



Sustainability and education – considering sustainability and environmental factors when teaching food technology in schools

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Proposed topics for discussion



Aspects of diet and food supply under the spotlight from a sustainability perspective include:

- fish
- meat
- milk and milk products
- Some imported food for which deforestation is taking place, e.g. cocoa, coffee, palm oil, soya, beef
- excessive food packaging
- food waste

Competing Pressures in the Food System



Competing Pressures in the Food System

Based on: Government Office for Science (2010) UK Cross-Government Food Research and Innovation Strategy

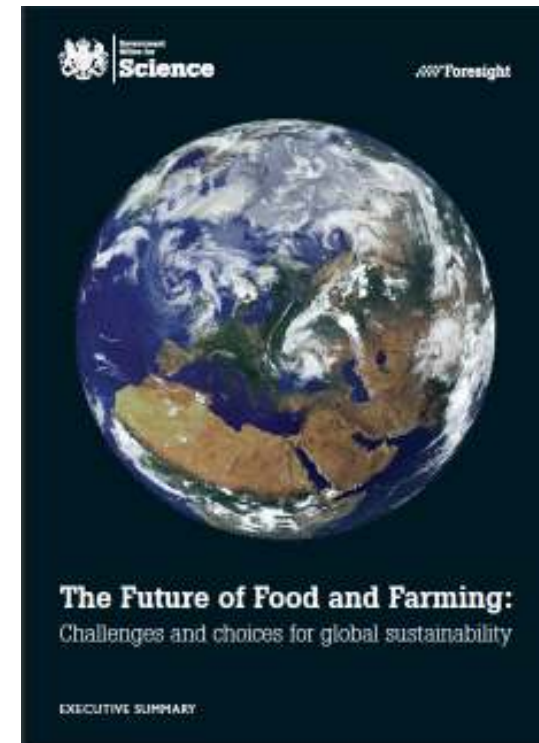
Challenges and Research Drivers		Tensions and Trade-Offs
Livestock production could be reduced	Livestock are a high source of greenhouse gases and a reduction in livestock production could help to meet carbon targets.	In the UK, livestock use grazing land less suitable for arable production, helping to maintain landscapes and avoiding the significant release of soil carbon that would arise from conversion to arable croplands. Efficiencies have already been achieved.
Aquaculture and fish farming		
Lower red meat consumption		
Thinning of livestock sizes	Lower red meat consumption would reduce health risks for many individuals, through reduced saturated fat consumption.	Forty percent of women have low (?inadequate) iron intakes and some people have low intakes of vitamins B ₆ , B ₁₂ and zinc - red meat is one of the best sources of these nutrients.
GM technologies and pesticides		
Free range and animal welfare		
Reducing antibiotic use		
Excessive carbon footprint	Excessive packaging is generally viewed by the consumer as wasteful and has an additional carbon footprint of its own.	The embedded carbon/water in food is often higher than that in the packaging, and in many cases, smarter packaging that reduces spoilage and waste of the food has a net benefit to overall carbon and water footprints.
Consumer choice		
Sustainable production		
Animal health and welfare	different research programmes to address the range of possible threats.	have been shown to be cost effective in reducing outbreaks.
A reduction in the use of pesticides is potentially beneficial for health and has strong regulatory drivers.		Pesticide bans reduce yields and potentially make some crops economically non-viable by increasing production costs and reducing availability.

The challenges



There are major failings in the current food system. Key global challenges are:

- Balancing future demand and supply sustainability – to ensure food supplies are affordable
- Ensuring there is adequate stability in food supplies – and protecting the most vulnerable from volatility
- Achieving global access to food and ending hunger (food security for all)
- Managing the food system so as to mitigate the impact of climate change
- Maintaining biodiversity and ecosystem services while feeding the world.



Priorities for action



- Promote sustainable intensification
- Work on the assumption that there is no new land for agriculture
- Make sustainable production central in development
- Anticipate major issues with water availability for food production
- Reduce waste – both in high- and low-income countries
- Work to change consumption patterns
- Ensure long term sustainability of fish stocks
- Invest in new knowledge
- Include the environment in food system economics
- Improve the evidence base and develop metrics to assess progress
- Empower citizens
- Spread best practice.





“There is little dispute about the importance of a balanced diet and the role of a **moderate** intake of **livestock products**; **communicating** this to the consumer should be a **priority for public health** (recognising the power of vested interests in promulgating contrary messages.”

“.... **Changing diets** is difficult but not impossible. It requires concerted and committed actions, possibly over long timescales,”

“ responsible **fishing** can only be incentivised by pressures from consumers and retailers.”



Nutrition Issues



- Increasing rates of overweight and obesity (HSE 2008, Foresight 2007):

- 61.4% of UK adults are either overweight or obese
- 24.5% of UK adults are obese; has tripled since the 1980s
- in 2008, 13.9% of children aged 2-10y were obese and a further 13.4% were overweight
- obesity rate in adults is expected to increase to 60% by 2050.

- People who are obese are at increased risk of related conditions such as cardiovascular disease (2-3 fold higher), diabetes & hypertension (greater than 3 fold higher) and some cancers.

- Particular concern about childhood obesity.



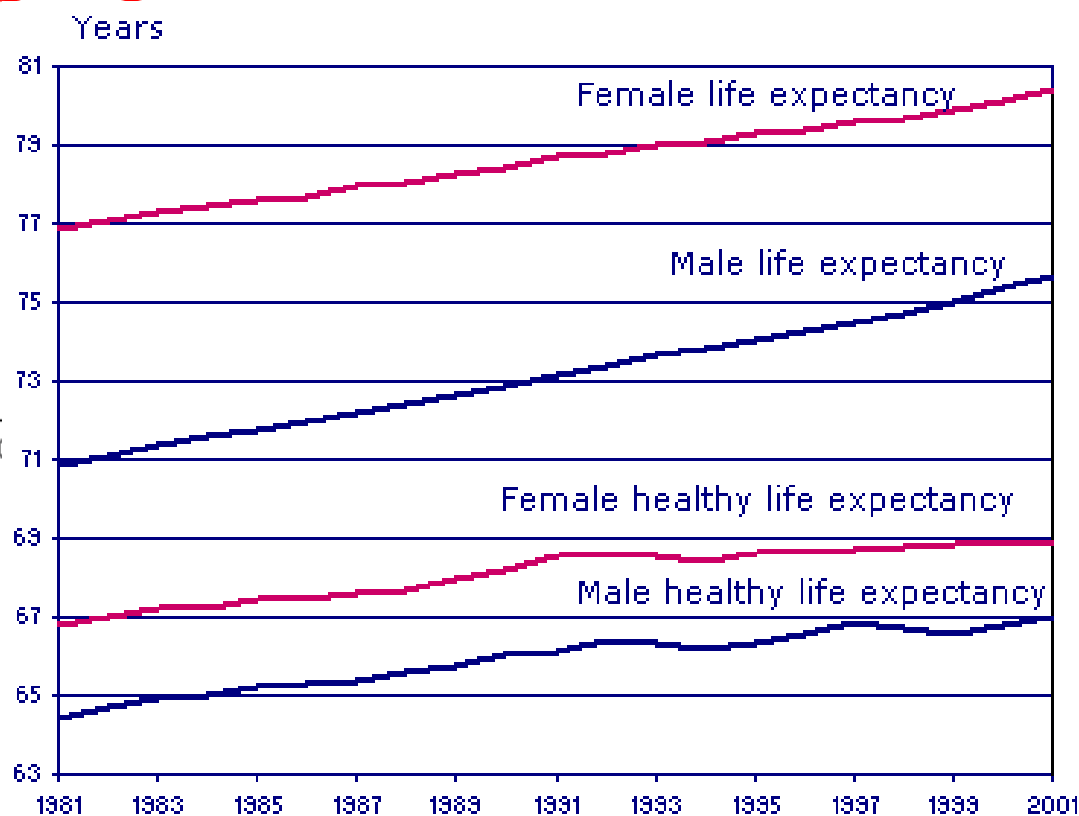
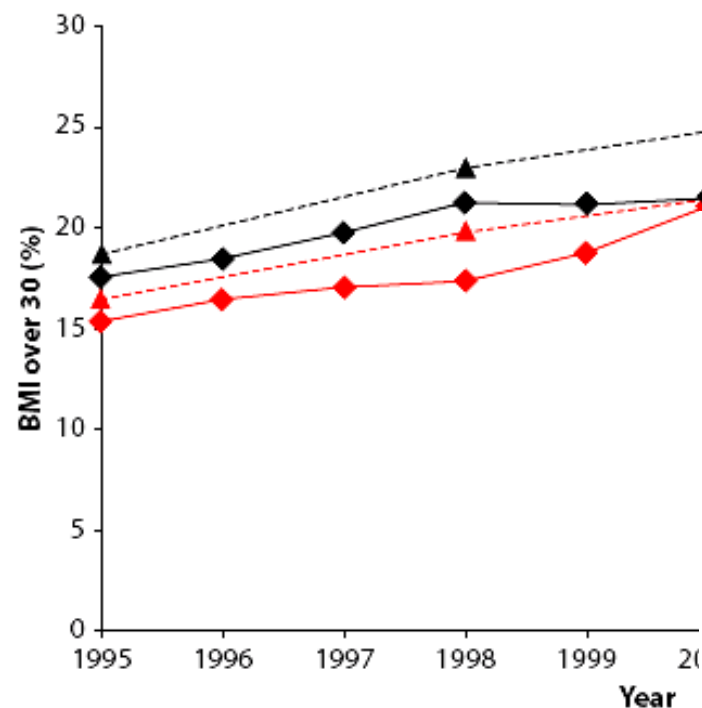
Nutrition Issues



- Life expectancy at birth is increasing, particularly with advancements in medicine and technology, by 2 years per decade. But healthy life expectancy is falling behind.
- Globally, more than 1 billion adults are overweight or obese yet 1 billion others are malnourished.
- The global population is growing – currently 6 billion and expected to reach 9 billion by 2050.
- Rapid development in China, India and South America is fuelling demand for a more western pattern of eating – including more meat and dairy products.
- Limited natural resources (e.g. land, fuel, water).
- Need healthy, low impact food that is affordable by all – which means we need to produce more food, more efficiently.



Fig 3.5 Prevalence of obesity by sex, adults aged 16-64 years, 1995-2004, England and Scotland



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.



CHALLENGES

Not meeting dietary recommendations for many foods and nutrients



Food / nutrient	Recommendation	Current intake	Meeting recommendation?
Fruit & vegetables	At least 5x80g/d	4.4x80g/d	x
Oily fish	At least 1x140g/wk	~70-80g/wk	x
Energy	M ~2500kcal/d F ~2000kcal/d	M 2255kcal/d F 1645kcal/d	✓
Fat	Average 35% en	Average 33% en	✓
Saturated fat	Average 11% en	Average 12.8% en	x
NMES (added sugars)	< 11% en	Average 12.5% en	x
Dietary fibre	Average 18g/d	Average ~13g/d	x
Salt	Average 6g/d	Average 8.6g/d	x
Vitamins & minerals	Dietary reference values	Various	✓ x

Low nutrient intakes and/or status in the UK population



Table 1: Nutrients where there is evidence of low intakes and/or status in the UK population

Low intake*	Low status
Iron	Iron
Riboflavin	Riboflavin
Vitamin A	Vitamin B ₆
Calcium	Vitamin B ₁₂
Magnesium	Folate
Potassium	Thiamin
Zinc	Vitamin C
Iodine	Vitamin D




*'Low' defined as intakes less than the Lower Reference Nutrient Intake (LRNI)

Source: SACN (2008): *The Nutritional Wellbeing of the British Population*

Low nutrient intakes and/or status in the UK population






Table 2: Food types that contribute $\geq 10\%$ of **intake for those nutrients where there is low intake and/or status**

Food Type	Contribution (%) of food types to average daily intake of specific nutrients
Meat and meat products 	zinc (34%), vitamin B₁₂ (30%), vitamin A (28%), vitamin B₆ (21%), vitamin D (22%), thiamin (21%), iron (17%), potassium (15%), riboflavin (15%), magnesium (12%)
Fish and fish dishes 	vitamin D (25%), vitamin B₁₂ (18%), iodine (11%)
Milk and milk products 	calcium (43%), iodine (38%), vitamin B₁₂ (36%), riboflavin (33%), zinc (17%), vitamin A (14%), potassium (13%), magnesium (11%)

Low nutrient intakes and/or status in the UK population



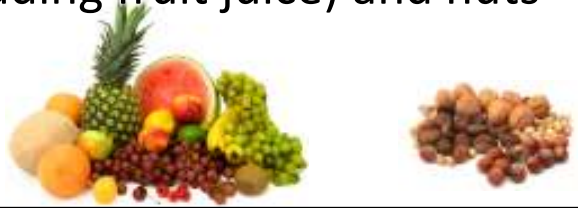


Table 2 cont.

<p>Cereals and cereal products</p> 	<p>iron (44%), thiamin (34%), folate (33%), calcium (30%), magnesium (27%), zinc (25%), riboflavin (24%), vitamin B₆ (21%), vitamin D (21%), potassium (13%), iodine (12%) (largely through fortification)</p>
<p>Potatoes and savoury snacks</p> 	<p>vitamin B₆ (19%), potassium (18%), vitamin C (15%), thiamin (13%), folate (12%), magnesium (10%)</p>
<p>Vegetables (excluding potatoes)</p> 	<p>vitamin A (27%), vitamin C (22%), folate (15%), thiamin (15%), iron (10%), potassium (10%)</p>

Low nutrient intakes and/or status in the UK population



Table 2 cont.

<p>Fruit (excluding fruit juice) and nuts</p> 	<p>vitamin C (19%)</p>
<p>Drinks (including tea, coffee, fruit juice, alcoholic drinks)</p> 	<p>vitamin C (27%), folate (14%), vitamin B₆ (11%), riboflavin (10%)</p>
<p>Fat spreads</p> 	<p>vitamin D (17%), vitamin A (10%)</p>

Source: Henderson et al. (2003): 2000/01 National Diet and Nutrition Survey: adults aged 19-64 years

Average daily intake



Food	Estimated average daily intake (g) for adults		
	Men	Women	All
Meat and meat products	134	91	113
- Red meat	96	57	76
- White meat	38	34	36
Milk and milk products	213	163	188
- Milk	165	120	143
- Cheese	18	12	15
- Yoghurt and dairy desserts	30	31	30

Source: Bates et al. (2010) National Diet and Nutrition Survey: Rolling Programme (2008/09).

Food wastage – in field, post-field and in home



In field (Feeding Britain 2009):

- Crop left in field after harvest
- Reduction in field losses would require significant investment in either manpower or engineering technology



Post-field (Feeding Britain 2009):

- Losses during storage, processing, packing and retailing due to a number of technical reasons. Knowledge exists and action being taken.
- Also, rejections on aesthetic grounds. Would require a major re-education process, particularly for retailers and consumers.



Food wastage at home



Statistics (WRAP):

- UK household food waste – 8.3 million tonnes each year
- Accounts for >20 million tonnes of CO₂eq. emissions each year (equivalent to taking 1 in 4 cars off the road in the UK)
- More food and drink is thrown away than packaging



Why is food wasted?

A lack of:

- Confidence and skills in food preparation
- Planning prior to shopping
- Knowledge about food storage
- Understanding about date labelling on foods



CONSUMER CHOICE

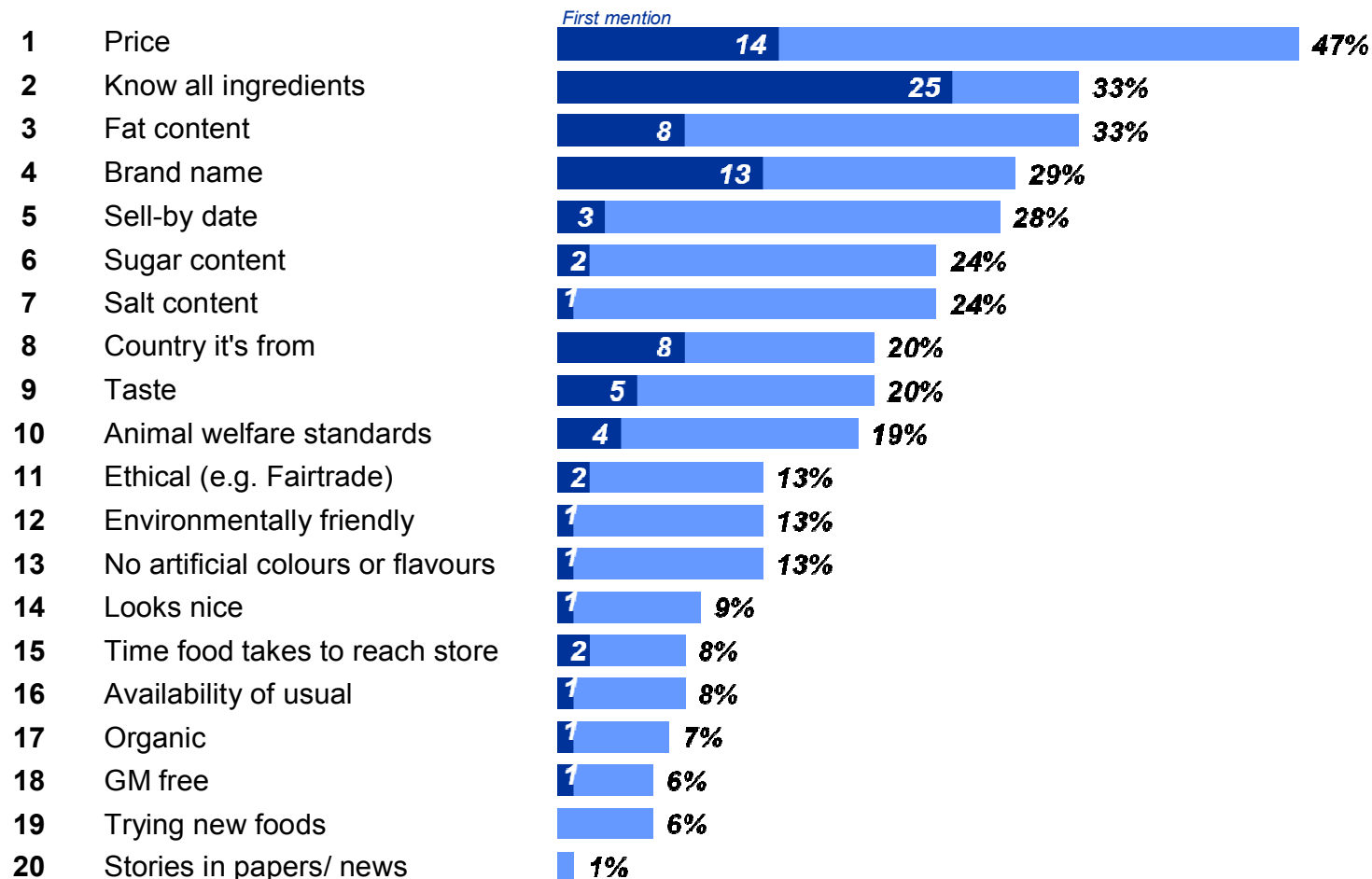
Institute of Grocery Distributors -
Shopper Trends (2010):



Drivers of product choice

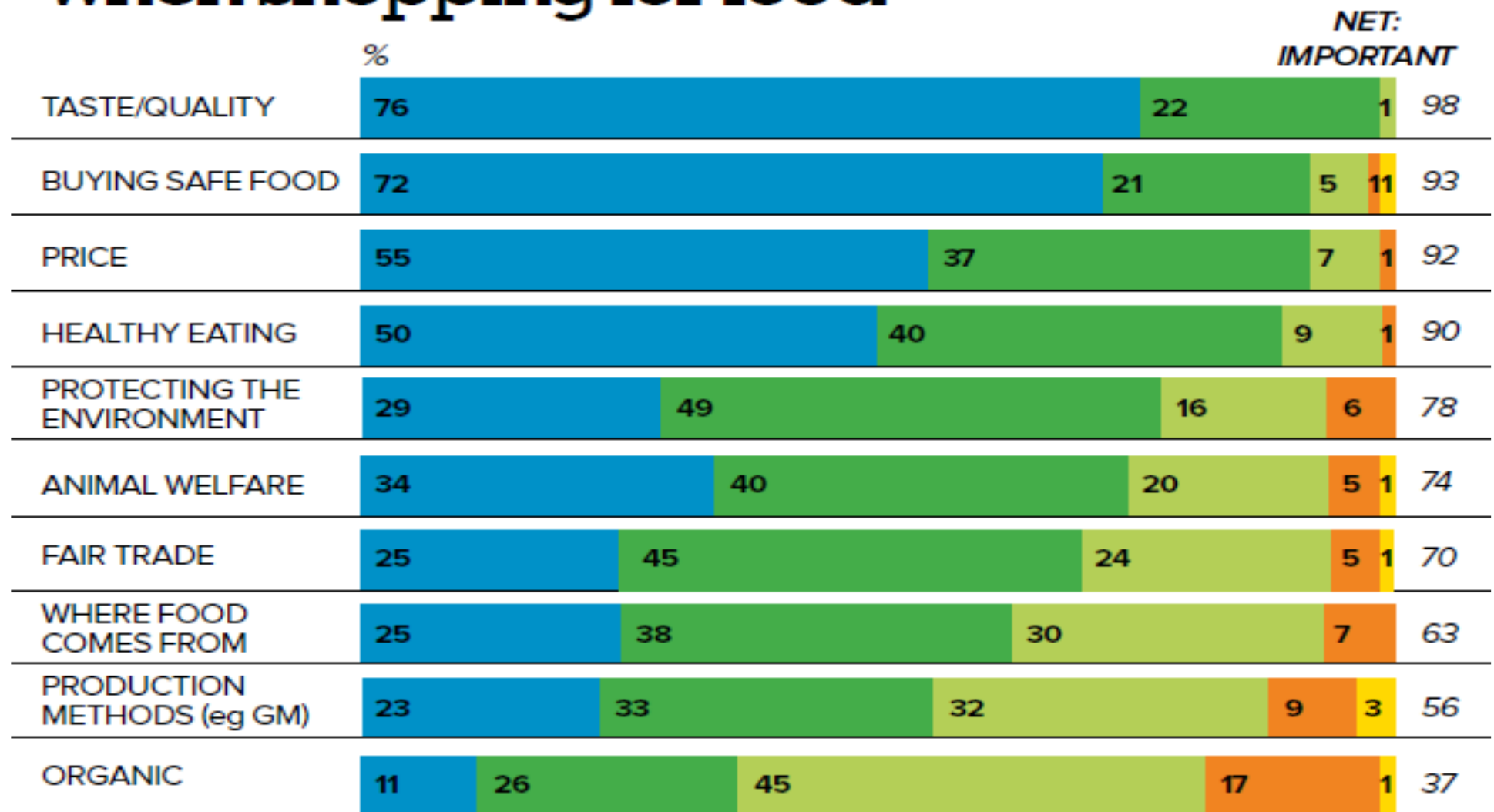


MyReports



6% None of these/Don't know
 Source: IGD Shopper Trends 2010

Importance of different factors when shopping for food



■ VERY IMPORTANT
 ■ FAIRLY IMPORTANT
 ■ NOT VERY IMPORTANT
 ■ NOT AT ALL IMPORTANT
 ■ DON'T KNOW

Source: Which? (2010)
Making sustainable food choices easier

When shopping for food, how important would you say the following Issues are to you when choosing what to buy
(Base all shopping for groceries at least once a month n = 854)



Roles to play

Need everyone to work together:

- Government
- Industry (primary producers to retailers)
 - Grow and source products sustainably
 - Research and innovation
 - Information for consumers
- Public health professionals
- Educators
- Consumers

What we need to achieve

- To identify dietary patterns that provide the many nutrients we need for health, in appropriate amounts, but that are also equitable, affordable and sustainable.
- To produce more food with fewer resources (e.g. land, water, fuel), to feed the growing global population.
- Develop clear messages for consumers.



SUSTAINABLE & HEALTHY DIETS: MAJOR CHALLENGES AND NO SINGLE SOLUTION



- Reduced intakes of some foods
- Increased intakes of alternative sources of 'low' nutrients
- Food from sustainable sources (e.g. fish)
- New crops (drought-tolerant, disease-resistant, increased nutritional value, increased yields)
- New technologies (e.g. GM, Marker Assisted Selection)
- Locally grown foods
- Seasonal foods
- Food fortification
- Increased efficiency
- Limit food and energy wastage



Overall

- Nutrition is key to the debate on a low impact diet
- \uparrow or \downarrow in intake of a food may change the balance of nutrients in the diet, required for good health
- Relationships and trade-offs
- Challenges and opportunities for nutrition
- Teachers have a role in schools



Food – a fact of life



Case study: dairy farming



The environment and sustainability



www.foodafactoflife.org.uk

Coming soon ...



Meat in a Green World

- climate change
- sustainable development
- overview of livestock farming
- reducing greenhouse gas emissions
- changing consumers' behaviour



www.meatandeducation.com