PLANET EARTH

A PERSONAL LOOK AT AND REVIEW OF OUR SITUATION

[Click on any of the above titles to go to the relevant section]

DISCLAIMER R. DREW

This is a very personal reflection on the climate problems. I take responsibility for what I have written, based largely on memories, observations and deep passionate concern

I make no apology for expressing in words to the best of my ability, the extreme nature of the challenges before us

I am not 'marketing' these ideas, nor am I setting out to teach, just to assemble as wide a picture as possible of a staggeringly complex issue.

This is not an organised or comprehensive guide to anything… There are many other comprehensive papers on the subjects touched on here and

I do not claim to be an expert in any of these areas, and there may be mistakes I need to correct.

AIMS

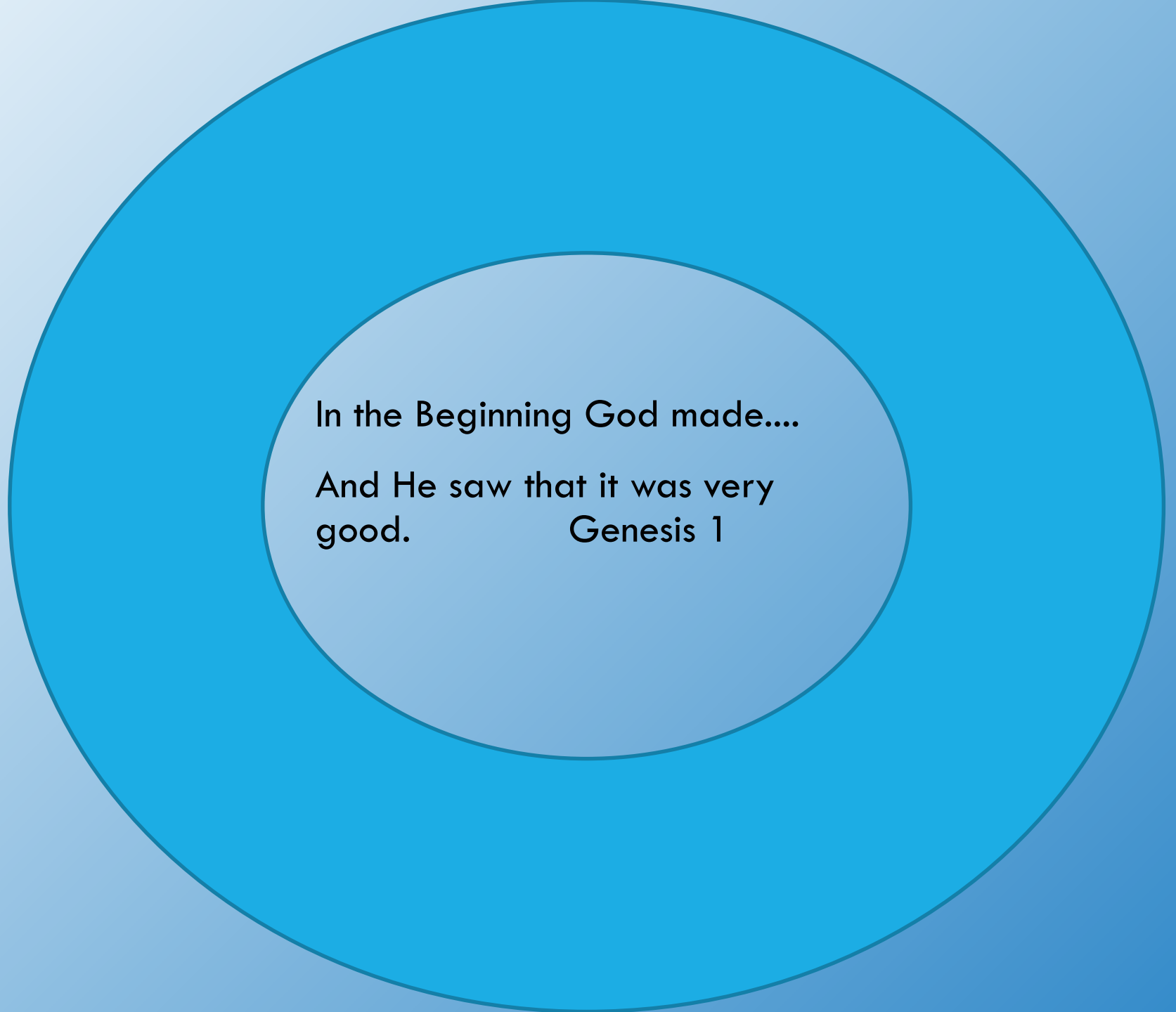
I aim to broaden my own and possibly our understanding, to help us to think, talk and pray through to make wise individual and collective choices. It is only a start. A beginning to draw together some ideas of the complexity of the enormous global issues that we face

I do hope to inspire prayer at the deepest possible levels of commitment. In fact I hope that any or all of these slides could be used to form the basis of prayers.

I expect to update this regularly and I anticipate that this contribution will be added to, expanded and illustrated with shared ideas, understanding and knowledge from those who specialise in different aspects.

I am not trying to dictate to, or to judge, anyone

EARTH


In the Beginning God made....
And He saw that it was very good. Genesis 1

ABOUT PRAYER

It is apparently easy to pray for each others needs, lost keys, sore joints, illnesses, provision, safe travel, smooth running of events, good weather, well being etc. that's great and there's nothing wrong with that as far as I know, but we are faced, and have been for at least 50 years, with a monumental ecological crisis which most of us including myself have only a minimal grasp of.

Praying for this is seriously urgent. The bible refers to all of creation groaning… that's surely what we are hearing now. The power of God is so much greater than anything we can imagine. Call on His Greatness. He knows what He created. If there is a solution.. He will know what it is

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PLANET IN CRISIS

GLOBAL WARMING - CLIMATE CHANGE

THESE PROBLEMS ARE WIDELY EQUATED AND RARELY DEFINED. BUT THEY ARE SEPARATE AS WELL AS LINKED

Global warming

Carbon dioxide, sulphur dioxide, methane and other gases freed to the earth's atmosphere behave like a blanket, retaining warmth that would have been lost, and raising the average temperature of earth, leading to increased melting of polar ice caps, and rising sea levels

Climate change

The knock-on effects of global warming can lead to, but are not the only cause of changes in earth's regional climates or of extremes in weather events and changes of sea level

GLOBAL WARMING - CLIMATE CHANGE

Global warming refers to the average temperatures of the earth as a whole. [It does **not** mean that we will have better summers or milder winters]

Climate change is related because climate is driven by ocean water temperatures and circulation and movements of air and water masses

The results of both can lead to catastrophic changes in sea level, ocean circulation, and atmospheric activity, and instability, leading to floods, droughts, huge storms, temperature extremes, etc.

SO .. WHY, HOW WHAT WHERE

Most of our attempts to 'improve' things or rectify problems have environmental costs, and seem to lead to even more serious problems, [even if we can't always see that straightaway]

Surely the most outstanding need is to invoke the power of God Here and Now.

If we really believe in the Greatness and Awesome power of our loving merciful and Creator God….

We should be on our knees in tears

CURRENTLY WE KNOW WE ARE FACING DRAMATIC CLIMATE CHANGE

We see ice chunks the size of Wales breaking away from the Antarctic ice shelf

Hottest recorded summers/autumn/spring

Warmest winters

Heaviest floods

Wildest wild fires and storms

Extinctions of many species, particularly the larger ones

Rising sea levels

NOTHING IS FOREVER

We have a lovely temperate climate here in the UK now. Rarely too hot or too cold. [even if we'd like more sun in summer and shorter winters]

But in the history of this country told by our geological record we have twice experienced desert conditions [the rich red soils of Devon derive from the first of these] and dense tropical fern forests for millions of years led to the formation of our coal reserves.

And deep sea fossils have been found in rocks on top of Snowdon and half way up the Andes demonstrating that large areas of land were once under water

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WHAT IS OUR EFFECT ON EARTH

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15 A Century of Damage 4

16 How can we reduce our negative impact?

17 Shiny New equals Better?

18 Geopolitics

19 Statistics

OVER THE LAST CENTURY WE HAVE CAUSED:

Destruction of the ozone layer in space which shields the planet from harmful UV and solar radiation [we cut back on refrigerants like CFCs but currently high-return-very-illegal-smuggling of related banned gasses, HFCs.. From eastern Europe *BBC news, nov 21*]

Sewage contamination of rivers, seas and beaches. Thousands of tons of plastics [nappies, nurdles etc] wet-wipes and raw sewage discharged frequently into our rivers and seas. 'Surfers against Sewage' informed of 5000 major releases of sewage overflow in UK last year affecting 300 flagged bathing beaches

Micro plastic residue from pre-manufacturing, [nurdles] and post-breakdown

Food, land and water toxicity due to chemical treatments, industrial chemical waste, herbicides, insecticides, hormone pollution due to birth control pills, agricultural growth promoters and antibiotics. And huge quantities of chemical weapons dumped at sea in first half 20th C

Carcinogenic waste products from many industrial processes. Asbestos

100,000s pollutants recorded in the St Lawrence Seaway [late 1970s]

A CENTURY OF DAMAGE 2

Massive increases in use of energy for industrial and domestic use

Cars, air travel, industrial machinery, tourism, domestic and industrial heating and lighting, gadgets and appliances

Air pollution CO2, SO2, Methane, NO and CO, together with particulate organic carbons, cause breathing problems for many and damage to many tree species making them vulnerable to attack from pests and viruses [Dutch elm disease, ash die back, oak virus, chestnut virus] [and white pine beetle in USA and Canada]

These gasses also lead to acid rain, destroying thousands of acres of forests in Scandinavia and Finland, wiping out unnumbered precious, unique and beautiful species in acidified freshwater lakes, and even changing the acidity [pH] of rivers and seawater

A CENTURY OF DAMAGE 3

Whales [and other cetaceans] and cod, anchovies and herring among many species hunted and fished almost to extinction

Moa, dodo, giant tortoises, and many others, gone. 30 more species recently declared extinct

Buffalo in USA grazing in many herds a million strong across the plains, were almost wiped out by settlers and the Indian wars. Reduced to less than 1000 animals in late 1800s, they were only saved on the initiative of a couple of independent individuals who kept and protected a small numbers of the last few hundreds of buffalo.

Even in Alaska subsistence farmers are finding it harder and harder to hunt the caribou and other meat and salmon they need to survive the winters

A CENTURY OF DAMAGE 4

We have seen populations of many beautiful species plummet. Many British native birds, butterflies and pollinating insects have focused attention as they have been reduced to around 10% of their 1950s levels. Hedgehogs endandered.

Destruction of forests for fuel, farmland and mineral extraction… even the ‘protected’ Amazon rainforest in Brazil is being felled at the rate of an area the size of Wales every year [and burned for charcoal which is shipped mainly to China and some of the wood ends up in USA and Europe]

Wetlands and marsh habitats have been reclaimed, for agriculture [90% of wetlands in Britain have been lost in the last 70 years]

Many unique and valuable species are being lost before we can even identify them

HOW CAN WE

Reduce our negative impact

Limit Damage

Take responsibility for our actions

How can we even find out?

Who can we trust when vested interests are so powerful?

SHINY-NEW EQUALS BETTER? TODAY'S CULTURE?

Fast turnover fashion industry leads to massive waste and on-going landfill problems before the acrylics and other manmade fibres break down to leave their toxic residue. Sweat shops, slave labour.

Company cars, changed every 3 years increase expectations. Cars last much longer than that. How many of the new gadgets and guizmos do we actually need?

New build houses. How many will still be around in 200 years?

Newest technology? Is it always necessary or even desirable? Are we ready for the extra cost, waste and fraud associated with it.

Can we understand the implications in time to make adequate laws to protect users, and the planet

Food mountains and our own piles of waste food, and waste…

POLITICS

Geopolitics. Resources. Blame game. Lack of responsible, joined up thinking. Denial.

UN, NATO, OPEC etc

International politics, tensions, competition, and trade. Corruption. 'Deals.' Wars

Marketing [style over substance] Vested Interests. Lobbying. Bribery.

Deception. Disbelief. Suspicion. Greed. Misinformation [accidental and deliberate]

Protest movements and activism. Social media. NGOs Persecutions of whistle blowers, environmental activists and journalists

Fishing quotas. Poaching. Agricultural policy. Food mountains

Conservation and protection of endangered species. Land corridors. ZSL, WWF etc

Banning of chemical weapons from 1925 [active mustard gas from 1918 is still being fished out of the north sea] Nuclear, chemical and biological developments. Cloning. Microwave weapons, How do we decide where and when enough is enough. Who polices the decisions?

STATISTICAL LIMITS AND HEALTH WARNING!

All statistics have limited applications and often different methods of estimating

They work from different bases and timelines

Varying sampling techniques

They make different assumptions

Data from different sources vary in reliability

Just the way they are represented can be seriously misleading. [Lies damned lies and statistics] You can make them show almost anything you want.

But they can be very useful

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THE WONDER OF CREATION

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22 Fragility of this Beautiful Planet

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24 The Beauty of Creation

WONDER OF CREATION

FRAGILITY OF THIS BEAUTIFUL HOME PLANET

Earth is a modest mass of molten rock [more than 12,000 km wide] travelling and spinning rapidly[!] through space

It is held together by gravity and surrounded by a very, very thin cooler surface skin; we call it the crust, and we all live on it. It varies in thickness from 8km under the oceans to about 70 km under the continents

You could imagine earth a bit like a football kicked into the air and containing an extremely hot, and layered, part liquid, part solid centre, with its own internal fire. The crust [skin] would be about the thickness of a sheet of slightly elastic tissue paper!

Earth's crust is affected by the movement of the 'molten' rock inside.

It behaves a bit like skin on simmering soup; bits break off and move around and crumpling up

[Earth is about 5,400 deg c in the centre, 1,400 deg c at the base of the crust]

EARTH IS ALSO AFFECTED BY…

Movement of the skin [crust] which causes mountain belts to rise, long faults and deep ocean trenches to develop [plate tectonics]

Circulation of the 'molten' liquid parts of the earth's mantle and core

Earthquakes [and tsunamis]. Volcanic activity. Associated mostly with edges of bits of the earth skin, where most of the movement happens. [For example, the Pacific rim, or 'ring of fire']

Meteor/asteroid strikes [which are inevitable but really random]

Solar 'wind', radiations. Electro-magnetic fields

Oceanic currents [circulation] and atmospheric pressure variations

Land and Sea tides linked to phases of the moon

BEAUTY OF CREATION

2/3 Earth's crust is covered by ocean. Only 1/3 is land.

Much of that is mountainous, desert or frozen. Most of the world's land based species have to share the remnant [about 10%]

Many different processes and cycles operate in complex interaction on creation

For example Carbon cycle

Nitrogen cycle

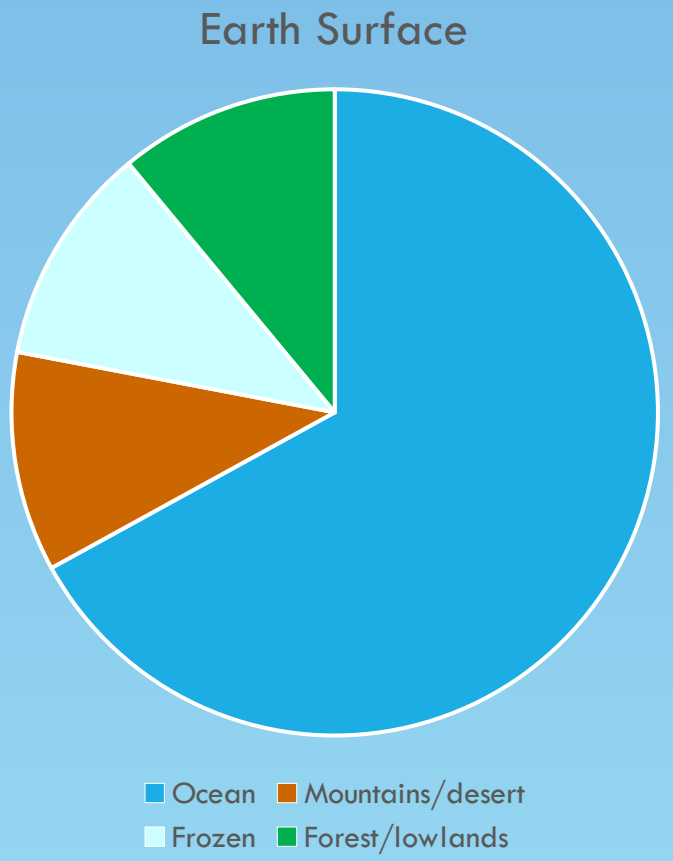
Water cycle. [Only about 3% of water on earth is 'sweet' [97% is salty] Extraordinary properties of water which make life possible.

Ground water is not an inexhaustible supply. Once salty water begins to invade the space left by extraction of ground water it will be very difficult [if not impossible] to recover

Buffers/interactions/balances/interdependence. Carbon sinks and reservoirs

Acid and alkali environments

Other linked effects.



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CLIMATE, SEA LEVEL AND ‘RATES’

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27 Sea Level Rise and Rates of Rise

28 Temperature Rise and Rates of Rise

CLIMATE AND SEA LEVEL CHANGES

We refer to climate change as if it is a simple event, but it is a complex interaction of many different things. For those who remember school maths, it's a bit like doing quadratic equations with 1,000,000 variables instead of 3.

The changes which occur are not all the same every where.

When the earth's temperature warms, sea level inevitably rises and when it cools the sea level goes down

SEA LEVEL RISES, AND RATES OF RISE

It would be helpful to register the difference between

Rise… in centimetres and

Rate of rise as in centimetres **per year.**

We may be able to reduce the **rate of rise** of sea level, but the sea level is still rising

Most of the discussions on TV and radio concern controlling rates of rise, and often do not make clear the fact that the levels will still rise, but at a slower rate…

AND TEMPERATURE RISES

Similarly open discussions frequently blur the boundaries between

Actual temperature rise.. Degrees

and

Rates of rise of temperature … Degrees per unit time

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SEA LEVEL, ICE AGES ETC

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31 Ice ages

32 Ice ages do other things too

33 Mass Extinctions

SEA LEVEL CHANGES ARE CAUSED WHEN

Polar Ice cap melting increases the amount of water in the seas, and raises 'sea level'

The crust is moved up or down by many metres due to forces within the moving layers of the earth [as crustal 'plates' move on 'molten' rock circulating underneath] Mountains like the Alps, Andes, Rockies, and deep trenches like the Marianas trench, which is deeper below sea level than Mount Everest is above it, demonstrate the colossal scale of the forces involved

The crust will rise as hot molten rock from the lower layers leaks towards the surface… [Islands can appear on the oceanic ridges]

Earth's crust can also move up or be forced down by the weight of ice [as Scotland was in the last ice age] and it rebounds slowly when the ice melts

As the sea temperature rises [above 4deg Centigrade] its volume increases

ICE AGES

Ice Ages trap huge quantities of pure water as great sheets of ice, hundreds of metres thick, at the poles, causing world wide sea-levels to fall. [a 'recent' ice sheet extended almost as far south as the Thames valley]

World wide sea level rises when the ice melts from the poles, by many tens of metres. [Eustatic changes]

There have been several ice ages 'recently' when earth has cooled. And pleuvial [rainy, wet] periods when the earth warmed, polar ice retreated and sea levels rose.

The sheer weight of ice in an Ice Age can depress the earth's crust beneath [Scotland and northern England] When the ice has gone it 'springs' back up again, seen in the raised beaches round the Scottish coast. [Isostatic changes in sea level]

Conversely some crust is forced up [southern England] and sinks back as the weight of ice is removed elsewhere

ICE AGES DO OTHER THINGS TOO

In the frozen 'wastelands' called permafrost, huge quantities of carbon in un-rotted vegetable matter [mainly mosses and lichens] are locked away frozen into the soils. This is being released as CO2 and methane already and will continue as long as the ice sheets and permafrost retreat.

- Occasionally gasses or liquids, and even pollen grains are trapped within the ice sheets which enable palaeo-climatologists and palaeo-botanists to study the climate and often vegetation [and diets of human and animal populations] from thousands of years ago

MASS EXTINCTIONS

When conditions change adversely populations are vulnerable

In the last 500,000,000 years [!] at least 2 major mass extinctions have occurred when more than 50 % of ALL life on earth was destroyed

One was probably caused by a prolonged massive eruption of flood basalt lavas in Siberia at the end of the Permian [252 Mn yrs ago] Known as the Great Dying. I have heard estimates as high as 90% of all species extinct.

2nd caused by a small [10km] meteor impact off the Yucatan peninsular in Mexico [66Mn years ago] between *Mesozoic and Cenozoic ages. Probably in conjunction with massive flood basalt eruptions in India, the Deccan traps. Marking the end of the dinosaurs

A further extinction is thought to have occurred about 74,000 years ago when a 'supervolcano' erupted in Sumatra [5000 times more powerful than the mount St Helens eruption] wiping out a large proportion of Homo sapiens. [Gene pool/DNA evidence bottleneck]

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CONSIDER THE OCEANS

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36 Ocean dumping

37 Around Britain

38 Global warming

39 Corals

OCEANS….

2/3 of the earth's surface

Oceans are enormous. And we have foolishly allowed ourselves to think of them as an endlessly forgiving dumping grounds for our rubbish.

How wrong…

OCEAN DUMPING…..

Over the past 150 years, **all types of wastes have been ocean dumped. These include sewage (treated and untreated), industrial waste, military wastes (munitions and chemicals), entire ships, garbage, dredged material, construction debris, and radioactive wastes (high- and low-level).**

For example EPA records indicate that more than 55,000 containers of radioactive wastes were dumped at three ocean sites in the Pacific Ocean between 1946 and 1970. Almost 34,000 containers of radioactive wastes were dumped at three ocean sites off the East Coast of the United States from 1951 to 1962.

AROUND BRITAIN…

The **Ministry of Defence** **has lost records** of more than one million tonnes of munitions dumped at sea

Also Operation Sandcastle in 1955, the scuttling in the Irish Sea of three ships containing German nerve gas and arsenic, which have never been monitored by the ministry.

The ministry says 24 ships containing chemical weapons were sunk between 1945 and 1957. It has lost the names of two ships scuttled in 1956 and 1957. Another 14,000 tonnes of the poisonous gas phosgene were “loose dumped” in Beaufort’s Dyke in the Irish Sea in 1946 and 1947.

Any of which may be brought up again by fishing nets

GOBAL WARMING

Oceans are not an endlessly forgiving dumping grounds for our rubbish.

The oceans can absorb a lot, but extra heat causes a number of problems, some of which we know about…

Increasing the temperature of the water causes the water to expand [further increasing sea levels]

CO2 dissolving in the oceans causes changes in acidity and affects how ocean animals make their shells, reducing the amount of carbon locked into their shells

But the most serious impact we currently know of concerns corals

CORALS

Coral reefs are the richest, most active habitat you could imagine.

They support some 70% of all oceanic life forms at some point in their life cycle.

They are extremely sensitive to temperature changes [and light and pollution]

I heard quoted [BBC R4] that a 1.5deg C rise in average sea temperature will wipe out 70% of all corals. [It was referred to as inevitable]

And 2deg C will kill them all. It is apparent that as many as 70% of all ocean life forms will be seriously compromised as a result.

We are currently on track for a 2.4 degree rise, **if all the participants in cop 26 meet all their commitments**

[No more fish and chips then]

[Why is it always 70%?]

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HUMAN ACTIVITY AFFECTS THE PLANET

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42 ‘Natural’ Disasters

43 Years of human damage

44 Deforestation

45 Overfishing

46 Farming

47 Energy use and transport

48 Chemicals

49-50 Mining

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IN ADVERSITY

All animals, including humans, tend to move in search of suitable places to live

If an area becomes too hostile for whatever reason, they move on

It is, if you like, a nomadic way of thinking and operating

Unfortunately when artificial boundaries are put in place [like national boundaries] this movement becomes difficult, fraught with danger or impossible

In the last 20 years or so the importance of corridors of movement have been recognised in particular as they relate to endangered species being able to interbreed with other tiny remnants, but it is much harder to overcome the barriers of country, sovereignty and land ownership, where the migrating species is human, and there are millions of them

‘NATURAL’ DISASTERS

We have seen many episodes of severe drought and crop failures in many parts of the world, witnessed massive human and animal mortality and seen suffering and misery on an unimaginable scale on our nightly news bulletins over the last 100 years

Earthquakes, volcanic eruptions

Hurricanes cyclones floods tornadoes tsunamis and inundations, wild fires..

All terribly destructive, all-consuming

We have changed so much and made such profound demands of the planet it is hard to know which of all the disasters, are part of the natural cycle of changes in earth and what we have directly or indirectly caused

All of these are now often attributed entirely to recent human activity, yet similar events are recorded throughout the last 2000 years and even back to the flood, the destruction of Sodom and Gomorrah and the great Middle eastern famine in biblical times Also seen in recent geological history

YEARS OF HUMAN DAMAGE

Deforestation

Overfishing.

Farming. Destruction of gigantic herds of grazing animals and of large predators for sport. Habitat destruction for agriculture

Transport and Energy use

Chemicals industry

Mining

Overpopulation

YEARS OF HUMAN DAMAGE DEFORESTATION

In Britain, serious deforestation began approx. 5000bc in response to new ideas about growing crops… Another massive wave of destruction occurred in the 1700s when local iron smelting plants were developed. Eg Bonawe in Scotland, resulted in thousands of acres of mature oaks being felled in less than 20 years to make charcoal.

Cop 26 estimated that many thousands of sq km of forests are being destroyed, and over 4000 of them in the Amazon rainforest in 1 year

YEARS OF HUMAN DAMAGE

OVERFISHING

Whales, cod, herring anchovies.. Huge numbers of enormous schools of whales and shoals of fish were wiped out in the 19th and 20th century until quotas and minimum fish sizes were introduced in the latter half of the 20th century, to try to allow the remaining stocks to recover

YEARS OF HUMAN DAMAGE FARMING

Huge herds of many species of wild grazing animals wiped out as Grasslands were extensively taken over for domesticated grazing animals [cows sheep and goats]

Fertile plains taken over mainly for a very small number of types of crops [wheat corn soy beans cotton and rice]

Forests cleared for subsistence farming everywhere. Results in soil erosion, desertification, and destruction of many species

Chemicals added to soils for higher productivity, weed and pest control, cause untold damage

YEARS OF HUMAN DAMAGE

ENERGY USE AND TRANSPORT

Combustion engines burn fossil fuel and pollute environment with NO, CO2 and particulate organic carbon. Cars aeroplanes, [industrial machinery]

Energy came initially from local wood supplies, then charcoal [for higher temperatures] and coal, followed by oil and gas. Non renewable fossil fuels, taking millions of years to develop and a hundred to destroy.

Renewable energy like solar PVs, water and wind power. How much energy does it take to produce them and how often do they need replacing or updating

Nuclear power generating masses of apparently cheap clean electricity until you consider the radioactive waste management and decommissioning costs.

YEARS OF HUMAN DAMAGE CHEMICALS

Unimaginably vast chemical industry affecting every branch of today's life.

From Food preservation, 'improvement' and distribution, to herbicides and insecticides, from military weapons to medicines, from petrochemicals to polystyrene and plastics, which clothe us keep us dry and house our latest technology, causing massive toxic waste, damaging land, sea and rivers, and poisoning many species.

Lack of regulation and/or oversight

YEARS OF HUMAN DAMAGE

MINING

Mining of many different minerals causes serious environmental damage and scars the face of the earth

Examples include gold mining in Alaska and Australia. Coal mining anywhere Copper, tin Kaolin clay etc

Heavy metal pollution renders large tracts of land so toxic plants won't grow, animals and people die. Ground and surface water sources are polluted. Acid mine drainage. Carcinogens and pockets of high cancer incidence.

Careless mining can ignite the entire coal seam, even the whole field

Burning coal mines

MINING SCARS ON THE FACE OF THE EARTH

YEARS OF HUMAN DAMAGE OVERPOPULATION.
THE ELEPHANT IN THE ROOM

The limited space on the land area of earth's crust has to be shared with all land based species, including all habitats, which were all operational before there were humans, and now has to accommodate **8 Billion** people as well.

The Homo sapiens population has grown over many thousands of years, and experienced serious setbacks through natural disasters, from volcanic winters through tsunamis and inundations of thousands of square miles, to floods, droughts, plagues and famines, all of which restrict populations

Since the development mainly of more plentiful supplies and easy distribution of food, better health care and pest control, the human population has entered an exponential growth phase which is extremely difficult to restrain.

POPULATION CONTROLS

Major disasters earthquakes, volcanic eruptions [specially supervolcanoes and flood basalts] Tsunamis, Weather events,

Rising sea levels, floods, nuclear/volcanic winters, returning ice ages

Culture, politics and major disagreements, conflict, wars.

Food supply breakdown due to pollution/pests/viruses. Lack of transport

Birth control. Medical priorities

Pollution, epidemic virus/bacterial illness

All of which cause widespread and catastrophic human suffering, as the planet is suffering now

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USE OF ENERGY

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WE ALL USE AND NEED FOOD AND FUEL DON'T WE?....

Almost everything we do requires energy, which we have used for many thousands of years and as we have discovered easier ways to obtain energy, our use of it has increased

Fossil fuels were wonderful in the 19th and early 20th century, until we began to see that coal was seriously dirty, polluting both atmosphere and soils, and causing health issues.

Oil and natural gas seemed to be cleaner and easier until we began to understand that there were only finite amounts of both available, that their combustion still causes pollution and

that all of them were causing changes in the composition of atmospheric gasses, leading to something like a heat retaining blanket in the atmosphere and changes to both the temperature and chemistry of oceans seas, rivers, and inland lakes.

RENEWABLE ENERGY? NOT ALL THAT GLITTERS IS GOLD

Renewable energy is of course very desirable. We have to stop using hydrocarbons [coal oil and gas] for 2 obvious reasons. Global warming and actually they will run out eventually.

Laws govern generation of private power in UK. Revise, update

Wind turbines, great when it's windy! Water power limited availability

Solar PV s and panels. How much does it cost to make them and how soon do they need to be replaced? How soon does the next generation arrive? They have an environmental cost of their own

Wave and tidal generators. Vast expensive projects and limited availability. Potential. Environmental impact on sea currents, coast lines, beaches, and wildlife

And Nuclear power …

Nuclear accidents, 3 Mile Island, Chernobyl, Fukushima…are inevitable. Fail dangerous control systems. Serious Danger of burning through the earths crust to release volcanic activity on unimaginable scale. Immediate shut down and failsafe systems needed

Nuclear??? Who designated this most vulnerable, dangerous and most persistently polluting energy 'renewable' or 'green'? Nuclear waste is radioactive and needs to be stored under controlled conditions, some of it for 10,000 years.

Decommissioning nuclear plants is not factored into the cost of the energy. We pay for that afterwards

Nuclear power stations in UK already constructed at sea level on sand and shingle [cf the wise man and the foolish man] and more are to be built in the same area

[See slide 78 about Doggerland]

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ODD RELATED THINGS

58 Unexpected everyday changes

59 More odd things

UNEXPECTED EVERY DAY CHANGES

Heavy metal pollution, [like mercury in the Japan sea]

Even low levels of pollution are concentrated up the food chain so that the fish the world used to eat from this area became so toxic they could not be used

Insecticides and Herbicides. DDT. Graffiti from the late 1960's

'You can't eat people, they contain too much DDT'

Antibiotics overuse. MRSA and other resistant bugs. Bleach Antibacterial sprays

Plastics, not always recycled, dumped and burned in Poland now. Atmospheric pollution. Micro-plastic residue in sea poisoning and starving fish. In Soils… In waterways.

Paper and many chemical industries. Highly Carcinogenic residues. Acrylics Colour. Toxic base and fixers, like chromium, tin, aluminium

Single use anything… Waste

Plant importing- invasive species. Japanese knotweed, Rhododendron ponticum, sycamore and MANY others, destroy native species and whole habitats. New Zealand flatworms destroy uk earthworms, wrecking soil structure

MORE ODD THINGS

Plant breeding to improve productivity. Uncontrolled hybridising. A New protein in wheat our bodies don't know how to process.. Causing euphoric 'hits' … Obesity?

Genetic modification. Uncontrolled unstoppable world wide experiment, with unknown consequences. Cloning and hybridising. Dolly the sheep. Rescuing endangered plants

Pollution of rivers and seas. [eg PCB's were banned 50 years ago but fish and mammals in North sea are still dying of poisoning from them]

Fish starve at sea because their bellies are half full of micro plastic particles

More than 100,000 pollutants in the St Lawrence seaway alone interact in unknown ways producing who knows how many more toxic, damaging combinations

Zander, useless, imported fish in UK rivers, killing indigenous stocks Green parakeets, Mink, coypu, grey squirrels, Pacific oysters, escapees doing untold environmental damage spreading out of control at expense of native species

Magnetic, sound and light pollution effects only just being recognised. [stranding whales and porpoises?]

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WHAT CAN WE DO, IN ADDITION TO PRAYER

There probably isn't a single one-size-fits-all thing to go in here

I look for principles that will stay in God's will as far as I understand it

And minimise my damaging impact on the planet

SEEK OUT THE NATURE OF GOD

God is love. Immense beyond all understanding

He is a creative God of infinite variety

He provides for all his creation

Everything He makes is woven together with astounding intricacy, beauty and interdependence

WHICH IMPLIES….

I would be wary of things which seem to contradict God's nature

So cloning seems wrong in the face of a God of infinite variety

Processing food.. if God provides Variety and seasonally, we should probably expect to eat a fresh varied diet with minimal processing. Modification and preservation all reduce the goodness in any food.

Moderation, not eating/drinking/consuming/wasting to excess..

Perhaps we should consider carefully the ethics of Gene modifying and selecting? Or Growing spare parts from human stem cells?

THERE IS NO PLANET B

Surely our responsibilities are to reduce our impact on environmental resources to a minimum

To think this through for ourselves and make changes without waiting for international or local governments to agree blanket measures [that won't fit all]

CONSISTENT SMALL CHANGES ADD UP TO BIG SAVINGS

Keep air as clean and unpolluted as possible. Minimise car use. Walk, bike [free gym!] Use public transport

Reduce water consumption. Showers generally use less than baths, but power showers use a lot of water. A small bath is quite adequate. Count how long it takes to fill a cup.. Then count as you fill the kettle and you will have the right amount of water for your tea, and not waste power heating more water than you need.

Use a cup of water for rinsing after cleaning your teeth, instead of keeping the tap running. Try not to run a gallon of cool water out of the system to get to warm water.

Collect rain water for the garden. Use 'hippo' bags in toilet cistern to reduce flush size. From 1976 'Save water – bath with a friend' !!

AND

Insulate your home and hot water tank if you haven't yet

Save energy by reducing the thermostat. Mine has been at 58deg F [or about 14 deg C] for many years. You will need to use spare clothes to layer to keep warm [which will also reduce waste] and you could heat a small space to sit in the evening. Move frequently! [unless you are older, sick or vulnerable]. In the winter 2021-22 I cut it to 8 Deg C.

Only replace cars, furniture, kitchens etc when you really have to

You don't have to be governed by fashion…

AND WE COULD…

Reinstate canals. That would save enormous quantities of fossil fuels and slow down the supply chain, making it less vulnerable to disastrous breakdown

Use railways to shift a much higher percentage of heavy loads. Save fossil fuels, greenhouse gasses and particulate organic carbon pollution

Use public transport where possible. This means we need a good efficient, punctual public transport system. Car share [1980s] Keeping huge numbers of single occupancy cars off the road. Car pools

Install solar power, wind turbines, and heat exchangers on all new builds, domestic and industrial. [I don't understand why we haven't been doing this for 20 years]

Install rain water collection systems [ditto]

Designate space wherever possible to restore habitats

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WHAT ELSE?

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ISN'T THERE ANYTHING ELSE?

Use natural materials where possible

Grow your own food where possible. Think seasonal. Minimise food miles. Use less processed food. Don't buy plastic wrapped sealed products if possible [they contain manufactured CO2]

Travel, certainly fly, less. Walk, use bike. Appreciate where you are

Protect and encourage wildlife. Plant trees. Protect bees [there'll be no food without them] Compost garden waste. Feed and protect the soil, it is a valuable and irreplaceable asset. Protect ancient woodland, they are irreplaceable.

Clean up the coastline, restore natural seaweeds

Re-wilding.. The latest buzz word! Forests, marshlands etc

Where when and how do we decide/agree to stop producing plastics, poisons, weapons, WMD. Expensive, damaging and dangerous research. Space exploration and many others

EAT WISELY?

We have thought about growing our own, buying local and seasonal where possible.

Try to use minimally processed foods. Processing generally degrades the food value

Avoid UHP foods. 'ULTRA HIGH PROCESSED' gives us a clue that it is far from what God gave us. My pet example is margarine. It is made from a lovely flavoursome thick deep red nutritious oil which is drawn off palm nuts from trees grown in West Africa, [unfortunately at the expense of the primary forest] This wonderful stuff is so highly processed and 'refined' by the time you see it, you would never recognise the original from the spread you are familiar with.

Avoid mixtures of processed fats….[I suspect their role in high cholesterol is more serious than we understand] Doughnuts for instance and many commercial cakes and pastries are made with combinations of 4 or more different refined fats.

The vegetarian butcher…. Why make plants look or taste like meat?? And how much goodness will actually be left in the plants when they get to your table in the new disguise? Enjoy Plants!

Understand how your body uses food. Explore properties of different foods, and the way it keeps your body healthy. Reduce the cost of and dependence on, medical care.

[Insects… I'm not sure about]

Waste less.

VALUE VERSUS ENVIRONMENTAL COST RESEARCH AND DEVELOPMENT

Energy expensive, eg space rockets and exploration??

Destructive ideas Mechanical Chemical and Biological research usually starts with good intentions but is often diverted into weapons development. Origin of latest plague [pandemic] in doubt.. Occurring coincidentally in Wuhan, China, close to a biological research establishment

Technology also now being diverted into weapons… [Chinese microwave fryers] used against subversives and foreign agents. Drones to deliver accurate strikes of conventional weapons

Embryo research, cloning. Stem cells

?? Assess the value and environmental cost of research

SO

Resist temptation

Reduce demand/consumption/food miles

Reuse

Recycle/upcycle/mend

Install alternative energy source(s) if at all possible

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REALITY CHECK

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GET REAL

This is our last chance to recognise some serious changes are taking place.

That we have to make voluntary changes as soon as possible

And some other things will have to change because we won't have any choice

SOME SERIOUS CHANGES ARE GOING TO HAPPEN

Earth will continue to warm up. The last ice sheet has been retreating for 10,000 years.

Earth movements are beyond our control

Asteroid and meteor impacts ditto

Volcanic and seismic activity also ditto.

Tsunamis and big storms do massive damage in a very short time scale, usually completely outside our control.

Sea level will continue to rise.

IF WE CANT STOP IT.. CAN WE MITIGATE THIS?

What is most at risk of inundation?

Low lying land and towns

Nuclear power stations constructed on shingle beaches near sea level

Fail-safe systems are needed for rapid shut down

LOW LYING LAND.. SOFT ROCKS

Both the Dungeness and Sizewell Nuclear power generators are built on shingle and a few feet above current sea level and only 100m away from the sea

Well below a safe level in a tidal surge or storm

And on shifting shingle on the fastest eroding coasts in the country

NEIGHBOURING LOW LYING LAND

Most have heard of the sunken village of Dunwich near Aldeburgh, just north of the Sizewell nuclear complex.

It may not be so well known that in the stone age, more than 8000 years ago there was a substantial population of villages farms and hunter-gatherers living seriously organised and sophisticated lives between Eastern England and Germany, an area named Doggerland after the well known fishing area Dogger Bank. The North sea didn't exist.

Doggerland is thought to have been inundated due to a general sea level rising from 20000 to 8000 years ago and some of it swept away in a very short space of time as a result of flooding after a tsunami [probably from a landslide in the canary islands which is still in a position to generate similar catastrophic waves now]

Marginally less appalling, but part of the same process, was the overnight disappearance of 4,000 acres of Earl Godwinstone's land off Dover in a storm around 1000 AD, leaving only the remnant now known as the Goodwin sands, famous for shipwrecks and the annual cricket match played there one low tide each summer.

DOGGERLAND APPROX. 20-15000 YEARS AGO

Europe extended well beyond the outermost Scottish islands and 150 miles into the Atlantic

Marsh and lush forests

Inundation took place

As sea levels rose

As Ice sheets retreated

By 8000 bc it was gone

CAN WE BUILD SEA DEFENCES?

Sea defences are the first method we think of, from breakwaters on beaches to levees in New Orleans, to the Thames barrier and the sea wall round Holland.

They need to defend very large areas inland

They are very expensive

It's difficult to stop water getting in round the edges, or underneath, through the rock/soil

Sometimes they aren't high enough

And they affect the local sea currents and movement of offshore sediment, often causing problems along the coast

SEA DEFENCES

Holland

New Orleans

Eastern England

Dawlish Railway

Eastern USA.

Pacific Islands and others

HOLLAND

40% of Holland lies below sea level, now.

60% of the country is vulnerable to flooding

They have an annual spend of more than £500m on **maintaining current** sea defences

They are planning for future sea level rises of 1-2 metres

THE SNAG WITH DEFENSIVE WALLS

The walls look well enough in calm weather

Most damage is done in stormy weather, when the waves may be 30 or 40 feet higher than the average sea level

Or during tidal surges due to low atmospheric pressure and or persistent unfavourable winds

OR ALL OF THEM

OR AS A RESULT OF GEOLOGICAL FORCES

As the Japanese discovered after investing in enormous defensive walls round their nuclear power plant at Fukushima, they had to watch a colossal wall of water surge over their defences and inundate the town, leading to extensive loss of life, destruction of property, and failure of the safety mechanisms at their nuclear power plant, leading to massive explosions and contamination of the land for miles around for many years, and who knows how much radiation escaped into the sea and the atmosphere

LONDON PLUS

Much of Greater London and a substantial area of the Thames estuary, Essex, Suffolk, Norfolk, Bedfordshire, Lincolnshire, also Somerset and Gloucestershire, are very vulnerable to flooding.

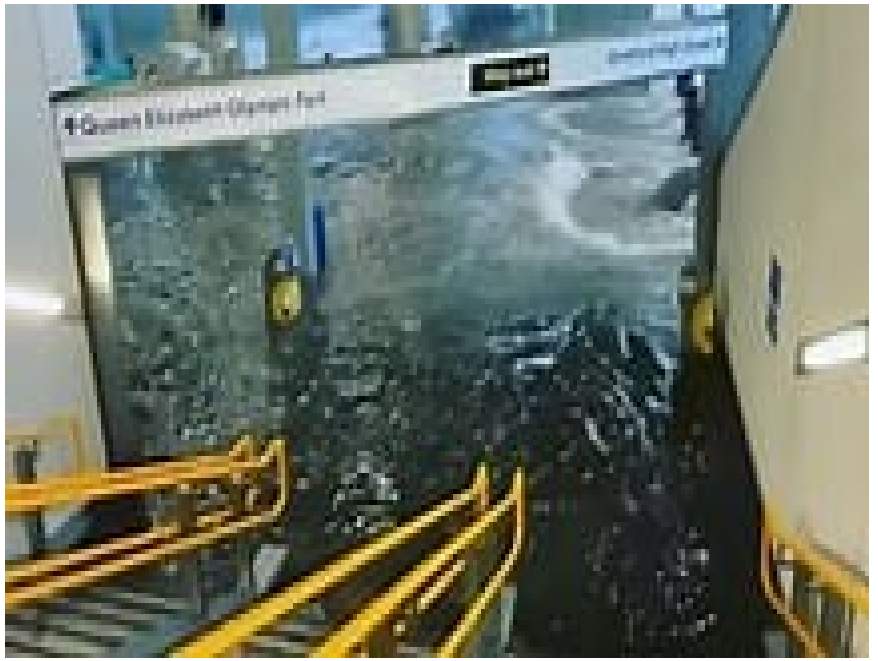
Museums and art treasures, records of all sorts stored in basements in London

Architectural and archaeological heritage

Millions of homes and industries

Farming regions

Water retaining schemes, more needed to keep fresh water in the ground.



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MORE REALITY

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CURRENT SITUATION

Earth's population is now 8 Billion people and increasing at the rate of about 2 every second.

All of us need clean air, water, food and space to live and grow, but there is only a small proportion of the earth's surface that can be used, and it has to be shared with ALL other land-based species, and all habitats, forests rivers grassland etc

A 'GOVERNMENT SOLUTION' DOES NOT NECESSARILY SOLVE THE PROBLEM

The Chinese worked out 30 years ago that they would not be able to feed their rapidly expanding population and famously, courageously, limited families to 1 child. Imposing heavy penalties on those who broke the rule

This might have worked if their culture had not been biased towards male children [a family had to supply a dowry when their daughters married but a son brought in a dowry] As a result, 1000s of infant girls were thrown out or killed at birth. Now some areas are so short of girls that a man can SELL his girlfriend, and kidnap gangs/people traffickers STEAL women from one community to SELL elsewhere, NOW IN THE 21st CENTURY

LIMITS TO POPULATION GROWTH

Clean Air, Pure Water, Food availability.

Droughts, Famines, Plagues

Wars

Natural disasters

Faced with any of these things any population of any species move away from the disaster area [refugees] But artificial boundaries limit allowable movement for all species [land corridors for movement of endangered species… across political boundaries]

Witness the human problems on a relatively small scale in Europe over the last 20 years

Population growth and extinction

- Species tend to develop more and more efficient ways of feeding themselves until they realise it isn't working so well, and they may try to correct the latest developments back to an earlier state. Eg The Good Life, Richard Briers 70s sitcom, [and graptolites….]
- Successful population growth unchecked, leads to exponential growth
- Most species once they enter an exponential population growth phase experience a sudden catastrophic reduction or total extinction.
- Humans are already in an exponential growth phase……

NO EXCUSES

The outlook may look bleak… it is, but there is no excuse for any one of us to shirk our personal responsibility to reduce our environmental impact

We don't know or understand everything and cannot solve all these problems, politically, economically or scientifically.

The more we depend on ourselves, governments or science to put it right, the worse is our overwhelming tendency to make everything worse. God alone is the creator of all things, He alone knows how to overcome the disasters we have introduced. He alone has the power and the understanding. TRUST Him. Pray without ceasing for His grace and mercy for His Groaning creation.

Never stop praising God and thanking Him for what he has done and is doing

It was His Spirit that brooded on the waters

And even when there are no figs on the tree, no grapes on the vine and no cattle in the shed, praise Him still and rejoice because HE is God [Hab3:17]

FOOD FOR THOUGHT, PRAYER AND ACTION

Where when and how do we decide/agree to stop producing poisons, weapons, WMD. Expensive, damaging and dangerous research. Space exploration and many others.

Stop polluting each other's air, water and oceans

What do we really need? What is really important to us?

Nationality and landownership

How do we expect to be treated if we become refugees?

Search out old skills… how did we survive before….?

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BEWARE BANDWAGONS

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BEWARE BANDWAGONS

Lots of ideas look good at first …. But Look deeper.

Eg electric cars… good idea, but not if it means we ditch millions of energy-expensively produced cars long before they have finished their useful life… waste even more energy. Where will all the electric energy come from?? At what cost to the planet. Who will maintain them?

PVs, solar panels and wind power look a really good idea.. But you still have to check how much energy it takes to make them, and how quickly they will need to be replaced as they give out or are replaced by more efficient technology

Nuclear power looked a great idea until we realised the cost of decommissioning the power stations and storing all the very radioactive waste, for thousands of years, wasn't included in the cost of the power.

SOME EARLY BANDWAGONS!

In the 60s and early 70s Insecticides, herbicides had been widely used for several decades and were beginning to show their deadly side. Insecticides, herbicides, DDT contamination

1970 graffiti 'you can't eat people- they contain too much DDT'

CFC's, PCB's, particulate organic carbons and sewage treatment were hot topics. Note that fish are still dying of PCB contamination in the north sea today though PCBs were banned in the early 70s. And polluted beaches are still a problem today. [according to a recently televised review of the north sea and the national news sept 2021]

And is there still a hole in the ozone layer? What does it mean for us?

1976 drought slogan 'save water bath with a friend'

Acid rain…… you can probably think of many more…

MORE RECENT BANDWAGONS

'Jeans are bad' recent TV documentary. No! Monoculture of **any** crop is bad. Including cotton. God is a God of Infinite variety

Natural fibre is more environmentally friendly than any artificial fibre

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FOOTNOTES AND EPILOGUE

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NUCLEAR POWER AND ELECTRIC CARS

In Britain, the current nuclear power stations are nearing the end of their productive lives. Within 4 years most of them will need to be phased out. There is currently not enough generating capacity to replace them, hence the urgency for Sizewell C.

So how on earth, literally, will we power all electric cars?

HEARD RECENTLY ON BBC NEWS

3 G20 Nations: India, China and Australia are increasing their use of coal [the most polluting hydrocarbon fuel] by 4% this year.

And China is planning to build 43 new coal fired power stations

Estimates suggest that 90,000 new mechanics will be needed to maintain electric cars, but we can only train 60,000 in time available

British pig farmers are having to shoot and BURN 1000s of pigs [Nov 2021] because there aren't enough trained uk abattoir workers and butchers to process the animals

Annually British farmers burn thousands of tons of sheep fleeces because the law doesn't allow them to sell the fleeces for as much as it costs them to shear the sheep

American owned[?] companies in UK are being paid hefty subsidies to *produce* CO2 for the food industry, much of our prepared/bagged fresh food is packed in CO2.

Am I the only one baffled by the irony?

RANDOM THINGS LABELLING?

I read recently that 'superwash' wools are not quite what they seem.

You would think they would be environmentally friendly.. Simple wool from sheep to clothes on your back…

But in order to reduce the tendency of all wool to shrink, and in order to satisfy the desire for softer and softer 'feel' to all our clothes, the scales that coat all wool fibres [which enable wool to felt and become wind/water proof] are now [chemically] stripped off and the scales are then replaced with polymer [plastic] coating….

Like plastic-reinforced-paper teabags there seems to be no limit to the invasiveness of the toxic plastic industry and no obligation to inform people of it… Surely like any other labelling this information should be made available so we can all make informed and sensible environmentally friendly choices

A FOOT NOTE ON OUR HARD WATER!

Additional benefits of only boiling the exact amount of water you need is that no hot water cools down in your kettle, so none of the inevitable calcium deposits settle out in your kettle, so you save on de-furring the kettle and the environment saves on CO2, produced by de-furring!

You use less electricity when the element is clean and not coated with CaCO3. Your kettle heats the water more quickly and the element is less likely to burn out, so

you and the planet win every way! I think…

AND BOILERS

20% CO2 we produce in Britain is said to derive from household heating, mainly gas boilers

Replacement systems of air and ground heat source pumps can cost upwards of £6000- 20000, involving complete replacement of previous system and using quite large areas of garden for the first and about a quarter of an acre for the second

COMPLEXITY, INTERNATIONAL REGULATIONS, WASTE,

There are regulations controlling trade in soy beans, to prevent tropical forests being cleared illegally to grow them. … but they are grown in countries with difficult political situations, and it was recently revealed [BBC news autumn 2021] that products like Cadbury chocolate, cathedral city cheese and Cravendale milk, are derived from cattle fed soya beans up to 50% of which are being grown on illegally cleared rainforest sites

Why do we use soybeans at all? Cows wouldn't normally eat them.. Because we get faster weight gain and higher productivity. Should we reconsider?

COAL SEAM FIRES

Can occur spontaneously, or from wild fires

But are often the result of carelessness or arson

Have been around for millions of years but are much more common now

In India, as of 2010, 68 fires were burning beneath a 58-square-mile (150 km^2) region of the Jharia coalfield in Dhanbad, Jharkhand. Mine fires started in this region in 1916 and are rapidly destroying the only source of prime coking coal in the country.[29]

Indonesia, unnumbered fires.

China, hundreds

Many others

‘DRAGONS’ COAL SEAM FIRES

China [Wikipedia]

In China, the world's largest coal producer with an annual output around 2.5 billion tons, coal fires are a serious problem. It has been estimated that some 10–200 million tons of coal uselessly burn annually, and that the same amount again is made inaccessible to mining.[11] Coal fires extend over a belt across the entire north China, where **over one hundred major fire areas** are listed, each of which contains **many individual fire zones**. They are concentrated in the provinces of Xinjiang, Inner Mongolia and Ningxia. Beside losses from burned and inaccessible coal, these fires contribute to air pollution and considerably increased levels of greenhouse gas emissions and have thereby become a problem which has gained international attention. China's coal mine fires make up as much as 1 percent of the global carbon dioxide emissions from fossil fuels.[10]

Some sources suggested 4%

AFTERTHOUGHT ELECTRIC CARS

Where will the electricity come from?

How many cars will be dumped that still have years of life left

Where will the dumped cars go?

USE YOUR OWN BRAIN

- Don't wait to be told by government
- Find out, think through and take suitable steps yourself to reduce your footprint on earth, [not just the carbon footprint]
- Waste less
- Be ready to adapt
- Not all steps are appropriate for everyone
- Help each other

- Love the Lord with all your heart and He will direct your paths

BUZZING WITH IDEAS?

Share your tips thoughts and experience

Also see **#C4 Life Hacks** in the weekly News-sheet

ADDENDUM!

Green Investments sound a great idea. [I tried 35 years ago and was advised against as there wasn't much and what there was wasn't a good investment. And Again 25 years ago]

Now there will be plenty of opportunity and even more scams…. everyone wants to be seen as 'green.' Go for it but be careful.

Also beware scam phone calls offering to update your insulation from an 'eco centre' They wont give their telephone number, or their address, and only a vague location. Internet says they are a scam.

AND THE FINAL WORD.. MAYBE

When you are scraping the last drops from your honey jar, remember it took the bees 50,000 sorties for pollen to make a single drop of honey

Thanks Guys

TAKE CARE OF THIS BEAUTIFUL PLANET

ZZZZZZZZ

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