The future of food
The future of biodiversity

Biodiversity and healthy diets

Richard Mithen
In 2050 things are going to be dire......

Declaration: I’m an evidence-based optimist

* Knowledge * Technology * Capital * Legislation *
## Nutritional reminder......

<table>
<thead>
<tr>
<th>Protein and amino acids</th>
<th>Essential</th>
<th>Functionally essential</th>
<th>Non essential</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carbohydrate</td>
<td>Monosaccharides</td>
<td>Oligosaccharides</td>
<td>Polysaccharides</td>
</tr>
<tr>
<td>Fats</td>
<td>Saturated</td>
<td>Mono-unsaturated</td>
<td>Polyunsaturated</td>
</tr>
<tr>
<td></td>
<td>Short chain</td>
<td>Medium</td>
<td>Long</td>
</tr>
<tr>
<td>Vitamins</td>
<td>B vitamins, C</td>
<td>A, D, E, K</td>
<td></td>
</tr>
</tbody>
</table>

Minerals

HarvestPlus
Better Crops • Better Nutrition

Phytochemicals?

Healthy aging
WHO recommendations

- Eat roughly the same amount of calories that your body is using. A healthy weight is a balance between energy consumed and energy that is 'burnt off'.
- Limit intake of fats, and prefer less unhealthy unsaturated fats and trans fats.
- (Limit intake of red meat)
- Increase consumption of plant foods, particularly fruits, vegetables, legumes, whole grains and nuts
- Limit the intake of sugar
- Limit salt/sodium consumption and ensure salt in iodised
The eatwell plate

Use the eatwell plate to help you get the balance right. It shows how much of what you eat should come from each food group.
How diverse does a ‘healthy diet’ need to be?

Nutritional (needs)

Log Diversity

Cultural (wants)
1st Agricultural revolution - Domestication of crops and livestock

2nd Agricultural revolution

1st Agri-food transition

2nd Agri-food transition

- Life Expectancy (yr)
- Year (AD)

1000
2000
3000
4000
5000
6000
7000
8000
9000
10000
0

- Population

Smart phone
DNA
Penicillin
Germ theory

'Scientific' plant breeding
Reduction in life span

26 → 19 years

Reduction in height

Male: 1.75 → 1.60 m
Female: 1.65 → 1.52 m

• Increase in inflammatory disease

• Increase in dental disease

• Increase in anaemia/porotic hyperostosis
Paleopathology and the Origin of Agriculture in the Levant

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- Change in diet – less diversity, more cereals?
- Increase in zoonosis and infection diseases?
2\textsuperscript{nd} Agri-Food transition

- Seven billion more people
- Life span c. 30 years $\Rightarrow$ c. 75 years
- Urbanisation
Obesity......

There is no obvious relationship between obesity and income. The groups with the lowest levels of obesity are poor men and rich women.


Source: Health Survey for England, DH; the data is the average for 2007 to 2009; England; updated Mar 2011.
Prevalence of Childhood and Adult Obesity in the United States, 2011-2012

Cynthia L. Ogden, PhD; Margaret D. Carroll, MSPH; Brian K. Kit, MD, MPH; Katherine M. Flegal, PhD

**IMPORTANCE** More than one-third of adults and 17% of youth in the United States are obese, although the prevalence remained stable between 2003-2004 and 2011-2012.

**OBJECTIVE** To provide the most recent national estimates of trends in childhood obesity between 2003 and 2012, and provide analyses among adults.

**RESULTS** In 2011-2012, 8.1% (95% CI, 5.8%-11.1%) of infants and toddlers, 10.5% (95% CI, 8.7%-12.3%) of children aged 2-5 years, and 16.9% (95% CI, 14.9%-19.2%) of 2-19 year-olds were obese. There was no significant change from 2003-2004 through 2011-2012 in the prevalence of obesity in children and adolescents aged 2-19 years. However, there was a significant decrease in obesity prevalence among women (P = .02). There was a significant decrease in obesity among children (from 13.9% to 8.4%; P = .03) and a significant increase in obesity among adults aged 20 years and older (from 31.5% to 38.1%; P = .006).

**CONCLUSIONS AND RELEVANCE** Overall, there have been no changes in the prevalence of obesity in youth or adults between 2003-2004 and 2011-2012. Obesity among women remains high and thus it is important to continue surveillance of trends in obesity among adults and youth.
The majority of the population, and one in five children, are overweight or obese in the OECD area. A nearly tenfold variation in rates of obesity and overweight is observed across OECD countries. The obesity epidemic has spread further in the past five years, but rates have been increasing at a slower pace than before. Obesity and overweight have been virtually stable, or have grown modestly, in Canada, England, Italy, Korea, Spain and the United States, but have increased by a further 2-3% in Australia, France, Mexico and Switzerland. The economic crisis is likely to have contributed to further growth in obesity. Social disparities in obesity persist, and have increased in some countries.

Figure 3. Trends in child obesity, age 3-17

Mexico's 118 million people drink 163 litres of soda each, or nearly half a litre a day.

Sugar tax is reducing consumption.

10 star jumps gives free metro tickets.
Nutritional

Cultural

• Not sustainable
• Environmental damage
**Beetroot**: nitrates, betaines, B vitamins

**Goat cheese**: fat

**Cod**: protein, selenium, phosphorous, B12, B6, cholesterol

**Potatoes**: carbohydrate, vit C, potassium, manganese

**Kohl rabi, kale, broccoli**: sulphur compounds, minerals, vit K

**Chocolate**: Cocoa polyphenols