **monoculture**. Up to 40% of land is now degraded by eg soil erosion and salinisation.
Conservation: demands increasing from the need to maintain biodiversity, habitats and endangered species, meaning less land to farm.	The **technological challenge** will be to grow more from less land, with fewer hands as in most regions fewer people will be living in rural areas and even fewer will be farmers.	**New demands** from cropland for bioenergy which removes land from production for food.	**Peak oil**: petrochemicals are the driver of modern agriculture – pesticides, fertilisers and herbicides. This is unsustainable and there are already clear signs we are running out of oil.
Collapse of important **gene pools** of native breeds by replacement by high-yielding domestic varieties, especially GMOs. May lower capacity to adapt to climatic change and new pests.	**The agri-food chain** is dominated by TNC supermarkets from grower, distributor to point of sale in especially industrialised economies but increasingly in transition economies also.	**Accessibility** of markets, land **ownership** systems, **inheritance** laws, role of **aid agencies** all play parts in the current global food security issues.	**Politics:** government policies – hence the rise of fair-trade movements. **Wars** and ethnic unrest are also factors disrupting agricultural output and distribution.
Impending '**water bankruptcy'**, coined by the Davos meeting 2009. Agriculture accounts for 70% of global freshwater use, but unsustainable extraction from lakes, rivers and groundwater is an ever-growing threat to the long-term sustainability of global food production. The UN 2005 Millennium Ecosystem Assessment identified 70 of the world's major rivers as being close to their maximum extraction levels, e.g. Colorado, Ganges, Jordan, Nile and Tigris-Euphrates.		**Climate change** directly affects food production by changing agro-ecological conditions. Rising sea levels flooding areas and increased seasonal variations in rainfall will alter water availability, making yield prediction more difficult. New crop diseases and pests. Regional shifts in agricultural production with adverse affects at lower latitudes, where most developing countries are. Melting of the glaciers in the Himalayas is feared in many Asian countries.	

Case study 6: China's changing experience of hunger and obesity

China has 22% of the world's population, but only 7% of its total arable land. Only in 2005 did China shift from being a recipient of the World Food Programme to being a donor. All its history and management is dominated by strong centralised government policies.

Mid 20th C

Between 1958 and 1961 an estimated 10-40m died from the humanitarian disaster of the 'Great Famine'. This was the result of:

- a series of major droughts and floods
- more importantly the huge social changes accompanying the 'Great Leap Forward', involving collectivisation of farming, forced migration of peasants to work in factories and inappropriate crop planting and ploughing techniques, leading to degradation of land.

Late 20th C

Great regional differences in food security: western, rural areas generally fare worse than the richer, more urban eastern regions.

The most vulnerable regions of Shanzi, Guangxi, Guizou, Yunnan, Tibet, Shaanxi, Gansu and Qinghai are still most food insecure: 90.5m people, about 7% of the total population. All suffer harsher environments, poorer transportation and infrastructure and have a history of low incomes and poverty.

21st C

- The country's recent breakneck economic growth has led to the rise of a new wealthy class whose dietary demands have changed from the basic staple of rice to more western foods, and who consume more food and have a more sedentary life style generally.
- The one-child policy also has led to pampered, overfed children.
- Now, according to the WHO, over 18% of the Chinese population are overweight, with over 50% classed as overweight in the 35-59 age groups, and up to 10% of Chinese youth.
- The prevalence of type 2 diabetes, specifically related to diet, is about 12% in the USA, 7.1% in India but a growing 4.5% in China .

The government prioritised **self-sufficiency** in the supply of basic products for the Chinese diet (e.g. rice and grain).

Collectivisation was abolished in 1978.

Government intervention in food distribution and marketing systems, national and local food reserve schemes, price regulations, increased international trade and rural infrastructure development.

5 year plans still target the poorer areas of the country, e.g. highway construction, water and sanitation projects to improve access and utility of food.

New technologies embraced, e.g. integrated pest management, hybrid and new crops to improve output. To combat degradation from the advancing Gobi desert, encroaching on grazing lands by 900sq miles/year, a controversial massive plantation of trees has started, 4,500 km long, called the 'Green Wall', target completion: 2074.

Land grabbing: since the 1960s government support of land purchases abroad for its own food production. It started in nearby countries: Laos and Cambodia, but now in Africa, especially Zambia, Tanzania and Angola. The impact may be to put these areas into increasing longer-term food insecurity, although an injection of investment is welcomed short term.

In response to the epidemic of **obesity,** the government is encouraging production of weight reduction 'tonics', creams, soaps, free tape measures for students in Beijing to monitor waistlines, and compulsory 'fat camps'.

- Moreover, the dumping of subsidised food commodities on world markets by the EU further undermines incentives for investment in Kenyan agriculture.

As a result, the FAO estimated in 2009 that 10 million Kenyans were critically food insecure, especially the 3.2 million affected by drought in the marginal agricultural areas of Eastern, Coast and Central Provinces and 3.5 million urban slum dwellers such as in Kibera, Nairobi. Other vulnerable groups include displaced people, and the 2.2 million affected by HIV and AIDS. Current and future changes in climate patterns are likely to exacerbate existing problems. Interestingly, Kenya's prevalence of overweight people is estimated at 22% in women, since being fat is still seen as a sign of affluence.

Case studies 4 and 5: a comparison of Ethiopia and Australia: the varying roles of climate, politics and development

Australia and Ethiopia are good case studies to assess the importance of climate and development as a cause of food insecurity. Australia is number 2 out of 189 countries ranked for quality of life by the UN's Human Development Indicator Report 2009. Ethiopia was ranked 171. Haiti is 149. Politics and good governance are critical aspects in food supply and security: poor decisions made by the Ethiopian rulers over decades contrast with the stable democracy of Australia. Ethiopia's economy is dominated by smallholder agriculture, employing 89% of the labour force. In contrast, only 3.6% of Australia's labour force work in agriculture. The sector is characterised by large-scale farms orientated to production for world markets. Ethiopia's population is rising at 3.2%, higher in some rural areas, whereas Australia's population is increasing at only 1.7% a year, concentrated in urban areas.

Both Ethiopia and Australia have experienced significant drought hazard events in every decade since 1970. Eastern Ethiopia has been experiencing a severe drought hazard since 2007 and Australia's recent drought from 2003 until 2009 was

Figure 4: Data table

Data from WHO	GHI 1990	GHI 2009	BMI/Overweight/ Obesity BMI ≥ 25 kg/m²		BMI/Overweight/ Obesity BMI ≥ 30 kg/m²	
			males	females	males	females
UK	N/A	N/A	61.9	65.7	24.2	21.6
Australia	N/A	N/A	72.1	62.7	23.8	24.9
Taiwan	N/A	N/A	19.2	13.4	30.5	21.3
China	12	6	33.1	24.7	1.6	1.9
Kenya	20	20.2	6.9	21.7	0.1	1.9
Ethiopia	44	31	33.1	24.7	1.6	1.9
Haiti	34	29	15.1	50.6	0.7	15

NB GHI is an index weighting the food situation of the entire population and the effects of inadequate nutrition on children, a physiologically particularly vulnerable and high risk group. The index ranks countries on a 100-point scale, with 0 being the best score ('no hunger') and 100 being the worst.

one of the worst in living memory. Both countries face the same potential reduction in biological productivity in their dryland ecosystems as a result of extreme weather events. Their food producers face similar environmental constraints, such as salinisation and aridity, on agricultural production.

Subsistence farmers in the centre and east of Ethiopia do not have the capital to invest in technological solutions to maintain agricultural productivity during dry periods. The country's main investments in water storage and irrigation serve large-scale coffee producers in the south and west. Australia has invested heavily in the Snowy Mountains Water Transfer Scheme to improve irrigation in the Murray-Darling basin. Moreover, individual farmers are pioneering technologies to improve productivity during dry periods, such as partial-root zone irrigation, or switching from sheep to hardier goats.

As a result, there is a clear difference in the way the two countries experience food insecurity. The World Food Programme estimate that 15% of Ethiopia's population suffers chronic food insecurity, with higher concentrations in rural areas. Erratic climate, unsustainable population growth, and high levels of vulnerability to hazard events can lead directly to famine events, with the highest mortality reserved for the youngest. 7.5% of Australian households also reported experiencing food insecurity in 2003, with higher concentrations in some urban areas. But there is no famine amongst Australia's urban poor. Welfare payments ensure even the poorest do not experience the dire outcomes of the poorest Ethiopians.

Conclusion

Food security is a complex and dynamic global issue. Undernutrition blights the lives of billions. Large-scale famines are now rarer, but urban areas, increasingly face shortages in supply and quality. Key factors include changes in cultural habits and lifestyles in our increasingly globalised world. Efforts at management range from local to international enacted by a range of players. Goal 1 of the UN Millennium Development Goals to 'Eradicate extreme poverty and hunger by 2015' may well be ambitious, especially in sub-Saharan Africa. Signs of hope come from some transition economies like China, yet ironically, these are now battling the double burden of famine and feast, as obesity and its related health and financial externalities escalate.

Websites

Use internal search engines within following reputable websites:

UN FAO website, useful videos on Haiti and how to feed the world in 2050 http://www.fao.org ·

Medicins Sans Frontiers on child malnutrition and failings of 2010 World Food Summit http://www.msf.org.uk ·

BBC on global hunger index, UK food policy 2030 and threats of obesity and climate change http://news.bbc.co.uk ·

DEFRA on all aspects of food supply: http://www.defra.gov.uk

Focus Questions

Questions	Help points
1. Identify the root and direct causes of the global 'food crunch' of the 21st century.	Try to split up the range of causes including the following: infrastructure, land tenure, changing food tastes, increased climatic hazards, population increase etc.
2. Use copies of Figure 2 to summarise the role of differing factors causing feast or famine in each of the case studies.	Remember the size of the circle indicates the importance of that factor in causing food security or insecurity.
3. Further research: Create a 'wall' of management options available to reduce the risk of famine and obesity, similar to Figure 3 factors.	Ensure you identify the role of the following • Technology, especially GM crops • Research and development • Greener agriculture • International cooperation eg on trade • Support of small scale farming eg by NGOs and aid agencies • Early warning systems • Education
4. Study Figure 4: are there any obvious patterns/trends shown in the feast and famine?	• Why is the GHI index not calculated for some countries? • Why might there be a difference between male and female rates of obesity?