

**Church of England
Diocese of London**



The Environmental Challenge
WORLD, ENVIRONMENT,
CLIMATE, RESPONSES

September 2009

[Our World](#)
[Trees, woods, forests](#)
[Oceans and seas](#)
[Lakes and rivers](#)
[Population](#)
[War and the environment](#)
[Origins](#)

[Climate change](#)
[Science and evidence](#)
[Two British lifetimes](#)
[Scenarios](#)
[‘Tipping points’](#)
[Are we scared?](#)
[How sure can we be?](#)

[Seers/doommongers?, sceptics/deniers?](#)
[‘An Inconvenient Truth?’](#)
[Responses](#)
[Energy and carbon](#)
[Water and waste](#)
[Transport](#)
[Humans. nature, food](#)

[“Eyes directed towards heaven”](#)
[An environmental or human challenge?](#)
[Why should Christians Care?](#)
[Faiths](#)
[So what can we do?](#)
[“No man is an island”](#)

THE ENVIRONMENTAL CHALLENGE

❖ Our World

- o The natural elements
- o Earth, water, air
- o Ice, heat – wood, fire
- o Brown, green, blue – red!
- o Plants, animals, people
- o Country and cities



**“God who made the earth,
the air, the sky, the sea –
Who gave the light its birth –
careth for me.”**

Sarah B Rhodes

Shrinking the footprint
www.shrinkingthefootprint.co.uk @shfprint.org



This presentation explores ways to understand the challenges faced by our world and environment. How we can meet our responsibilities to tackle these? We and those with whom we share this world – in our communities, parishes, churches?

So – what is our environment, our World? Christians believe that ‘our’ world – albeit we do live in it – is in fact God’s World. He made it, it belongs to Him. We are only tenants, charged with the responsibility to look after it.

The environment is everything natural around us – the earth, the water, the air. We have an effect on all of these – perhaps the air especially is the problem which worries us most right now. The world is heating up, ice is melting, forests are burning.

We will return to the specific challenge of climate change by-and-by. First we will take a general tour round the environment and environmental issues. But, it is noticeable that climate change and CO₂ emissions keep popping up, whatever else we are talking about. It is a common thread through the whole story.

We believe God is not absent from our urban environments. The upper sign photographed here, on a wall in the Aylesbury Estate in Southwark, reads: “Nobody is Not Loved” – to which someone has added a second sign under it: “Yeah Yeah Yippee Yippee Yah”!

[Our World](#)
[Trees, woods, forests](#)
[Oceans and seas](#)
[Lakes and rivers](#)
[Population](#)
[War and the environment](#)
[Origins](#)

[Climate change](#)
[Science and evidence](#)
[Two British lifetimes](#)
[Scenarios](#)
[‘Tipping points’](#)
[Are we scared?](#)
[How sure can we be?](#)

[Seers/doommongers?, sceptics/deniers?](#)
[‘An Inconvenient Truth’?](#)
[Responses](#)
[Energy and carbon](#)
[Water and waste](#)
[Transport](#)
[Humans. nature, food](#)

[“Eyes directed towards heaven”](#)
[An environmental or human challenge?](#)
[Why should Christians Care?](#)
[Faiths](#)
[So what can we do?](#)
[“No man is an island”](#)

THE ENVIRONMENTAL CHALLENGE

❖ Trees, woods, forests

- o Deforestation, 9000BC–2000AD; logging, slash & burn
Was ~ 50% of land area, down to ~25-30%
- o Causes, motives
Agriculture; oil; roads; timber; land values, law, tenure; corruption, abuse of power; rebellion, war
- o Consequences
Dispossession; damage to species, habitats, ecology
Climate change, greenhouse gases – ‘sinks’ or ‘sources’?
- o Reforestation
Natural re-growth, plantations, regeneration projects
- o Trends
Rapid losses 19th & 20th c, slowing late 20th/ early 21st c
More losses – S America, Africa, SE Asia; but gains too



“Progress is being made, but is very uneven.”

*‘State of the World’s Forests 2007’,
UNFAO*

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Perhaps the first environmental problem originating with human behaviour was deforestation. It has been rampant for millennia, ever since the beginnings of farming. It took off in the Bronze Age or even before. Until the Middle Ages, Britain was heavily wooded, then it was gradually cleared for farming.

Deforestation today is mainly in tropical forest areas, including logging (for timber, or oil exploration) and slash and burn – as a preliminary to crop growing, for food and now also biofuels. Rebellion and civil war, or corruption and abuse of power, may also cause deforestation. The interaction between traditional common land ownership and modern western systems of land law is arguably a major factor in many African countries. The current net position is a shrinkage of woodland/forested areas by getting on for half since pre-historic times. Contrary to sceptics like Bjorn Lomborg, satellite measurements have now revealed the situation to be even worse than feared.

But there is some good news too. Deforestation is reducing in South America, with several countries striving to get a grip on it. It remains rampant in Indonesia. Africa is in the balance, the Congo basin being the worst affected region. Boreal (northern) forests are increasing, mainly due to planned plantations, in Canada, the UK and northern Europe. In China, there is an immense programme of reforestation – almost enough to offset the losses in other parts of SE Asia. On balance, there is still a net loss of forested area, but it is slowing.

And it needs to! The consequences of deforestation are calamitous, destroying wildlife (and human) habitats, and causing CO₂ to be released (by burning and rotting of tree wood) – in areas where it was previously absorbed. This is referred to by climate scientists as turning ‘sinks’ into ‘sources’ – a ‘double whammy’, as Tony Juniper has put it. Forests may well no longer even be absorbing more than they give out – the balance being only just made up by other vegetation.

[Our World](#)
[Trees, woods, forests](#)
[Oceans and seas](#)
[Lakes and rivers](#)
[Population](#)
[War and the environment](#)
[Origins](#)

[Climate change](#)
[Science and evidence](#)
[Two British lifetimes](#)
[Scenarios](#)
[‘Tipping points’](#)
[Are we scared?](#)
[How sure can we be?](#)

[Seers/doommongers?, sceptics/deniers?](#)
[‘An Inconvenient Truth’?](#)
[Responses](#)
[Energy and carbon](#)
[Water and waste](#)
[Transport](#)
[Humans. nature, food](#)

[“Eyes directed towards heaven”](#)
[An environmental or human challenge?](#)
[Why should Christians Care?](#)
[Faiths](#)
[So what can we do?](#)
[“No man is an island”](#)

THE ENVIRONMENTAL CHALLENGE

❖ Oceans and seas

- o Warming, circulation systems
- o Carbon sinks, acidification, corals
- o Pollution, predation
- o Over-fishing, collateral impacts
- o Birds, whales and dolphins, shark fins
- o Sea lanes, noise and sonar
- o The deep ocean



**“I must down to the seas again
To the lonely sea and the sky,
And all I need is a tall ship
And a star to steer her by.”**

John Masefield

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<http://www.wedu.ge.ch/po/stael/anglais/g1/Read/moby-dick.jpg>

John Masefield’s poem ‘Sea Fever’ is a romantic idyll of the sea. But it goes on to the feverish activities of humans – in trade and exploitation.

Our knowledge of how the seas and oceans behave is growing but still very limited – especially the deep ocean. Yet birds, whales, dolphins – all are impacted by us. We do not know what causes whales to beach themselves – it may be the sonar from our ships which causes cetacians to become disorientated, though such beachings began before the present technological era. There is a famous painting of one from 17th Holland.

Humans are the top predators in the oceans. When the clubbing of seals was finally banned, an MP remarked that ‘some fishermen see seals as “the rats of the sea” ’ – because they ‘get through a huge amount of fish’. As though seals were vermin because they eat what God designed them to eat! Is it necessary to preserve fish stocks only so we humans can eat as much as we like? Shark finning is now also being limited. Till recently, shark fins sold to restaurants to make soup were cut off living sharks in Scottish waters, the living sharks being discarded into the sea back to die in misery.

The Gulf Stream, which gives us our mild climate, is part of a larger circulation system, potentially vulnerable to climate impacts. The seas, like the forests, act as carbon ‘sinks’ – dissolving up to half of the CO₂ we emit. This proportion may be reducing, as the oceans become saturated: they are getting more acidic. This is killing the corals, key components in marine eco-systems.

We also pollute the sea with chemicals and plastic. The gathering of plastic around Midway in the Pacific has received a lot of publicity. Plastic degrades into granules, quicker than once thought. These are very harmful to birds (as are the larger pieces which they pick up to feed their young). There is now a project hopefully to clean it up.

[Our World](#)
[Trees, woods, forests](#)
[Oceans and seas](#)
[Lakes and rivers](#)
[Population](#)
[War and the environment](#)
[Origins](#)

[Climate change](#)
[Science and evidence](#)
[Two British lifetimes](#)
[Scenarios](#)
[‘Tipping points’](#)
[Are we scared?](#)
[How sure can we be?](#)

[Seers/doommongers?, sceptics/deniers?](#)
[‘An Inconvenient Truth?’](#)
[Responses](#)
[Energy and carbon](#)
[Water and waste](#)
[Transport](#)
[Humans. nature, food](#)

[“Eyes directed towards heaven”](#)
[An environmental or human challenge?](#)
[Why should Christians Care?](#)
[Faiths](#)
[So what can we do?](#)
[“No man is an island”](#)

THE ENVIRONMENTAL CHALLENGE

❖ Lakes and rivers

- o Climate change, melting glaciers – drying
- o Deforestation – flooding
- o Aral Sea, Lake Chad
- o Damming
- o Pollution, habitats, species loss
- o Amazon, Yellow River, Murray-Darling
- o The Baiji (Yangtze River Dolphin)



[www.wonderfullywild.com/
images/baiji.gif](http://www.wonderfullywild.com/images/baiji.gif)

“Other species have been brought back from the brink of extinction like the southern right whale ... but only through the most intensive ... efforts.”

Karen Baragona,
WWF

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This is one area where things get really scary – whether it is the pollution of the Ganges, the drying of the Aral Sea, the Three Gorges dam across the Yangtze in China.

Humans depend on fresh water, most of it from lakes and rivers. Hundreds of millions have insufficient water, or clean water, already. Millions are likely to turn into billions in the coming decades. At least a billion depend on meltwater from the Himalayas. That is vanishing as the glaciers rapidly recede.

Several of the world’s largest river systems are drying up. The Yangtze supports more than 300m people. Both its upper and lower reaches are becoming parched – even more because of the barrier at the Three Gorges. The Yellow River, further north in China’s historic heartland, is fast dwindling too.

Other species suffer with us from this, of course – though they do not understand and are not to blame. The Yangtze River dolphin was declared extinct in 2007 – then one was spotted – just one? We do not know if he or she still survives – or has a friend.

Australian cities, or Mexico City, may perhaps be the first large centres of population to run out of water altogether – if current droughts continue, and the taking of water from aquifers. For how long can desalination provide for life to go on?

[Our World](#)
[Trees, woods, forests](#)
[Oceans and seas](#)
[Lakes and rivers](#)
[Population](#)
[War and the environment](#)
[Origins](#)

[Climate change](#)
[Science and evidence](#)
[Two British lifetimes](#)
[Scenarios](#)
[‘Tipping points’](#)
[Are we scared?](#)
[How sure can we be?](#)

[Seers/doommongers?, sceptics/deniers?](#)
[‘An Inconvenient Truth’?](#)
[Responses](#)
[Energy and carbon](#)
[Water and waste](#)
[Transport](#)
[Humans. nature, food](#)

[“Eyes directed towards heaven”](#)
[An environmental or human challenge?](#)
[Why should Christians Care?](#)
[Faiths](#)
[So what can we do?](#)
[“No man is an island”](#)

THE ENVIRONMENTAL CHALLENGE

❖ Population

- o The World, the UK, London
- o Demographics, migration, urbanisation
- o Shrinking the footprint, multiplying the feet
- o Carrying capacity, resources pressure
- o Food: productivity, land, shortages
- o Sanitation, water, disease
- o People, relationships, stuff
- o Women, education, empowerment
- o Policy, ethics, realism



“It has a profound impact on all life on Earth, yet ... it has been conspicuously absent from public debate.”

*John Feeney,
BBC website 2009*

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www.bbc.co.uk/history/historic_figures/malthus_thomas.shtml

Population may be the most controversial aspect of the environmental crisis. In some ways one might rather not handle such a hot potato. Yet people keep asking “When is the Church going to face up to the issue of population?”

World population is 6.7 bn and rising. Estimates say it might rise to c 9 – 11 bn. 9 bn or so by 2050 is the figure taken account of in climate change targets – above that, even if individual emissions are stabilised, total emissions will continue to rise along with population. It has been claimed that the UK, at 60 million, is already over-populated by a factor of three! We have not had a population of 20m or less since the 19th c! London was one of the first mega-cities, now there are others of three times the size.

The carrying capacity of the earth is limited: we are inflicting ecological damage as a consequence of our numbers. And how to feed everyone? We have improved agricultural productivity, but there must be a limit. A Victorian cleric called Thomas Malthus (his portrait is on the slide) – made dire predictions of a natural cull of the human species. This hasn’t happened yet – but it still might do, albeit his thinking is not widely accepted now (and was very callous). World population over c 5 bn may be unsustainable. Attempts have been made to control population growth in India and China, Egypt and Iran – they succeeded most in Iran (patriotic duty was the driver); China’s One Child Policy was remarkably successful – in its own terms – but has now been widely relaxed.

Issues of women’s education and empowerment in the developing world are of considerable relevance. People have more children also when they are struggling to subsist. Children represent a pension. Whereas the wealthy collect stuff. On the other hand, if population increases, economies must grow to supply it. If it started to reduce, there might be more to go round then the birth-rate could go on dropping by itself.

[Our World](#)
[Trees, woods, forests](#)
[Oceans and seas](#)
[Lakes and rivers](#)
[Population](#)
[War and the environment](#)
[Origins](#)

[Climate change](#)
[Science and evidence](#)
[Two British lifetimes](#)
[Scenarios](#)
[‘Tipping points’](#)
[Are we scared?](#)
[How sure can we be?](#)

[Seers/doommongers?, sceptics/deniers?](#)
[‘An Inconvenient Truth?’](#)
[Responses](#)
[Energy and carbon](#)
[Water and waste](#)
[Transport](#)
[Humans. nature, food](#)

[“Eyes directed towards heaven”](#)
[An environmental or human challenge?](#)
[Why should Christians Care?](#)
[Faiths](#)
[So what can we do?](#)
[“No man is an island”](#)

THE ENVIRONMENTAL CHALLENGE

❖ War and the environment

- o The Second World War
- o Nuclear weapons and testing
- o Armaments industries
- o 'Scorched earth'
- o Vietnam, Iran/Iraq, Israel and Palestine
- o Civil wars and proxy wars
- o Resources wars

Gestapo officer: “Did you do that?”

Pablo Picasso: “No, you did.”



web.uvic.ca/akeller/pw401/resources/rf_image_optimize/guernica_large.jpg

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One of the greatest causes of damage to the environment is war, another reason – if that were needed – to redouble our efforts and our prayers for peace.

There is no greater scourge – of human origin – to the natural as well as the human world, to the conservation of resources, the preservation of the biosphere and even the climate, than war. WW2 caused devastation on a global and a local scale, from the radioactive contamination of the atmosphere caused by atomic bomb explosions, to the plight of animals trapped in Berlin Zoo. The development of armaments has placed extraordinary demands on raw materials.

Perhaps even more concentrated damage to landscapes and the biosphere was inflicted during the 'carpet bombing' of Vietnamese jungle villages with napalm and phosphorus. Later 20th and 21st c wars had scarcely less of an effect on the desert (as well as the archaeology of ancient Mesopotamia and Persia).

Conflicts may also be a distraction from efforts to mitigate our impact on the environment and climate. Arab-Israeli antagonisms greatly compromise the benefits of communal agriculture in the Kibbutzim, and make it impossible for many Muslim young people to perceive the environment as their top priority.

Civil wars and proxy wars, in Africa especially, have aggravated poverty, loss of arable land, deforestation, drought and starvation. This, in turn, leads to wars over resources – that being one factor leading to the conflict in Darfur (not the only factor). War may be a consequence as well as a cause of environmental degradation.

All is summed up in the famous horsemen of the Apocalypse – each inexorably leading to the next – and, in the visual arts of the 20th c, by Picasso's masterpiece 'Guernica'.

[Our World](#)
[Trees, woods, forests](#)
[Oceans and seas](#)
[Lakes and rivers](#)
[Population](#)
[War and the environment](#)
[Origins](#)

[Climate change](#)
[Science and evidence](#)
[Two British lifetimes](#)
[Scenarios](#)
['Tipping points'](#)
[Are we scared?](#)
[How sure can we be?](#)

[Seers/doommongers?, sceptics/deniers?](#)
['An Inconvenient Truth'?](#)
[Responses](#)
[Energy and carbon](#)
[Water and waste](#)
[Transport](#)
[Humans. nature, food](#)

["Eyes directed towards heaven"](#)
[An environmental or human challenge?](#)
[Why should Christians Care?](#)
[Faiths](#)
[So what can we do?](#)
["No man is an island"](#)

THE ENVIRONMENTAL CHALLENGE

❖ Origins

- o Hunting, mining, agriculture, cities
- o Trade, war, male domination, anthropocentrism
- o Population, territorial expansion
- o Deforestation, habitat destruction, wildlife persecution
- o Capitalism, industrialisation, consumerism
- o Pollution, fossil fuels, greenhouse gases

“This is the ... the door of the future ... onto a crisis more ... global, more inescapable ... than any ever encountered ... which will take decisive shape within the life span of children ... already born.”



‘Only One Earth’, Barbara Ward & René Dubos, UN, 1972

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www.alifetimeofcolor.com

It is worth considering how humanity has got into the present situation of environmental stress. This is often blamed on the industrial revolution; industrialisation has certainly played a big part.

But the problem goes back much further, to the dawn of human origins in fact. Humankind has always made unsustainable demands on the planet’s resources, by massive over-hunting to begin with, mining, then supplementing what can be obtained locally by means of trade and plunder. More and more we have confused what we need, with what we want and can get by fair means or foul.

The slide offers a list of various contributing factors. There have been attempts to blame the environmental crisis on the command in Genesis 1 to “be fruitful and multiply, fill the earth and subdue it.” But this is nonsense – firstly, it is to wrench texts right out of their context, the Bible does not give us licence to use God’s creation entirely for our own pleasure. Also, environmental pressure was already visible in times and places when the Bible hadn’t yet been written, let alone known read in those places!

The quote at the bottom of this slide comes from a report commissioned by the United Nations in 1972. It seems melodramatic, yet it represented a broad symposium of expert opinion even at that time; and little which has happened since makes one feel this was overstated. It remains likely that, if we go on as we are doing, climate change among other environmental crises will have major and irreversible impacts within the lifetime of some people born before 1972.

[Our World](#)
[Trees, woods, forests](#)
[Oceans and seas](#)
[Lakes and rivers](#)
[Population](#)
[War and the environment](#)
[Origins](#)

[Climate change](#)
[Science and evidence](#)
[Two British lifetimes](#)
[Scenarios](#)
[‘Tipping points’](#)
[Are we scared?](#)
[How sure can we be?](#)

[Seers/doommongers?, sceptics/deniers?](#)
[‘An Inconvenient Truth?’](#)
[Responses](#)
[Energy and carbon](#)
[Water and waste](#)
[Transport](#)
[Humans. nature, food](#)

[“Eyes directed towards heaven”](#)
[An environmental or human challenge?](#)
[Why should Christians Care?](#)
[Faiths](#)
[So what can we do?](#)
[“No man is an island”](#)

THE ENVIRONMENTAL CHALLENGE

❖ Climate change

- o Average world temperature up 0.7 - 0.8C in 90 years
 - up 0.3 - 0.4C from 1910s to 40s
 - apparently down 0.1C from 1940s to 70s
 - up 0.4 - 0.55C from 1970s to 2000s
- o Medieval warm period some 0.5C cooler than now
- o Hottest since 1850: 1998, 2005, 2003, 2002, 2004
 - 10 warmest all in last 12 – 2008 was 10th warmest
- o 2000s already 0.2C average above 1990s

“Warming ... has penetrated into the ... oceans over the past 40 years ... it cannot be explained by natural ... variability ... We conclude that it is of human origin.”



*Dr Tim Barnett & six others,
Scripps Institution of Oceanography,
California, 2005*

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Now let's concentrate on climate change. Here is a brief summary of current knowledge.

Think of the time since the early 20th c as three successive phases of three decades each. Overall there has been a rise in temperature of about $\frac{3}{4}$ of one degree. That might not seem much, but it has been enough to result in quite turbulent weather – heat waves and droughts, massive flooding in several countries. Temperature extremes fluctuate several times more than the average; and they tend to be more pronounced on land than at sea.

Global warming has also caused a rise in sea levels of about 20 cm already, just by the thermal expansion of water – even before melting ice contributes to sea level rises.

Most of the rise took place in the first and third periods, most of all in the last 30 years. In the late 20th c, there was an upward acceleration. Warming has not ceased in the 21st century as some are claiming, but there may now be a lull till perhaps the mid to late 2010s. There also appears to have been a dip during the middle three-decade period – thought to have been caused by atmospheric aerosols.

It is often said that in earlier warm periods, during Roman and early medieval times, vineyards grew in southern England! Well they do now, too. And it wasn't necessarily equally warm all over the world in those days: warmer and cooler periods in the Far East, and possibly North America, appear not to have coincided. And it might have been less easy then to source any French wine, whenever you fancied it!

On average, the last decade is thought to have been the warmest for 1000 years at least. The quotation at the foot of the slide is taken from a fairly recent authoritative report on warming of the oceans, which strongly supports the belief that the warming which is going on is caused by us humans.

[Our World](#)
[Trees, woods, forests](#)
[Oceans and seas](#)
[Lakes and rivers](#)
[Population](#)
[War and the environment](#)
[Origins](#)

[Climate change](#)
[Science and evidence](#)
[Two British lifetimes](#)
[Scenarios](#)
[‘Tipping points’](#)
[Are we scared?](#)
[How sure can we be?](#)

[Seers/doommongers?, sceptics/deniers?](#)
[‘An Inconvenient Truth?’](#)
[Responses](#)
[Energy and carbon](#)
[Water and waste](#)
[Transport](#)
[Humans. nature, food](#)

[‘Eyes directed towards heaven’](#)
[An environmental or human challenge?](#)
[Why should Christians Care?](#)
[Faiths](#)
[So what can we do?](#)
[‘No man is an island’](#)

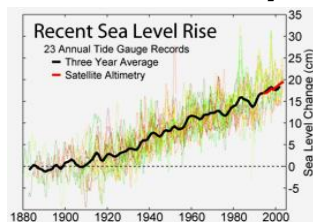
THE ENVIRONMENTAL CHALLENGE

❖ Science and evidence

- o Temperature and CO₂ measurements
- o Arctic sea ice, glaciers
- o Sea levels, mid-tide at datum points
- o Acidity of rain and sea
- o Ice cores, Antarctica
- o Tree rings
- o Corals, sea sediments

**“The greenhouse effect was discovered
by Joseph Fourier in 1824 and ...**

**first investigated ...
by Svante Arrhenius in 1896.”**



Wikipedia Commons

www.science.tv

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These are the main sources of evidence on which climate scientists base their conclusions. The International Panel on Climate Change (IPCC), which advises the UN, relies largely on such evidence.

Some measurements are taken at widely varying points around the world. Some are more local. Greenhouse gas measurements were taken only in Hawaii, to begin with (from 1958); now they come from more than 300 stations in 66 countries. Ice cores and tree rings yield what is basically archaeological evidence. This does require some interpretation, but it is generally consistent with current data.

Altogether, there is now rather a substantial body of evidence to draw on. It would be a tough task to discredit so much evidence; it comes from independent sources, but they support each other.

The prevailing view is that the warming we see is almost certainly linked to the production of CO₂ and other gases, which cause the well-known 'greenhouse effect'. The greenhouse effect is not at all a new idea, it is solid science, tried and tested. That is not to discount all other factors, but they play a secondary role.

[Our World](#)
[Trees, woods, forests](#)
[Oceans and seas](#)
[Lakes and rivers](#)
[Population](#)
[War and the environment](#)
[Origins](#)

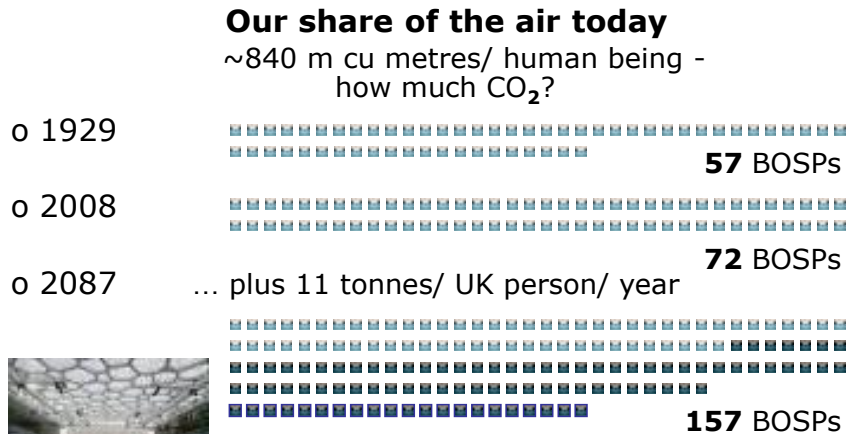
[Climate change](#)
[Science and evidence](#)
[Two British lifetimes](#)
[Scenarios](#)
[‘Tipping points’](#)
[Are we scared?](#)
[How sure can we be?](#)

[Seers/doommongers?, sceptics/deniers?](#)
[‘An Inconvenient Truth’?](#)
[Responses](#)
[Energy and carbon](#)
[Water and waste](#)
[Transport](#)
[Humans. nature, food](#)

[‘Eyes directed towards heaven’](#)
[An environmental or human challenge?](#)
[Why should Christians Care?](#)
[Faiths](#)
[So what can we do?](#)
[“No man is an island”](#)

THE ENVIRONMENTAL CHALLENGE

❖ Two British lifetimes



Beijing Olympic swimming pool

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Some people doubt whether it's possible for us puny human beings to make any difference to the amount of gases like CO₂ in the air. Yet it is feasible to make a simple estimation of how much effect we could have. Of course one needs to make assumptions and simplifications, but a fair estimate is reasonably feasible. And the answer is, yes we can have a very big effect indeed.

This calculation is based on Beijing Olympic swimming pools-full! The small blue rectangles in the slide are pictures of Beijing swimming pools. An Olympic swimming pool is 50 x 30 metres; the competition pool at Beijing was 3 metres deep.

If the breathable and flyable volume of the earth's atmosphere were divided equally among today's 6.7 bn human beings, each would be allocated a share of 840 cu metres of air. In 2008, this volume of air – 840 cu m – contained 72 swimming pools full of CO₂; 79 years before (one British lifetime) – that's in 1929 – the same amount of air would have had less CO₂, just 57 swimming pools. But if we carry on the way we are in the UK, each of us will have increased that to 157 swimming pools by 2087, 79 years hence, one more average lifetime. That's the amount each UK person would be responsible for – more than double what it is now!

One might take this calculation with a pinch of salt, were it not very close to the official estimates made for the United Nations. It is too simple in the way it models the natural carbon cycle. But other approximations roughly cancel that out.

The main thing to realise is, if we actually allow this to happen, or anything like it, that will spell doom. The climate would go back to something like the age of the dinosaurs, not a world fit for humans, nor much other life that exists now.

[Our World](#)
[Trees, woods, forests](#)
[Oceans and seas](#)
[Lakes and rivers](#)
[Population](#)
[War and the environment](#)
[Origins](#)

[Climate change](#)
[Science and evidence](#)
[Two British lifetimes](#)
[Scenarios](#)
['Tipping points'](#)
[Are we scared?](#)
[How sure can we be?](#)

[Seers/doommongers?, sceptics/deniers?](#)
['An Inconvenient Truth'?](#)
[Responses](#)
[Energy and carbon](#)
[Water and waste](#)
[Transport](#)
[Humans. nature, food](#)

["Eyes directed towards heaven"](#)
[An environmental or human challenge?](#)
[Why should Christians Care?](#)
[Faiths](#)
[So what can we do?](#)
["No man is an island"](#)

THE ENVIRONMENTAL CHALLENGE

❖ Scenarios

- o Ice-free arctic summers, melting glaciers
- o NW/NE passages open, longer growing seasons
- o Rising sea levels, flooding of cities, deltas, islands
- o Extreme weather, heatwaves, flash floods

www.independent.co.uk/multimedia/archive/00015/05polarbear_15021t.jpg



- o Drying up of lakes and rivers
- o Famine, drought, expanding deserts
- o Mass migrations, social breakdown?

“We have seen the consequences of ignoring risk in the current economic ... crisis ...

The ... consequences of ignoring climate change will be very much bigger ...”

Lord Nicholas Stern

Shrinking the footprint



So, if we carry on as we are, we are heading for a catastrophe. Even emissions quite a lot less than at our present level would have disastrous results. That is why we have to cut CO₂ emissions by 80% by 2050, at the very least!

The slide lists some of the results of climate change which are likely if we don't take drastic action to curb emissions. These are scenarios; they are not all certainties, nor equally probable – that depends on what we do and how soon, among other things. But actually most of them are happening already. It's a matter of how much worse they get, and how widespread.

It isn't all gloom; there may be benefits for some people. It might be easier to grow wheat in Siberia (though buildings in the region would have to be rebuilt to deal with subsidence)!

And the price to pay includes much of Bangladesh and other delta areas permanently under water, several Pacific islands entirely submerged, drought across China and SE Asia, the Sahara and Arabian desert region expanding, parts of southern Europe such as Greece and Spain reduced to semi-desert, regional scale forest fires, huge flows of refugees, resources wars, probably many animals and plants wiped out.

Some people have called this kind of talk 'climate porn' – well it is pretty repellent, as well as being unfair on those who will suffer most.

Climate change is not the only factor likely to lead to some of the outcomes in this slide. It is one cause, probably the main cause – but the most dangerous consequences are likely to be the outcome of several factors reacting on each other – questions of politics and security, as well as economic, health and climate factors.

[Our World](#)
[Trees, woods, forests](#)
[Oceans and seas](#)
[Lakes and rivers](#)
[Population](#)
[War and the environment](#)
[Origins](#)

[Climate change](#)
[Science and evidence](#)
[Two British lifetimes](#)
[Scenarios](#)
[‘Tipping points’](#)
[Are we scared?](#)
[How sure can we be?](#)

[Seers/doommongers?, sceptics/deniers?](#)
[‘An Inconvenient Truth’?](#)
[Responses](#)
[Energy and carbon](#)
[Water and waste](#)
[Transport](#)
[Humans. nature, food](#)

[“Eyes directed towards heaven”](#)
[An environmental or human challenge?](#)
[Why should Christians Care?](#)
[Faiths](#)
[So what can we do?](#)
[“No man is an island”](#)

THE ENVIRONMENTAL CHALLENGE

❖ 'Tipping points'

- o The planet, sub-systems
Arctic ice, sea currents, monsoons, forests, clouds
- o Early to mid 1940s
CO₂ concentrations dipped, then rose to ~310 ppm
- o Mid 1970s
Warming resumed, Arctic melting
- o '100 Months to Save the Planet'?
- o Scientific, political, public awareness



“Nine ways in which the Earth could be tipped into a potentially dangerous state that could last for many centuries have been identified by scientists ...”

The Independent, 05/02/08

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www.shrinkingthefootprint.org



The idea of a 'tipping point' is much talked about, meaning the point of no return – after that, nothing we do to stop climate change can catch up. Or, it is some point in the process where a small added impact gives rise to a sudden massive change (like the last straw which broke the camel's back).

This may apply to the entire climate system, or to one or more sub-systems, such as the Arctic and Antarctic ice, sea currents, monsoons, tropical and northern forests. Any of these may become subject to runaway change within the foreseeable future.

There could still – just – be other trends working the opposite way, giving us the chance to retrieve the situation as a whole. The clouds may be helping, at least for a while. The current solar minimum too (there are few or no sunspots) – but we're running out of that source of credit. A 'point of no return' might have passed without anyone noticing.

Some of the graphs suggest that a threshold was already crossed soon after WW2. A slight dip in greenhouse gases occurred early in the war, followed by an acceleration – presumably a consequence of the war effort. At this point about 310 ppm CO₂ was passed, which might be about the safe limit. This was three decades before the sudden lift-off in global warming in the 1970s – which we can now also see was most likely the point at which melting of the Arctic ice began in earnest. (Three decades is reckoned to be the time-lag between causes and consequences in relation to climate change.)

It's possible climate change may become irreversible, in scientific terms, without regard to anything we can do politically or economically. Or it might be theoretically possible to reverse the process – but we just can't or won't organise or agree to do what's needed. There is talk of '100 Months to Save the Planet'. If 100 months pass and little is done – what then?

[Our World](#)
[Trees, woods, forests](#)
[Oceans and seas](#)
[Lakes and rivers](#)
[Population](#)
[War and the environment](#)
[Origins](#)

[Climate change](#)
[Science and evidence](#)
[Two British lifetimes](#)
[Scenarios](#)
['Tipping points'](#)
[Are we scared?](#)
[How sure can we be?](#)

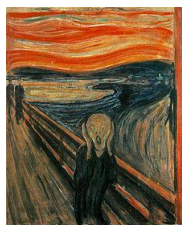
[Seers/doommongers?, sceptics/deniers?](#)
['An Inconvenient Truth'?](#)
[Responses](#)
[Energy and carbon](#)
[Water and waste](#)
[Transport](#)
[Humans. nature, food](#)

["Eyes directed towards heaven"](#)
[An environmental or human challenge?](#)
[Why should Christians Care?](#)
[Faiths](#)
[So what can we do?](#)
["No man is an island"](#)

THE ENVIRONMENTAL CHALLENGE

❖ Are we scared?

- o 'Doomsday experiment'
- o Population 'explosion'
- o Hole in the ozone layer
- o Smoking and cancer
- o HIV and AIDS
- o Nuclear waste
- o GM crops
- o Asbestos



en.wikipedia.org/wiki/The_Scream/
Edvard Munch

**'That night a fire *did* break out,
You should have heard Matilda shout!
But every time she shouted "FIRE!!"
They only answered "Little liar!"
So when Matilda's aunt returned,
Matilda and the house were burned.'**

Hilaire Belloc

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On the other hand, there are those who say this is all scare stories, and there is nothing really to worry about.

A number of 'scares' are listed, which can be recalled from the last four decades or so. Some of them were nonsense. The so called 'doomsday experiment' – properly speaking the 'Large Hadron Collider', a particle accelerator tunnel under the Alps – was never remotely likely to cause the end of the world! It quickly broke down anyway!

Of the others, more than half were and/or still are real threats, some of them quite serious ones obviously. We no longer argue that AIDS is not caused by HIV, nor that smoking has nothing to do with lung cancer.

We really can't box all scares together, and conveniently dismiss them *en bloc*. Each one has to be considered on its own evidence, put on one side if there is none, otherwise taken however seriously it merits.

The verse from one of Hilaire Belloc's comic children's poems reminds us of the danger of 'crying wolf wolf' – but also of the real dangers of fire and other hazards. Our risk is greater if we get hysterical about imaginary risks, or ignore real ones. We must learn to tell the difference.

[Our World](#)
[Trees, woods, forests](#)
[Oceans and seas](#)
[Lakes and rivers](#)
[Population](#)
[War and the environment](#)
[Origins](#)

[Climate change](#)
[Science and evidence](#)
[Two British lifetimes](#)
[Scenarios](#)
['Tipping points'](#)
[Are we scared?](#)
[How sure can we be?](#)

[Seers/doommongers?, sceptics/deniers?](#)
['An Inconvenient Truth?'](#)
[Responses](#)
[Energy and carbon](#)
[Water and waste](#)
[Transport](#)
[Humans, nature, food](#)

["Eyes directed towards heaven"](#)
[An environmental or human challenge?](#)
[Why should Christians Care?](#)
[Faiths](#)
[So what can we do?](#)
["No man is an island"](#)

THE ENVIRONMENTAL CHALLENGE

❖ How sure can we be?



- o Geological/palaeontological epochs
Interesting evidence, approximately known
- o Prehistoric/ historic times
Fairly sure – sound evidence and inference
- o Recent past and present
Almost certain – millions of direct observations
- o Near future
Very confident current trends will continue –
day-to-day weather forecasts still shaky!
- o Distant future
Fairly confident of broad trends -
particular years/ decades much harder
- o Models and probabilities

**“Jim Hansen ... to a Senate committee ...
said 99% sure Earth ...
getting warmer ... ”**

Craig Pittman reviewing Mark Bowen

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Should we believe scientists' predictions? After all, we are being asked to change our lives, and whole economies!

In principle, the future is unknowable. The philosopher David Hume said that nothing about the future can be deduced from our past experience: however often we let go of a stone, it might not fall to the ground next time. One day it might jump up and hit us on the nose. Yet we have never seen this happen; common sense tells us gravity will not fail. Eclipses happen as predicted, every time.

Climate science can't hope to be that reliable. It can make out general trends, which are unlikely to reverse. But in the distant future there could be changes to the sun, causing large effects. For the next few decades we can be pretty sure how things are tending: towards warming, instability, damaging consequences. Models and probabilities are employed to help. These models are not that good, but they are getting better. They can't yet accurately forecast the weather from month to month, or even week to week. But they are getting better at tracing the big picture.

Certainty about the past, too, is firmer the closer it is to the present. We don't have all the numbers about the weather today, until it becomes yesterday. Measurements are not gathered instantly. But we have millions of measurements for the recent past – temperature, atmospheric content etc. The farther back you reach, the more assumptions and deductions you need. It gets ambiguous, hazy. Yet we have some knowledge going back 1m years, some think even 50m years – almost back to the dinosaurs!

The present is the time for decisions. We have enough reason to decide to change our lives: hoping to save life and civilisation for the future of our children, even for ourselves!

[Our World](#)
[Trees, woods, forests](#)
[Oceans and seas](#)
[Lakes and rivers](#)
[Population](#)
[War and the environment](#)
[Origins](#)

[Climate change](#)
[Science and evidence](#)
[Two British lifetimes](#)
[Scenarios](#)
[‘Tipping points’](#)
[Are we scared?](#)
[How sure can we be?](#)

[Seers/doommongers?, sceptics/deniers?](#)
[‘An Inconvenient Truth’?](#)
[Responses](#)
[Energy and carbon](#)
[Water and waste](#)
[Transport](#)
[Humans. nature, food](#)

[“Eyes directed towards heaven”](#)
[An environmental or human challenge?](#)
[Why should Christians Care?](#)
[Faiths](#)
[So what can we do?](#)
[“No man is an island”](#)

THE ENVIRONMENTAL CHALLENGE

❖ Seers/doommongers? sceptics/deniers?

- o IPCC, Lord Stern
- o James Hansen, Al Gore
- o Mark Lynas
- o James Lovelock



www.freakingnews.com/pictures/30500/Manhattan-Flood--30789.jpg

- o Bjorn Lomborg
- o Nigel Lawson, Christopher Monckton
- o Ian Plimer
- o Joe Blogger

“Global warming and resulting rising sea levels have the potential to put much of New York City ... at risk of severe flooding ...”

CNN.com 1998

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We may not like to acknowledge the other side of the argument. The government tends to say that ‘the debate is over’. But many people – a noisy minority perhaps, maybe not even in the minority – still do not ‘believe in’ climate change, or think the threat is exaggerated. There are very good grounds for concluding that it is not exaggerated. But we must be aware of those who disagree, and have the evidence.

Bjorn Lomborg does make some good points. He has now acknowledged that climate change is happening, though he thinks we’re dealing with it the wrong way – as does James Lovelock.

Christopher Monckton and Nigel Lawson (a former Chancellor of the Exchequer) are also well-known sceptics. (Monckton is Lawson’s son’s brother-in-law.) A Q & A sheet is available from the Head of Environmental Challenge with answers to Lawson’s objections; not all he says is nonsense, but most of it is! And Ian Plimer is an Australian science professor, yet he seems not to know what the sun is made of! Both of these have recently published books on the subject.

Answers to common misunderstandings may also be found in ‘The Hot Topic’, by Gabrielle Walker and Sir David King, and on the Royal Society website.

The IPCC and Lord (Nicholas) Stern are included on this slide because sceptics often have a go at them. Nigel Lawson compared them both to the Da Vinci Code! Numerous websites dismiss climate scientists as crazy nerds or self-interested scaremongers. This is just mindless abuse.

James Hansen is a scientist who advises Al Gore. Many Americans resent that he is paid by NASA – a US government agency. We do need to be aware of the paid interests people have – including the oil industry.

[Our World](#)
[Trees, woods, forests](#)
[Oceans and seas](#)
[Lakes and rivers](#)
[Population](#)
[War and the environment](#)
[Origins](#)

[Climate change](#)
[Science and evidence](#)
[Two British lifetimes](#)
[Scenarios](#)
[‘Tipping points’](#)
[Are we scared?](#)
[How sure can we be?](#)

[Seers/doommongers?, sceptics/deniers?](#)
[‘An Inconvenient Truth?’](#)
[Responses](#)
[Energy and carbon](#)
[Water and waste](#)
[Transport](#)
[Humans, nature, food](#)

[“Eyes directed towards heaven”](#)
[An environmental or human challenge?](#)
[Why should Christians Care?](#)
[Faiths](#)
[So what can we do?](#)
[“No man is an island”](#)

THE ENVIRONMENTAL CHALLENGE

❖ ‘An Inconvenient Truth’?

- o True Rises in CO₂ and temperature since early 20th c
Melting glaciers, drying Sahel, Lake Chad
- o Minor inaccuracies 2005 the hottest year
- o Debatable
Frequency of hurricanes, causes of flooding in China
Polar bear drownings



- o Exaggerated/ distorted
Imminent multi-metre sea level rises
Hurricane Katrina/ New Orleans
- o Untrue Pacific Nations all evacuated
- o Understated?
Melting icecaps, thawing tundra
Deforestation

**“We have ...
entered a period of
consequences.”**

Winston Churchill quoted by Al Gore

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Public awareness of climate change was alerted by Al Gore’s famous film – itself based on an earlier touring presentation. He deserves our gratitude, but unfortunately there have been persistent questions about the accuracy of his information. There was even a UK court ruling on the subject (the validity of which is itself debated). It’s best to be candid about this – otherwise we all get lumped together and labelled as scare-mongers. To be frank, then, much of the material in ‘An Inconvenient Truth’ is dubious – maybe so much that it shouldn’t be shown. Examples are given in the slide – from the debatable to the downright untrue.

Some of Gore’s evidence – snow melting on Kilimanjaro for instance – might turn out to be more climate-related than is thought at the moment. No question, the mountain’s striking skull-cap of snow (unique in the tropics) is dwindling. When it will vanish completely? Is this due to climate change, one of the ‘canaries in the coal-mine’, or other causes?

A lot of Al Gore’s examples, though, are perfectly correct. In general terms, his conclusions and the film as a whole are sound. We don’t have to rely on every single detail – which he got from his advisors – in order to be confident of what we’re saying. There is also evidence which he could have made more of. Maybe it’s better known now – eg the methane emitted from thawing tundra.

To contrast the stuff produced by sceptics, this tends to have some good points, with heaps of arrant nonsense. The general arguments of most skeptics are distorted, obtuse, or plain wrong. We’re still willing to answer point by point if we must. It is very close to certainty – brute fact – that climate change is happening; and beyond reasonable doubt that its principal cause is atmospheric changes from human activity. Severe consequences are predicted all over the world, more in some places than others, sooner and more sudden than we thought even four years ago.

[Our World](#)
[Trees, woods, forests](#)
[Oceans and seas](#)
[Lakes and rivers](#)
[Population](#)
[War and the environment](#)
[Origins](#)

[Climate change](#)
[Science and evidence](#)
[Two British lifetimes](#)
[Scenarios](#)
[‘Tipping points’](#)
[Are we scared?](#)
[How sure can we be?](#)

[Seers/doommongers?, sceptics/deniers?](#)
[‘An Inconvenient Truth’?](#)
[Responses](#)
[Energy and carbon](#)
[Water and waste](#)
[Transport](#)
[Humans. nature, food](#)

[“Eyes directed towards heaven”](#)
[An environmental or human challenge?](#)
[Why should Christians Care?](#)
[Faiths](#)
[So what can we do?](#)
[“No man is an island”](#)

THE ENVIRONMENTAL CHALLENGE

❖ Responses

- o Prevention/ avoidance?
- o Time-lag/ turnaround time
- o Mitigation – reducing our impact
- o Adaptation – for living in an altered world
- o Preparation – thinking, planning, praying
- o Reclamation – hope, for a different future

African landscape



www.christianaid.org.uk/issues/climatechange/facts/index.aspx /
Glynn Griffiths

“No-one made a greater mistake than he who did nothing, because he could only do a little.”

Edmund Burke

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Well then – in St Paul’s words – “What shall we say unto these things?”
Or as the Gospels put it, “What must we do to be saved?”

Before going on to more detailed areas for action, let’s highlight the kinds of response we might attempt.

We might have hoped to avoid climate change altogether – but regrettably that is no longer on the cards. There is thought to be a time-lag of about three decades between any CO₂ emitted and their effect on the climate. Therefore we may have to live with the consequences of the last 30 years’ emissions, whatever we do now. It’s also thought that the CO₂ we put out takes a century at the very least to be absorbed by the oceans and the trees – and then no more than half is being mopped up in this way. The world is like a supertanker, which may take as much as seven decades or even more to turn around! So we need to start thinking about mitigation and adaptation.

Mitigation is about reducing the damage we cause as much as possible; adaptation means developing lifestyles which will be least vulnerable to those impacts that we can’t deflect quick enough. Communities need to learn to support one another – as they have done at past times of crisis in history, when they were less in a position to see it coming than we are now.

Ultimately we need to communicate a spirit of hope and trust in God’s provision in all ways – especially where we are helpless to influence the outcome – as we must be to a large extent, with something as intangible and intractable as the weather.

[Our World](#)
[Trees, woods, forests](#)
[Oceans and seas](#)
[Lakes and rivers](#)
[Population](#)
[War and the environment](#)
[Origins](#)

[Climate change](#)
[Science and evidence](#)
[Two British lifetimes](#)
[Scenarios](#)
[‘Tipping points’](#)
[Are we scared?](#)
[How sure can we be?](#)

[Seers/doommongers?, sceptics/deniers?](#)
[‘An Inconvenient Truth?’](#)
[Responses](#)
[Energy and carbon](#)
[Water and waste](#)
[Transport](#)
[Humans. nature, food](#)

[“Eyes directed towards heaven”](#)
[An environmental or human challenge?](#)
[Why should Christians Care?](#)
[Faiths](#)
[So what can we do?](#)
[“No man is an island”](#)

THE ENVIRONMENTAL CHALLENGE

❖ Energy and carbon

- o Coal, oil, gas, nuclear
- o Energy sustainability, security, affordability
- o Emissions: direct and indirect
- o UK Parliament and Government
- o Committee on Climate Change
- o Budgets, trading and offsetting
- o Renewable technologies
- o Carbon capture and storage?



[en.wikipedia.org/wiki/London_Parliament_\(Monet\)](http://en.wikipedia.org/wiki/London_Parliament_(Monet))

“The Climate Change Act sets up an innovation in the governance of carbon emissions ... it commits the Government to establishing legally carbon budgets.”

*Lord Adair
Turner, CCC
Chairman*

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Let's talk now about the different sources of energy, their carbon and other implications. Traditionally we have relied on three sources of fossil fuels. Coal is extremely dirty, oil suffers from notorious supply issues, gas is increasingly subject to international power politics. Most UK nuclear power stations have now come to the end of their lives.

There are three issues constraining supplies: sustainability (what's left in the ground and for how long – lots of coal, diminishing reserves of oil), security (who are you buying it from and are they your friends?), and affordability (how much is it costing?). These questions should be addressed together – yet governments tend to worry about whichever is uppermost at any time and forget the others.

Also we must think about emissions (what's the effect on the climate?). These may be direct (flue gases from your own boiler), or indirect (emissions from power stations, you use the electricity but the CO₂ is emitted elsewhere).

The government is putting its trust in keeping coal fired power stations but scrubbing the carbon from the smoke. This is a new technology, not nearly ready to be deployed on a large scale.

Meantime it is essential to introduce renewable technologies as much as we can: solar panels, geothermal heat pumps, biomass boilers. Churches are beginning to do this.

The UK Parliament has been busy over the years passing laws, but so far they have mainly left it to others to implement them – at least till 2008, as the Climate Change Act lays heavy duties on the Government. The Committee on Climate Change give statutory advice to the Government. The Government is very keen on trading and offsetting – by which we buy the right to emit from other countries, who must then make the cuts on our behalf. This is not entirely to be dismissed, but we should be very wary.

[Our World](#)
[Trees, woods, forests](#)
[Oceans and seas](#)
[Lakes and rivers](#)
[Population](#)
[War and the environment](#)
[Origins](#)

[Climate change](#)
[Science and evidence](#)
[Two British lifetimes](#)
[Scenarios](#)
[‘Tipping points’](#)
[Are we scared?](#)
[How sure can we be?](#)

[Seers/doommongers?, sceptics/deniers?](#)
[‘An Inconvenient Truth’?](#)
[Responses](#)
[Energy and carbon](#)
[Water and waste](#)
[Transport](#)
[Humans. nature, food](#)

[“Eyes directed towards heaven”](#)
[An environmental or human challenge?](#)
[Why should Christians Care?](#)
[Faiths](#)
[So what can we do?](#)
[“No man is an island”](#)

THE ENVIRONMENTAL CHALLENGE

❖ Water and waste

- o Rain and drought
- o Flooding, lawns and patios
- o Water conservation, re-use
- o Land fill – emissions, birds
- o Recycling, sorting/separation, ‘commingling’
- o Food waste, packaging, carrier bags

“The Thames region has lower water availability per person than Morocco, but Londoners consume ... 18 litres per day more than the national average ...”



The Guardian, 29/08/08

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‘Water and waste’ are issues in their own right – and also they have climate change consequences. Cleaning and distribution, and moving and recycling waste, all use electricity and emit carbon. Landfill sites emit methane (CH₄), a greenhouse gas 20 x more powerful than CO₂ (though less abundant, and it may settle out of the air quicker).

Water conservation and flooding are problems in different kinds of weather.

We have recently completed an assessment of the risks to churches from flooding.

We don’t think recycling water on site has been installed by any churches in London yet. ‘Grey water’ systems are more appropriate for new housing. For a church, ‘rainwater harvesting’ may be more worthwhile considering – if only a giant water butt for the churchyard in dry summers.

Recycling of waste is done in different ways by different authorities. Some ask you to sort it for yourselves, others pick it all up together (‘commingled’) and sort it later. There are pros and cons for both options. Not all authorities take garden waste.

It’s important not to contaminate sorted waste for recycling – eg allowing crisp packets to get into the garden waste. This can cause a whole load to be sent to landfill instead. Special items such as electrical goods may be collected by a special call on prior request.

Plastic and packaging need to be reduced as much as possible. More than 13 billion carrier bags are distributed in the UK every year. Where do they all end up? Many go to landfill sites, somewhat less bad if they are tied up with other waste inside them, worse if they are loose and can be taken by gulls to feed their chicks – or flying around in the street where they get stuck in trees and hedges and may be a threat to nesting birds.

[Our World](#)
[Trees, woods, forests](#)
[Oceans and seas](#)
[Lakes and rivers](#)
[Population](#)
[War and the environment](#)
[Origins](#)

[Climate change](#)
[Science and evidence](#)
[Two British lifetimes](#)
[Scenarios](#)
[‘Tipping points’](#)
[Are we scared?](#)
[How sure can we be?](#)

[Seers/doommongers?, sceptics/deniers?](#)
[‘An Inconvenient Truth?’](#)
[Responses](#)
[Energy and carbon](#)
[Water and waste](#)
[Transport](#)
[Humans. nature, food](#)

[“Eyes directed towards heaven”](#)
[An environmental or human challenge?](#)
[Why should Christians Care?](#)
[Faiths](#)
[So what can we do?](#)
[“No man is an island”](#)

THE ENVIRONMENTAL CHALLENGE

❖ Transport

- o Foot, cycle
- o Car, buses, rail, Tube
- o Air quality, traffic fumes
- o Low-emissions zones
- o Hybrid cars, electric vehicles, fuel cells
- o Sea and air

Honda FCX Clarity



BBC website 2008

“After a century of constant improvements, the internal combustion engine still only converts ... about 16% of the energy in gasoline to turn the car's wheels.”

www.fuelcells.org

Shrinking the footprint



We take decisions every day on the best mode of transport. Cars, buses, rail and Tube, rank in that order as far as emissions are concerned. The figures can be calculated from www.travelfootprint.org. Shanks' ponies remain the least emitting form of locomotion.

Cars are more polluting than planes, mile for mile, but aircraft emissions are 2 - 4 times more damaging at high altitude and the journeys are usually much longer – also air travel has been the fastest growing sector. International rail journeys are less polluting, but much more expensive even if air journeys are offset. It is not feasible to take the train to Africa, America or Japan. Either we forego such journeys, or we self-ration, or we omit non-essential travel – or else we abandon all restraint, at great cost to the planet.

Travel by sea is an option, less easy to estimate the emissions. Mostly it is used for freight. Recreational sea travel is mostly the extended cruise – a different proposition entirely. It is no longer necessary to cross to Europe by ferry, though the ferry is an option to Ireland. But this is not thought much of an improvement on the aeroplane – at least not in terms of CO₂. Other emissions may well tip the balance in favour of sea.

Alternatives to the internal combustion engine are getting more and more viable. Hybrid cars are familiar, though their life-cycle emissions – manufacture and importation – are controversial.

Most electric vehicles run on lithium-ion batteries. A rapid charging battery has just been announced. The hydrogen powered fuel cell remains the holy grail for vehicles and other uses. But it is a 'Catch-22' – hydrogen fuel cells can't run without a re-supply grid; but it isn't economic to install such a grid without the demand from vehicles. Nevertheless, the world's first hydrogen car is illustrated. It was hailed by 'Top Gear'!

[Our World](#)
[Trees, woods, forests](#)
[Oceans and seas](#)
[Lakes and rivers](#)
[Population](#)
[War and the environment](#)
[Origins](#)

[Climate change](#)
[Science and evidence](#)
[Two British lifetimes](#)
[Scenarios](#)
['Tipping points'](#)
[Are we scared?](#)
[How sure can we be?](#)

[Seers/doommongers?, sceptics/deniers?](#)
['An Inconvenient Truth'?](#)
[Responses](#)
[Energy and carbon](#)
[Water and waste](#)
[Transport](#)
[Humans: nature, food](#)

["Eyes directed towards heaven"](#)
[An environmental or human challenge?](#)
[Why should Christians Care?](#)
[Faiths](#)
[So what can we do?](#)
["No man is an island"](#)

THE ENVIRONMENTAL CHALLENGE

❖ Humans, nature, food

- o Meat and fish
- o Farming, livestock and methane
- o Wildlife or vermin?
- o Co-existence and culling
- o The albatross, the eagle, the sparrow, the honey-bee
- o Temperatures and the seasons
- o Extinctions?

March hares – February 2009



www.timesonline.co.uk/tol/news/environment/article5786534.ece

“Do not slaughter a cow or a sheep and its young on the same day.”

Leviticus 18: 28

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www.shrinkingthefootprint.co.uk



Nature provides our food, and it is also of value, to be cherished in its own right. The livestock kept to feed an expanding meat-eating population around the world makes a major contribution to greenhouse gases, through methane emissions from cattle. Over-fishing is combining with climate change to deplete stocks to a dangerous level. The sea as well as the field must be given time and space to rest and recover.

The fauna and flora in our churchyards remind us of our relationship with wild nature as a whole. We cannot have these islands – or the biosphere – to ourselves; we must learn to share them with others – whether foxes, birds, bats, butterflies.

We have little reason to feel smug in the UK about our love of nature. This is a recent Damascus Road conversion for us. From the 16th to the 19th centuries, few countries could rival us for wildlife persecution. Everything was treated as vermin; churchwardens offered bounties for the extermination of birds and mammals. It's fortunate they were not more successful. To the extent that they did drive any species to extinction within these shores, some – like the Sea Eagle – are now being reintroduced. But what's happened to the sparrow, or the bees? Further afield, we may rejoice at the recent recovery of albatross populations in the Southern Ocean.

It's interesting – and alarming – climate change is causing many species to move gradually further north, a few miles per year, looking for cooler weather. And the seasons are changing. This affects hedgehogs for example – their young cannot eat enough to gain strength and survive the period of hibernation. And Spring is arriving in the UK 2 weeks earlier than in the middle of the 20th c.

Improved animal welfare goes back to biblical times – we can eat, but must not exploit, oppress or drive to the margins. Why should we cull the deer or the badgers? They have their rights. Why are a few thousand of another mammal species too many, when 60m humans are seemingly not enough?

[Our World](#)
[Trees, woods, forests](#)
[Oceans and seas](#)
[Lakes and rivers](#)
[Population](#)
[War and the environment](#)
[Origins](#)

[Climate change](#)
[Science and evidence](#)
[Two British lifetimes](#)
[Scenarios](#)
[‘Tipping points’](#)
[Are we scared?](#)
[How sure can we be?](#)

[Seers/doommongers?, sceptics/deniers?](#)
[‘An Inconvenient Truth’?](#)
[Responses](#)
[Energy and carbon](#)
[Water and waste](#)
[Transport](#)
[Humans, nature, food](#)

[“Eyes directed towards heaven”](#)
[An environmental or human challenge?](#)
[Why should Christians Care?](#)
[Faiths](#)
[So what can we do?](#)
[“No man is an island”](#)

THE ENVIRONMENTAL CHALLENGE

❖ “Eyes directed towards Heaven”

“After I left London ... I remained three Weeks with Wordsworth at Race-down ...

While we were with him he relaxed the rigour of his philosophic Nerves so much as to go a Coursing several times, and I assure you did not eat the unfortunate Hares with less relish because he heard them heave their death groans, and saw their Eyes directed towards Heaven with that glare of vacant sadness which belongs to the expiring creature – **for his usual Appetite shewed itself at the dining Table ...”**



Henry Eldridge/
www.wordsworth.org.uk/history/index.asp?pageid=39

*Azariah Pinney to James Tobin, 1796 –
of William Wordsworth*

Quoted in Juliet Barker, ‘Wordsworth: A Life in Letters’

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Little comment is needed on this slide. Wordsworth is renowned for his Romantic sensibilities towards wild nature.

Far be it from us to accuse the great Poet Laureate of hypocrisy. But his contemporary who wrote the letter quoted here did so, or insinuated hypocrisy anyway – with his wry observation on Wordsworth hunting and eating wild hare.

Perhaps Wordsworth the hunter is as natural a phenomenon (or more so) than Wordsworth, the Romantic poet and cultural icon.

There is a lesson here for us: people are watching us, to see if our words and sentiments are matched by our behavior.

[Our World](#)
[Trees, woods, forests](#)
[Oceans and seas](#)
[Lakes and rivers](#)
[Population](#)
[War and the environment](#)
[Origins](#)

[Climate change](#)
[Science and evidence](#)
[Two British lifetimes](#)
[Scenarios](#)
[‘Tipping points’](#)
[Are we scared?](#)
[How sure can we be?](#)

[Seers/doommongers?, sceptics/deniers?](#)
[‘An Inconvenient Truth?’](#)
[Responses](#)
[Energy and carbon](#)
[Water and waste](#)
[Transport](#)
[Humans. nature, food](#)

[“Eyes directed towards heaven”](#)
[An environmental or human challenge?](#)
[Why should Christians Care?](#)
[Faiths](#)
[So what can we do?](#)
[“No man is an island”](#)

THE ENVIRONMENTAL CHALLENGE

❖ An environmental or human challenge?

- o Whose challenge?
Our world, resources use, food, air and water
Forests, oceans, pollution, transport, energy, climate
Population, war
- o The common factor
The human species, a challenge to nature?
- o Natural hazards, human challenges
Earthquakes, volcanoes? 'Acts of God'?
Human genius, creativity, foresight; exploitation and harm



**“What a piece of work is man! how noble
in reason!! ... the paragon of animals!
And yet, to me, what is this quintessence
of dust?; man delights not me;
no, nor woman neither ...”**

Hamlet

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It is time now to begin drawing some conclusions.

We speak of an environmental challenge, but the truth is this is a human challenge to the environment. There are lots of environmental challenges; those already mentioned in this talk are listed. But they all have one thing in common – us. Human beings are dangerous to the environment. God gave us the responsibility to look after His creation. Instead, we have pretty well wrecked it – at least the biosphere on this planet – almost beyond recall.

It was wise of God to make the distances between planets and stars very large indeed. NASA seems to be concluding that interplanetary travel is unviable. Dream on, those who would like to colonise other places. Meanwhile we have 'No Planet B'.

Of course, some natural disasters are none of our making. Sometimes people get confused about this. A tsunami is caused by an underwater earthquake. Yet the Boxing Day Tsunami three years ago was linked by some commentators to climate change. They are completely unconnected. There is nothing whatever we can do to stop earthquakes and volcanoes (though we could do better at prediction, and mitigating the consequences). These events do raise terrible issues of why God allows suffering. However that is not the subject of this talk, nor of the Environmental Challenge.

It is not obligatory to go along entirely with the guilt-trip of some commentators about the environmental harm we have caused. Some of this – deforestation, pollution, over-use of pesticides – has been reckless, even wanton. But we need not condemn the industrial revolution for wanting to make life better. The consequences we now face could not have been foreseen then. We don't want to return to the hardships of the Middle Ages. Another major contribution to our emissions comes from concrete manufacture – a creative not destructive thing in itself. Yet now we do know the consequences, it is imperative we must take action.

[Our World](#)
[Trees, woods, forests](#)
[Oceans and seas](#)
[Lakes and rivers](#)
[Population](#)
[War and the environment](#)
[Origins](#)

[Climate change](#)
[Science and evidence](#)
[Two British lifetimes](#)
[Scenarios](#)
[‘Tipping points’](#)
[Are we scared?](#)
[How sure can we be?](#)

[Seers/doommongers?, sceptics/deniers?](#)
[‘An Inconvenient Truth’?](#)
[Responses](#)
[Energy and carbon](#)
[Water and waste](#)
[Transport](#)
[Humans, nature, food](#)

[“Eyes directed towards heaven”](#)
[An environmental or human challenge?](#)
[Why should Christians Care?](#)
[Faiths](#)
[So what can we do?](#)
[“No man is an island”](#)

THE ENVIRONMENTAL CHALLENGE

❖ Why should Christians care?

- o A foundational mandate
Genesis Ch 1
Care and stewardship, not exploitation
- o A Gospel imperative
Colossians Ch 1
Allegiance to Christ:
“All things ... made by Him and through Him”
- o A redemptive project
Reclaiming ‘life in all its fullness’



www.himalayaguides.com/rising.jpg

“We only have one planet – already under strain and we are living on the capital which we should be passing intact to our children.”

The Bishop of London

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Environmental concern is ‘core business’ for Christians. It is not a luxury, nor a trendy fad – but an essential complement to preaching the Good News of the Kingdom of Heaven. Let us not be ‘so heavenly-minded, we’re no earthly use’!

We have a mandate to care for creation – even to exercise a kind of rulership. This may not be ‘dominion’ – using the word in some translations of the first book of the Bible; at least, not in the abusive or exploitative sense, that is often read into it. Genesis was not necessarily the first biblical book to be written and read. Jewish people during Old Testament times would have been familiar with the rest of the Law, and as time went on with the Psalms and the Prophets. They would have known that selfish exploitation was ruled out. And so should we. All the great religions agree on this.

These imperatives are reinforced by the New Testament. In Colossians, St Paul proclaims Christ’s creative, purposive and sustaining roles in creation. Our responsibility to exercise stewardship is rooted in our allegiance to Christ, and dependence upon Him.

Moreover, Christ is the only being with both a complete understanding of creation (it was made through Him in His capacity as the eternal Word, and He continues to observe and sustain it from without); and personal experience from within of what it’s like to be part of the world (having lived for a little time as a man). He can understand our condition, and he can also feel it.

At this time of looming crisis for the earth and all its creatures, we are called to participate in Christ’s redemptive work, to reclaim nature from its ‘bondage to decay’. We proclaim ‘life in all its fullness’. We are not prepared to consign the earth to a crippled life or semi-death. The ‘New Heaven and Earth’ will be redeemed versions of those we dwell in now. Maybe our present mission is to build a bridge to a transformed nature in our outer environment, as much as in our inner hearts.

[Our World](#)
[Trees, woods, forests](#)
[Oceans and seas](#)
[Lakes and rivers](#)
[Population](#)
[War and the environment](#)
[Origins](#)

[Climate change](#)
[Science and evidence](#)
[Two British lifetimes](#)
[Scenarios](#)
[‘Tipping points’](#)
[Are we scared?](#)
[How sure can we be?](#)

[Seers/doommongers?, sceptics/deniers?](#)
[‘An Inconvenient Truth?’](#)
[Responses](#)
[Energy and carbon](#)
[Water and waste](#)
[Transport](#)
[Humans. nature, food](#)

[“Eyes directed towards heaven”](#)
[An environmental or human challenge?](#)
[Why should Christians Care?](#)
[Faiths](#)
[So what can we do?](#)
[“No man is an island”](#)

THE ENVIRONMENTAL CHALLENGE

❖ Faiths

- o Judaism – Torah, and Kabbalah?; God, Man and Nature
- o Islam – Qur'an, humans as vice-regents
- o Hinduism – India, sacred rivers, the environmental crisis
- o Sikhism – sky, earth, trees, water
- o Buddhism – detachment/ engagement
- o Confucianism, Daoism – cosmology, ritual, relationships

Kyoto



“Here is a major, human emergency. Have the faiths of humankind got anything to say about this challenge?”

The Bishop of London

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We need make no claim that Christianity is the only faith with the answers about the environment or the climate. Here are several of the world's main religious faiths, with a simple and naïve summary of key themes on this topic.

No-one holds a monopoly of all the answers. We must, and do, work in harmony with other faiths, and others of goodwill. Most share a passionate and growing environmental concern. We can learn from each other on these issues, happily without compromising our respective core beliefs and therefore without conflict.

However it is essential to stimulate communication and common action. We must not get bogged down in competitive text-quoting (even though there are plenty of quotes in this presentation!)

Two of them, on this slide and the one before, come from our own Bishop of London. They represent a clarion call, ringing like a bell. Of course the Bishop means the faiths of the world do have something to say, but you wouldn't know it from the way most of their adherents act (including ourselves).

Illustrated on this slide is a temple bell from Kyoto in Japan, the home of the last big climate change agreement. We are now working towards the next major UN summit, in Copenhagen in December. We pray that Copenhagen will deliver a new, more comprehensive, and more effective, treaty. At the moment, the omens are not very good on that.

[Our World](#)
[Trees, woods, forests](#)
[Oceans and seas](#)
[Lakes and rivers](#)
[Population](#)
[War and the environment](#)
[Origins](#)

[Climate change](#)
[Science and evidence](#)
[Two British lifetimes](#)
[Scenarios](#)
[‘Tipping points’](#)
[Are we scared?](#)
[How sure can we be?](#)

[Seers/doommongers?, sceptics/deniers?](#)
[‘An Inconvenient Truth’?](#)
[Responses](#)
[Energy and carbon](#)
[Water and waste](#)
[Transport](#)
[Humans. nature, food](#)

[‘Eyes directed towards heaven’](#)
[An environmental or human challenge?](#)
[Why should Christians Care?](#)
[Faiths](#)
[So what can we do?](#)
[‘No man is an island’](#)

THE ENVIRONMENTAL CHALLENGE

❖ So what can we do?

- o Walking the walk
 - Turning down, switching off
 - Saving, reusing, recycling, cherishing
 - Work in communities, but don't exempt ourselves
- o Talking the talk
 - Taking it home and to work
 - Communicating and networking
 - Political engagement
- o Sharing the vision
 - Christ in creation, hope for the future



www.phrases.org.uk/images/oak-seedling.jpg

“So we don't need to sit around and wait for businessmen or politicians to take the lead.”

www.whatyoucando.co.uk

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www.shrinkingthefootprint.co.uk



Almost last of all, a summary to take away with us.

'Walking the walk' means turning down, switching off, changing lightbulbs etc – every way to avoid waste. Saving water. Dealing with our rubbish responsibly. Insulating the loft. Tending the churchyard.

'Talking the talk' is not a way of avoiding responsibility or spreading hot air. It's about influencing those around us in a helpful way – in church, at home, in the workplace.

And about political engagement. Write to your MP. If he/she is on the government side, he should push the leadership to adopt a strong stance in Copenhagen – and to put the government's principles into action here, which at the moment they don't do as much as we would like. If there is a new government next year – well, send your opposition MP the same message.

And we need to keep our spiritual eyes open too. The environment and climate change present us with big, big problems. But we believe in a future and a hope. We need to keep our spiritual wires plugged in to the ultimate source of power and light. Lots more practical tips are on the website 'whatcanyoudo.co.uk'.

The picture illustrates a popular proverb "Great oaks from little acorns grow".

[Our World](#)
[Trees, woods, forests](#)
[Oceans and seas](#)
[Lakes and rivers](#)
[Population](#)
[War and the environment](#)
[Origins](#)

[Climate change](#)
[Science and evidence](#)
[Two British lifetimes](#)
[Scenarios](#)
['Tipping points'](#)
[Are we scared?](#)
[How sure can we be?](#)

[Seers/doommongers?, sceptics/deniers?](#)
['An Inconvenient Truth?'](#)
[Responses](#)
[Energy and carbon](#)
[Water and waste](#)
[Transport](#)
[Humans. nature, food](#)

["Eyes directed towards heaven"](#)
[An environmental or human challenge?](#)
[Why should Christians Care?](#)
[Faiths](#)
[So what can we do?](#)
["No man is an island"](#)

THE ENVIRONMENTAL CHALLENGE

❖ “No man is an island”

“No man is an island entire of itself; every man
is a piece of the continent, a part of the main;
if a clod be washed away by the sea,
Europe is the less,
as well as if a promontory were,
as well as any manner of thy friends
or of thine own were;
any man's death diminishes me,
because I am involved in mankind.

**And therefore never send to know
for whom the bell tolls;
it tolls for thee.”**



www.timesonline.co.uk/multimedia/archive/00188/island385_188469a.jpg

John Donne

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Here is the famous homily from the 17th century writer and divine John Donne.

Donne was a London man – and a man of the world. This quote is associated with his time in Lincoln’s Inn, the legal precinct between Holborn and the Strand.

What applies to our relations with humanity as a whole may be extended to the environment – animal and plant life, the biosphere and all creation.

We are an integral part of all of these, and should care when any creature suffers or dies. Even though all of us must die one day, let us leave a planet fit for others to live in after us.

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September 2009

[Our World](#)
[Trees, woods, forests](#)
[Oceans and seas](#)
[Lakes and rivers](#)
[Population](#)
[War and the environment](#)
[Origins](#)

[Climate change](#)
[Science and evidence](#)
[Two British lifetimes](#)
[Scenarios](#)
[‘Tipping points’](#)
[Are we scared?](#)
[How sure can we be?](#)

[Seers/doommongers?, sceptics/deniers?](#)
[‘An Inconvenient Truth?’](#)
[Responses](#)
[Energy and carbon](#)
[Water and waste](#)
[Transport](#)
[Humans, nature, food](#)

[‘Eyes directed towards heaven’](#)
[An environmental or human challenge?](#)
[Why should Christians Care?](#)
[Faiths](#)
[So what can we do?](#)
[‘No man is an island’](#)