



General Certificate of Education
Advanced Subsidiary Examination
January 2012

General Studies (Specification A)

GENA2

Unit 2 AS Science and Society

Source Booklet

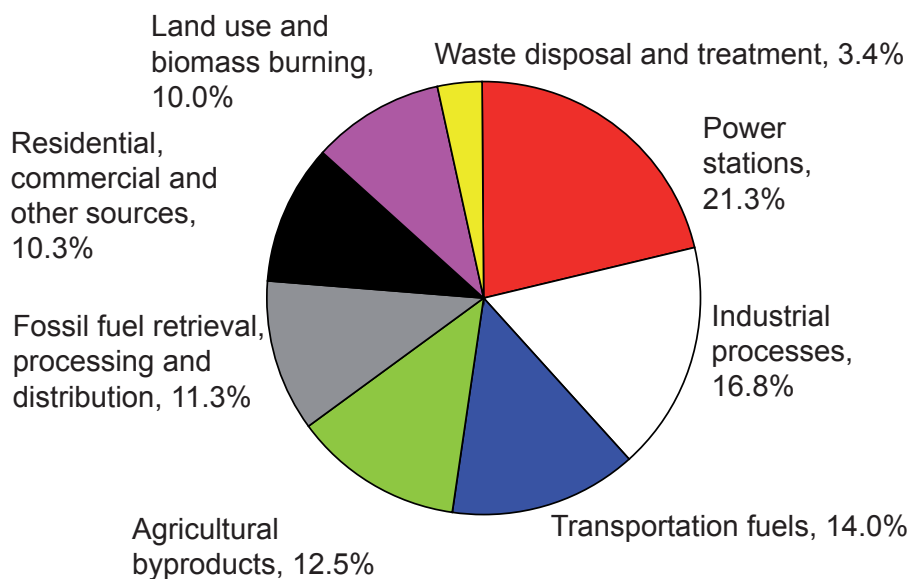
Source for use with **Questions 1.1 to 1.30.**

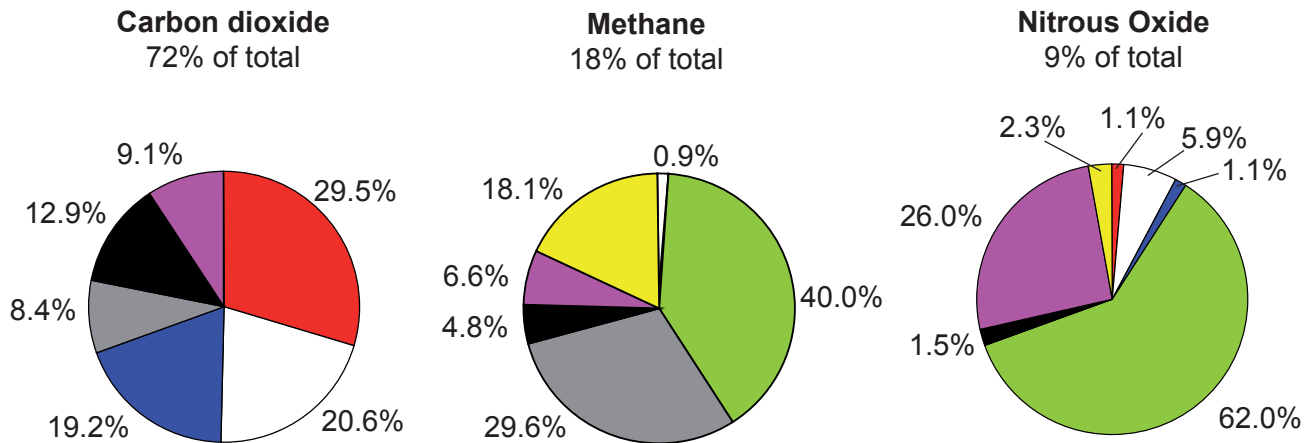
Section ASource for **Questions 1.1 to 1.30**

Ethical Eating – Eat Less Meat?**Source A: Why it's green to go vegetarian**

- (1) However much we might like to believe the sceptics, there is a very broad scientific consensus that our climate is changing and that humans are, at least in part, responsible.
- (2) 'Greenhouse gases' are so called because they act like the glass of a greenhouse, trapping energy from the Sun to warm up the Earth. Most of these gases occur naturally and without them our planet would be too cold to sustain life. The balance is a very delicate one and there has been a massive increase in greenhouse gas emissions.
- (3) At the beginning of 2007, a United Nations (UN) panel reported that global temperatures will probably rise between 1.8°C and 4°C by the end of this century. This may not sound much, but the ice caps are melting and the report suggests that the higher temperatures would result in rising sea levels and increases in the numbers of hurricanes and storms.
- (4) Apart from water vapour, three of the most damaging greenhouse gases are carbon dioxide (CO₂), methane (CH₄) and nitrous oxide (N₂O). The atmospheric concentrations of all these three gases have increased phenomenally in modern times. For example, comparing figures from 2005 with pre-industrialised levels (measurements from 1750) methane has increased from 715 parts per billion (ppb) to 1774 ppb.

Figure 1: Global greenhouse gas emissions by sector, 2000
(percentages by quantity; category colours consistent throughout)





- (5) According to a UN report in 2006, farmed animals produce more greenhouse gas emissions (18%) than the world's entire transport system (13.5%). Cows' flatulence, alongside animal excrement, make the headlines due to both of them being extremely damaging. Methane has 23 times the global warming impact of CO₂ and a single cow can produce as much as 500 litres of methane a day.
- (6) However, global concerns are wider. In 2008 there were approximately 6.5 billion people living on Earth and this number is expected to grow to 9 billion by 2050. Worldwide food production currently requires around 30% of the total soil available, 20% of fossil fuel energy and a major part of the freshwater flows.
- (7) Raising cattle causes the most environmental damage of any non-human species through over-grazing, soil erosion, desertification, tropical deforestation for ranches and growing of soya for their feed, in addition to gaseous emissions and manure products which release ammonia into the atmosphere. The rearing of livestock for food is extremely wasteful. Despite the fact that thousands of children across the world die from malnutrition every day, the majority of grain is eaten by cows rather than humans. In the United States, 70% of grain is consumed by livestock.
- (8) Meat and seafood are the two most rapidly growing ingredients in the global diet and also two of the most costly in resource use. In 2006, 276 million tonnes of chicken, pork, beef and other meat were produced compared with about 70 million tonnes in 1961 and demand for animal flesh is expected to more than double by 2050. In order to meet this growing appetite for animal protein, animals will no doubt be reared more intensively and cheaply, with factory farming causing further pollution. For example, a typical battery egg factory with 60 000 hens produces around 75 000 kg of excrement each week. In addition, once the animals have been reared, the meat then needs to be distributed to the consumers and this creates more greenhouse gases.
- (9) Diet is an important tool in working to achieve environmental sustainability. Studies on world food security estimate that an affluent diet containing meat requires up to 3 times the resources of a vegetarian diet. There are already approximately 4 million vegetarians in the UK today – in 1945 the figure stood at 100 000. At the present rate of growth, we will all be vegetarian by 2030.

Turn over ►

- (10) Studies have shown that mortality from coronary heart disease is 30% less among vegetarians and that there is a high correlation between a diet high in animal fat and cancer. Vegetarians have a high fibre diet and increased consumption of fruit and vegetables. A vegetarian diet also has the right kind of fat. In the UK, we eat too much animal fat and too little unsaturated vegetable fat.
- (11) There is also no problem with protein or iron. For vegetarians, good sources of protein are pulses, beans, cheese and free range eggs. Vegetarians can also get plenty of the iron needed for healthy red blood cells which carry oxygen round the body. The iron can come from wholemeal bread, leafy green vegetables, dried fruit, nuts and seeds. The absorption of iron is also improved by consuming plenty of vitamin C. Vegetarians can also help to stem the growing tide of diabetes due to their relative leanness, high intake of complex carbohydrates and fibre and low intake of saturated fat.
- (12) Ultimately, vegetarianism is the door to civilisation. If we want to live in a civilised world, a vegetarian diet is an important step. Animals are sentient beings: many have complex emotions and can suffer pain. A diet that avoids animal suffering, barbarity and exploitation must be a step towards an enlightened, civilised existence.

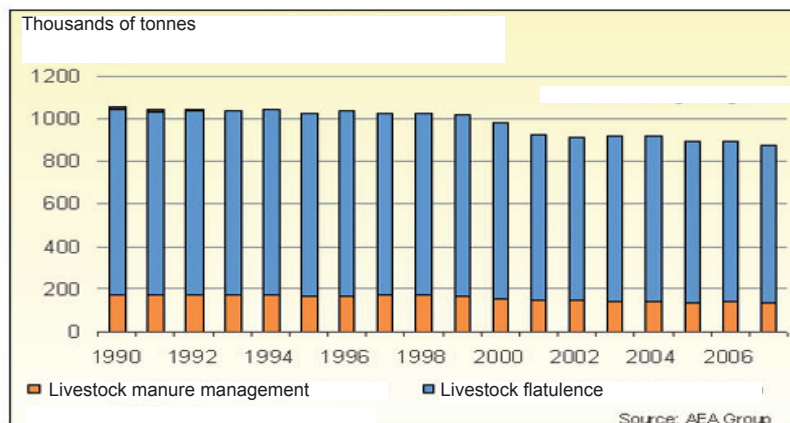
Source: adapted from The Vegetarian Society
www.vegsoc.org

Source B: NFU hits back in debate over climate change and livestock

- (13) The National Farmers' Union (NFU) is challenging the increasingly fashionable view that livestock farming is a major contributor to greenhouse gas emissions and warning that using climate change as an argument to discourage people from eating meat could be environmentally counter-productive. This counter-attack has been prompted by proposals being discussed by Camden Council to "choice edit" menus in its staff canteens by removing meat and dairy products, and by guidelines issued by the food and farming pressure group Sustain which encourages other authorities to do likewise.
- (14) The NFU's Director of Communications, Anthony Gibson, says the climate change case against livestock farming has been based on exaggerated and out-of-date information, which confuses the UK and worldwide situations.

- (15) Far from being responsible for 18% of greenhouse gas emissions, as was claimed in the 2006 UN report *Livestock's Long Shadow*, farmed livestock in the UK account for only 8% of gross emissions, and even that figure takes no account of the greenhouse gases that would be emitted in the course of replacing the contribution that livestock make to diets and fertility.
- (16) If cereal production increased at the expense of permanent pasture, for example, it would lead to significant emissions of CO₂ from soils; while the fertility provided by livestock manures would need to be replaced by additional fertiliser, involving further emissions of nitrous oxide.
- (17) Mr Gibson has written to Sustain to challenge their arguments. He said: 'The NFU does not feel that ill-conceived choice-editing policies produced on the back of flawed evidence deliver meaningful reductions in harmful emissions. We feel that these reductions can be achieved through technological advances in areas such as feeding, breeding and anaerobic digestion.'
- (18) 'Nowhere in the document does it recognise that the livestock industry is improving its carbon footprint. Methane emissions show a continual decrease. Livestock farms help complete the carbon cycle. Cows graze on grass and other green forage, important sinks for carbon across large parts of the British countryside. Livestock farmers are vital in habitat creation in large parts of the country. And this whole issue has to be seen in a much wider international context; climate change is, after all, a global problem that will not be addressed by ill-conceived ideas implemented in England alone.'

Figure 2: Methane emissions from agriculture in the UK



Source: adapted from ROBERT BENSON, Union Challenges Environment Myth, *The Yorkshire Post*, 18 April 2008

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