2025 EDITION

FOUR SHIFTS

For a green and fair global economy

ARISE

FOUR SHIFTS

For a green and fair global economy

2025 EDITION

ARISE

The world has seen massive positive change over the last 200 years since the industrial revolution. The number of people in the world living in extreme poverty has dropped from over 90% to less than 10%. This has been driven by our expanding global economy which has created wealth, jobs and the modern world. However, at the same time the impact on the environment over the past 200 years has been devastating. That same global economy is driven by fossil fuels and overconsumption of limited natural resources. Greenhouse gas emissions have increased by more than 5000%, and the total wildlife on earth, on which we all depend for survival, has dropped by over two thirds during the last 50 years alone. If we carry on we will unleash terrible environmental destruction leading to a global collapse undoing all the positive gains of the last 200 years.

We need to rewire our global economy to be green and fair, so it still creates jobs and lifts people out of poverty, but does so without wrecking the planet. What we need is 4 Shifts, two to secure a safe environmental ceiling and two to guarantee a fair developmental social floor.

1. **From polluting fossil fuels to clean energy**
2. **From overconsumption and waste to the circular economy**
3. **From aid and welfare dependent to self-sufficient and thriving strong and fair economies**
4. **From economies that only work for the richest to societies which tax and provide social spending to also help the poorest**

Arise is a global movement, mobilising Christians to campaign and take practical action to help the world make these 4 Shifts. Arise's 4 Shifts report explains why 4 Shifts economics is needed and what it looks like.

www.ariseuk.org

CONTENTS

EXECUTIVE SUMMARY

We live in an era of paradox. The world has seen massive positive change over the last 200 years since the industrial revolution. The number of people in the world living in extreme poverty has dropped from around 90% of the world's population in 1820 to less than 10% today.[1] Since 1990 alone, in little more than a single generation, the proportion of people in the world who fail to complete secondary school has dropped by over 20%;[2] the proportion of people living in slums has decreased by over 40%,[3] the proportion of people in the world without sufficient food has almost halved;[4] the proportion of people who do not have safe sanitation has decreased by well over 60%; and the proportion without clean water has declined by an incredible 75%.[5]

Figure i: The world has changed massively over the last 200 years since the industrial revolution. The number of people living in extreme poverty has dropped from around 90% of the world's population in 1820 to less than 10% today, as our expanding global economy has created wealth, jobs and the modern world.

[1] Ravallion, M., *The Economics of Poverty*, (2016); *World Development Indicators*, World Bank, (2022)
[2] Barro, R. & Lee, J-W., *Barro-Lee Estimates of Educational Attainment for the Population Aged 15 – 64 from 1950 to 2015*, (2021)
[3] *Urban Indicators Database*, UN-Habitat, (2022)
[4] *FAO Stat*, UN Food and Agriculture Organization, (2022)
[5] WHO/UNICEF Joint Monitoring Programme for Water Supply, Sanitation and Hygiene, (2022)

Of course there have been massive setbacks and injustices along the way, and the world still has a long way to go to tackle extreme poverty completely. Nevertheless, this is still staggering progress in development, reducing poverty faster than at any other time in human history. This progress has been driven by our expanding global economy which has created wealth, jobs and the modern world. This global economy has both reduced poverty directly as well as created a base of wealth that governments have been able to tax and use to provide basic services, such as healthcare and education for their populations, to help ensure no one is left behind.

However, at the same time the impact on the environment over the past 200 years has been truly devastating. Greenhouse gas emissions have increased by more than 5000%,[6] and the total wildlife of the earth, on which we all depend for survival, has dropped by two thirds over the last 50 years alone.[7]

Figure ii: The same expanding global economy which has propelled so much positive development is driven by fossil fuels and overconsumption of limited natural resources, leading to massive environmental catastrophe, which impacts the poorest hardest.

Everywhere the environment is battered by pollution, deforestation, mountains of waste, over fishing, over hunting and overconsumption. Natural landscapes are being converted into farmland, fresh water is depleted and the oceans are becoming more acidic. Global climate change is leading to heat waves, droughts, floods, cyclones, wildfires, landslides, massive polar

[6] *The PRIMAP-hist national historical emissions time series (1850-2018)*, Climate Watch, World Resources Institute, (2022)
[7] *Living Planet Index*, World Wildlife Fund & Zoological Society of London, (2022)

melting, the melting of the world's glaciers, sea-level rise, the devastation of coral systems, mass food and fresh water shortages, ill health, huge negative economic impacts, conflicts over scarce resources, the creation of huge numbers of climate refugees, and much more, all of which hits the poorest hardest.[8] The tragic irony is that the same expanding global economy which has propelled so much positive development is driven by fossil fuels and overconsumption of limited natural resources, leading to massive environmental catastrophe.

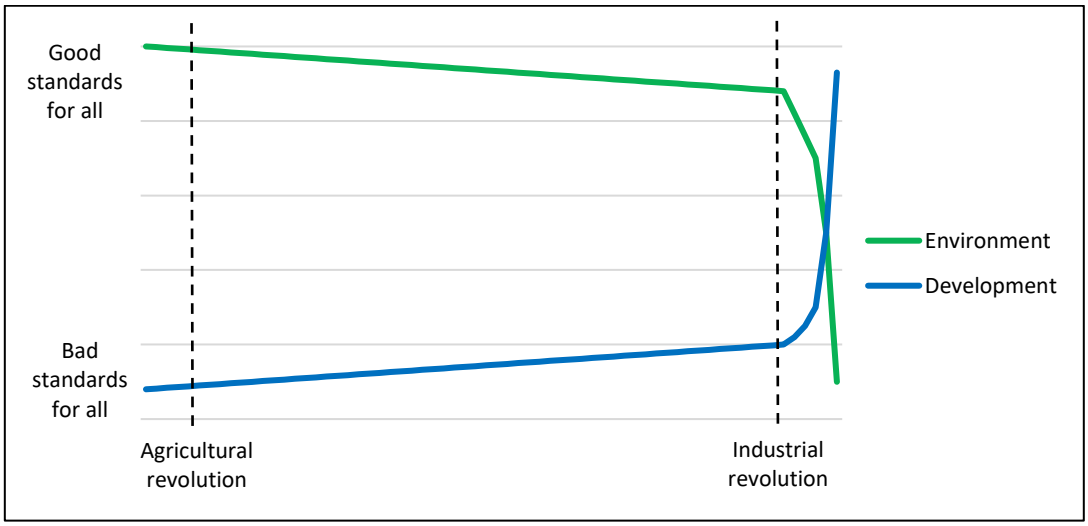

Figure iii: The 200 years since the industrial revolution have witnessed huge progress in development, but this has come at the price of terrible destruction in the natural environment.

If we continue unchanged along this path, we will fall off a cliff. If we continue to overconsume and pollute the natural environment on a global scale, we will face a collapse into a new global dark age which will cause massive human suffering and loss of life and wipe out all the gains in development that have been achieved over the last 200 years.[9] On the other hand, going backwards to a pre-industrial world is not desirable either. That was a world of widespread conflict, poor social justice standards and crushing poverty.[10] So is there another way?

Yes, we need to rewire our global economy to be green and fair so it still creates jobs and lifts all out of poverty, but does so without wrecking the planet. We need a green economy revolution. Arise believes this is possible and can be achieved through four key economic shifts. We still need ***strong and fair economies*** which we can ***tax and provide social spending*** to meet basic needs. However, in the future these economies need to be powered – not by fossil fuels – but by renewable ***clean energy***. They also need to move away from the

[8] *Climate Change 2022, Impacts, Adaptation and Vulnerability, Working Group 2, Sixth Assessment Report, Summary for Policy Makers*, IPCC, (2022), pp. 11 – 21; *Climate Change 2021, The Physical Science Basis, Working Group 1, Sixth Assessment Report, Summary for Policy Makers*, IPCC, (2021), pp. 5 – 6, 9 – 14, 17 – 36, 39 – 41; *Global Warming of 1.5^{0}C, Summary for Policy Makers*, IPCC, (2018); *Climate Change and Land, Summary for Policy Makers*, IPCC, (2020); *The Ocean and Cryosphere in a Changing Climate, Summary for Policy Makers*, IPCC, (2019); *Atlas of Mortality and Economic Losses from Weather, Climate and Water Extremes*, World Meteorological Organization, (2014); Houghton, J., *Global Warming, The Complete Briefing, Fifth Edition*, (2015), pp. 2 – 8, 75 – 76, 124, 143 – 217, 252 – 256, 350 etc.

[9] Meadows, D., Meadows, D. & Randers, J., *Limits to Growth, The 30-Year Update*, (2010); Diamond, J., *Collapse*, (2006); Morris, I., *Why the West Rules – For Now*, (2011), pp. 598 – 603, 611 – 613 etc.

[10] Juniper, T., *What has Nature ever done for us*?, (2013), pp. 256 – 257; Houghton, J., *Global Warming, The Complete Briefing, Fifth Edition*, (2015), p. 220; Collier, P., *The Plundered Planet*, (2010), pp. 8, 16, 212 – 219, 226 etc.

overconsumption of our current 'extract, use, throw away' linear economic model to an environmentally sustainable ***circular economy***. This would eliminate all pollution, overconsumption and waste and push resources back around the economy in a circular fashion.

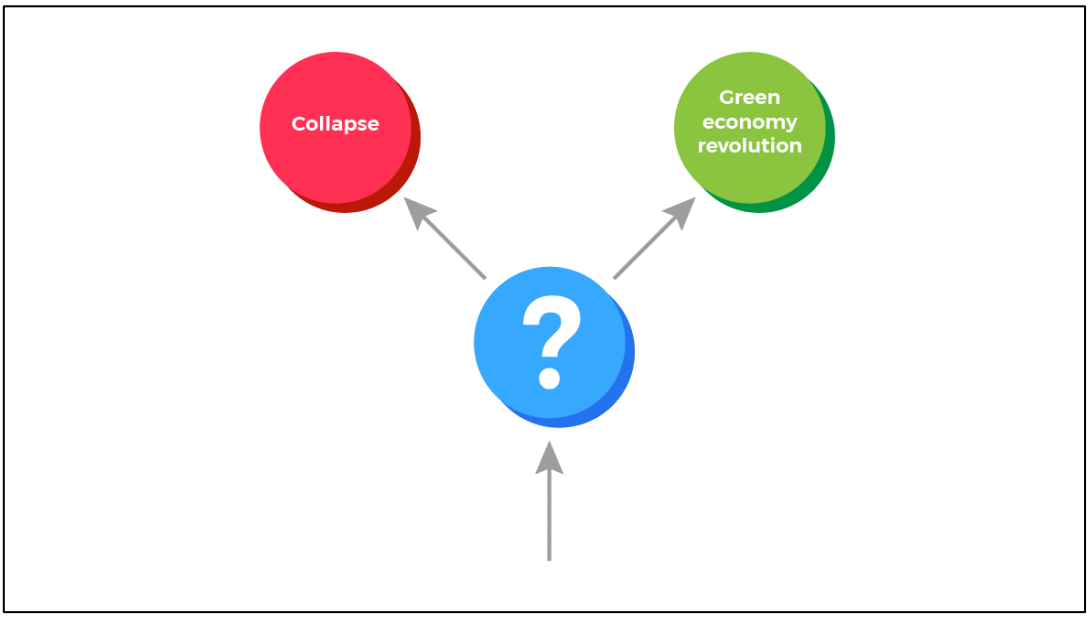

Figure iv: The choice before humanity, a global environmental collapse which will undo 200 years of progress on development, or a green economy revolution.

But how are we to achieve these shifts? What are the policies and practices that will be required in order to make them happen? Well, what we need is not just one or two limited actions but a new economic paradigm; a new world view and economic orthodoxy which captures the best of what works, but also embraces what we need to do that is new in order to drive the green economy revolution. That is why Arise has launched the Four Shifts campaign (www.ariseuk.org/campaigns/4-shifts).

Four Shifts economics captures the two great shifts that the world needs to secure a safe environmental ***ceiling*** that keeps us well within planetary boundaries: clean energy and the circular economy. It then holds them together with the two great shifts on development that are necessary for guaranteeing the social ***floor***, which lifts all out of poverty and below which no one should be allowed to fall: strong and fair economies from which nations can tax and provide social spending to meet basic needs.

There are many specific actions under each of these shifts that governments need to take. (These are captured in the boxes at the end of each section in Parts 2 and 3 of this report, and collected together in the Appendix). Taken together these changes would transform our global economy to bring about a green economy revolution. Arise's Four Shifts campaign (www.ariseuk.org/campaigns/4-shifts) combines these actions into a simple overall framework that the world can understand and we as individual Christians can sign up to and campaign for, so that we can work together to transform our world one step at a time.

SHIFT ONE: CLEAN ENERGY	SHIFT TWO: CIRCULAR ECONOMY
*From polluting fossil fuels to **clean energy**.* **Strengthen the global Paris Agreement on climate change** to scale down the use of fossil fuels to zero emissions and scale up clean energy to 100% by 2030, banning the future use of fossil fuels. Bring in **national climate change laws** to implement it in every sector (energy, transport, buildings, industry etc.) in every nation.	*From overconsumption and waste to the **circular economy**.* Agree a **global circular economy law** to ban polluting activity, further human expansion into wild lands, the production of natural resources that takes out more than it puts back in, and all waste, in order to trigger the shift to a circular economy. Bring in **national circular economy laws** to implement it in every nation.
SHIFT THREE: STRONG AND FAIR ECONOMIES	**SHIFT FOUR: TAX AND SOCIAL SPENDING**
*From aid and welfare dependent to self-sufficient and thriving **strong and fair economies**.* Every government to develop a proactive **national industrial and economic development strategy** to create a diverse national economy that progressively moves up the value chain from agriculture to manufacturing to services to the knowledge economy, using whatever policies are most effective at each stage.	*From economies that only work for the richest to societies which **tax and provide social spending** to also help the poorest.* Agree a **global tax and social spending agreement** for every nation to collect tax at an amount equivalent to at least 45% of the national economy, one third from income taxes, one third from wealth taxes and one third from other taxes. Spend at least two thirds of this on healthcare, education and social protection (pensions, benefits etc.). Bring in **national tax and social spending laws** to implement it in every nation.

Figure v: Four Shifts economics

This is not an impossible dream. Indeed, it is the only real choice open to us, and it has already begun. In recent decades strives forward have included: the *Montreal Protocol* outlawing the use of chlorofluorocarbons (CFCs); Europe and North America's reduction in greenhouse gas emissions; the slowing and reversing of deforestation, especially in temperate countries; the growing amount of protected land and territorial waters; the many international environmental treaties; the already rapidly increasing share of the world's energy that is provided by renewable technology; and the 2015 *Paris Agreement* on climate change. All of these are big steps forward along this path. The green economy revolution has already begun!

Figure vi: The world needs a new global green and fair Four Shifts economic revolution, shifting to 100% clean energy, and a circular economy, driven by strong and fair economies which nations can also tax to provide social spending to meet basic needs.

Only by continuing to pursue these types of policies, the kind outlined under Four Shifts economics, can the world continue to improve standards of social justice and development as God would want (and indeed drive them even further and faster), whilst also finally returning us to the proper and safe balance with our natural environment described in the Bible. All of the scientific evidence shows us that the environmental crisis we are witnessing is coming to a head now, in our lifetimes. We are the first generation in history to truly understand the choice we face between collapse and a new green economy revolution. We are the generation that gets to choose which way the world will go, and that future generations will look back at and hold responsible, one way or another. Governments, businesses and the world can only hope to make this transition if we as individual Christians first find our voice, stand up and call for these four great shifts. If we Arise! Get involved and do something amazing with your life that will make a difference and change the world forever. Join us and support Arise's Four Shifts campaign (www.ariseuk.org/campaigns/4-shifts)

INTRODUCTION: THE CHOICE BEFORE US

We live in an era of paradox. The world has seen massive positive change over the last 200 years since the industrial revolution. The number of people in the world living in extreme poverty has dropped from around 90% of the world's population in 1820 to less than 10% today.[11] Since 1990 alone, in little more than a single generation, the proportion of people in the world who fail to complete secondary school has dropped by over 20%;[12] the proportion of people living in slums has decreased by over 40%,[13] the proportion of people in the world without sufficient food has almost halved;[14] the proportion of people who do not have safe sanitation has decreased by well over 60%; and the proportion without clean water has declined by an incredible 75%.[15] Of course there have been massive setbacks and injustices along the way, and the world still has a long way to go to tackle extreme poverty completely. Nevertheless, this is still staggering progress in development, reducing poverty faster than at any other time in human history. This progress has been driven by our expanding global economy which has created wealth, jobs and the modern world. This global economy has both reduced poverty directly, as well as created a base of wealth that governments have been able to tax and use to provide basic services, such as healthcare and education for their populations, to help ensure no one is left behind.

However, at the same time the impact on the environment over the past 200 years has been truly devastating. Greenhouse gas emissions have increased by more than 5000%,[16] and the total wildlife of the earth, on which we all depend for survival, has dropped by over two thirds during the last 50 years alone.[17] Everywhere the environment is battered by pollution, deforestation, mountains of waste, over fishing, over hunting and overconsumption. Natural landscapes are being converted into farmland, fresh water is depleted and the oceans are becoming more acidic. Global climate change is leading to heat waves, droughts, floods,

[11] Ravallion, M., *The Economics of Poverty*, (2016); *World Development Indicators*, World Bank, (2022)
[12] Barro, R. & Lee, J-W., *Barro-Lee Estimates of Educational Attainment for the Population Aged 15 – 64 from 1950 to 2015*, (2021)
[13] *Urban Indicators Database*, UN-Habitat, (2022)
[14] *FAO Stat*, UN Food and Agriculture Organization, (2022)
[15] WHO/UNICEF Joint Monitoring Programme for Water Supply, Sanitation and Hygiene, (2022)
[16] *The PRIMAP-hist national historical emissions time series (1850-2018)*, Climate Watch, World Resources Institute, (2022)
[17] *Living Planet Index*, World Wildlife Fund & Zoological Society of London, (2022)

cyclones, wildfires, landslides, massive polar melting, the melting of the world's glaciers, sea-level rise, the devastation of coral systems, mass food and fresh water shortages, ill health, huge negative economic impacts, conflicts over scarce resources, the creation of huge numbers of climate refugees, and much more, all of which hits the poorest hardest.[18] The tragic irony is that the same expanding global economy which has propelled so much positive development is driven by fossil fuels and overconsumption of limited natural resources, leading to massive environmental catastrophe.

If we continue unchanged along this path, we will fall off a cliff. If we continue to overconsume and pollute the natural environment on a global scale, we will face a collapse into a new global dark age which will cause massive human suffering and loss of life and wipe out all the gains in development that have been achieved over the last 200 years.[19] On the other hand, going backwards to a pre-industrial world is not desirable either. That was a world of widespread conflict, poor social justice standards and crushing poverty.[20] So is there another way? Yes, we need to rewire our global economy to be green and fair so it still creates jobs and lifts all out of poverty, but does so without wrecking the planet. We need a green economy revolution. Arise believes this is possible and can be achieved through four key economic shifts.

This report takes us on a journey to explore and discover those crucial four shifts. In Part 1: Where have we come from? – Trends in development and the environment, we look at where have we come from – using the most accurate statistics and authoritative sources, organisations and experts in each field – to examine precisely both the development progress and the environmental decline of the past 200 years. Having thus fully understood the challenge humanity now faces, we turn in Parts 2 and 3 to consider where we need to go next. In Part 2 Where do we need to go next? – What does the Bible say? we begin where all Christians should, by examining what the Bible teaches us about how to reduce poverty and develop, whilst caring for God's creation at the same time. (Here extensive Biblical references are given. All quotes are from the New International Version.)[21] In Part 3: Where do we need to go next? – What does history teach us? we look at what we can also learn from history since Biblical times on how to successfully tackle poverty and bring about development whilst also caring for the environment, drawing on the most authoritative sources, organisations and experts in each field. (Once again extensive references are provided, many more could be added, but space does not permit. Summary details for each reference are given in the footnotes throughout the report. Full publication details, editions, websites etc. are given in the Bibliography at the end. Further evidence is available from Arise on request.)

---

[18] *Climate Change 2022, Impacts, Adaptation and Vulnerability, Working Group 2, Sixth Assessment Report, Summary for Policy Makers*, IPCC, (2022), pp. 11 – 21; *Climate Change 2021, The Physical Science Basis, Working Group 1, Sixth Assessment Report, Summary for Policy Makers*, IPCC, (2021), pp. 5 – 6, 9 – 14, 17 – 36, 39 – 41; *Global Warming of 1.5^{0}C, Summary for Policy Makers*, IPCC, (2018); *Climate Change and Land, Summary for Policy Makers*, IPCC, (2020); *The Ocean and Cryosphere in a Changing Climate, Summary for Policy Makers*, IPCC, (2019); *Atlas of Mortality and Economic Losses from Weather, Climate and Water Extremes*, World Meteorological Organization, (2014); Houghton, J., *Global Warming, The Complete Briefing, Fifth Edition*, (2015), pp. 2 – 8, 75 – 76, 124, 143 – 217, 252 – 256, 350 etc.

[19] Meadows, D., Meadows, D. & Randers, J., *Limits to Growth, The 30-Year Update*, (2010); Diamond, J., *Collapse*, (2006); Morris, I., *Why the West Rules – For Now*, (2011), pp. 598 – 603, 611 – 613 etc.

[20] Juniper, T., *What has Nature ever done for us*?, (2013), pp. 256 – 257; Houghton, J., *Global Warming, The Complete Briefing, Fifth Edition*, (2015), p. 220; Collier, P., *The Plundered Planet*, (2010), pp. 8, 16, 212 – 219, 226 etc.

[21] Scriptures taken from the Holy Bible, New International Version®, NIV®. Copyright © 1973, 1978, 1984, 2011 by Biblica, Inc.™ Used by permission of Zondervan. All rights reserved worldwide. www.zondervan.com The "NIV" and "New International Version" are trademarks registered in the United States Patent and Trademark Office by Biblica, Inc.™

Finally, in the Conclusion: Four Shifts for a green and fair global economy, we draw all these lessons together to see how four economic shifts hold the key to the great transition to a green and fair green economy. That is why Arise has launched the Four Shifts campaign (www.ariseuk.org/campaigns/4-shifts). Arise's Four Shifts campaign brings all these policies together into a simple overall framework which the world can understand and we as individual Christians can sign up to and campaign for, so that we can work together to bring about a green and fair global economy, transforming our world one step at a time.

PART 1: WHERE HAVE WE COME FROM? – TRENDS IN DEVELOPMENT AND THE ENVIRONMENT

HOW DO WE JUDGE PROGRESS ON DEVELOPMENT AND THE ENVIRONMENT? – DEFINING INDICATORS

Let us begin this exploration by defining precisely what we mean by 'development' and 'environment', and selecting which specific indicators we will use to judge progress or decline in recent decades.

Development

In terms of development, it is relatively easy to define what success would look like. A short list of indicators for successful development can be drawn from key internationally recognised frameworks, such as the *Sustainable Development Goals*. Put simply, a global economy that is successful and lifting all out of poverty would mean every person having a good job or livelihood, sufficient food to eat, access to safe water and sanitation, adequate housing, education, healthcare (for both physical and mental health), access to electricity and the internet, and where levels of inequality within and between nations are in decline. Therefore, the indicators we will use to assess humanity's progress on development are as follows …

INDICATOR	SOURCE
Development	
Number of people with sufficient food	*FAO Stat*, UN Food and Agriculture Organization, (2022)
Number of people with access to safe water	WHO/UNICEF Joint Monitoring Programme for Water Supply, Sanitation and Hygiene, (2022)

Number of people with access to safe sanitation	WHO/UNICEF Joint Monitoring Programme for Water Supply, Sanitation and Hygiene, (2022)
Number of people with sufficient housing	*Urban Indicators Database*, UN-Habitat, (2022)
Number of people with a good job/livelihood	*World Development Indicators*, World Bank, (2022)
Number of people with full education up to secondary level	Barro, R. & Lee, J-W., *Barro-Lee Estimates of Educational Attainment for the Population Aged 15 – 64 from 1950 to 2015*, (2021)
Number of people with full healthcare (physical and mental health)	• UN Inter-agency Group for Child Mortality Estimation, access via *World Development Indicators*, World Bank, (2022) • UN Population Division, access via *World Development Indicators*, World Bank, (2022)
Number of people with access to electricity	*Global Electrification Database, World Development Indicators*, World Bank, (2022)
Number of people with access to the internet	*International Telecommunication Union (ITU) World Telecommunication/ICT Indicators Database*, access via *World Development Indicators*, World Bank, (2022)
Levels of inequality within and between nations	World Inequality Database, (2022)

Figure 1.1: Development indicators

Environment

Turning to the environment, again it is relatively easy to define what success would look like. A global economy that is having a neutral or indeed positive environmental impact, would be one where humanity is not polluting or degrading the natural world, but living in balance and harmony with it. However, it is more complex to define a short list of indicators that enable us to look at all the complicated ways humanity can damage the natural world, to tell us if this is happening or not. Scientists tell us our natural environment and climate has always changed throughout history. However, this is a slow process that usually takes tens of thousands of years or longer.[22] The question is whether humanity itself is now despoiling God's creation and changing our environment in far more rapid ways than we can possibly adapt to. Humanity could potentially do this in two ways. First, by introducing new chemicals and substances into the natural world, or artificially changing the balance of those elements that already exist, in ways which dangerously downgrade and damage the environment. Second, we could do this

[22] Hansen, J., *Storms of my Grandchildren*, (2011), pp. 36 – 51; see also Lynas, M., *Six Degrees*, (2008), pp. 208, 217 – 236; Kolbert, E., *Field Notes from a Catastrophe*, (2015), pp. 85 – 86, 129 – 131 etc.

by overconsuming natural resources (fresh water, crops, trees etc.) faster than the planet can replenish them.

How do we begin to assess whether either of these things is happening or not? The most up-to-date science which attempts to look at the entirety of this problem has been brought together by dozens of the world's leading environmental scientists who identified a series of 'Planetary Boundaries' in two ground-breaking scientific papers in 2009 and 2015. If these critical planetary boundaries are crossed, we will dangerously destabilise our environment. This framework has received widespread recognition by scientists around the globe, the governments of the world, the United Nations, World Bank and other international institutions.[23] These nine boundaries are inter-related, so fortunately we do not need to assess all nine of them in detail in order to judge how humanity is impacting the environment, but instead can consider the underlying causes which are driving change across all of them.

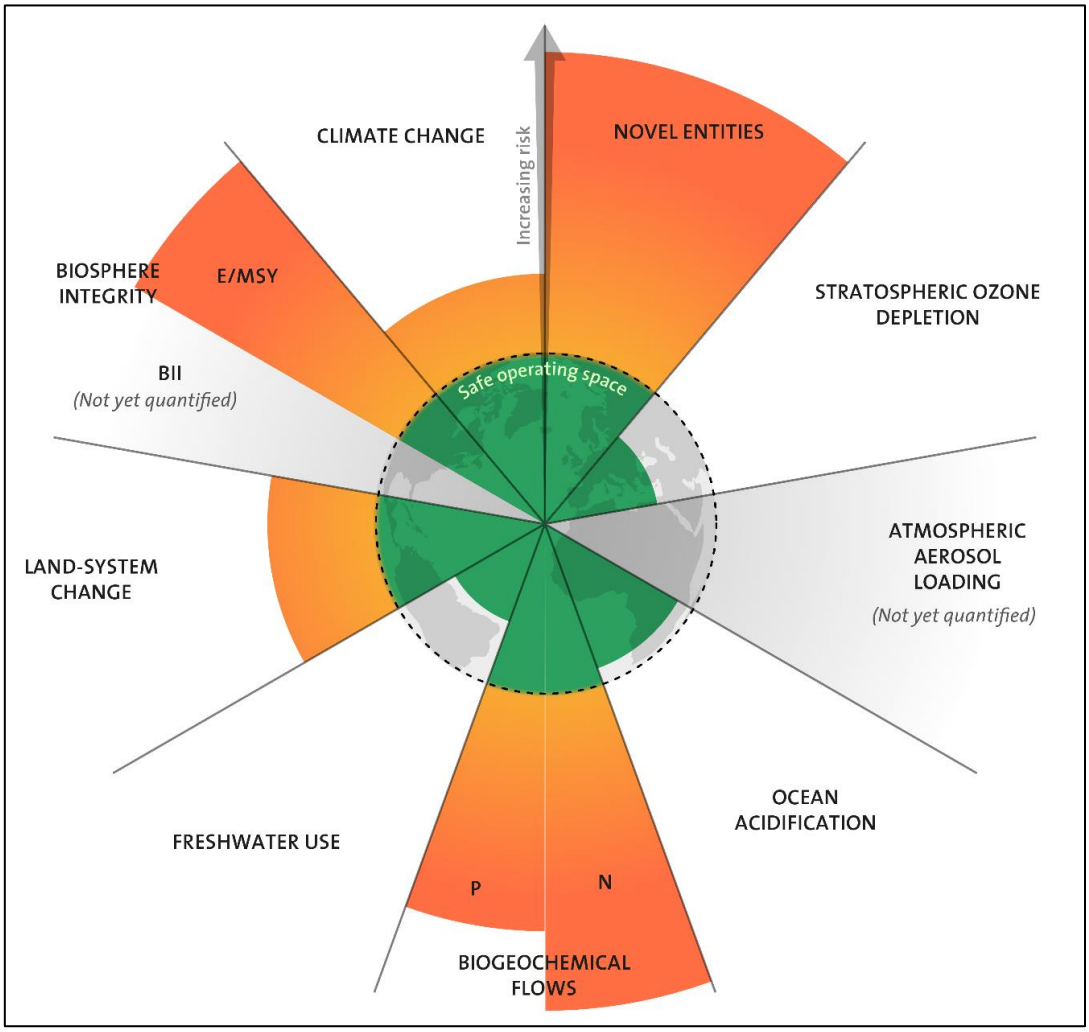

Figure 1.2: Planetary Boundaries [24]

[23] *Planetary Boundaries: Exploring the Safe Operating Space for Humanity*, Ecology and Society 14 (2), (2009); *Planetary Boundaries: Guiding Human Development on a Changing Planet*, Science 6223 (347), (2015); Lynas, M., *The God Species*, (2012); *A Safe and Just Space for Humanity*, Oxfam, (2012) etc.

[24] Designed by Azote for Stockholm Resilience Centre, based on analysis in Persson et al 2022 and Steffen et al 2015

The first, and probably most familiar, of these boundaries is ***i) climate change***. In the last 200 years, human activity has dramatically increased the amount of one major greenhouse gas (carbon dioxide [CO2], over 80% of man-made emissions) and five minor greenhouse gases (methane and nitrous oxide, and sulphur hexafluoride, hydrofluorocarbons [HFCs] and perfluorocarbons [PFCs], collectively known as the fluoride or 'F-gases') in our atmosphere. This has overwhelmingly been caused by the burning of fossil fuels (coal, oil, gas), as well as deforestation (plants absorb CO2 and other greenhouse gases, therefore with significantly less trees and plants, many more greenhouse gases remain in the atmosphere) and as by-products of various industrial and agriculture processes, including methane emissions from cattle and paddy fields. This in turn strengthens the greenhouse effect, a natural process by which energy from the sun is trapped in our atmosphere, keeping the planet warmer than it would be without it, enabling life to exist.[25]

This strengthening of the greenhouse effect has already led to an increase in the global average temperature of just over one degree to date, compared to the historic average before the industrial revolution.[26] On top of this, even if all man-made greenhouse gas emissions were to cease tomorrow, we already face further warming as the concentration of the gases we have already released builds up in the atmosphere. Such a relatively rapid change is unanimously recognised by climate scientists as unprecedented in human and even geological history.[27] A global average temperature rise of a few degrees doesn't sound like much, but the Intergovernmental Panel on Climate Change (the most authoritative scientific body on climate change in the world), every credible scientific institution in the world, and the overwhelming majority of tens of thousands of climate scientists around the globe, all warn of the potentially devastating impacts that such a change would have. These impacts include heat waves, droughts, floods, cyclones, wildfires, landslides, huge biodiversity loss, massive polar melting, the melting of the world's glaciers, sea-level rise, the devastation of coral systems, mass food and fresh water shortages, ill health, huge negative economic impacts, conflicts over scarce resources, the creation of huge numbers of climate refugees, and much more. All of which would of course be most devastating in the world's poorest countries and communities.[28]

---

[25] Houghton, J., *Global Warming, The Complete Briefing, Fifth Edition*, (2015); *Climate Change 2021, The Physical Science Basis, Working Group 1, Sixth Assessment Report, Summary for Policy Makers*, Intergovernmental Panel on Climate Change, (2021); *Global Warming of 1.5^{0}C, Summary for Policy Makers*, Intergovernmental Panel on Climate Change, (2018), pp. 4 – 5; *Renewable Energy Sources and Climate Change Mitigation, Summary for Policy Makers and Technical Summary*, Intergovernmental Panel on Climate Change, (2012), pp. 7, 33 – 34; *Weather, Climate and the Air we Breathe*, World Meteorological Organization, (2009), pp. 7 – 10, 25 – 29 etc.

[26] *Global Warming of 1.5^{0}C, Summary for Policy Makers*, Intergovernmental Panel on Climate Change, (2018); *World of Change: Global Temperatures*, NASA, www.earthobservatory.nasa.gov/world-of-change/global-temperatures; *Is the Climate Warming?*, The Royal Society, (2020), www.royalsociety.org/topics-policy/projects/climate-change-evidence-causes/question-1/ etc.

[27] *Climate Change: Evidence and Causes*, The Royal Society, (2014), pp. 3 – 4, 9 – 10, B2 – B5; *Climate Change 2022, Mitigation of Climate Change, Working Group 3, Sixth Assessment Report, Summary for Policy Makers*, Intergovernmental Panel on Climate Change, (2022); *Climate Change 2021, The Physical Science Basis, Working Group 1, Sixth Assessment Report, Summary for Policy Makers*, Intergovernmental Panel on Climate Change, (2021), pp. 7, 9; *The Ocean and Cryosphere in a Changing Climate, Summary for Policy Makers*, Intergovernmental Panel on Climate Change, (2019), p. 22; Hansen, J., *Storms of my Grandchildren*, (2011) etc.

[28] *Climate Change 2022, Impacts, Adaptation and Vulnerability, Working Group 2, Sixth Assessment Report, Summary for Policy Makers*, IPCC, (2022), pp. 11 – 21; *Climate Change 2021, The Physical Science Basis, Working Group 1, Sixth Assessment Report, Summary for Policy Makers*, IPCC, (2021), pp. 5 – 6, 9 – 14, 17 – 36, 39 – 41; *Global Warming of 1.5^{0}C, Summary for Policy Makers*, IPCC, (2018); *Climate Change and Land, Summary for Policy Makers*, IPCC, (2020); *The Ocean and Cryosphere in a Changing Climate, Summary for Policy Makers*, IPCC, (2019); *Atlas of Mortality and Economic Losses from Weather, Climate and Water*

Figure 1.3: The vast increase in human greenhouse gas emissions over the last 200 years is leading to global climate change.

Global climate change is also the driver of another planetary boundary: ***ii) ocean acidification***. As more greenhouse gases are emitted and the world warms, this increases the levels of acidity in the world's oceans which is devastating for marine ecosystems and the complex land-based ecosystems, including humanity, that depend upon them.[29] We will therefore look at trends in greenhouse gas emissions, since these should be rapidly declining if we are to stay within both the planetary boundaries of climate change and ocean acidification.

Next, let us turn to the boundary of ***iii) biosphere integrity***. With every passing discovery we become increasingly aware of the hugely diverse and complex web of species and ecosystems which make up our biosphere, and which are critically dependent on each other. Any major decline in the total numbers and diversity of the species in the world would be a crime against God's beautiful creation, and would have dangerous and far reaching impacts on humanity.

Extremes, World Meteorological Organization, (2014); Houghton, J., *Global Warming, The Complete Briefing, Fifth Edition*, (2015), pp. 2 – 8, 75 – 76, 124, 143 – 217, 252 – 256, 350 etc.

[29] Lynas, M., *Six Degrees*, (2008), pp. 53 – 56; *Living Blue Planet*, World Wildlife Fund & Zoological Society of London, (2015), pp. 3, 12, 21, 24 – 25, 33 – 34, 44, 56, 60; *Climate Change 2021, The Physical Science Basis, Working Group 1, Sixth Assessment Report, Summary for Policy Makers*, Intergovernmental Panel on Climate Change, (2021), pp. 6, 9, 28 – 30, 34 – 35, 39; *Climate Change 2022, Impacts, Adaptation and Vulnerability, Working Group 2, Sixth Assessment Report, Summary for Policy Makers*, Intergovernmental Panel on Climate Change, (2022), pp. 11, 19, 21; *Global Warming of 1.5^{0}C, Summary for Policy Makers*, Intergovernmental Panel on Climate Change, (2018), pp. 5, 8 – 9, 13; *The Ocean and Cryosphere in a Changing Climate, Summary for Policy Makers*, Intergovernmental Panel on Climate Change, (2019), pp. 8 – 9, 13 – 14, 16, 21 – 22, 25 – 29, 31 etc.

We depend upon these ecosystems for our survival.[30] We will therefore consider rates of biodiversity change to assess how we are doing on this planetary boundary.

Measuring levels of biodiversity loss also help us assess how we are doing on three further planetary boundaries: ***iv) atmospheric aerosol loading, v) novel entities and vi) biogeochemical flows***. These are all caused by humanity polluting the environment through the release of tens of thousands of artificial ('novel') chemicals and aerosols, or increasing levels and interfering with the cycles of naturally occurring elements, such as phosphorus and nitrogen, through various agricultural and industrial processes. Such pollution risks degrading our environment in ways which could be incredibly dangerous to humanity.[31] Ideally, we would like to measure levels of pollution for these substances, but a lot of this information isn't available. However, one of the most common impacts of pollution is biodiversity loss. Hence examining rates of biodiversity loss should also give us a reasonable indication of whether the pollution which drives these three planetary boundaries is at a damaging level.

In addition to the impact of pollution, the major drivers of biodiversity loss are climate change (which we have already considered), and primarily the loss of natural habitats through human expansion. This leads us to our next planetary boundary ***vii) land-system change*** – the deforestation and conversion of wild land for agriculture, thus destroying the natural ecosystems critical for the health of our environment. The expansion of agriculture and food production is also the primary driver putting pressure on our next boundary, ***viii) fresh water use***, as more and more of the world's limited and precious fresh water is demanded for agriculture and food production. [32] We will therefore consider the levels of deforestation, as well as the amount of land and marine territory in our world which is formally protected from damaging human expansion.

With our final planetary boundary: ***ix) stratospheric ozone depletion***, we have some encouraging news. Stratospheric ozone depletion is caused by the release of chlorofluorocarbons (CFCs) into the atmosphere which has resulted in a hole in the ozone layer, a layer in our atmosphere which protects us from ultraviolet radiation from the sun.[33] Fortunately this was one of the first global environmental crises to be discovered in the 1980s, and the *Montreal Protocol* banning CFCs globally was agreed by world governments in 1987 and has been incredibly effective, to the extent that the ozone layer is now recovering.[34] We therefore do not need to measure progress on CFCs, as the world has successfully addressed

[30] Sachs, J., *The Age of Sustainable Development*, (2015), pp. 34, 190 – 192, 205, 340, 447 – 480; *Living Planet Report*, World Wildlife Fund & Zoological Society of London, (bi-annual flagship report); *Planetary Boundaries: Exploring the Safe Operating Space for Humanity*, Ecology and Society 14 (2), (2009); *Planetary Boundaries: Guiding Human Development on a Changing Planet*, Science 6223 (347), (2015) etc.

[31] *A Safe and Just Space for Humanity*, Oxfam, (2012), pp. 12 – 15, 17; Lynas, M., *The God Species*, (2012), pp. 21, 85 – 109, 139, 157 – 197, 235; Marr, A., *A History of the World*, (2013), p. 561 etc.

[32] *Global Environmental Outlook 6: Summary for Policy Makers*, UNEP, (2019), pp. 4, 6, 8 – 9, 12 – 13, 16, 19 – 20; *Living Planet Report*, World Wildlife Fund & Zoological Society of London, (bi-annual flagship report); *Global Forest Resources Assessment 2020*, Food and Agriculture Organization, (2020) etc.

[33] *Planetary Boundaries: Exploring the Safe Operating Space for Humanity*, Ecology and Society 14 (2), (2009); *Planetary Boundaries: Guiding Human Development on a Changing Planet*, Science 6223 (347), (2015); Houghton, J., *Global Warming, The Complete Briefing, Fifth Edition*, (2015), pp. 50 – 53, 266 – 267, 347; Meadows, D., Meadows, D. & Randers, J., *Limits to Growth, The 30-Year Update*, (2010), pp. xii, xvii, 1, 113, 123, 181 – 202, 222, 228, 257 etc.

[34] Goodall, C., *Sustainability: All that Matters*, (2012), pp. 53 – 54; *Vienna Convention for the Protection of the Ozone Layer*, (UN, 1985); *The Montreal Protocol on Substances that Deplete the Ozone Layer*, UN, (1987, incorporating adjustments in 1990, 1992, 1995, 1997, 1999, 2007 and 2016); Dietz, R. & O'Neill, D., *Enough is Enough*, (2013), pp. 69 etc.

this planetary boundary already; a source of encouragement and hope for the future. Finally, we will also consider the rate of human population growth and consumption, to judge what pressure this is putting on all nine planetary boundaries. Taken together then, we can be confident that examining the following environmental indicators will give us a good picture of whether humanity is living in harmony and balance with creation, as God intended, or whether we are damaging God's creation by living beyond planetary boundaries …

INDICATOR	SOURCE
Environment	
Greenhouse gas emissions	*The PRIMAP-hist national historical emissions time series (1850-2018)*, Climate Watch, World Resources Institute, (2022)
Biodiversity loss	*Living Planet Index*, World Wildlife Fund & Zoological Society of London, (2022)
Levels of deforestation or reforestation	*Global Forest Resources Assessment 2020*, Food and Agriculture Organization, (2020)
Percentage of land/sea turned over to human occupation and agriculture	*Protected Planet Report 2020*, International Union for Conservation of Nature & United Nations Environment Programme World Conservation Monitoring Centre, World Database on Protected Areas, (2020)
Pollution levels	Information not available
Percentage of waste vs percentage recycled	Information not available
Population growth	• Johnson, T. M. & Zurlo, G. A., *World Christian Encyclopedia, Third Edition*, (Edinburgh: Edinburgh University Press, 2020) • Barrett, D. B. & Johnson, T. M., *World Christian Trends*, (Pasadena: William Carey Library, 2001) • Both drawn from the *World Christian Database*, hosted by the Center for the Study of Global Christianity at Gordon-Conwell Theological Seminary • UN Population Division, access via *World Development Indicators*, World Bank, (2022)

Figure 1.4: Environmental indicators

So, having defined our indicators to judge humanity's progress or decline in development and the environment, let us now consider what these indicators show us.

TRENDS IN DEVELOPMENT AND THE ENVIRONMENT – WHAT DO THE INDICATORS TELL US?

Development

In the area of development, we only have reliable data available for the last few decades. However, academics are in overwhelming agreement that for the vast majority of human history, poverty and very low ***"bare subsistence"*** standards of living were widespread, almost universal compared with modern standards. Levels of inequality, or relative poverty, were therefore also extremely high through most of human history, as a very small number of aristocrats controlled virtually all wealth and resources, whilst the vast majority of the population were extremely poor. As Yuval Noah Harari puts it in his book on the history of humanity *Sapiens*, ***"Until the late modern era, more than 90 per cent of humans were peasants who rose each morning to till the land by the sweat of their brows. The extra they produced fed the tiny minority of elites – kings, government officials, soldiers, priests, artists and thinkers – who fill the history books. History is something that very few people have been doing while everyone else was ploughing fields and carrying water buckets."*** The historian Ian Morris adds that between the agricultural revolution of around 10,000 BC and the industrial revolution beginning in the late eighteenth century, ***"Most farmers (that is most people) remained stunted and poorly nourished across this whole ten-thousand-year history … 'Pile work with work upon work' advised the ancient Greek poet Hesiod, whose Works and Days (composed around 700 BC) is our oldest surviving source purporting to describe life from a peasant's point of view. Twenty-six centuries later, a priest in southern Italy concluded that 'the peasant works, in order to eat, he eats in order to have the strength to work; and then he sleeps.' … peasant life would have struck almost any visitor from the fossil-fuel (modern) world as nasty, brutish, and poor."*** The economist and adviser to the United Nations Jeffrey Sachs concurs, ***"For most of human history, output per person was at a very low level, just around the level needed to survive. Most of humanity lived on farms and grew food for their own subsistence. In most years, the food was enough to keep them alive. In bad years, with droughts or floods or heat waves or pests, the harvest might fail, and people would die, sometimes in large numbers."*** In short ***"The world before 1750 was a world of poverty … most people in most ages lived rural lives, always on the edge of famine, disease, and early death."*** [35] However, in recent decades this situation has begun to change dramatically, and it is from here that we pick up the story.

If we look at the global trends for those who have sufficient food, safe water and sanitation, a decent standard of housing, a good job, education, quality healthcare (for both physical and mental health), and access to electricity and the internet, the first thing we observe is that in each of these areas change has been significant (Figure 1.5). This change has been gradual and steady rather than with great peaks and troughs, as we might expect from the gradual process of nations and communities emerging out of poverty around the world. The number of people in the world without clean water, safe sanitation, living in extreme poverty on less than $1.90 a day (as defined by the World Bank), without electricity, and who lack access to the internet has been declining. (The World Bank also tracks the numbers living on less than $3.20 and $5.50 a day, both of which follow the same broad trends as for those on under $1.90 a day, giving us some confidence that this is a continued increase out of extreme poverty, not just one

[35] Harari, Y. N., *Sapiens*, (2014), p. 114, see also pp. 113, 116 – 117, 298 – 301; Morris, I., *Foragers, Farmers and Fossil Fuels*, (2015), pp. 52, 54, 56, see also pp. 44 – 92; Sachs, J., *The Age of Sustainable Development*, (2015), pp. 19, 73, see also pp. 51, 67, 71, 74, 277 – 279 etc.

that plateaus after people reach a certain very basic level.) The number of people living in slums or who haven't completed secondary education has tragically been increasing. Finally, the number of people without sufficient food has been declining for most of the period since 1990, until disturbingly starting to grow again from 2018.

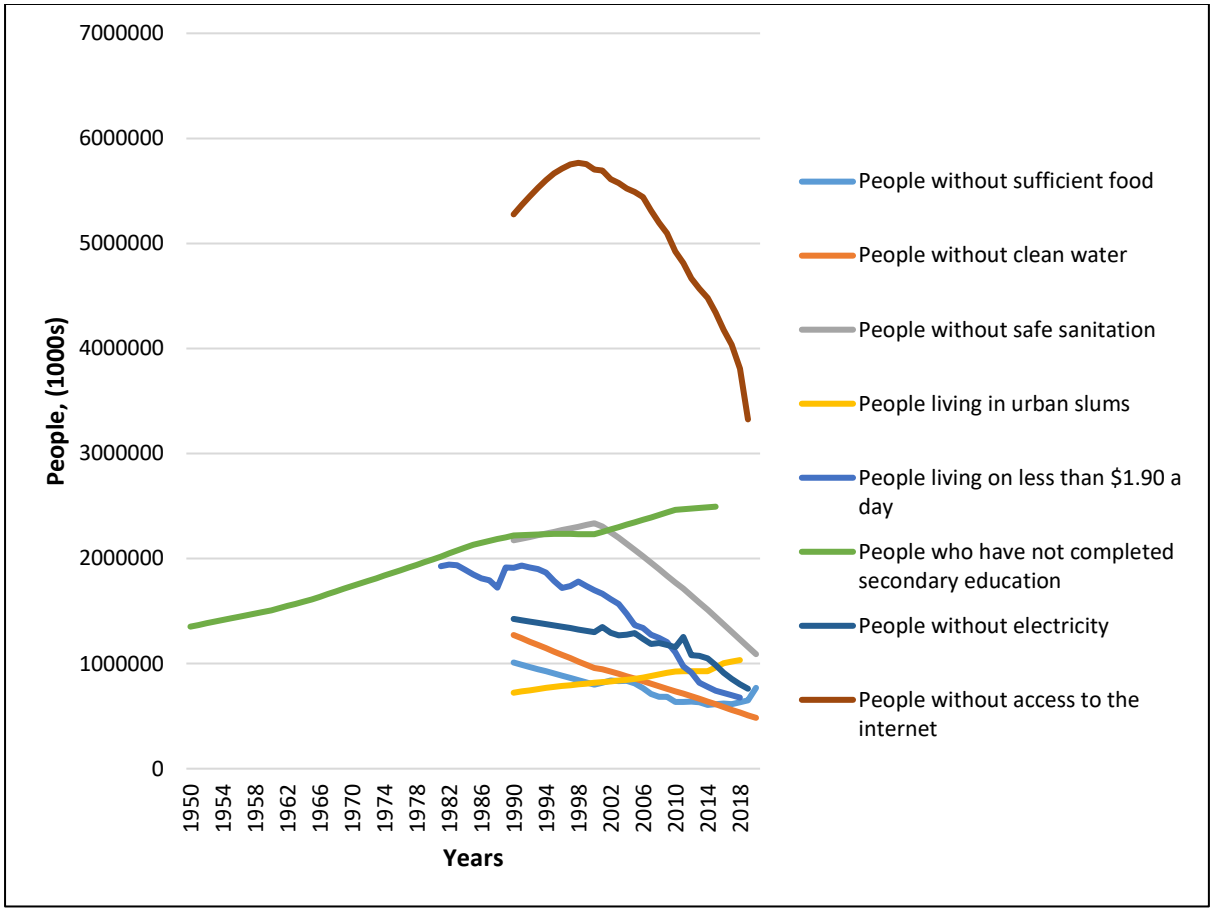

Figure 1.5: Global poverty trends [36]

If we break these global totals down to a continental level (Figures 1.6 – 1.13), we find that where the poverty trends are improving, such as the absolute numbers of people without clean water, safe sanitation, living on under $1.90 a day, access to electricity or access to the internet, the progress has primarily been achieved in Latin America and the Caribbean (LAC), North Africa, and Asia. Conversely, and strikingly, in each of these areas (except for access to clean water), the numbers are all tragically increasing in Sub-Saharan Africa. The same is true for the number of people without sufficient food. For most of the time since 1990 the number of people without sufficient food has reduced dramatically in Asia, Latin America and the Caribbean (LAC), and Oceania, whilst it has continued to rise in Africa. However, here, worryingly, the numbers without sufficient food have also begun to rise again in Asia, Latin America and the Caribbean (LAC), and Oceania in the most recent years.

[36] *FAO Stat*, UN Food and Agriculture Organization, (2022); WHO/UNICEF Joint Monitoring Programme for Water Supply, Sanitation and Hygiene, (2022); *Urban Indicators Database*, UN-Habitat, (2022); *World Development Indicators*, World Bank, (2022); Barro, R. & Lee, J-W., *Barro-Lee Estimates of Educational Attainment for the Population Aged 15 – 64 from 1950 to 2015*, (2021); *Global Electrification Database, World Development Indicators*, World Bank, (2022); *International Telecommunication Union (ITU) World Telecommunication/ICT Indicators Database*, access via *World Development Indicators*, World Bank, (2022)

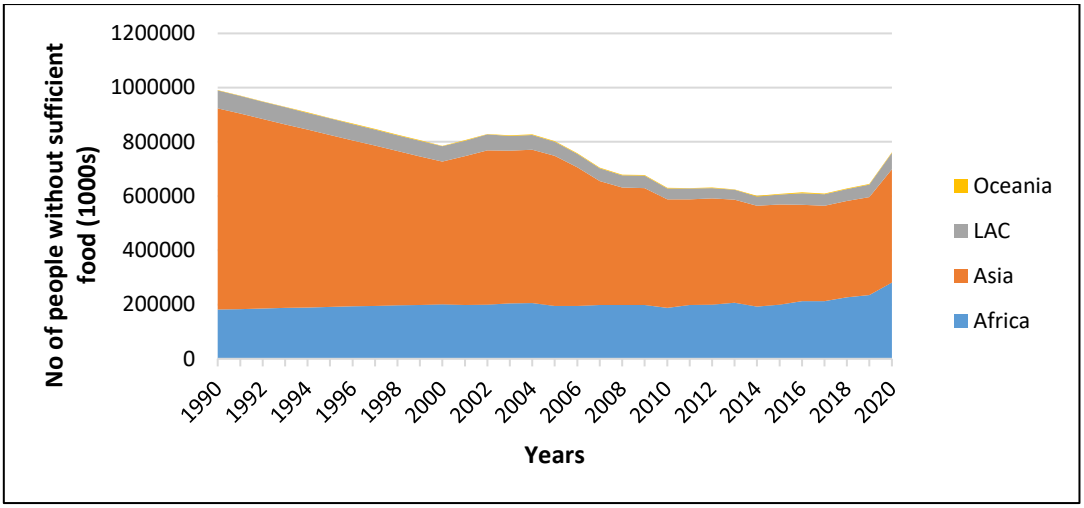

Figure 1.6: People in the world without sufficient food [37]

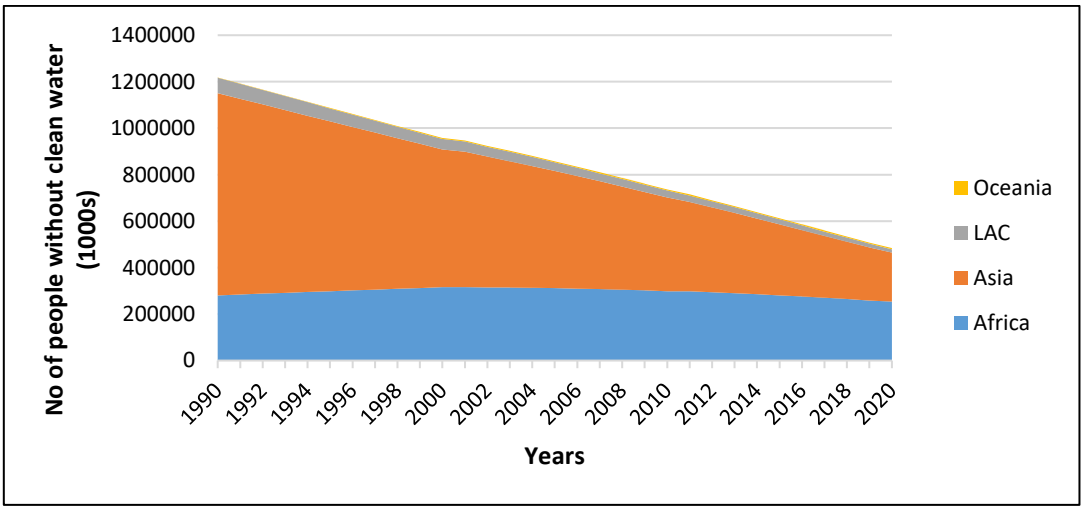

Figure 1.7: People in the world without access to safe water [38]

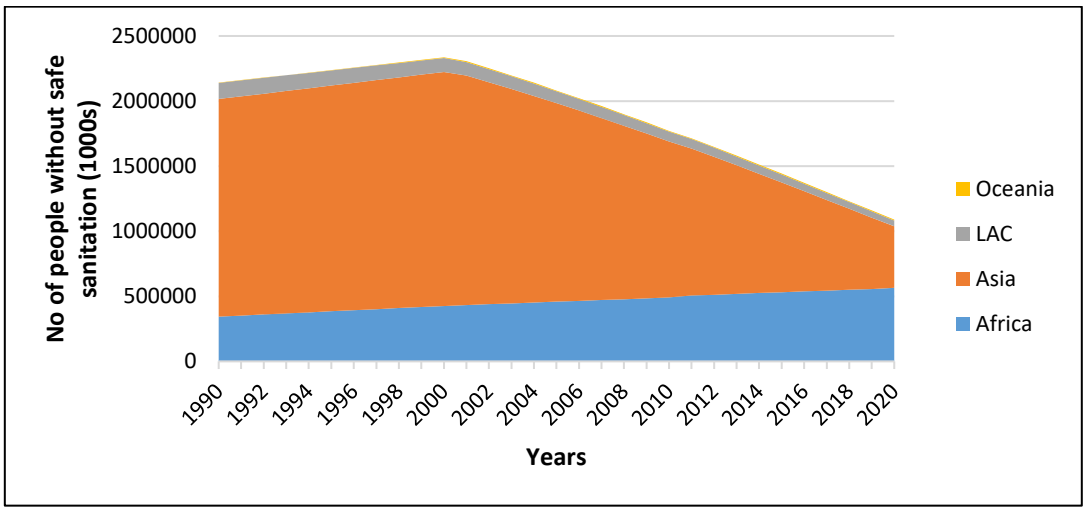

Figure 1.8: People in the world without access to safe sanitation facilities [39]

[37] *FAO Stat*, UN Food and Agriculture Organization, (2022)
[38] WHO/UNICEF Joint Monitoring Programme for Water Supply, Sanitation and Hygiene, (2022)
[39] WHO/UNICEF Joint Monitoring Programme for Water Supply, Sanitation and Hygiene, (2022)

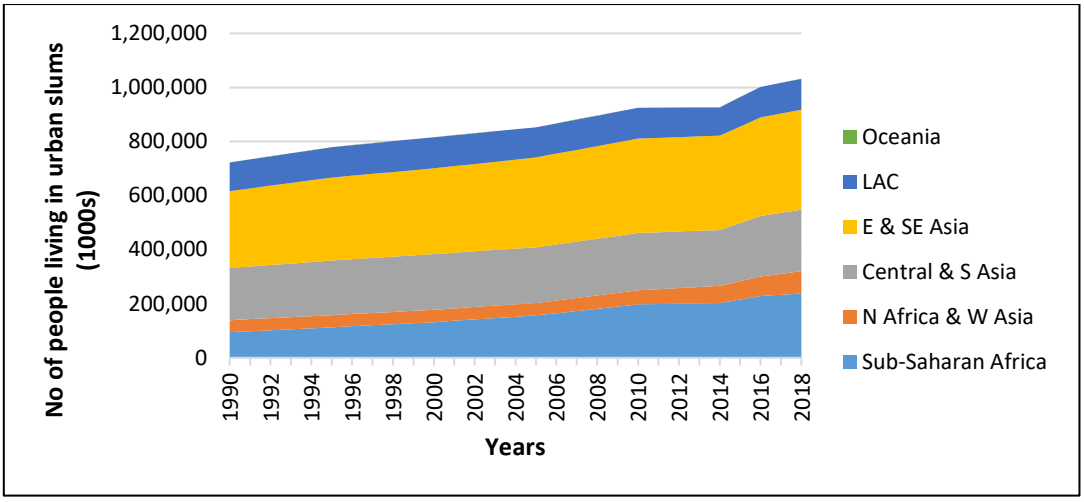

Figure 1.9: People in the world living in slums [40]

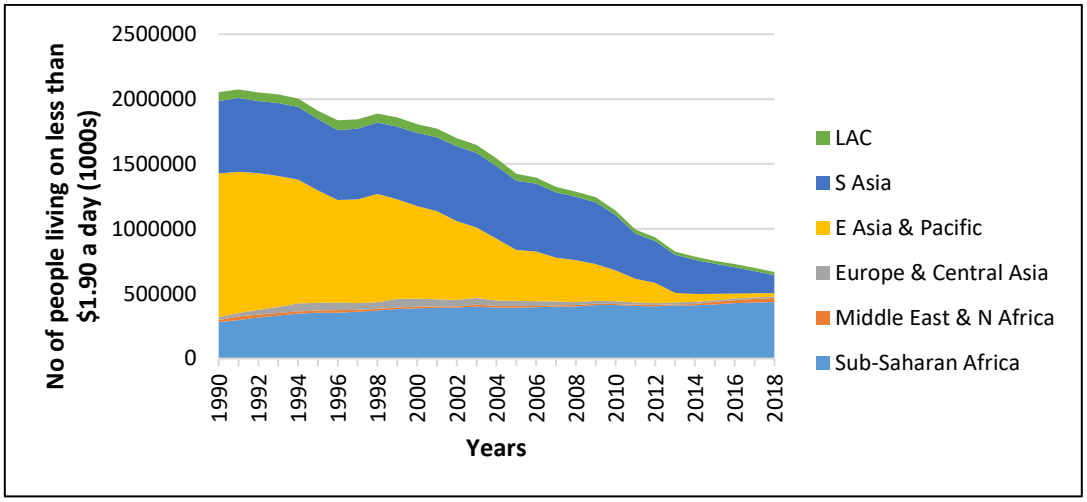

Figure 1.10: People in the world living on less than $1.90 a day [41]

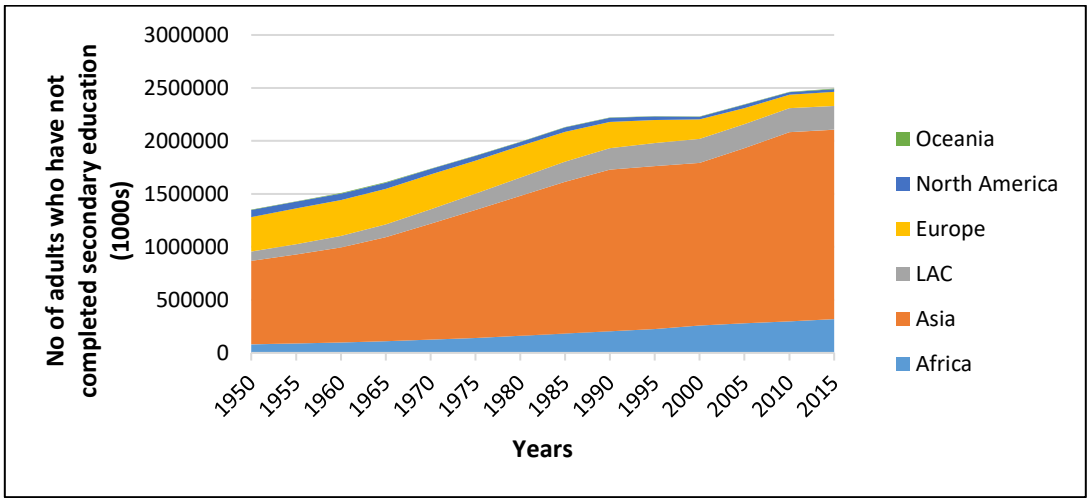

Figure 1.11: People in the world who have not completed secondary education [42]

[40] *Urban Indicators Database*, UN-Habitat, (2022)
[41] *World Development Indicators*, World Bank, (2022)
[42] Barro, R. & Lee, J-W., *Barro-Lee Estimates of Educational Attainment for the Population Aged 15 – 64 from 1950 to 2015*, (2021)

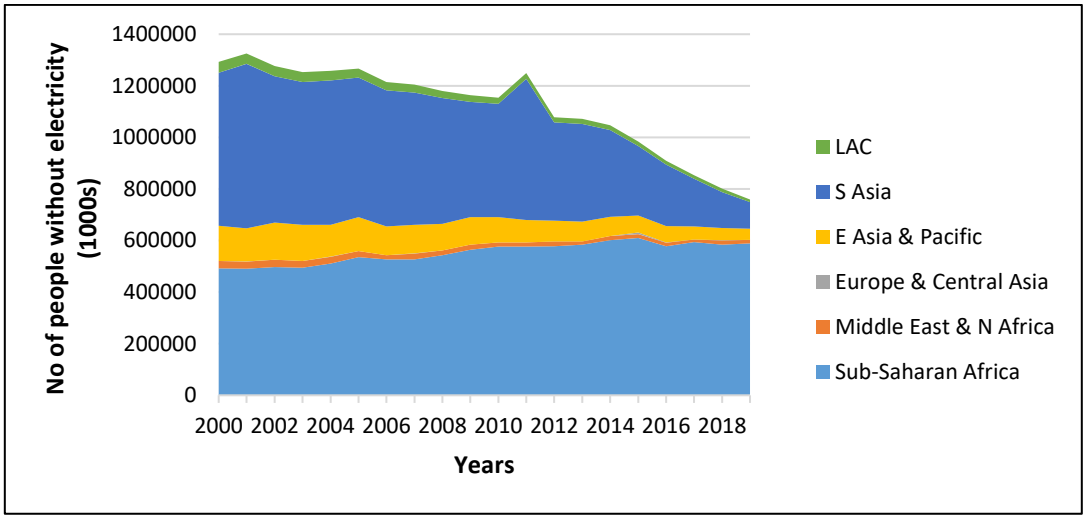

Figure 1.12: People in the world without access to electricity [43]

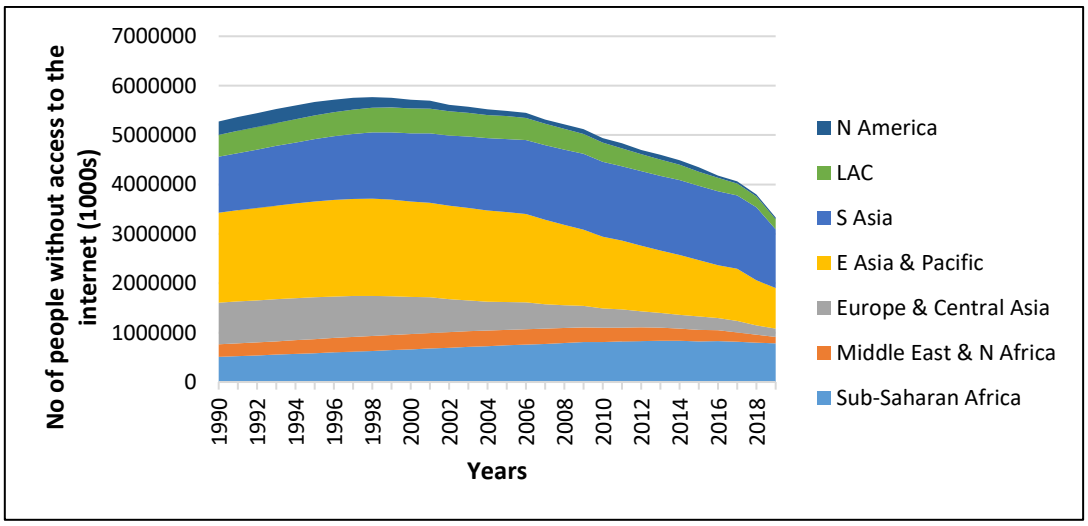

Figure 1.13: People in the world without access to the internet [44]

In terms of the poverty trends that have been worsening globally throughout the period, such as the number of people living in slums or who have not completed secondary education, at a continental level, we see that tragically this is the case in virtually all regions; Sub-Saharan Africa, Latin America and the Caribbean (LAC), North Africa and Asia. More encouragingly, throughout the period considered, there are virtually no people at all in Europe and North America who lack sufficient food, safe water and sanitation, adequate housing, are living on less than $1.90 a day, or who lack access to electricity. Similarly, internet provision, which was of course virtually non-existent anywhere in 1990, is now almost universal in Europe and North America. (Of course, many people in those continents may still be living in significant relative poverty, and only receiving these basic needs at a very minimal level though public, private or charitable social support.) Many millions living in Europe and North America are still not completing secondary school, although thankfully this number is decreasing.

[43] *Global Electrification Database, World Development Indicators*, World Bank, (2022)
[44] *International Telecommunication Union (ITU) World Telecommunication/ICT Indicators Database*, access via *World Development Indicators*, World Bank, (2022)

Therefore overall, we are seeing encouraging progress in reducing the total numbers of people living in various kinds of poverty in many, if not all, areas and continents of the world. However, in many ways, examining total numbers is misleading. In 1950, the date of our earliest information, there were less than 3 billion people in our world. Today there are more than 8 billion. The global population has more than doubled, and indeed has often grown most rapidly in the world's poorest regions during the period of time we are considering. It is therefore even more encouraging that in most regions, against the backdrop of dramatic population growth, the absolute numbers living in poverty have declined (and that the numbers living in slums or without secondary education have not risen as dramatically as they could have). This represents a huge achievement, and is even more noticeable if we look at the same figures as percentages (Figure 1.14). If we add the under five and adult mortality rates (information we only have as proportions, not absolute numbers), we can also get an understanding of general health and access to healthcare.

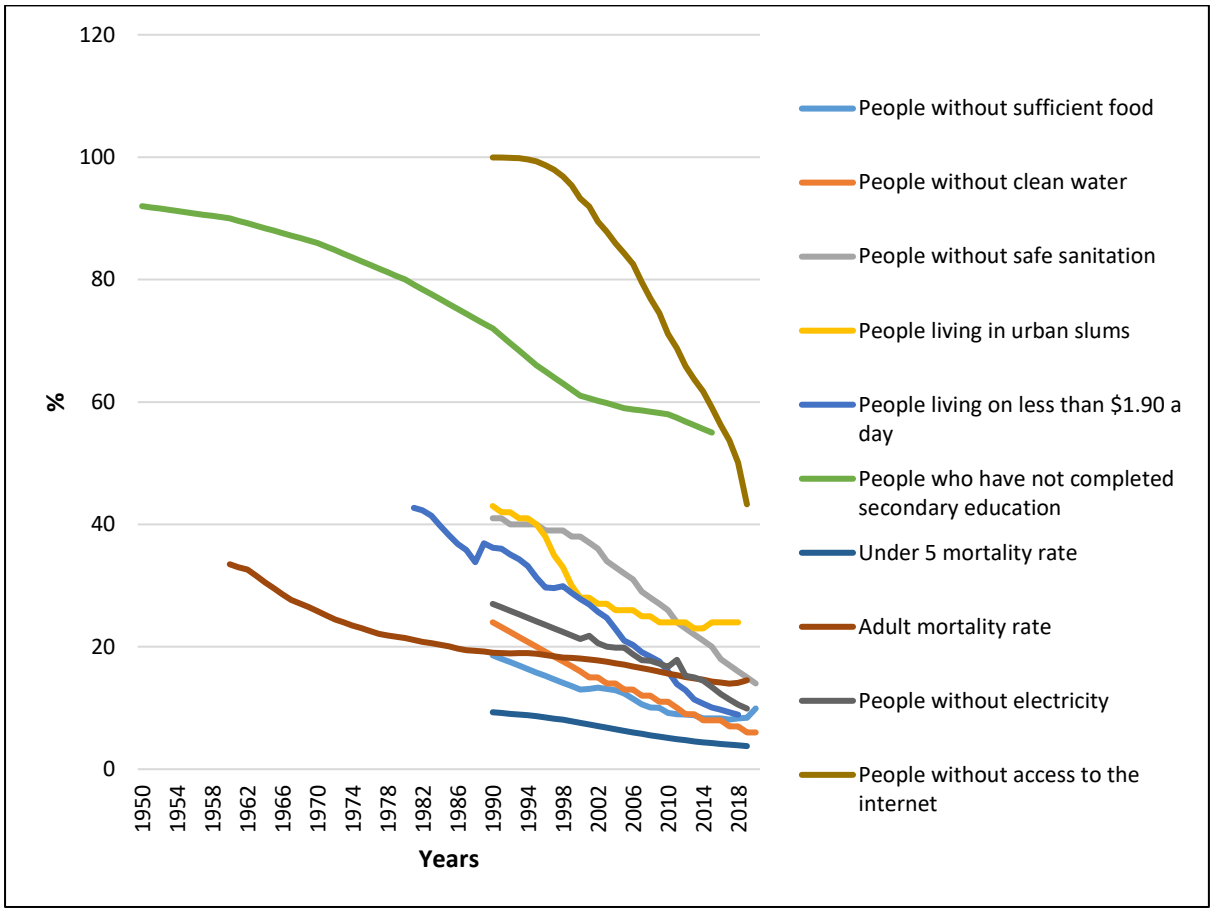

Figure 1.14: Global poverty trends by percentage [45]

[45] *FAO Stat*, UN Food and Agriculture Organization, (2022); WHO/UNICEF Joint Monitoring Programme for Water Supply, Sanitation and Hygiene, (2022); *Urban Indicators Database*, UN-Habitat, (2022); *World Development Indicators*, World Bank, (2022); Barro, R. & Lee, J-W., *Barro-Lee Estimates of Educational Attainment for the Population Aged 15 – 64 from 1950 to 2015*, (2021); UN Inter-agency Group for Child Mortality Estimation, access via *World Development Indicators*, World Bank, (2022); UN Population Division, access via *World Development Indicators*, World Bank, (2022); *Global Electrification Database*, *World Development Indicators*, World Bank, (2022); *International Telecommunication Union (ITU) World Telecommunication/ICT Indicators Database*, access via *World Development Indicators*, World Bank, (2022)

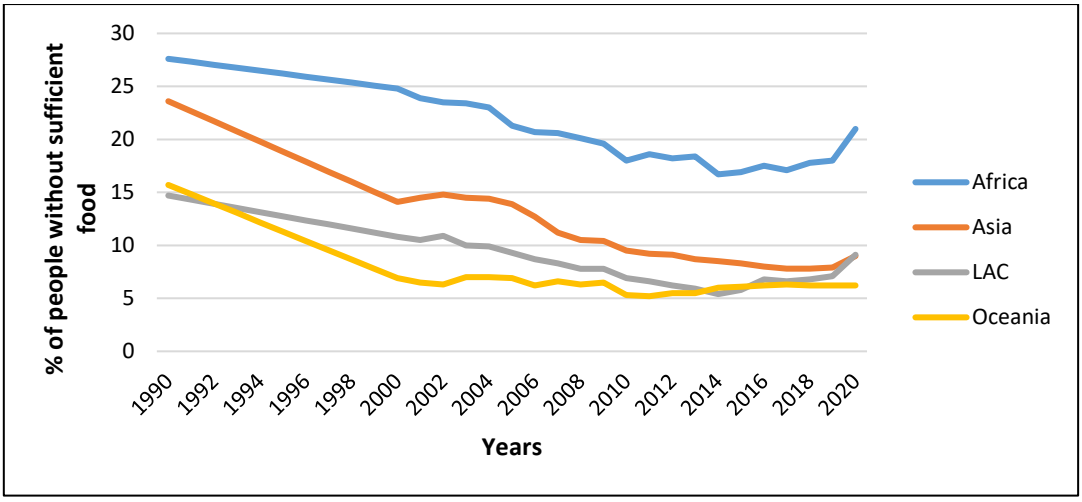

Figure 1.15: Percentage of people in each continent without sufficient food [46]

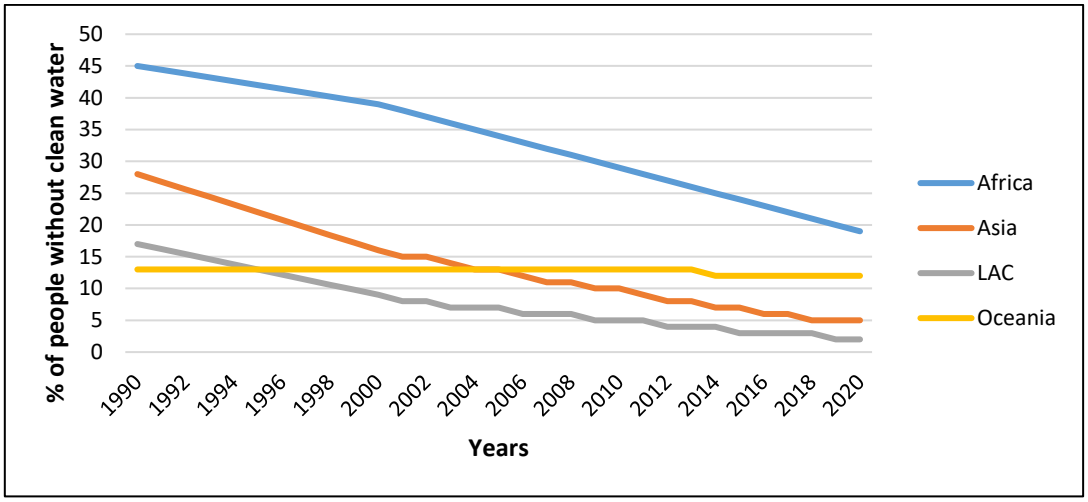

Figure 1.16: Percentage of people in each continent without access to safe water [47]

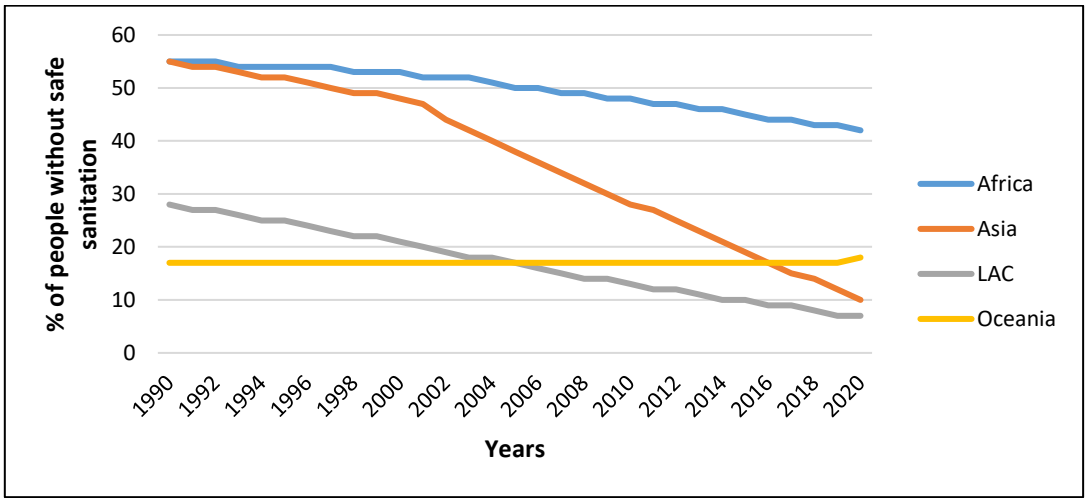

Figure 1.17: Percentage of people in each continent without access to safe sanitation facilities [48]

[46] *FAO Stat*, UN Food and Agriculture Organization, (2022)
[47] WHO/UNICEF Joint Monitoring Programme for Water Supply, Sanitation and Hygiene, (2022)
[48] WHO/UNICEF Joint Monitoring Programme for Water Supply, Sanitation and Hygiene, (2022)

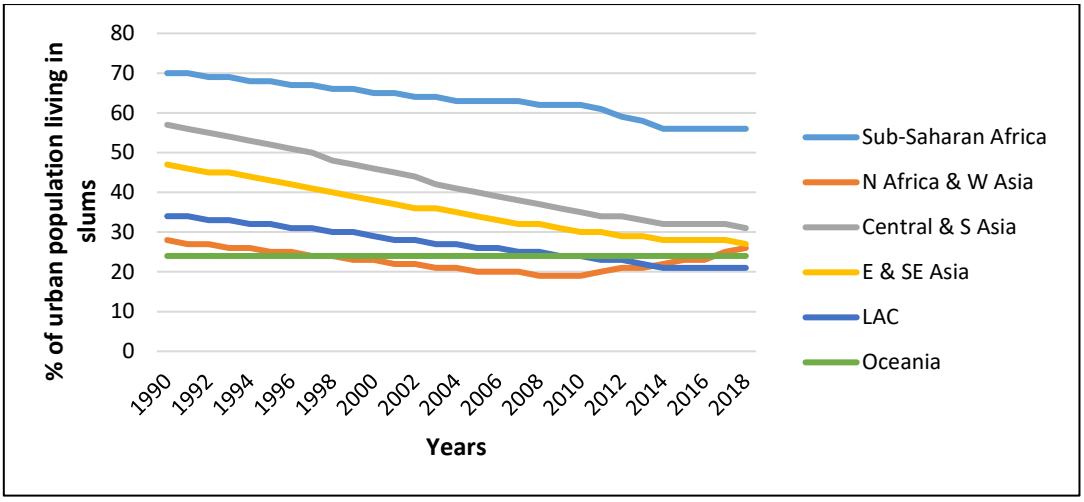

Figure 1.18: Percentage of people in each continent living in slums [49]

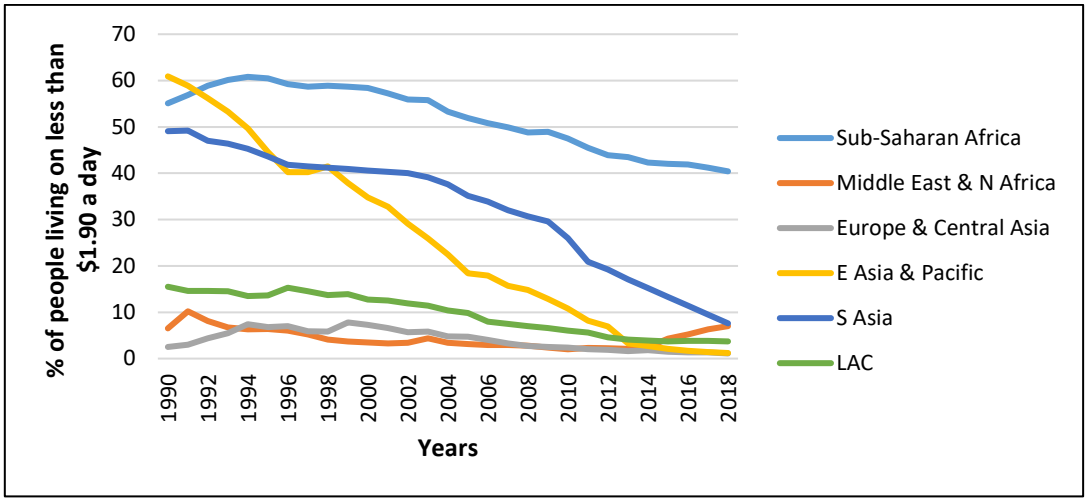

Figure 1.19: Percentage of people in each continent living on less than $1.90 a day [50]

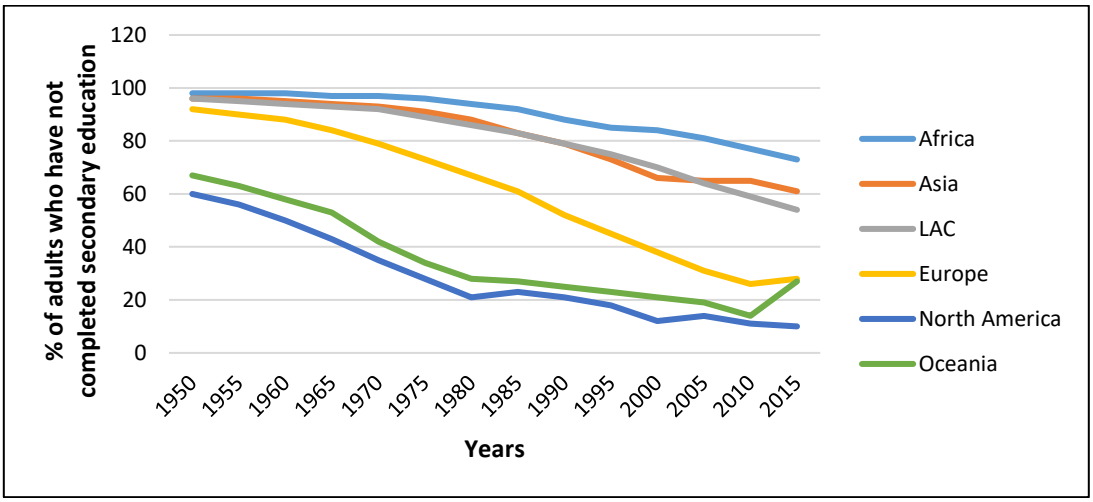

Figure 1.20: Percentage of people who have not completed secondary education [51]

[49] *Urban Indicators Database*, UN-Habitat, (2022)
[50] *World Development Indicators*, World Bank, (2022)
[51] Barro, R. & Lee, J-W., *Barro-Lee Estimates of Educational Attainment for the Population Aged 15 – 64 from 1950 to 2015*, (2021)

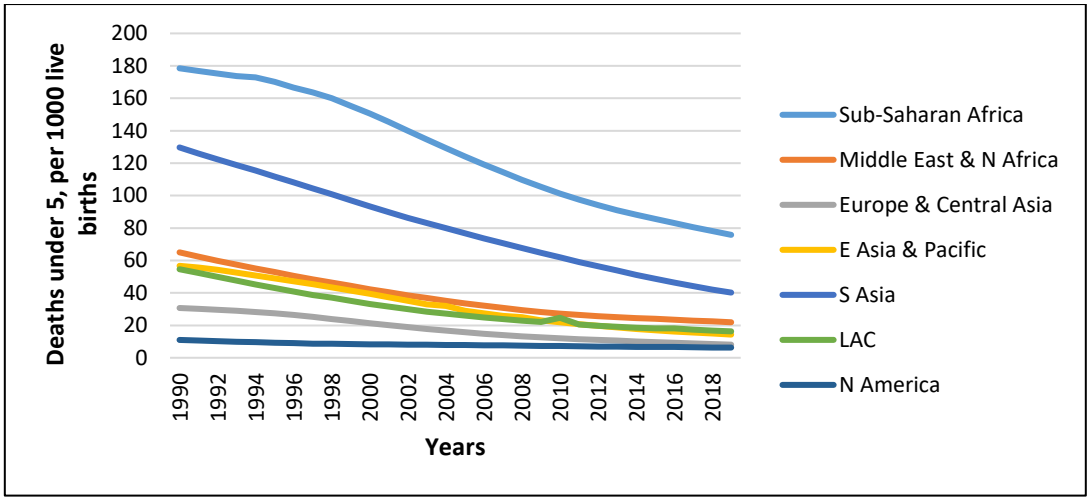

Figure 1.21: Under 5 mortality rates in each continent [52]

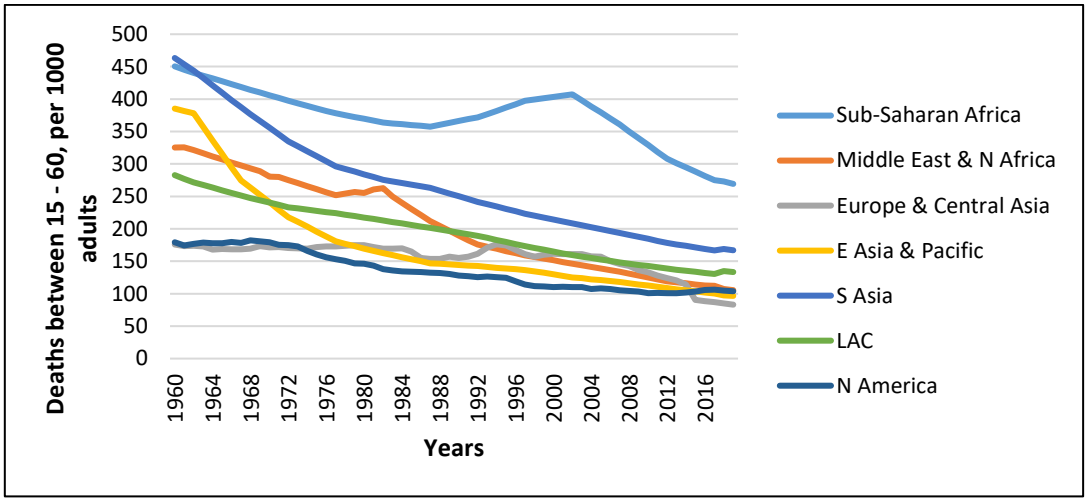

Figure 1.22: Adult mortality rates in each continent [53]

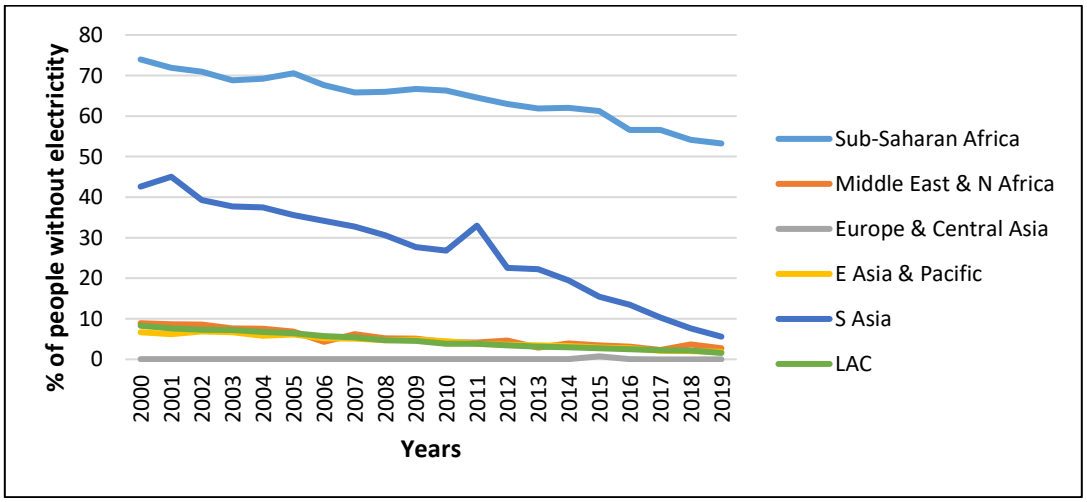

Figure 1.23: Percentage of people in each continent without electricity [54]

[52] UN Inter-agency Group for Child Mortality Estimation, access via *World Development Indicators*, World Bank, (2022);
[53] UN Population Division, access via *World Development Indicators*, World Bank, (2022)
[54] *Global Electrification Database, World Development Indicators*, World Bank, (2022)

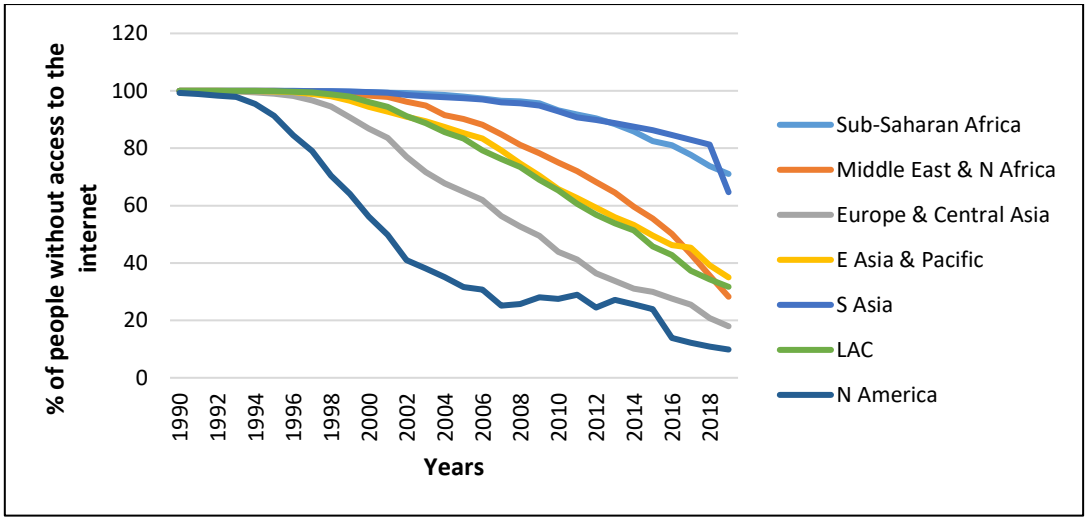

Figure 1.24: Percentage of people in each continent without access to the internet [55]

Now we find that both globally and (almost without exception) in every single region (Figures 1.15 – 1.24), and across all poverty indicators, the percentage of the population remaining in various kinds of poverty is declining, often rapidly and significantly. This is also true in Sub-Saharan Africa, the region we saw that was making the least progress in reducing total numbers in poverty. It has been argued that the booming economies of China and India, both with populations of well over 1.3 billion, and together accounting for more than a third of the world's population, are largely responsible for this dramatic global improvement in reducing poverty. Certainly, some of the most significant improvements we have seen, both in absolute numbers and percentages, do occur in parts of Asia due to economic progress in China and India. However, as these graphs make clear, even without China and India, we still see significant progress across all poverty indicators in almost all regions when we look at the total percentage of the population living in various types of poverty.

Of course this is not always a smooth progression. There are often significant setbacks and reversals lasting many years. We see this in the graphs in areas such as the heart-breaking increase in adult mortality in Sub-Saharan Africa in the 1990s and 2000s as a result of HIV, or the temporary spike in the numbers without electricity in South Asia in 2011. More recently we see an increase in the proportion living in urban slums and on under $1.90 a day in the Middle East and North Africa in the 2010s. There has also been a tragic increase in the proportion of people without sufficient food in Africa, Asia, Latin America and the Caribbean (LAC), and globally since 2018, driven by a growth in conflict, climate change, economic crises, and most recently, Covid-19. Nevertheless, despite these setbacks, the overall picture is one of a remarkable and often rapid decline in poverty across multiple indicators, in almost all continents, over many decades, an encouraging conclusion.

Having reviewed the evidence on progress tackling extreme poverty, let us now turn to consider relative poverty and inequality.

[55] *International Telecommunication Union (ITU) World Telecommunication/ICT Indicators Database*, access via *World Development Indicators*, World Bank, (2022)

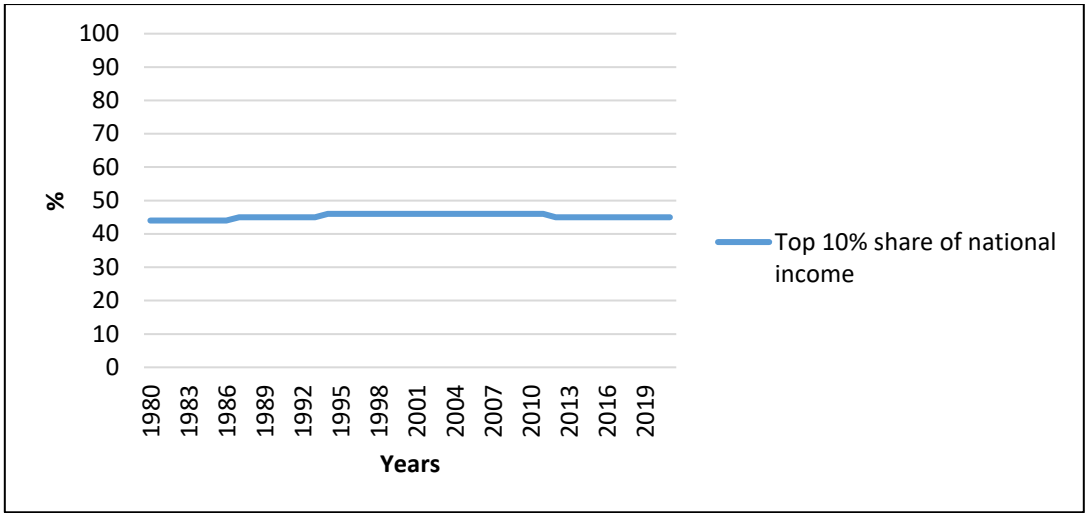

Figure 1.25: Share of national income owned by the top 10% in each country, global average [56]

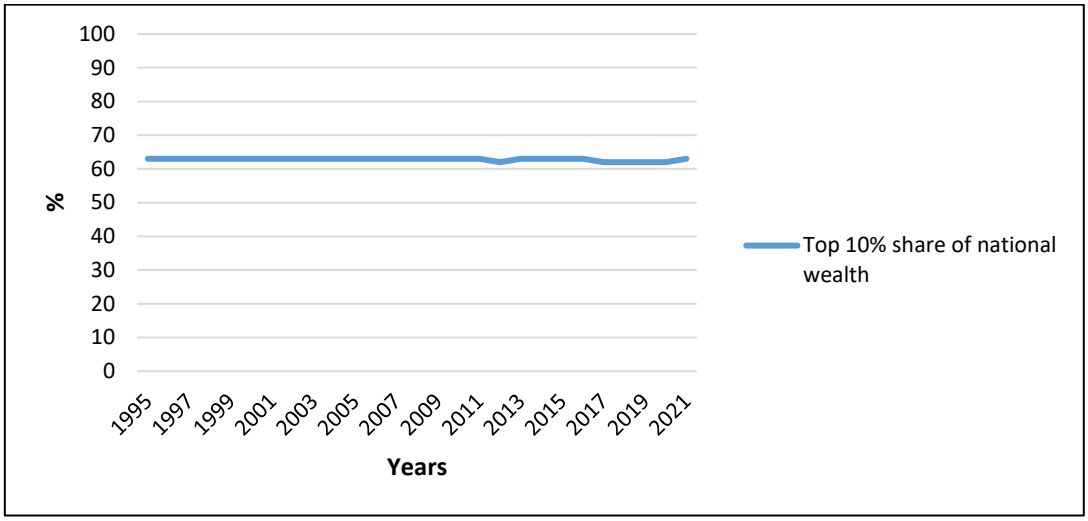

Figure 1.26: Share of national wealth owned by the top 10% in each country, global average [57]

If we look at the average share of national income earned by the top 10% in each country, and the share of national wealth (savings, investments, assets etc.) owned by the top 10% in each country (Figures 1.25 – 1.26), we find that both have remained remarkably unchanged at around 45% and 63% respectively over recent decades. This is a disturbingly high level of national income and wealth to be captured by just 10% of the population, especially in a world where much widespread and desperate extreme poverty still exists, as we have seen.

[56] World Inequality Database, (2022)
[57] World Inequality Database, (2022)

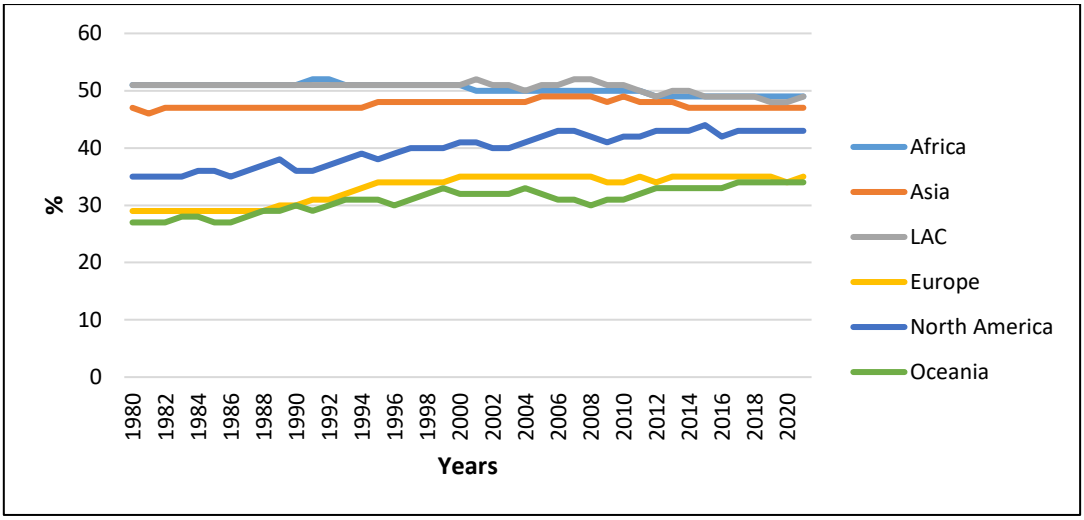

Figure 1.27: Share of national income owned by the top 10% in each country, continental averages [58]

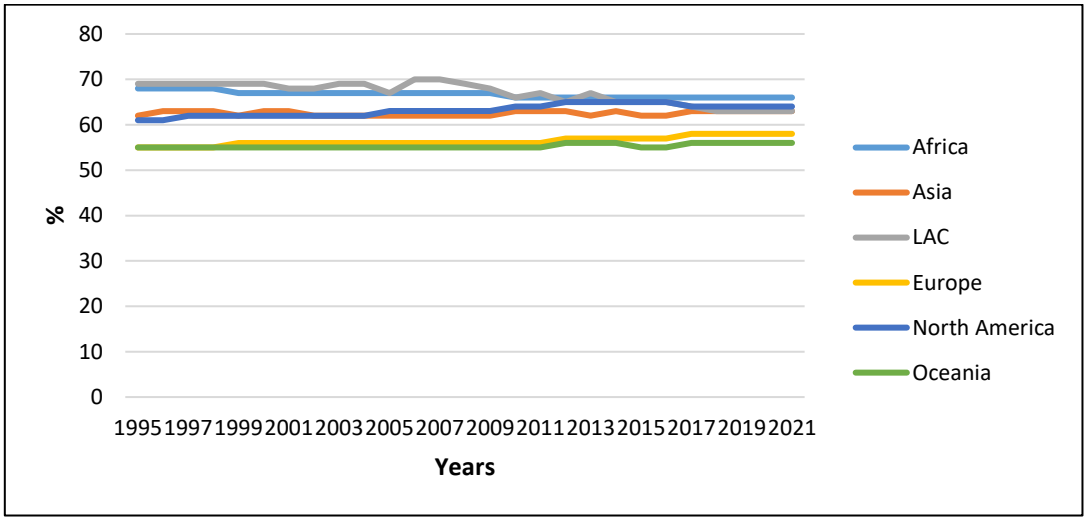

Figure 1.28: Share of national wealth owned by the top 10% in each country, continental averages [59]

If we break these figures down to look at them at a continental level (Figures 1.27 – 1.28), we find that the levels of income and wealth owned by the top 10% are on average higher in more developing regions like Africa, America and Latin America and the Caribbean (LAC). In those regions the levels are again essentially flat, or even coming down slightly. In more developed regions like North America, Europe and Oceania the level of income and wealth owned by the top 10% in each country is lower (though still very high) than in the developing regions. The share of national wealth owned by the top 10% in North America, Europe and Oceania has also remained essentially unchanged, or possibly risen slightly throughout the period. However, the share of national income earned by the top 10% in North America, Europe and Oceania has been increasing steadily since 1980.

What appears to be happening with these trends is that, as we saw, for most of history all countries were poor, and levels of inequality very high. In the developing regions of the world

[58] World Inequality Database, (2022)
[59] World Inequality Database, (2022)

like Africa, Asia and Latin America and the Caribbean (LAC) we see there are indeed still higher levels of inequality in recent decades (though not as high as they would have been historically). Conversely, in more developed regions of the world those historically high levels of inequality dropped from the late nineteenth century. This was a result of governments introducing higher levels of taxation, especially on those nearer the top of society, to pay for welfare states, providing basic services like education and healthcare, and social protection payments for the unemployed, elderly and incapacitated. These changes often came in response to major social and economic upheavals like the First and Second World Wars. However, since the 1970s those levels of inequality in more developed regions like North America, Europe and Oceania have worryingly begun to rise again. As the French economist Thomas Piketty puts it in his famous and influential study on the subject, *Capital in the Twenty-First Century*, ***"the reduction of inequality that took place in most developed countries between 1910 and 1950 was above all a consequence of war and of policies adopted to cope with the shocks of war. Similarly, the resurgence of inequality after 1980 is due largely to the political shifts of the past several decades, especially in regard to taxation and finance."*** In particular, ***"Since the 1970s, income inequality has increased significantly in the rich countries, especially the United States, where the concentration of income in the first decade of the twenty-first century regained – indeed, slightly exceeded – the level attained in the second decade of the previous century."*** [60]

This matters because there appears to be a whole host of alarming consequences for development, peace and social cohesion that correlate with these growing trends in inequality. This was powerfully demonstrated by Kate Pickett and Richard Wilkinson in their 2010 book *The Spirit Level*, and has since been reinforced by numerous other academics and research bodies. As Professors Pickett and Wilkinson write, ***"The last nine chapters have shown, among the rich developed countries and among the fifty states of the United States, that most of the important health and social problems of the rich world are more common in more unequal societies. In both settings the relationships are too strong to be dismissed as chance findings … One of the points which emerge from Chapters 4 – 12 is a tendency for some countries to do well on just about everything and others to do badly. You can predict a country's performance on one outcome from a knowledge of others. If – for instance – a country does badly on health, you can predict with some confidence that it will also imprison a larger proportion of its population, have more teenage pregnancies, lower literacy scores, more obesity, worse mental health, and so on. Inequality seems to make countries socially dysfunctional across a wide range of outcomes."*** Furthermore, after rigorous consideration of all the possible driving factors, ***"It is very difficult to see how the enormous variations which exist from one society to another in the level of problems associated with low social status can be explained without accepting that inequality is the common denominator, and a hugely damaging force."*** [61]

Having unpacked the trends in both absolute and relative poverty, let us draw those observations together and see what we have learned. One of the first things to strike us is that there is strong correlation between the different development trends. Different continents are either doing well across all the development trends or have the furthest to go with all of them (just like the inequality trends). This implies some common factor between all the trends we have considered. In broad terms, as we have seen, for the vast majority of human history

[60] Piketty, T., *Capital in the Twenty-First Century*, (2013), pp. 20, 15, but also see the whole book; *Even it Up*, Oxfam, (2014); Atkinson, A., *Inequality*, (2015) etc.
[61] Pickett, K. & Wilkinson, R., *The Spirit Level*, (2010), pp. 173 – 174, 195, but also see the whole book; Milanovic, B., *Global Inequality*, (2016); *Poverty and Shared Prosperity*, World Bank, (regular report) etc.

widespread abject poverty and high levels of inequality were the norm. Then over the last 200 years, something has caused this to change. The world has begun to move away from this historic norm to a new situation where development is dramatically improving. This process is furthest along in some parts of the world (North America, Europe), progressing steadily elsewhere (Latin America and the Caribbean, Asia) and furthest behind in others (Africa). However, everywhere the trend is positive. Of course, this is not a smooth upward curve, there are huge setbacks and delays along the way, often for many years. Also, just because this positive trend is true for our past, that does not mean it is natural and inevitable and will continue into our future. Furthermore, we still have a very long, long way to go to reach the fully developed world God wants to see.

Figure 1.29: For the vast majority of human history poverty was the norm. Over the last 200 years this has changed. Development has begun to improve and whilst there is still a long way to go, levels of absolute poverty have declined dramatically.

Nevertheless, stepping back and taking the long view the trend is clear and widely acknowledged by economists, historians and development experts. As Jeffrey Sachs the economist and adviser to the United Nations says in *The End of Poverty*, ***"The move from universal poverty to varying degrees of prosperity has happened rapidly in the span of human history. Two hundred years ago the idea that we could potentially achieve the end of extreme poverty would have been unimaginable … The past two centuries, since around 1800, constitute a unique era in economic history, a period the great economic historian Simon Kuznets famously termed the period of modern economic growth."*** During this time the world's average per capita income has increased ***"by around nine times between 1820 and 2000."*** Therefore, today, ***"The good news is that well more than half of the world, from the Bangladesh garment worker onward, broadly speaking, is experiencing economic progress. Not only do they have a foothold on the development ladder, but they are also actually climbing it. Their climb is evident in rising personal incomes and the acquisition of goods***

such as cell phones, television sets, and scooters. Progress is also evident in such crucial determinants of economic well-being as rising life expectancy, falling infant mortality rates, rising educational attainment, increasing access to water and sanitation, and the like." In summary, ***"Three main points stand out: all regions were poor in 1820; all regions experienced economic progress; today's rich regions experienced by far the greatest economic progress".***

Similarly, the World Bank economist Charles Kenny, observes in his study on global development *Getting Better,* ***"the world appears to be a far better place to live in today than it was in the middle of the last century or in any century before that. And life has gotten better in particular for those who suffered the worst living conditions in 1950. This is evidence of considerable success in development. Children born in the developing world today are far more likely to survive to old age than those born fifty years ago. They are far more likely to be educated (and thus literate as adults) – and this is particularly true of girls. They are more likely to enjoy civil and political freedoms. And the gap between the likely fortunes of a child born in the developing world and one born in the developed world has narrowed. In both relative and absolute terms, life in Africa, Asia, Eastern Europe, and Latin America is much better today than it was in the past."***

The Nobel Prize winning economist Angus Deaton also concurs in his book, *The Great Escape,* ***"Starting in the middle of the eighteenth century in Britain, longevity slowly began to improve in countries around the world. As people made their escape from disease and early death, living standards began to improve too, and, to a large extent, health and the level of living moved in parallel … one careful study estimates that the average income of all the inhabitants of the world increased between seven and eight times from 1820 to 1992. At the same time, the fraction of the world's population in extreme poverty fell from 84 to 24 percent."*** So that today ***"Life is better now than at almost any time in history. More people are richer and fewer people live in dire poverty. Lives are longer and parents no longer routinely watch a quarter of their children die."*** [62]

So, what was the common factor that began this process of incredible change that we are still living through? The evidence overwhelmingly points towards the industrial revolution which began in Britain and Europe towards the end of the eighteenth century and gradually spread around the world. This has driven our modern expanding global economy, which has created wealth, jobs and the modern world. This global economy has both reduced poverty and inequality directly, as well as created a base of wealth that governments have been able to tax and use to provide basic services, such as healthcare and education for their populations, to help ensure no one is left behind. However, before we unpack this process in more detail, let us turn to consider our environmental indicators, and what they tell us about progress or decline over the same period.

Environment

When we consider the environmental indicators, we see a far less positive picture. For the vast majority of history, humanity has lived well within the planetary boundaries. However, since fossil fuel consumption and industrialisation took off, there has been a staggering increase in

[62] Sachs, J., *The End of Poverty*, (2005), pp. 26 – 29, 19, see also pp. 30 – 51, 149 – 150, 168 – 169; Kenny, C., *Getting Better*, (2012), pp. 91 – 92, but also see the whole book; Deaton, A., *The Great Escape*, (2013), pp. 167, 1, but also see the whole book etc.

global carbon dioxide (CO2) emissions (the major greenhouse gas) since the 1850s, with a particularly dramatic rise in the years after the Second World War. The data relating to other greenhouse gases also shows significantly increasing emissions (Figure 1.30).

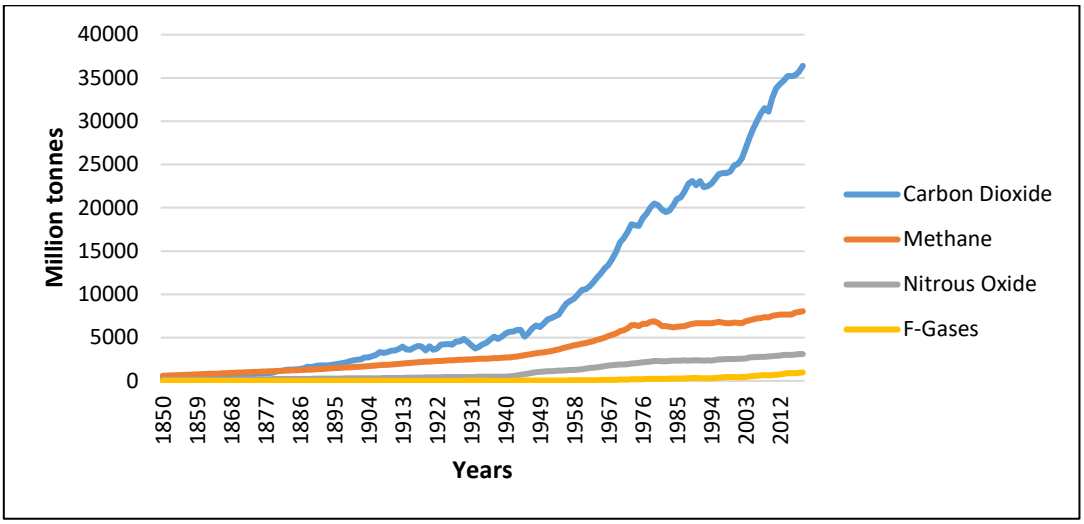

Figure 1.30: Global greenhouse gas emissions [63]

This increase has occurred for every greenhouse gas in every continent (Figures 1.31 – 1.34), with the exception of Europe and North America where CO2, methane and nitrous oxide emissions have all actually declined in recent years.

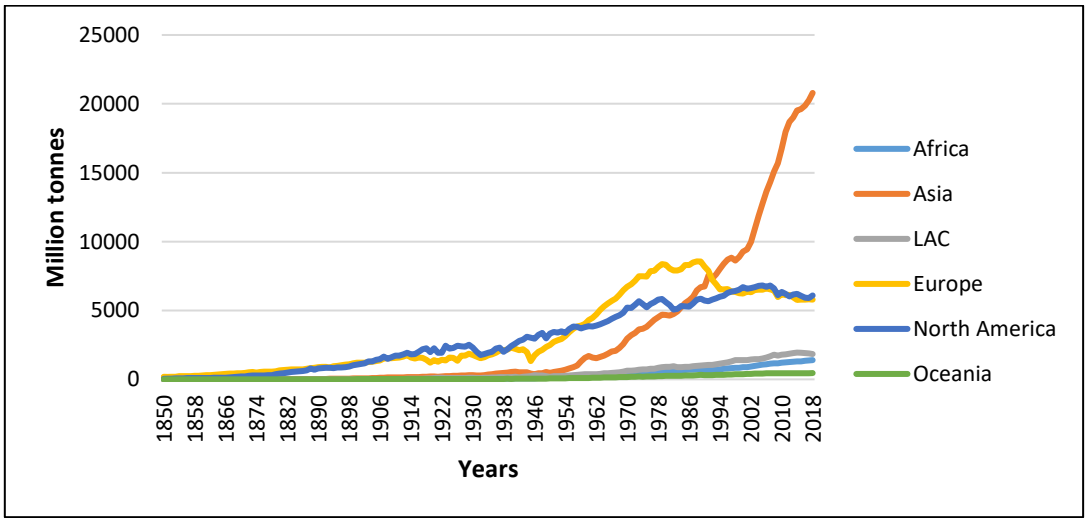

Figure 1.31: CO2 emissions [64]

[63] *The PRIMAP-hist national historical emissions time series (1850-2018)*, Climate Watch, World Resources Institute, (2022)

[64] *The PRIMAP-hist national historical emissions time series (1850-2018)*, Climate Watch, World Resources Institute, (2022)

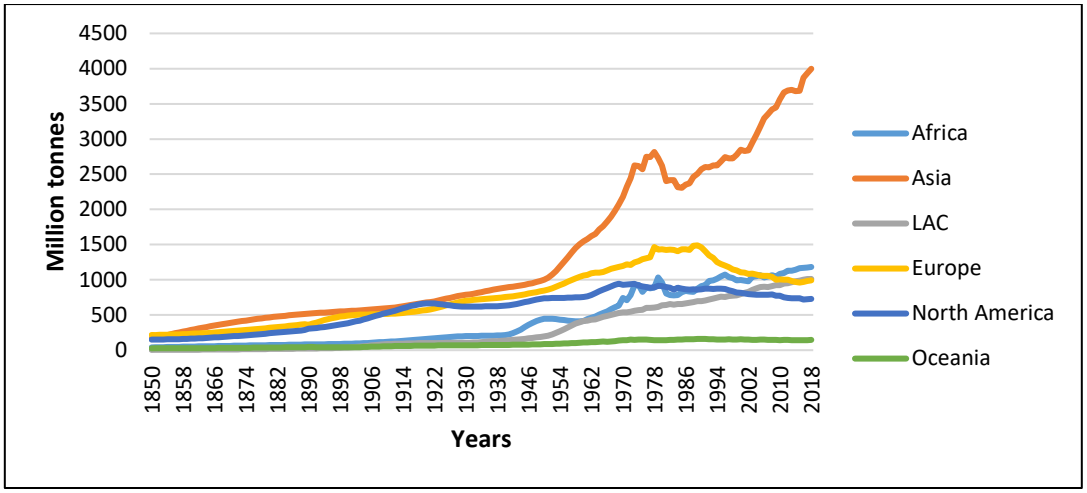

Figure 1.32: Methane emissions [65]

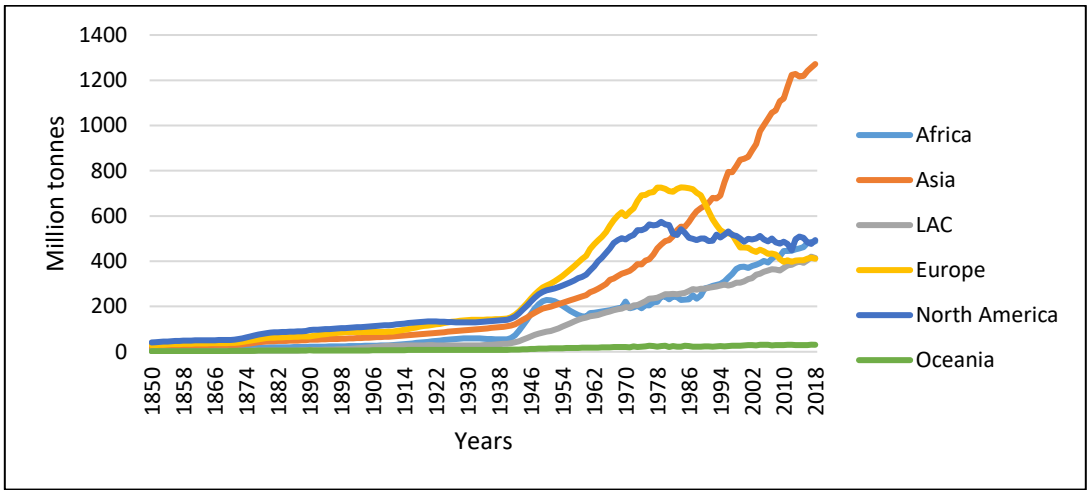

Figure 1.33: Nitrous oxide emissions [66]

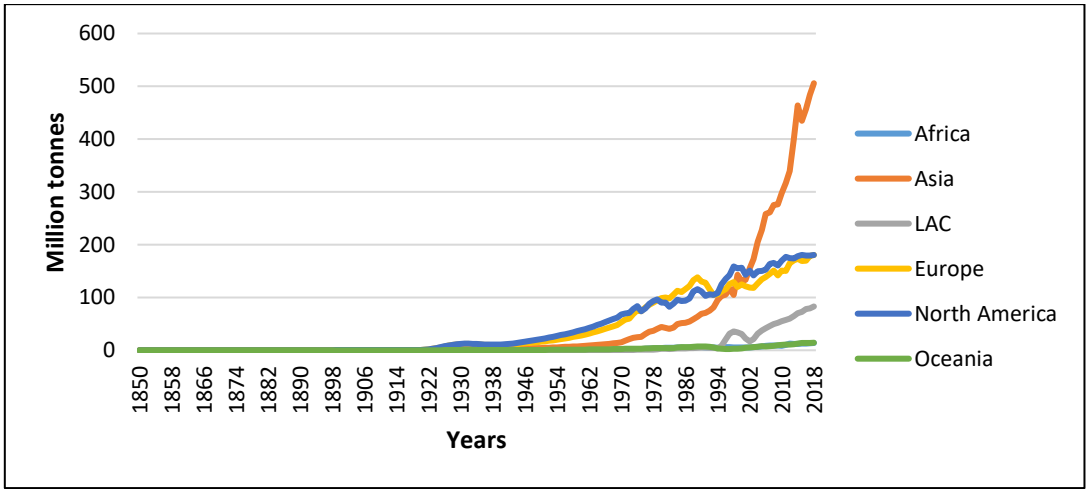

Figure 1.34: F-gases emissions [67]

[65] *The PRIMAP-hist national historical emissions time series (1850-2018)*, Climate Watch, World Resources Institute, (2022)
[66] *The PRIMAP-hist national historical emissions time series (1850-2018)*, Climate Watch, World Resources Institute, (2022)
[67] *The PRIMAP-hist national historical emissions time series (1850-2018)*, Climate Watch, World Resources Institute, (2022)

European and North American nations believe this decline is a result of the introduction of environmental policies, which have successfully begun to reduce their emissions whilst still retaining a healthy economy, setting out a model for the rest of the world to follow. There is some truth in this. However, it is also largely due to the fact that Europe and North America are increasingly transitioning into post-industrial, services and knowledge-based economies.[68] Europeans and North Americans still use fossil fuels and consume industrial goods, but increasingly they are no longer manufactured at home but in other parts of the world, effectively offshoring European and North American emissions. Indeed, this can be seen clearly in the particularly dramatic increase in emissions in Asia, as more and more nations in the world's most populous continent begin to develop and industrialise.

The Canadian journalist, academic and social activist Naomi Klein confronts this challenge in her book *This Changes Everything*, ***"climate change, when fully confronted, does raise some awfully thorny questions about what we in the wealthy world owe to the countries on the front lines of a crisis they had little hand in creating. At the same time, as elites in countries like China and India grow ever more profligate in their consumption and emissions, traditional North-South categories begin to break down and equally tough questions are raised about the responsibilities of the rich and the rights of the poor wherever they happen to live in the world … As we have seen, emissions in North America and Europe still need to come down dramatically but, thanks largely to the offshoring of production enabled by the free-trade era, they have pretty much stopped growing. It's the fast-rising economies of the Global South – with China, India, Brazil and South Africa leading the pack – that are mostly responsible for the surge in emissions in recent years"*** and therefore ***"the real battle will not be lost or won by us. It will be won or lost by those movements in the Global South that are fighting their own Blockadia-style struggles – demanding their own clean energy revolutions, their own green jobs, their own pools of carbon left in the ground."***[69]

At the same time, whilst we have looked here only at total emissions since this is what counts for driving global climate change, if we were to consider average emissions per person, we would see that overwhelmingly the citizens of the world's richest nations still consume far, far more than their fair share of total emissions, compared to those parts of the world that are still developing. Therefore, this growth in Asia and other parts of the world merely represents a catching up with the western norm. This is a 'climate justice' challenge widely recognised by politicians and environmental experts. As the academics Mike Berners-Lee and Duncan Clark say in their book *The Burning Question*, ***"the average Sub-Saharan African lifestyle takes less than a tonne of carbon dioxide a year to provide. That compares to around six tonnes globally, fifteen tonnes in much of Europe and more than twenty in North America and Australia."*** [70] Any approach to tackling climate change must also fully address this gross injustice.

[68] *Turning Points*, World Resources Institute, (2017); Coyle, D., *The Economics of Enough*, (2011), pp. 157, 181 – 208, 232, 268; *CO2 Emissions from Fuel Combustion*, International Energy Agency, (annual report) etc.
[69] Klein, N., *This Changes Everything*, (2014), pp. 411 – 412; see also Porritt, J., *Capitalism as if the World Matters*, (2007), pp. 142 – 147; Helm, D., *Natural Capital*, (2016), pp. 25 – 27; Raworth, K., *Doughnut Economics*, (2017), pp. 248 – 260; Goodall, C., *Sustainability: All that Matters*, (2012), pp. 29 – 41; Jackson, T., *Prosperity Without Growth, Second Edition*, (2017), p. 70 etc.
[70] Berners-Lee, M. & Clark, D., *The Burning Question*, (2013), p. 67, see also pp. 64 – 72; Stern, N., *Why are we Waiting?*, (2016), pp. 275 – 277, 281 – 285; *Overconsumption?*, Friends of the Earth, (2009), pp. 3, 5, 7, 9, 20 – 22 etc.

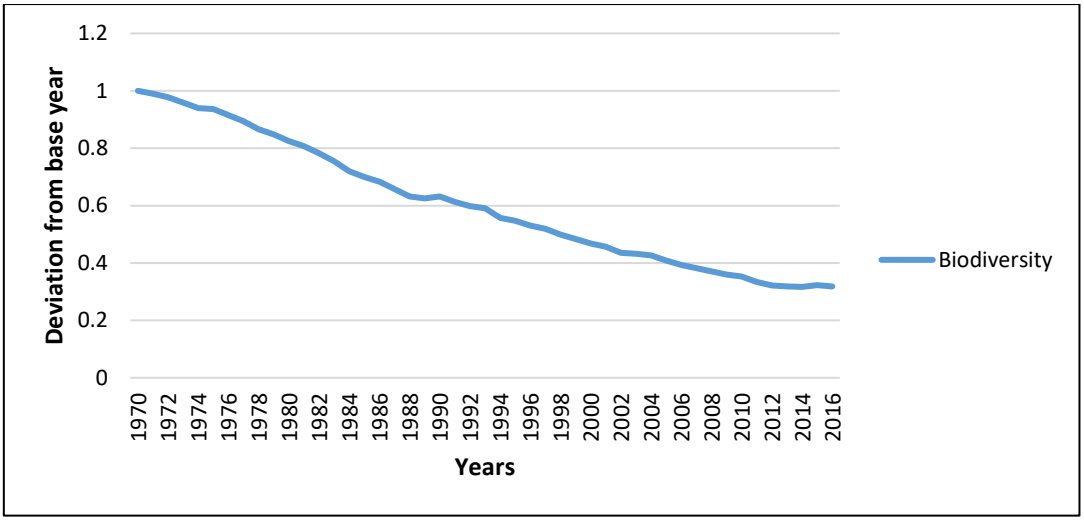

Figure 1.35: Changes in global biodiversity [71]

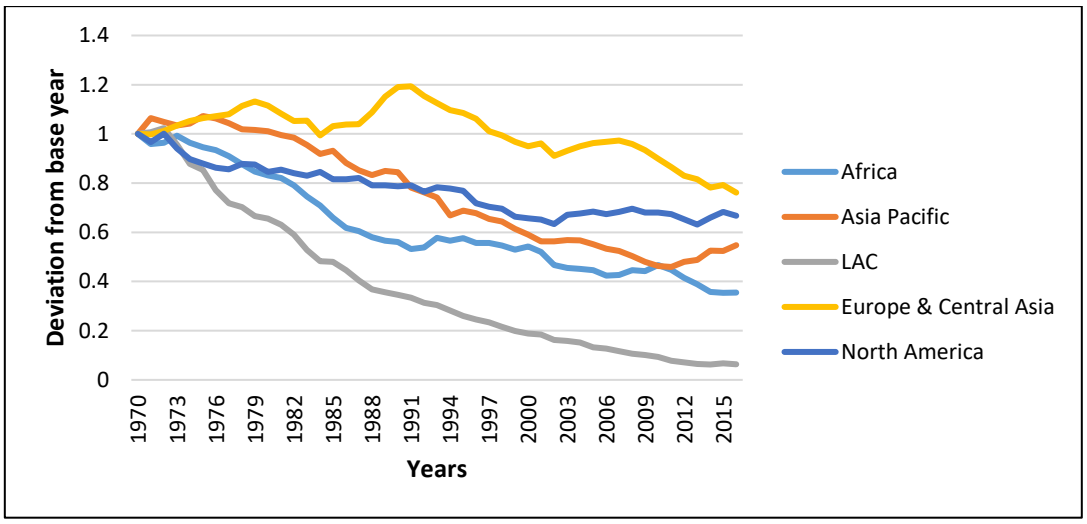

Figure 1.36: Changes in biodiversity per continent [72]

Turning to consider biodiversity, the picture is even bleaker. There has been a shocking decline in total biodiversity across the world since records began in 1970 (Figures 1.35 – 1.36). Today, there are less than a third of all the species, and the total numbers of organisms within each species, than were recorded in 1970. In other words, the total biodiversity of the world has been reduced by two thirds in little over 50 years. This is most pronounced in economically developing regions like Africa, Asia and Latin America and the Caribbean (LAC). It is less advanced, though still very serious indeed, in more economically developed regions like Europe and North America. This spectrum represents the varying degrees of development of nations across the world – some are at the industrialising and more heavily polluting stage, and others, such as Europe and North America, have largely transitioned to less polluting and more service and knowledge-based economies. These more developed economies now have the additional resources and institutional capacity to create and enforce the environmental legislation to reduce the damage to their own levels of biodiversity. Once again, this is no excuse for any moral superiority. Developed nations in Europe and North America devastated their own biodiversity during their own periods of heavy industrialisation, and indeed, their

[71] *Living Planet Index*, World Wildlife Fund & Zoological Society of London, (2022)
[72] *Living Planet Index*, World Wildlife Fund & Zoological Society of London, (2022)

biodiversity rates continue to decline today. Both this better trend in the developed world and the huge challenge in the developing world is widely recognised by scientists and climate activists, such as Mark Lynas, who explains in his book examining the Planetary Boundaries, *The God Species*, ***"In all developed countries, aquatic biodiversity has improved in the most polluted rivers of yesteryear, simply because sewage sludge is now properly treated, and releases of toxins by industrial enterprises are strongly regulated by national and regional environmental agencies. In rapidly industrialising countries, by contrast, horror stories continue to filter out from places like China about vast pollution incidents, and extraordinarily damaging levels of contamination. All of these arise from a failure of regulation, and can only be dealt with by national authorities having the capacity, the will and the funding to properly supervise industries and to mandate the construction of proper sewage treatment and other pollution controls."*** [73]

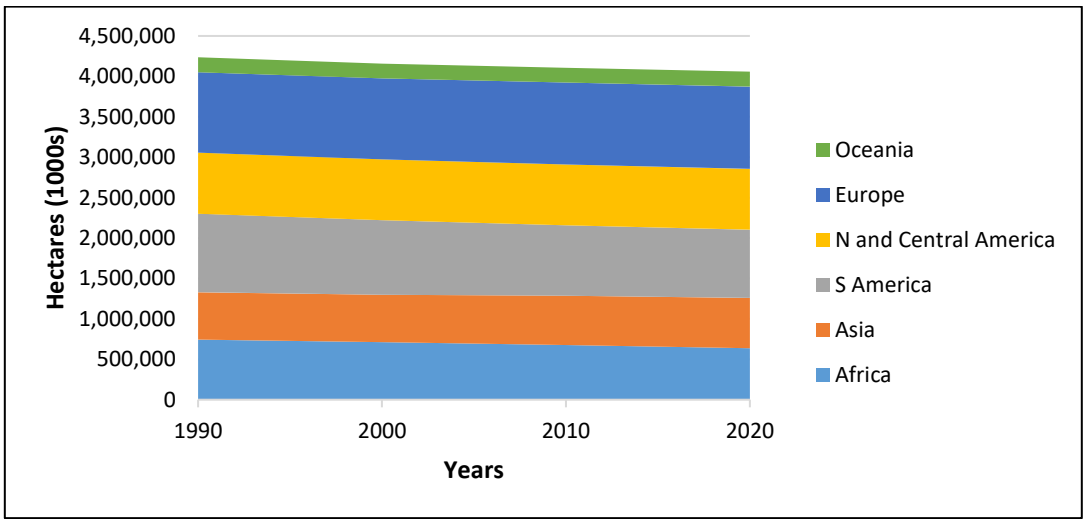

Figure 1.37: Forest area in the world [74]

The data on deforestation initially presents a more positive picture. The total forest area in the world is declining, but far less dramatically than we might expect, and indeed the rate is slowing (Figure 1.37). The 2020 *Global Forest Resources Assessment*, the most comprehensive and authoritative report on the state of the world's forests conducted every five years by the UN Food and Agriculture Organization, concludes ***"The rate of net forest loss decreased substantially over the period 1990–2020 due to a reduction in deforestation in some countries, plus increases in forest area in others through afforestation and the natural expansion of forests."*** [75] In Europe, North America and Asia, the total forest area has actually increased in recent decades. Once more, there is no case for moral superiority however. The world's more developed and temperate regions deforested their own nations on a vast scale in the centuries when they were industrialising, but in more recent decades, as their economies have moved beyond this phase, they are doing much better at reforestation.

[73] Lynas, M., *The God Species*, (2012), p. 166, see also pp. 184 – 191; *Hidden Consequences*, Greenpeace, (2011); Meadows, D., Meadows, D. & Randers, J., *Limits to Growth, The 30-Year Update*, (2010), pp. xiii, 108 – 111; Goodall, C., *Sustainability: All that Matters*, (2012), pp. 122 – 127; Diamond, J., *Collapse*, (2006), p. 472; *Equality, Security and Sustainability*, Institute of Development Studies, (2017), p. 15 etc.
[74] *Global Forest Resources Assessment 2020*, Food and Agriculture Organization, (2020)
[75] *Global Forest Resources Assessment 2020*, FAO, (2020), p. xi, but also see whole report; *Ending Global Deforestation*, Chatham House, (2013), pp. vi, 4 etc.

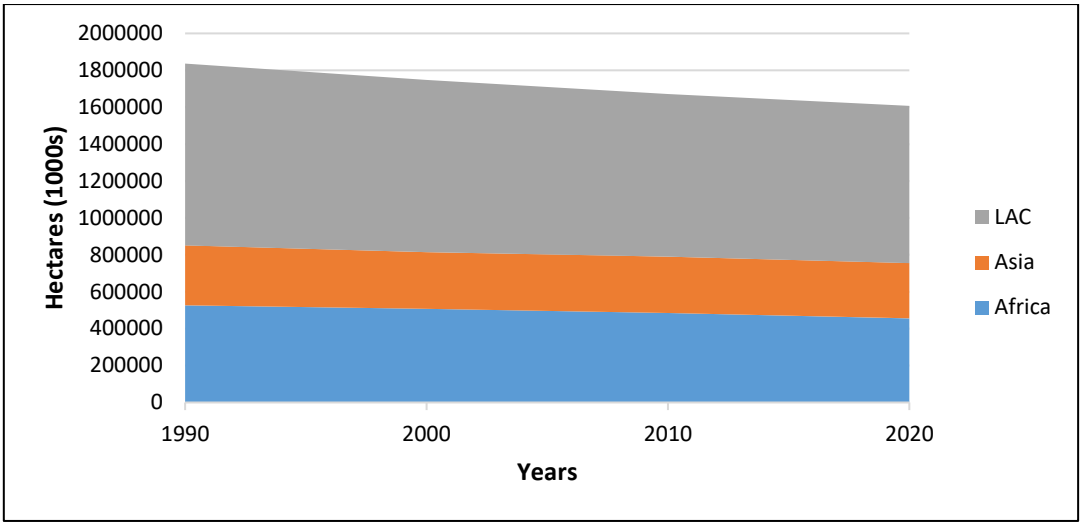

Figure 1.38: Forest area in rainforest nations [76]

Much less encouragingly, if we drill down beneath the global total and just look at the world's 30 major rainforest nations (Figure 1.38), we see a steeper rate of decline in rainforests at a global level, and in each of the three continents where they are found: Latin America, Asia and Africa. Thus denser, ancient tropical forest, which is home to a huge number of species and has more capacity to absorb CO2, is increasingly being replaced with newer, less biodiverse temperate forest which absorbs less CO2. Again the 2020 *Global Forest Resources Assessment* found that ***"More than 90 percent of deforestation in 1990–2020 was in the tropical domain".*** [77]

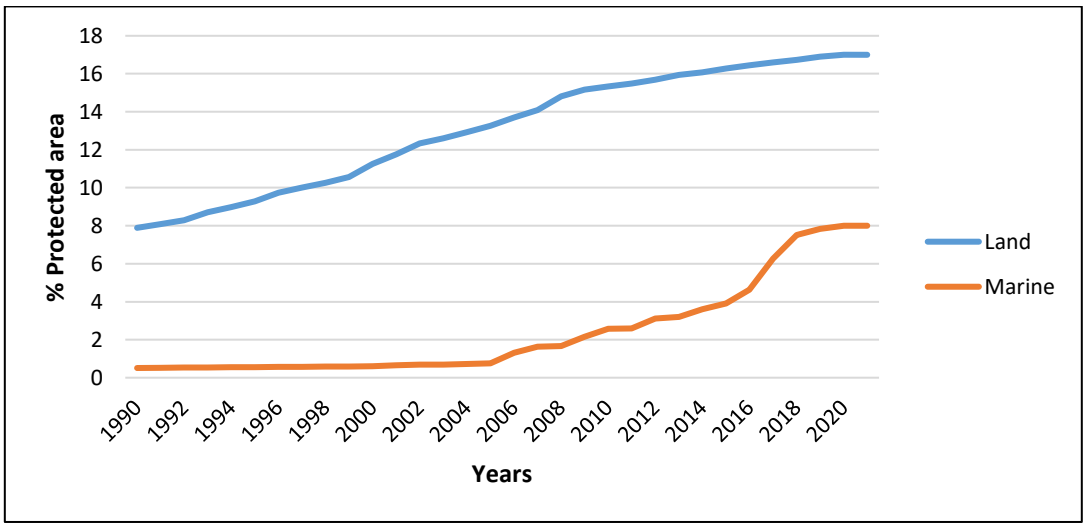

Figure 1.39: Global total protected area [78]

[76] *Global Forest Resources Assessment 2020*, Food and Agriculture Organization, (2020)
[77] *Global Forest Resources Assessment 2020*, Food and Agriculture Organization, (2020), p. 18, see also pp. xi, xiii, xiv, 18 – 19, 25 – 40, 48 – 50, 125; *Keeping Track of our Changing Environment*, UN Environment Programme, (2011), p. 39; Meadows, D., Meadows, D. & Randers, J., *Limits to Growth, The 30-Year Update*, (2010), pp. 75 – 79 etc.
[78] *Protected Planet Report 2020*, International Union for Conservation of Nature & United Nations Environment Programme World Conservation Monitoring Centre, World Database on Protected Areas, (2020)

More positively, the total amount of protected land across the world has grown significantly in every continent from virtually nothing a century ago, to 16.64% of all land and 7.74% of the seas and oceans today, helping to protect biodiversity from what would otherwise be an even steeper decline (Figure 1.39).

Finally, the global population has seen a staggering increase from historically relatively low levels of growth, rising from a billion people worldwide 200 years ago, to almost eight billion today (Figure 1.40).

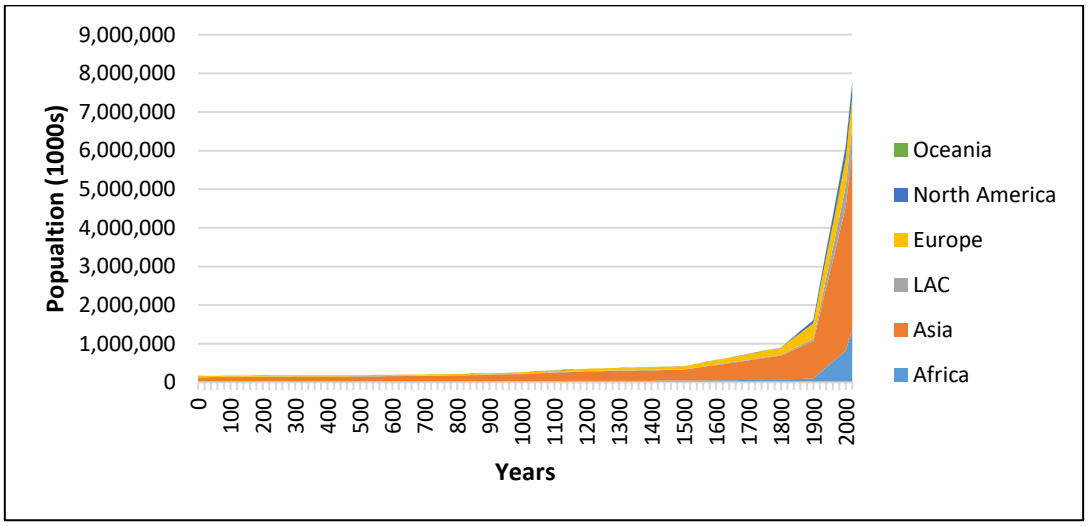

Figure 1.40: Total world population over the last 2000 years [79]

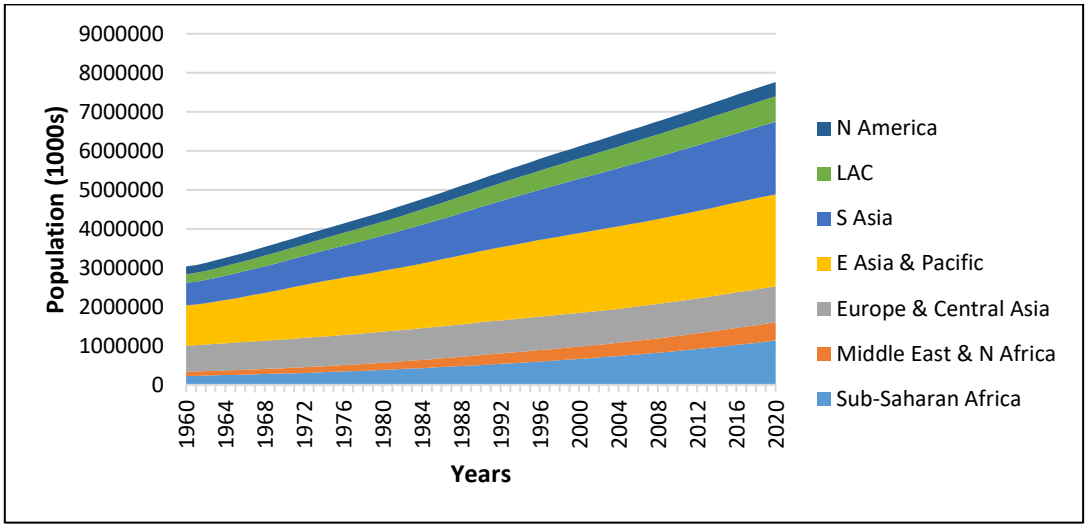

Figure 1.41: Population growth by continent since 1960 [80]

The total population is growing in every continent (Figure 1.41). However, its increase is once again most dramatic in those regions of the world that are currently going through periods of industrialisation and development such as Asia and Africa, and is slowest in areas such as Europe and North America that have already passed through this phase. This is because in pre-

[79] Barrett, D. B. & Johnson, T. M., *World Christian Trends*, (2001), pp. 320 – 333; Johnson, T. M. & Zurlo, G. A., *World Christian Encyclopedia, Third Edition*, (2020), pp. 919 – 932
[80] UN Population Division, access via *World Development Indicators*, World Bank, (2022)

industrial societies the birth rate tends to be high, with families having five, six or more children, but tragically only one, two or three surviving to adulthood, and hence the overall population growth is slow. As nations begin to develop, improvements in wealth, better food security, access to safe water, vaccinations and medication, all help to reduce child mortality rates significantly. As a result, most children survive to adulthood, and the overall population rises dramatically.[81] Fortunately, as this process continues, women and girls increasingly gain access to decent education, and health services and family planning become widely available. Also couples no longer face the tragic need to have large families in order to ensure some children survive into adulthood to help provide for them in old age. As a result of these factors, after a lag, the birth rate drops from five, six or more children to one, two or three, and as a result, the overall population stabilises again. This is the stage that the world is currently at.[82] As a result, globally the rate of population growth, whilst still staggering, has not increased since the early 1970s as more and more nations develop. Experts believe the global population will stabilise at around 9 – 10 billion in the middle of the twenty-first century.

Generally, despite some positives, we see a pretty grim picture across the vast majority of the planetary boundaries and environmental trends we have considered. The tragic irony is that the same expanding global economy which has propelled so much positive development is driven by fossil fuels and overconsumption of limited natural resources, leading to massive environmental catastrophe. Humanity's impact on the environment over the past 200 years has been truly devastating.

So, let us draw together our examination of the development and environment indicators to tell a single story of where humanity has come from, so that we can truly understand the challenge we now face in this generation, and begin to get a sense of where we must go next.

DEVELOPMENT PROGRESS AND ENVIRONMENTAL DEVASTATION – THE TWO GREAT AGRICULTURAL AND INDUSTRIAL REVOLUTIONS

The fundamental change triggered by the industrial revolution and its spread around the world, which in turn has resulted in dramatic improvements in development and huge declines in the natural environment in the last 200 years, itself sits within a longer story of human social and technological progress. Throughout human history, the dynamics of this process have been essentially simple and the same for both social and technological progress: different people in different places have invented and tried new things to improve their lives. Sometimes these innovations have had a single point of origin, at other times, similar ideas have been tried in varying locations independently. Ideas that have worked have been adopted and copied by others. This same slow and gradual process has taken us from the first stone tools to the latest online technology, and from Magna Carta to today's complex international legal codes. As the historian Ian Morris puts it in his book *Why the West Rules – For Now*, ***"For millennia social development has generally been increasing, thanks to our tinkering, and has generally done so at an accelerating rate. Good ideas beget more good ideas, and having once had good ideas we tend not to forget them."*** Or put less generously, ***"Change is caused by lazy, greedy, frightened people looking for easier, more profitable, and safer ways to do things. And they***

[81] Sachs, J., *Common Wealth*, (2008), pp. 157 – 202; Marr, A., *A History of the World*, (2013), pp. 402, 474, 559 – 560, 562 – 564; Meredith, M., *The State of Africa*, (2013), pp. 289 – 291 etc.
[82] Deaton, A., *The Great Escape*, (2013), pp. 15, 156, 244 – 245; Sachs, J., *Common Wealth*, (2008), pp. 157 – 202; Sen, A., *Development as Freedom*, (2001), pp. 215 – 218 etc.

rarely know what they're doing." [83] However, within the midst of this process there have been two great revolutions, the second of which we have already encountered, and both of which have dramatically accelerated the rate of change. Andrew Marr is just one historian amongst many to stress this in his book *A History of the World*, ***"the two most significant changes in human history were the invention of agriculture, upon which everything else depended, and the industrial revolution, which shaped today's world."*** [84]

Long before these revolutions though, modern Homo sapiens first emerged some 300,000 years ago. For the vast majority of human history (96%), human societies existed as Stone Age hunter gatherers, always on the move searching for enough food to survive. From this perspective our modern world and everything in it, is really part of a massive acceleration in technological and social development which is an aberration from the historic norm. Yuval Noah Harari summarises this well in his book *Sapiens*, ***"For nearly the entire history of our species, Sapiens lived as foragers. The past 200 years, during which ever increasing numbers of Sapiens have obtained their daily bread as urban labourers and office workers, and the preceeding 10,000 years, during which most Sapiens lived as farmers and herders, are the blink of an eye compared to the tens of thousands of years during which our ancestors hunted and gathered."*** [85] Even during this long seemingly static period, archaeology shows that change was taking place: increasingly effective stone tools, spears, wooden throwing tools, pottery, art, religion, language, boat craft, the needle, all were developed throughout this period. However, the pace of technological and social progress and change was much slower than it is today.

The first great leap forward was the agricultural revolution. Most scholars today believe that favorable changes in the climate around 12,000 years ago as the world entered our current geological era, the Holocene, meant food became more plentiful. As a result in some areas hunter-gatherers no longer needed to keep moving but became settled, returning to the same areas to gather food, and capturing and domesticating animals, thus agriculture emerged.[86] This process gradually spread around the world. However, even by the modern period it had still not spread to all. Many (though not all) of the native populations of America, Australia, Africa and the Pacific were still living as hunter gatherers when European colonial settlers arrived from the 1500s – 1800s. In remoter parts of the world today, many still do. This first great leap forward fundamentally changed the history of humanity. Over time we moved from a world where the vast majority of the human population were nomadic hunter gatherers to one where the vast majority were settled subsistence farmers living in small villages. The much larger food production which gradually became available, meant much larger populations. Larger populations living together in settled communities meant the first villages, then towns, then cities, and the emergence of more complex political structures: aristocracies, councils, kings. Writing, metallurgy, trade, wars, empire building, all began to emerge as a result.

---

[83] Morris, I., *Why the West Rules – For Now*, (2011), pp. 27 – 28, see also pp. 29, 560, 565 – 571; Marr, A., *A History of the World*, (2013), pp. 406, 455, 562; Diamond, J., *Guns, Germs and Steel*, (2017), pp. 260 – 288 etc.
[84] Marr, A., *A History of the World*, (2013), p. 521; see also Harari, Y. N., *Sapiens*, (2014), p. 45; Morris, I., *Foragers, Farmers and Fossil Fuels*, (2015) etc.
[85] Harari, Y. N., *Sapiens*, (2014), p. 45; see also Morris, I., *Foragers, Farmers and Fossil Fuels*, (2015), pp. 25 – 43; Diamond, J., *Guns, Germs and Steel*, (2017), pp. 31 – 50 etc.
[86] Overy, R. (Ed.), *The Times Complete History of the World*, (2015), pp. 29 – 47; *Planetary Boundaries: Exploring the Safe Operating Space for Humanity*, Ecology and Society 14 (2), (2009); *Planetary Boundaries: Guiding Human Development on a Changing Planet*, Science 6223 (347), (2015); Hansen, J., *Storms of my Grandchildren*, (2011), pp. 38 – 40, 45 – 46, 50, 84 – 85, 141, 143 etc.

This profound impact of the agricultural revolution is widely recognised by historians. In his classic work *Guns, Germs and Steel*, the scientist and historian Jared Diamond traces the huge long-term impact of early agricultural development on the history of nations. As he says in the 2017 twentieth anniversary edition of the book, ***"let's go back 13,000 years in human history, to the end of the last Ice Age. At that time, all humans in the world were living as hunter-gatherers, and not yet as farmers or herders. All hunter-gatherers have relatively simple political and economic and social institutions, compared to modern populous state-level societies like the United States … How did all these complex institutions arise in the last 13,000 years? Studies of history and archaeology and other sciences show that their development depended ultimately on the development of the densely populated sedentary societies with storable food surpluses (e.g., of wheat and cheese and potatoes) made possible by agriculture. That is, the most-ultimate cause of complex institutions is agriculture, and the next-ultimate cause is the densely populated sedentary societies and storable food surpluses resulting from agriculture. Food surpluses can be used to feed non-food producing specialists such as kings, bankers, book authors, and professors. Hence agriculture was a prerequisite for the development of all of the complex institutions of modern societies: advanced chiefdoms and states; bureaucracy; centralized government; educated literate citizens; investors; kings; a market economy; merchants; metal tools; national loyalty instead of just clan loyalty; rule by government-administered law; universities; and writing."*** [87]

With this first great leap forward, therefore, the pace of technological and social change increased dramatically. However, in the thousands of years since the invention of agriculture, nations and empires have been born, risen and fallen, and faiths have come and gone. But lying behind all the surface stuff of history, the new fundamental dynamic of the majority of the population living in rural villages and working on the land, ruled over by aristocracies, once established, remained unchanged. And as we have seen, in all this time, for the vast majority of history, humanity lived in balance with creation. Certainly humans had an impact on the natural environment, possibly contributing to the extinction through hunting of several large mammal species during the hunter gatherer period, and clearing extensive forest and wild lands to convert for farming since the agricultural revolution.[88] In some societies, humans out consumed their natural resource base entirely, resulting in dramatic collapses of those civilisations.[89] However overall, humans lived well within natural planetary boundaries, and the environment was broadly healthy.

That was until the second great leap forward began some 250 years ago: the industrial revolution. The invention of a number of new machines (often powered by coal) and vastly improved agricultural and manufacturing processes, hugely boosted productivity, creating vast surpluses for sale and generating wealth. Far fewer people were needed to produce food through agriculture, releasing a huge labour force which moved to the cities and found work in the new factories. Once again, this revolution accelerated the pace of change and brought about a host of new technologies and social innovations which began to fundamentally change the

[87] Diamond, J., *Guns, Germs and Steel*, (2017), pp. 507 – 508, but also see the whole book; Morris, I., *Foragers, Farmers and Fossil Fuels*, (2015), pp. xiv – xv, xix, 4 – 5, 10 – 24, 44 – 92, 140, 142 – 157, 170; Overy, R. (Ed.), *The Times Complete History of the World*, (2015), pp. 29 – 47, 53 – 75, 363, 365 etc.
[88] Juniper, T., *What has Nature ever done for us*?, (2013), pp. 82, 149 – 150; Lynas, M., *The God Species*, (2012), pp. 33 – 37; *Ecosystems and Human Well-Being: Overall Synthesis Report of the Millennium Ecosystems Assessment*, Millennium Ecosystems Assessment, (2005), p. 26; Kolbert, E., *The Sixth Extinction*, (2014), pp. 224 – 238; Berners-Lee, M. & Clark, D., *The Burning Question*, (2013), p. 7 etc.
[89] Diamond, J., *Collapse*, (2006); Lynas, M., *Six Degrees*, (2008), pp. 3 – 6, 131 – 135, 174 – 175; Kolbert, E., *Field Notes from a Catastrophe*, (2015), pp. 93 – 99, 117 – 121 etc.

norms of human society, just as the agricultural revolution had done. Steam power, heavy industry, chemicals, fossil fuel industries, plastics, computers, the 'green revolution' in agriculture in Africa and Asia in the 1960s, and much more all followed.

Socially, societies shifted from feudalism where the vast majority lived in rural villages as subsistence farmers and almost all wealth was bound up in the land, to a world where the majority moved to the cities and began to work, first in industry and manufacturing, and more recently, services and the knowledge economy. This created a vast expansion of the role of markets and the private sector and our modern market economy. Historians and economists stress the importance of the critical turning point of the industrial revolution. To take just one example, in his book *The Age of Sustainable Development*, the economist and adviser to the United Nations Jeffrey Sachs describes this as, ***"the story of the era of modern economic growth, the period since the start of the Industrial Revolution. It is only in this period that some parts of the world experienced sustained increases in gross domestic product (GDP) per person over long stretches and thereby transformed themselves from rural to urban, from peasant agriculture to high-yield agriculture, and from cottage industry (e.g., spinning and weaving) to modern industry and by now to a modern high-tech, knowledge-intensive industrial and service economy."*** … ***"The economic development that started as a local phenomenon in England and then spread across into western Europe and the other temperate-zone nations had finally spread to Japan by the late nineteenth century, and to the postcolonial world after World War II. By now, the ripples of modern economic growth have reached almost the entire planet."*** [90]

Booming economies resulted in the emergence of an educated and empowered middle class: merchants, businessmen, lawyers, students, journalists etc. They in turn demanded greater political rights and freedoms, and reduced corruption. This resulted in better governance, expansion of democracy, reduction in corruption and improvements in human rights. They also demanded better healthcare, education and social protection for the unemployed, elderly and incapacitated. As the political scientist Francis Fukuyama wrote in his work *Political Order and Political Decay*, ***"We live today in a world of globalized and expanding democracy due to the profound changes set in train by the Industrial Revolution. It set off explosive economic growth that dramatically changed the nature of societies by mobilizing new classes of people – the bourgeoisie or middle-class, and the new industrial working class. As they became self-conscious as groups with common interests, they started to organize themselves politically and demand the right to participate in the political system … Democracy in the developed world became secure and stable as industrialization produced middle-class societies" … "Middle-class groups were the primary leaders of the democratic transitions that took place in Denmark, Greece, France, Argentina, Portugal, and Spain in the nineteenth century, and were important parts of the coalitions that pressed for full democratization in Finland, Sweden, the Netherlands, Belgium, Germany, and Britain in the early twentieth."***

Similarly, the late Robert Dahl, one of the world's foremost experts on democracy, described the gradual spread of democracy over the last couple of centuries in his work *On Democracy*, ***"The institutions of market-capitalism were spread to one country after another. Market-capitalism not only resulted in higher economic growth and well-being but also fundamentally altered a country's society by creating a large and influential middle class***

[90] Sachs, J., *The Age of Sustainable Development*, (2015), pp. 71 – 72, 99, see also pp. 9 – 10, 18 – 23, 51 – 55, 67 – 102, 355 – 366; Morris, I., *Why the West Rules – For Now*, (2011), pp. 11 – 12, 39 – 40, 145, 160 – 161, 490 – 554, 564 – 565; Landes, D., *The Wealth and Poverty of Nations*, (1998), pp. xvii – xx, 168 – 524 etc.

sympathetic to democratic ideas and institutions … by cutting acute poverty and improving living standards, economic growth helps to reduce social and political conflicts … Growth also provides individuals, groups, and governments with surplus resources to support education and thus to foster a literate and educated citizenry. Market-capitalism is also favorable to democracy because of its social and political consequences. It creates a large middling stratum of property owners who typically seek education, autonomy, personal freedom, property rights, the rule of law, and participation in government. The middle classes, as Aristotle was the first to point out, are the natural allies of democratic ideas and institutions."

Figure 1.42: The industrial revolution was the second great leap forward in human social and technological change. The changes it unleashed led to the welfare state, reduced poverty, greater democracy and our modern world.

Or as the development economist Paul Collier writes in his book *Wars, Guns and Votes*, ***"The states of the mid-nineteenth century were run by the rich, and their priority was national security. The road from there to the present is paved with political protest from the excluded. Gradually, little by little, to avoid worse the rich expanded the franchise. This enabled them credibly to commit redistributive reforms that became irreversible without being so drastic that the economy was damaged. Nations inched towards democracy, and as they did so the priorities of government inched towards the priorities of ordinary citizens – the supply of public goods such as health and education instead of simply defense. Gradually the state became captured by the interest of ordinary citizens: we have arrived at the modern liberal democracy."*** [91]

[91] Fukuyama, F., *Political Order and Political Decay*, (2015), pp. 34, 406, but also see the whole book; Dahl, R. A., *On Democracy*, (2015), pp. 164, 167 – 168, see also pp. 166, 169 – 172, 178; Collier, P., *Wars, Guns and Votes*, (2009), pp. 175 – 176, see also pp. 154, 172, 174; see also Marr, A., *A History of the World*, (2013), pp.

So, we see that this process of change has transformed the role of the state. Prior to the industrial revolution, the traditional function of the state was to provide national defence, and law and order alone, funded by an average tax intake of well under 10% of gross national income. After the industrial revolution and the social changes it unleashed, the modern social state of all the world's developed nations today, provides not only national defence and law and order, but also healthcare, education and social support for their populations, funded by a tax intake of anywhere between 30 – 55% of gross national income, thus driving down extreme poverty.

The French economist Thomas Piketty sets this out in detail in his book *Capital in the Twenty-First Century*, when reviewing the economic and social history of Sweden, France, Britain and America as symptomatic of a wider pattern, ***"taxes consumed less that 10 percent of national income in all four countries during the nineteenth century and up to World War I. This reflects the fact that the state at that time had very little involvement in economic and social life. With 7 – 8 percent of national income, it is possible for a government to fulfil its central 'regalian' functions (police, courts, army, foreign affairs, general administration, etc.) but not much more."*** However, ***"Between 1920 and 1980, the share of national income that the wealthy countries chose to devote to social spending increased considerably. In just over half a century, the share of taxes in national income increased by a factor of at least 3 or 4 (and in the Nordic countries more than 5). Between 1980 and 2010 however, the tax share stabilized everywhere. This stabilization took place at different levels in each country, however: just over 30 percent of national income in the United States, around 40 percent in Britain, and between 45 and 55 percent on the European continent".*** Piketty then goes on to ***"detail what this historic increase in government tax revenues was used for: the construction of a 'social state.' In the nineteenth century, governments were content to fulfil their 'regalian' missions. Today those same functions command a little less than one-tenth of national income. The growing tax bite enabled governments to take on ever broader social functions, which now consume between a quarter and a third of national income, depending on the country. This can be broken down initially into two roughly equal halves: one half goes to health and education, the other to replacement incomes [pensions and unemployment compensation] and transfer payments [family allowances, guaranteed income, etc.]. Spending on education and health consumes 10 – 15 percent of national income in all the developed countries today … Replacement incomes and transfer payments generally consume 10 – 15 (or even 20) percent of national income in most rich countries today."***

Or as the historian Roger Osborne put it in his book *Of the People, By the People*, ***"Nineteenth-century liberals believed in free trade unfettered by government interference, a free hand for the hard-working middle class to prosper and to govern their country and their towns, and some help for the deserving poor. But this attitude could not hold. The infrastructure of society – the armed forces, education, highways, public sanitation, police forces and prisons – all had to be paid for. Tax on income, anathema to the liberal philosophy which saw it as a penalty for hard work, was introduced or made permanent across Europe and in the United States. The state now became not only the guardian of national security and the manager of the economy, but the guarantor of citizens' rights and the provider of education, health and pensions."*** [92]

300 – 306, 310, 313 – 317, 337 – 340, 344 – 346, 364, 394 – 400, 402 – 407, 549; Watson, A., *The Evolution of International Society*, (1992), pp. 192, 229 – 230, 240 – 241, 247, 249 etc.

[92] Piketty, T., *Capital in the Twenty-First Century*, (2013), pp. 475 – 477, see also pp. 471 – 534, 542; Osborne, R., *Of the People, By the People*, (2011), p. 180; see also Morris, I., *Foragers, Farmers and Fossil Fuels*, (2015),

Given this background, and all the positive change over the last 200 years, it is worrying to observe the levels of people without access to food begin to increase again in recent years. It is also disturbing to see the levels of inequality in developed nations in North America, Europe and Asia beginning to grow again from the early 1980s, as a result of policy changes made by elites. This threatens to unravel much of the progress we have seen in reducing poverty, inequality and social injustice. We must learn the lessons of our history, and not risk losing the progress that has been so hard fought to be gained.

Nevertheless, overall we are still living through this second great leap forward today. That is what most of the development trends we have considered in this section are showing us. What we call 'development' today, is really the continuing roll out of the industrial revolution around the world, and all the associated accelerated technological and social changes it brings with it. As we have seen, some parts of the world are the furthest down this road (where the industrial revolution began in Europe and North America), others are catching up rapidly (in Latin America and the Caribbean and Asia), and some are furthest behind (in Africa), but all are on that same journey. It is the story we have all been living through. As the economic historians Roger Findlay and Kevin O'Rourke put it in their *Power and Plenty*: ***"the economic history of the past two centuries can, as already noted, be viewed as the working out of the consequences of the Industrial Revolution: a 'Great Divergence' in income levels between regions, as the new technologies diffused only gradually across the globe; a 'Great Specialization' between an industrial core and a primary-producing periphery; consequent pressures to protect agriculture in the core, and manufacturing in the periphery; and, finally, a gradual unwinding of these trends as the Industrial Revolution spread to encompass an ever-increasing proportion of the globe. Indeed, we are still experiencing these entirely predictable consequences of events which took place in northern England two centuries ago."*** [93]

However, as we have seen, this story of great progress in development and the reduction of poverty has a terrible flip side. The tragic irony of our times is that the same process of industrialisation and economic development which has led to so much positive change is also driven by high consumption of fossil fuels, the mass expansion of industrial and agricultural processes using polluting chemicals, and an economic model which gobbles up natural resources far faster than the earth can replenish them through natural processes. This same process of development has also boosted food production and health resulting in a dramatic increase in the global population, which risks creating further pressures. As a result, we are facing environmental crisis across most of the planetary boundaries.

Greenhouse gas emissions are soaring, leading to dangerous climate change, set to become catastrophic in the years ahead. The latest assessment report by the Intergovernmental Panel on Climate Change, the most authoritative scientific body on climate change in the world, emphasises this at great length, reviewing a mountain of data and evidence to conclude unequivocally, ***"Widespread, pervasive impacts to ecosystems, people, settlements, and***

pp. 110 – 115; Kenny, C., *Getting Better*, (2012), pp. 12, 146 – 147; Castles, F., Leibfried, S., Lewis, J., Obinger, H. & Pierson, C. (Eds.), *The Oxford Handbook of the Welfare State*, (2010); Atkinson, A., *Inequality*, (2015), pp. 57 – 58, 60, 65 – 68, 74 – 80, 86, 100 – 101, 122, 169 – 172, 205 – 231, 252 – 258, 264 – 266, 290 – 299, 302 – 307; Green, D., *From Poverty to Power*, (2012), pp. 11 – 13, 17 – 20, 34 – 42, 73, 75, 78, 145, 148, 153, 173 – 181 etc.

[93] Findlay, R. & O'Rourke, K., *Power and Plenty*, (2009), p. xxiii, see also pp. xix – xx, xxiii, 311 – 546; Overy, R. (Ed.), *The Times Complete History of the World*, (2015), pp. 168, 202 – 203, 220 – 223, 231 – 235, 242 – 243, 268 – 269, 276 – 277, 283, 308 – 309, 314 – 315, 332 – 335, 340 – 341, 354 – 355, 360 – 361, 363, 366; Acemoglu, D. & Robinson, J., *Why Nations Fail*, (2013) etc.

infrastructure have resulted from observed increases in the frequency and intensity of climate and weather extremes, including hot extremes on land and in the ocean, heavy precipitation events, drought and fire weather" … "These include increased heat-related human mortality, warm-water coral bleaching and mortality, and increased drought-related tree mortality" … "Adverse impacts from tropical cyclones, with related losses and damages, have increased due to sea level rise and the increase in heavy precipitation. Impacts in natural and human systems from slow-onset processes such as ocean acidification, sea level rise or regional decreases in precipitation have also been attributed to human induced climate change" … "Climate change has caused substantial damages, and increasingly irreversible losses, in terrestrial, freshwater and coastal and open ocean marine ecosystems" … "Hundreds of local losses of species have been driven by increases in the magnitude of heat extremes, as well as mass mortality events on land and in the ocean" Climate change is also resulting in ***"the retreat of glaciers"*** and ***"permafrost thaw"***. ***"Increasing weather and climate extreme events have exposed millions of people to acute food insecurity and reduced water security, with the largest impacts observed in many locations and/or communities in Africa, Asia, Central and South America, Small Islands and the Arctic" … "Climate change has adversely affected physical health of people globally" … "The occurrence of climate-related food-borne and water-borne diseases has increased" … "Increased exposure to wildfire smoke, atmospheric dust, and aeroallergens have been associated with climate-sensitive cardiovascular and respiratory distress. Health services have been disrupted by extreme events such as floods" … "Hot extremes including heatwaves have intensified in cities, where they have also aggravated air pollution events and limited functioning of key infrastructure. Observed impacts are concentrated amongst the economically and socially marginalized urban residents" … "Infrastructure, including transportation, water, sanitation and energy systems have been compromised by extreme and slow-onset events" … "Economic damages from climate change have been detected in climate-exposed sectors, with regional effects to agriculture, forestry, fishery, energy, and tourism, and through outdoor labour productivity" … "Climate change is contributing to humanitarian crises where climate hazards interact with high vulnerability. Climate and weather extremes are increasingly driving displacement in all regions"***.

Similarly, a joint review by another leading scientific global body on climate change, the World Meteorological Organization, and the World Health Organization, the world's leading health body, *Atlas of Health and Climate*, reports, ***"Human health is profoundly affected by weather and climate. Extreme weather events kill tens of thousands of people every year and undermine the physical and psychological health of millions. Droughts directly affect nutrition and the incidence of diseases associated with malnutrition. Floods and cyclones can trigger outbreaks of infectious diseases and damage hospitals and other health infrastructure, overwhelming health services just when they are needed most. Climate variability also has important consequences for health. It influences diseases such as diarrhoea and malaria, which kill millions annually and cause illness and suffering for hundreds of millions more. Long-term climate change threatens to exacerbate today's problems while undermining tomorrow's health systems, infrastructure, social protection systems, and supplies of food, water, and other ecosystem products and services that are vital for human health. While the impact of climate change on health is felt globally, different countries experience these impacts to different degrees. Evidence shows that the most severe adverse effects tend to strike the poorest and most vulnerable populations."***

Figure 1.43: Climate change is leading to more extreme floods, droughts, storms, heatwaves, wildfires, sea-level rise, the growth of deserts and numerous other changes, all of which impact the poorest hardest.

Yet another key report from the London-based Royal Society, one of the world's oldest and most authoritative scientific institutions, stresses, ***"Global warming of just a few degrees will be associated with widespread changes in regional and local temperature and precipitation as well as with increases in some types of extreme weather events. These and other changes (such as sea level rise and storm surge) will have serious impacts on human societies and the natural world. Both theory and direct observations have confirmed that global warming is associated with greater warming over land than oceans, moistening of the atmosphere, shifts in regional precipitation patterns and increases in extreme weather events, ocean acidification, melting glaciers, and rising sea levels (which increases the risk of coastal inundation and storm surge). Already, record high temperatures are on average significantly outpacing record low temperatures, wet areas are becoming wetter as dry areas are becoming drier, heavy rainstorms have become heavier, and snowpacks (an important source of freshwater for many regions) are decreasing. These impacts are expected to increase with greater warming and will threaten food production, freshwater supplies, coastal infrastructure, and especially the welfare of the huge population currently living in low-lying areas."*** [94] We also now face the danger of runaway climate change, as global

[94] *Climate Change 2022, Impacts, Adaptation and Vulnerability, Working Group 2, Sixth Assessment Report, Summary for Policy Makers*, IPCC, (2022), pp. 11 – 13, see also pp. 14 – 21; *Atlas of Health and Climate*, World Meteorological Organization & World Health Organization, (2012), p. 4, but also see the whole report; *Climate Change: Evidence and Causes*, The Royal Society, (2014), p. 19, but also see the whole report; *Climate Change 2021, The Physical Science Basis, Working Group 1, Sixth Assessment Report, Summary for Policy Makers*, IPCC,

warming triggers certain tipping points. For example, the release of tens of millions of tonnes of methane as tundra begins to thaw, or the reduction in the amount of solar light and heat reflected back into space by large surface areas of ice due to melting ice caps. Tipping points like these mean that global climate change starts to happen faster and faster, a vicious downward spiral.[95]

Figure 1.44: Climate change results in more devastating storms and extreme weather events.

As if all of that were not bad enough, global climate change is also already leading to ocean acidification, which scientists overwhelmingly regard as having devastating impacts for all life on earth. In her study of climate change impacts around the world, *Field Notes from a Catastrophe*, the journalist Elizabeth Kolbert writes, ***"Owing to the extra CO2 that's been added to the seas so far, the oceans are now about 30 percent more acidic than they were at the start of the Industrial Revolution. If current trends continue, by the end of this century they will be 150 percent more acidic. This is a huge change in what amounts to a geological instant, and it's anticipated that it will have drastic consequences, though what, exactly, those consequences will be is difficult to predict. (Ocean acidification is associated with some of the worst crises in the history of life, including the end-Permian extinction, 250 million year ago, which killed off something like 90 percent of all species then on the planet.) Ocean acidification is apt to change the makeup of microbial communities, which in turn,***

(2021), pp. 5 – 6, 9 – 14, 17 – 36, 39 – 41; *Global Warming of 1.5^{0}C, Summary for Policy Makers*, IPCC, (2018); *Climate Change and Land, Summary for Policy Makers*, IPCC, (2020); *The Ocean and Cryosphere in a Changing Climate, Summary for Policy Makers*, IPCC, (2019); Kolbert, E., *Field Notes from a Catastrophe*, (2015); Lynas, M., *High Tide*, (2005) etc.

[95] Hansen, J., *Storms of my Grandchildren*, (2011), pp. ix, 42 – 43, 50, 72, 81 – 89, 120, 142 – 144, 250 – 260, 274 – 276; Lynas, M., *Six Degrees*, (2008), pp. 23 – 28, 115 – 121, 186 – 190, 197 – 206, 229, 246, 250 – 252; Houghton, J., *Global Warming, The Complete Briefing, Fifth Edition*, (2015), pp. 45 – 46, 106 – 116, 195, 208 – 209, 278 etc.

will alter the availability of crucial nutrients, like nitrogen and iron. It will change the way light passes through the water, and also sound. (It's expected the seas will become noisier.) Perhaps most significantly, it is going to make life more difficult for organisms like clams, oysters, and starfish that construct shells or external skeleton out of the mineral calcium carbonate. One group that appears particularly sensitive to changes in water chemistry is stony corals. Thus, a world of unchecked ocean acidification will also, most likely, be a world without coral reefs. 'The potential consequences of such acidification are nothing less than catastrophic,' J.E.N. Vernon, the former chief scientist of the Australian Institute of Marine Science, has written." [96]

In addition to climate change and ocean acidification, we are also driving plants and animals to extinction and destroying the world's biodiversity at a terrifying rate, not only devastating God's beautiful creation, but dangerously degrading the complex and finely balanced ecosystems on which all life, including humanity, depends. The *Millennium Ecosystems Assessment*, one of the most comprehensive and wide ranging studies ever produced into the state of the natural environment involving the top environmental scientists from around the world, reached this stark conclusion, ***"Over the past few hundred years, humans have increased the species extinction rate by as much as 1,000 times background rates typical over the planet's history. Extinction is a natural part of Earth's history. Most estimates of the total number of species today lie between 5 million and 30 million, although the overall total could be higher than 30 million if poorly known groups such as deep-sea organisms, fungi, and microorganisms including parasites have more species than currently estimated. Species present today only represent 2 – 4% of all species that have ever lived. The fossil record appears to be punctuated by five major mass extinctions, the most recent of which occurred 65 million years ago. The average rate of extinction found for marine and mammal fossil species (excluding extinctions that occurred in the five major mass extinctions) is approximately 0.1 – 1 extinctions per million species per year. There are approximately 100 documented extinctions of birds, mammal, and amphibians over the past 100 years, a rate 50 – 500 times higher than background rates. Including possibly extinct species, the rate is more than 1,000 times higher than background rates."*** [97]

As part of this process of massive biodiversity loss, overfishing has become a huge scourge. A 2015 report from the World Wildlife Fund and the Zoological Society of London, *Living Blue Planet*, surveyed a mountain of data on the state of the world's fish. The findings are shocking, ***"Today, the world's fish stocks are under considerable pressure, with 29 per cent classified as overfished and a further 61 per cent as fully exploited, with no ability to produce greater harvests (FAO 2014b). This is a big problem for future global food security. Overfishing not only affects the balance and interaction of life in the ocean, but also the social and economic well-being of the coastal communities that depend on fish for their way of life … As a result of this growing pressure, the number of fish stocks that are overfished and fully fished has increased, while less than 10 per cent of fisheries have any capacity for***

[96] Kolbert, E., *Field Notes from a Catastrophe*, (2015), pp. 202 – 203, see also pp. 210 – 235, 256; *Global Environmental Outlook 6: Summary for Policy Makers*, UN Environment Programme, (2019), pp. 7, 9 – 10, 19; Juniper, T., *What has Nature ever done for us*?, (2013), pp. 207 – 211, 218 – 219 etc.

[97] *Ecosystems and Human Well-Being: Overall Synthesis Report of the Millennium Ecosystems Assessment*, Millennium Ecosystems Assessment, (2005), p. 36, but also see the whole report; see also Kolbert, E., *The Sixth Extinction*, (2014); *Living Beyond Our Means: Statement from the Board of the Millennium Ecosystems Assessment*, Millennium Ecosystems Assessment, (2005); *Living Planet Report*, World Wildlife Fund & Zoological Society of London, (bi-annual flagship report) etc.

expansion." [98] Also on land, over hunting is having devastating impacts.[99] As is the human assisted spread of 'invasive species'.[100]

Figure 1.45: Pollution from agricultural and industrial processes is poisoning land and water, resulting in devastating impacts on God's creation.

Pollution too is rampant; more data piles up every year from academics and international organisations indicating just how bad this has become. A lot of this was brought together by the UN Environment Programme in a major study *Towards a Pollution Free Planet* which concluded, ***"Pollution today is pervasive and persistent. While the world has achieved significant economic growth over the past few decades, it has been accompanied by large amounts of pollution, with significant impacts on human health and ecosystems and the ways in which some of the major Earth system processes, such as the climate, are functioning. Though some forms of pollution have been reduced as technologies and management strategies have advanced, approximately 19 million premature deaths are estimated to occur annually as a result of the way societies use natural resources and impact the environment to support production and consumption."*** The report went on to find that ***"Pollution can have negative impacts and disproportionate burdens on women and men, and***

[98] *Living Blue Planet*, WWF & ZSL, (2015), p. 26, but also see the whole report; *Keeping Track of our Changing Environment*, UN Environment Programme, (2011), pp. 69 – 72; Collier, P., *The Plundered Planet*, (2010), pp. 153 – 171 etc.

[99] *The IUCN Red List of Threatened Species*, International Union for the Conservation of Nature, (2015), pp. 14 – 17; Diamond, J., *Collapse*, (2006), pp. 6 – 7, 487 – 488; *Ecosystems and Human Well-Being: Overall Synthesis Report of the Millennium Ecosystems Assessment*, Millennium Ecosystems Assessment, (2005), pp. 12, 91 etc.

[100] *Living Beyond Our Means: Statement from the Board of the Millennium Ecosystems Assessment*, Millennium Ecosystems Assessment, (2005), pp. 12 – 13; *Ecosystems and Human Well-Being: Overall Synthesis Report of the Millennium Ecosystems Assessment*, Millennium Ecosystems Assessment, (2005), pp. 12 – 18, 57 – 58, 67 – 69, 90 – 91; Kolbert, E., *The Sixth Extinction*, (2014), pp. 104 – 107, 193 – 216, 263; *The Future We Want*, UN General Assembly, (2012), p. 31 etc.

particularly on the poor and the vulnerable such as the elderly, children and the disabled, affecting their rights to health, water, food, life, housing and development. Many toxic dumpsites are located in poor areas, leading to environmental injustice. Pollution has significant economic costs from the point of view of health, productivity losses, health-care costs and ecosystem damages. These costs, already substantial, are expected to rise over time, not only because of the direct effect of pollution on health, but also the impact of weakened livelihoods, as well as the longer-term impact on ecosystem services, that in turn affect local communities, societies and economies … Pollution poses a direct threat to respecting, protecting and promoting human rights and gender equality, international human rights obligations related to health, life, food and water, safeguarding a healthy and sustainable environment for present and future generations". [101]

Humanity also now produces vast amounts of waste every day that litters, destroys and degrades the natural world. Many of the worst impacts are in the poorest countries where the infrastructure to process and manage waste is often weak or non-existent. The Christian relief and development organisation Tearfund explains in a key report on the issue, ***"Mountains of waste are harming some of the most vulnerable communities in both low-income and middle-income countries. Informal settlements are often choked with waste, and frequently grow up around dump sites due to a lack of alternatives. People in these settlements are already living in poverty, and air, soil and water pollution resulting from the waste that surrounds them increases their risk of disease and sometimes death. This problem is driven by the way that waste and resources are currently managed. At present many products (and their packaging) are made to be used for only a short time and then discarded. When they are thrown away they waste valuable resources and harm people's health, the planet and future generations. Around nine million people die every year of diseases linked to the mismanagement of waste and pollutants. That is six times as many as die from AIDS-related illnesses, and 20 times more than die from malaria each year."*** [102]

Turning to the planetary boundaries of changes in land use and fresh water we find a similar terrifying picture. The journalist and historian Andrew Marr summarises the findings of scientific studies and surveys on water and land use change in the conclusion to his *History of the World*, ***"There are now severe water shortages in many parts of the world, particularly Asia and Africa, as more and more people suck from rivers that grow no larger – or, because of the construction of huge dams, have grown smaller"***, and furthermore ***"across much of the world, the degradation of soils has reached a point where even the intensive use of fertilizer is not improving crop yields. In Africa, food production per head has actually fallen since 1960; in China, about a third of arable land has been abandoned because of erosion."*** [103]

---

[101] *Towards a Pollution Free Planet*, UNEP, (2017), pp. 6 – 7, but also see the whole report; Leonard, A., *The Story of Stuff*, (2010); Klein, N., *This Changes Everything*, (2014), pp. 310 – 315, 324 – 334, 350 – 352, 424 – 434, 439 etc.

[102] *Why Advocate on Waste and a Circular Economy?*, Tearfund, (2017), pp. 4 – 5, see also p. 3; *A New Textiles Economy*, Ellen MacArthur Foundation, (2017), pp. 19 – 21, 31, 36 – 37, 39 – 40, 66 – 68, 91; *The New Plastics Economy*, Ellen MacArthur Foundation, (2017), pp. 6, 11 – 12, 18, 20 – 23, 27, 29, 35; Trentmann, F., *Empire of Things*, (2016), pp. 622 – 675 etc.

[103] Marr, A., *A History of the World*, (2013), pp. 560 – 561, see also pp. 474, 562 – 563; *Global Environmental Outlook 6: Summary for Policy Makers*, UNEP, (2019), pp. 4, 6, 8 – 9, 12 – 13, 16, 19 – 20; *Ecosystems and Human Well-Being: Overall Synthesis Report of the Millennium Ecosystems Assessment*, Millennium Ecosystems Assessment, (2005); *Living Beyond Our Means: Statement from the Board of the Millennium Ecosystems Assessment*, Millennium Ecosystems Assessment, (2005) etc.

Figure 1.46: Humanity now produces vast amounts of waste every day that litters, destroys and degrades the natural world. Many of the worst impacts are in the poorest countries where the infrastructure to process and manage waste is often weak or non-existent.

Similarly, deforestation, especially of the world's ancient and biodiverse rainforests is continuing, with major consequences for the environment and human health. A study from the London-based international affairs think tank Chatham House, *Ending Global Deforestation* found ***"Worldwide, more than 1.6 billion people – almost a quarter of the global population – depend on forests for at least part of their livelihoods, including for fuelwood, foodstuffs and medicinal plants. The exploitation of forests, along with other natural resources, contributes to development, but in many countries forest-management practices are clearly unsustainable, taking place at the expense of biodiversity and the natural regulation of water and climate, and undermining subsistence support and cultural values for some communities. In some countries, armed conflict has been funded by revenues from timber sales. Between 12 and 15 per cent of global greenhouse gas emissions is estimated to derive from deforestation" … "in Latin America commercial agriculture, including livestock, was the most important direct driver of deforestation, contributing around two-thirds of total deforestation. In Africa and sub-tropical Asia, commercial agriculture and subsistence agriculture accounted for around one-third of deforestation each. Mining and infrastructure development both played larger roles in Africa and Asia than in Latin America; mining accounting for about 10 per cent of deforestation in Africa and infrastructure for about 10 per cent in Africa and Asia. Urban expansion was most significant in Asia, accounting for another 10 per cent of the total, probably owing to large population growth. For forest degradation … timber and logging activities accounted for***

more than 70 per cent in Latin America and Asia, whereas fuelwood collection and charcoal production were the main drivers for Africa." [104]

Figure 1.47: Deforestation of the world's ancient and biodiverse rainforests is continuing, with major consequences for the environment and human health.

In general, the trends considered above have been driven by an enormous increase in human consumption placing unsustainable pressure on the planet's natural boundaries. As the economist Professor Tim Jackson says in his book *Prosperity Without Growth*, ***"The material profligacy of consumer society is depleting key natural resources and placing unsustainable burdens on the planet's ecosystems. Establishing clear resource and environmental limits is vital. Integrating these limits into both economic structure and social functioning is essential … to proceed as though limits were irrelevant to human endeavour is to invite disaster."*** [105]

We are witnessing the flip side of the great progress we have seen on development over the past 200 years. We have become the victims of our own success. The historian, Ian Mortimer, explains this in his book *Centuries of Change*, ***"The demand side of mankind's exchange with the Earth and the supply side are thus in agreement. The twentieth century was not only when we satisfied more of our needs than ever before but also when we exploited Earth's non-renewable resources at an unprecedented rate. It was therefore unlike any previous period. In socio-economic terms, we are living on a newly discovered planet. The problem***

[104] *Ending Global Deforestation*, Chatham House, (2013); pp. 4 – 5, but also see the whole report; *Global Forest Resources Assessment 2020*, Food and Agriculture Organization, (2020); *Intact Forest Landscapes*, Greenpeace, (2011) etc.

[105] Jackson, T., *Prosperity Without Growth, Second Edition*, (2017), p. 201, but also see the whole book; Meadows, D., Meadows, D. & Randers, J., *Limits to Growth, The 30-Year Update*, (2010); Skidelsky, E. & Skidelsky, R., *How Much is Enough?*, (2013) etc.

is, of course, that we only have one planet, and using up a large proportion of its most useful resources in one century was not particularly clever". Or as another historian of long-term trends, Ian Morris, puts it in his book looking at human development over millennia, *Why the West Rules – For Now*, ***"global warming is perhaps the ultimate example of the paradox of development, because the same fossil fuels that drive the leap in social development since 1800 have also filled the air with carbon, trapping heat."*** The same point is made by yet another historian of historical trends, Yuval Noah Harari, ***"The Industrial Revolution opened up new ways to convert energy and to produce goods, largely liberating humankind from its dependence on the surrounding ecosystem. Humans cut down forests, drained swamps, damned rivers, flooded plains, laid down tens of thousands of kilometres or railroad tracks, and built skyscraping metropolises. As the world was moulded to fit the needs of Homo sapiens, habitats were destroyed and species went extinct. Our once green and blue planet is becoming a concrete and plastic shopping centre."***[106]

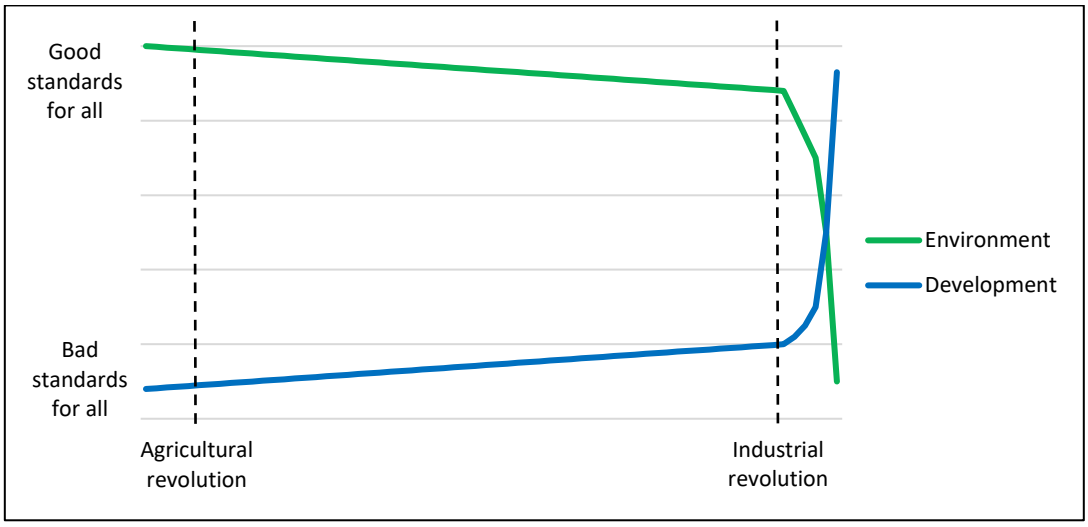

Figure 1.48: The Anthropocene: the 200 years since the industrial revolution have witnessed huge progress in development, but this has come at the price of terrible destruction in the natural environment.

We are now changing our climate and degrading our environment in massive and dangerous ways. We have left the Holocene and entered what scientists have widely termed the 'Anthropocene', the geological era where humanity is the driving force changing the environment and biosphere. As the environmental journalist Mark Lynas puts it in his book exploring Planetary Boundaries, *The God Species*, ***"On a planetary scale, humans now assert unchallenged dominion over all living things. Our collective power already threatens or overwhelms most of the major forces of nature, from the water cycle to the circulation of major elements like nitrogen and carbon through the entire Earth system. Our pollutants have subtly changed the colour of the sky, whilst our release of half a trillion tonnes of carbon as the greenhouse gas CO2 into the air is heating up the atmosphere, land and oceans. We have levelled forests, ploughed up the great grasslands and transformed the continents to serve our demands from sea to shining sea. Our detritus gets everywhere, from the highest mountains to the deepest oceans; abandoned plastic bags drift ghostlike in the unfathomable depths, even kilometres beneath the floating Arctic ice cap. Wherever you***

[106] Mortimer, I., *Centuries of Change*, (2014), p. 322, see also pp. 320 – 325, 328 – 344; Morris, I., *Why the West Rules – For Now*, (2011), pp. 598 – 599, see also pp. 552, 600 – 603; Harari, Y. N., *Sapiens*, (2014), p. 392, see also pp. 392 – 394, 465 – 466 etc.

look, this truth is there to behold: pristine nature – Creation – has disappeared for ever. There is a name for this new geological era. The Holocene – the 10,000-year, climatically equable post-ice age era during which human civilisation evolved and flourished – has slipped into history, to make way for the Anthropocene. For the first time since life began, a single animal is utterly dominant: the ape species Homo sapiens." [107]

In many ways none of this is anyone's fault. For most of the past 200 years humanity simply did not understand the damage we were doing to God's creation. However, now we do understand. So where do we go from here? Well continuing forward with business as usual is not an option. If we continue unchanged along this path we will fall off a cliff. Historically whenever societies have over consumed and polluted their natural resource base they have collapsed. We are now doing this on a global scale. Climate change and environmental degradation is already hitting the poorest, most vulnerable people in our world who did the least to cause it, hardest.[108] Furthermore, if we continue with present levels of consumption, pollution, environmental destruction and climate change we will also face a global collapse as we degrade the natural environment, upon which human economy, society and survival depends, below the point where it can sustain us. This will wipe out all the gains in development made in the last 200 years. It will push all of us back into a grim world of crushing poverty and an environment which can only sustain a much smaller human population. It will trigger significant conflict over diminishing resources in a context almost certainly too poor and conflict ridden to sustain good levels of human rights and democracy.

The Club of Rome, a group of leading environmentalists, economists and academics was one of the first groups to sound the warning of this possibility of global collapse in its famous 1972 report *Limits to Growth*. Thirty years later in a crucial update the authors stressed once again that ***"Collapse is not an attractive future. The rapid decline of population and economy to levels that can be supported by the natural systems of the globe will no doubt be accomplished by failing health, conflict, ecological devastation, and gross inequalities. Uncontrolled collapse in the human footprint will come from rapid increases in mortality and rapid declines in consumption."*** Their concerns are echoed by scientists, academics, politicians, economists and international affairs experts around the world. One such is the scientist and historian Jared Diamond, who in his book *Collapse,* details the historical environmental collapse of various civilizations, before warning that we now face the prospect of a similar catastrophic environmental collapse at a global level. He stresses that ***"Globalization makes it impossible for modern societies to collapse in isolation, as did Easter Island and the Greenland Norse in the past. Any society in turmoil today, no matter how remote – think of Somalia and Afghanistan as examples – can cause trouble for prosperous societies on other***

[107] Lynas, M., *The God Species*, (2012), p. 5, see also pp. 10, 12, 21, 29 – 30, 66, 84, 183, 199; Kolbert, E., *The Sixth Extinction*, (2014), pp. 92 – 110, 265; Sachs, J., *Common Wealth*, (2008), pp. 57 – 81 etc.

[108] *Climate for You*, World Meteorological Organization, (2011); *Climate Change 2022, Impacts, Adaptation and Vulnerability, Working Group 2, Sixth Assessment Report, Summary for Policy Makers*, Intergovernmental Panel on Climate Change, (2022), pp. 11, 14, 16, 28, 35; *Climate Change 2022, Mitigation of Climate Change, Working Group 3, Sixth Assessment Report, Summary for Policy Makers*, Intergovernmental Panel on Climate Change, (2022), pp. 52, 55, *Climate Change and Land, Summary for Policy Makers*, Intergovernmental Panel on Climate Change, (2020), p. 17; *Global Warming of 1.5^{0}C, Summary for Policy Makers*, Intergovernmental Panel on Climate Change, (2018), pp. 9 – 10, 18 – 19; *The Ocean and Cryosphere in a Changing Climate, Summary for Policy Makers*, Intergovernmental Panel on Climate Change, (2019), pp. 16 – 19, 32, 34; *Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation, Summary for Policy Makers*, Intergovernmental Panel on Climate Change, (2012), pp. 5 – 7; Klein, N., *This Changes Everything*, (2014), pp. 23, 40, 47 – 54, 103 – 106, 416 etc.

continents, and is also subject to their influence (whether helpful or destabilizing). For the first time in history, we face the risk of a global decline." [109]

On the other hand, going backwards to a pre-industrial world is not desirable either. As we have seen, that was a world of widespread conflict, poor social justice standards and crushing poverty. God would want us to continue, not undo, the development progress of the past 200 years, far less kick away the ladder and prevent nations that are still developing from enjoying these same benefits. Leading environmentalists agree. As the British scientist and activist Tony Juniper says, ***"we should not romanticise history. Most of the human story was brutal and filled with hazard, from disease and starvation. Life was short and painful and the rise of agriculture and cities is in part a means of escape – a search for comfort, convenience and longevity. And it has worked."*** Similarly, the late Sir John Houghton, the first chair of the Intergovernmental Panel on Climate Change and a devout Christian, adds ***"it is just not practical. The world population is now over six times what it was 200 years ago and about three times that of 50 years ago. The world cannot be adequately fed without farming on a reasonably intensive scale and without modern methods of food distribution … a 'back to nature' viewpoint is neither balanced nor sustainable."*** [110] So is there another way?

A DIFFERENT WAY – A THIRD GREAT 'GREEN ECONOMY' REVOLUTION

Yes, the world needs another great revolution in technological and social development, as significant as the two previous agricultural and industrial revolutions. This time we need a green economy revolution.[111]

So, what might be the key elements of this green economy revolution? Well, first, as we have seen, nations still need to develop modern strong and fair economies, which they can ***tax to provide social spending***, in order to continue to drive down poverty. This is how poverty has been successfully reduced in the past and it is crucial to maintain this for the future. Furthermore, as history indicates, ensuring nations continue to develop as fast as possible is, in turn, critical to slow and stabilise population growth and avoid putting further pressure on all the planetary boundaries. However, it is now essential that we rewire these economies so they are no longer driven by fossil fuels but by renewable ***clean energy***, and to move away from the overconsumption of our current 'extract, use, throw away' linear economic model to an environmentally sustainable ***circular economy***. A green economy revolution will be dependent on these four elements: ***strong and fair economies***, ***tax and social spending***, ***clean energy*** and a ***circular economy*** – our four shifts. Let us unpack each of these key shifts a little more.

---

[109] Meadows, D., Meadows, D. & Randers, J., *Limits to Growth, The 30-Year Update*, (2010), p. xi – xii, but also see the whole book; Diamond, J., *Collapse*, (2006), p. 23, but also see the whole book; Morris, I., *Why the West Rules – For Now*, (2011), pp. 598 – 603, 611 – 613 etc.

[110] Juniper, T., *What has Nature ever done for us*?, (2013), p. 256, see also p. 257; Houghton, J., *Global Warming, The Complete Briefing, Fifth Edition*, (2015), p. 220; see also Collier, P., *The Plundered Planet*, (2010), pp. 8, 16, 212 – 219, 226 etc.

[111] Sachs, J., *The Age of Sustainable Development*, (2015), pp. 2 – 3, 85 – 86, 167, 199, 214 – 217, 481 – 496, 505 – 511; Porritt, J., *Capitalism as if the World Matters*, (2007); *Towards a Green Economy: A Synthesis for Policy Makers*, UN Environment Programme, (2011) etc.

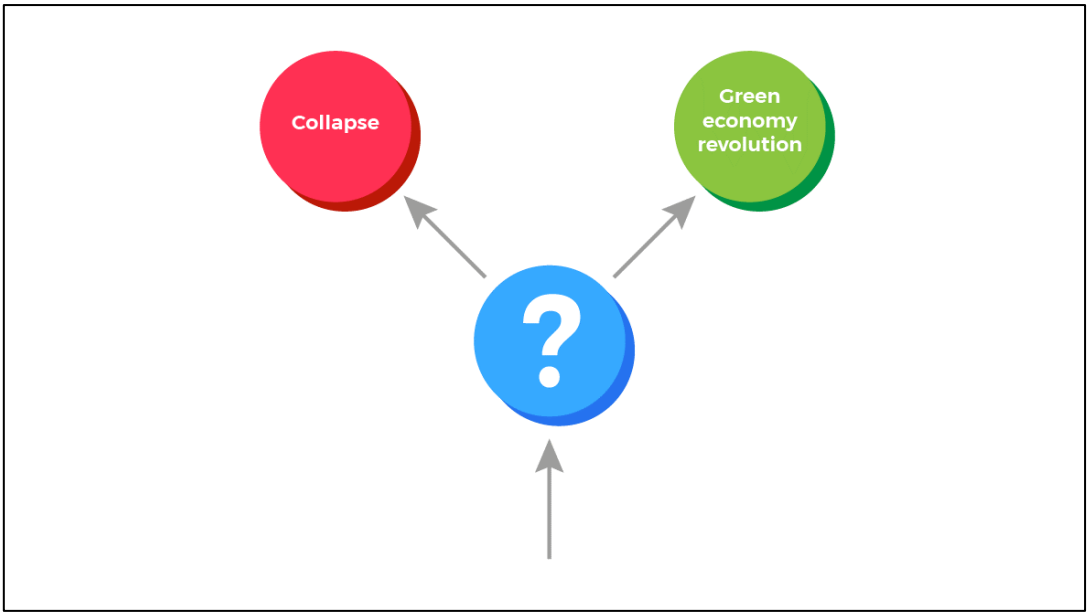

Figure 1.49: The choice before humanity, a global environmental collapse which will undo 200 years of progress on development, or a green economy revolution.

In terms of development, as we have seen, development appears to be a two-stage process. First, nations need to move out of the vast majority of their populations being trapped as poor rural subsistence farmers into the modern world, through building ***strong and fair economies***. That economic development is essential for ending poverty is widely recognised by economists. As the academic and former director of research at the World Bank, Martin Ravallion, concludes after reviewing a mountain of economic data in his work *The Economics of Poverty*, ***"As a rule, measures of absolute poverty tend to fall with positive growth and rise with contractions"***, and ***"the developing countries that have enjoyed higher rates of economic growth have seen faster progress against absolute poverty."*** [112] However, as we have seen, this alone will not reduce poverty for all. The economies of most developed nations took off significantly before extreme poverty in them was eliminated. It was only when booming economies created new middle classes, which began to demand that nations tax those economies in order to prevent obscene levels of inequality and provide basic health, education and social protection (as well as political reform), that the modern 'welfare state' emerged and poverty and inequality were truly reduced. Nations therefore need to secondly ***tax and provide social spending*** to meet basic needs.

This is a key point that the World Bank economist, Charles Kenny, points out in his book *Getting Better;* that one of the major factors behind global development progress of recent decades is precisely ***"the fact that governments are doing a better job at delivering services. Worldwide, countries are far more concerned about improving the quality of life of their citizens than they were a hundred years ago. The most corrupt and inefficient of countries in Africa are still providing services of a quality and extent far in advance of any country in the world prior to the Industrial Revolution" … "In 1788, government revenues as a percentage of GDP in the United Kingdom were around 12 percent – almost certainly one of the highest rates in the world. Today, government revenues are closer to 45 percent of GDP in the UK, and this number is hardly out of the ordinary … The world has witnessed***

[112] Ravallion, M., *The Economics of Poverty*, (2016), pp. 443, 434 – 435, see also pp. 379 – 476, 594 – 595; Commission on Growth and Development, *The Growth Report*, (2008), pp. 1, 13 – 15; Easterly, W., *The Elusive Quest for Growth*, (2002), pp. 9 – 10, 13 – 14 etc.

ubiquitous growth and convergence in the size of government, then. A lot of revenue that these governments raise is wasted, but some is spent on providing access to education, public health services, government information, running elections, and (even) protecting rights. This in turn suggests that big government may be a powerful force behind the growth in global quality of life."

Similarly, the Indian economist and Nobel Prize winner, Amartya Sen, in reviewing academic research on the links between economic growth and poverty reduction in his book *Development as Freedom*, finds that ***"the impact of economic growth depends much on how the fruits of economic growth are used"***, and thus ***"utilization of the enhanced economic prosperity to expand the relevant social services, including health care, education and social security"*** is key. Taking this approach, in recent decades ***"many Asian economies – first Japan, and then South Korea, Taiwan, Hong Kong, and Singapore, and later post-reform China and Thailand and other countries in East Asia and Southeast Asia – have done remarkably well in spreading the economic opportunities through an adequately supportive social background, including high levels of literacy, numeracy, and basic education; good general health care; completed land reforms; and so on."*** Similarly, ***"The rapid spread of literacy in the past history of the rich countries of today (both in the West and in Japan and the rest of East Asia) has drawn on the low cost of public education combined with its shared public benefits."*** Finally, the economist Branko Milanovic, in his book *Global Inequality*, rightly stresses the importance of taxation and social spending not only for reducing absolute poverty, but also relative inequality as well, ***"The era of broadly declining inequality – be it through nationalization, expansion of education, agrarian reform, or the welfare state – was a feature of the third quarter of the twentieth century almost worldwide."*** [113]

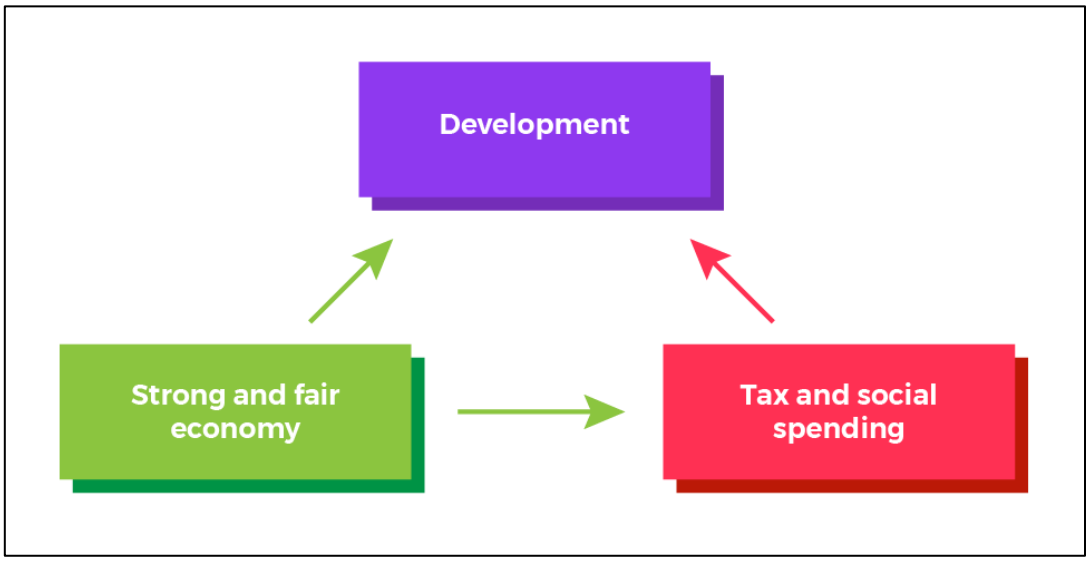

Figure 1.50: Development is driven by creating a strong and fair national economy, which can then be taxed to ensure the basic needs of all are met through social spending.

[113] Kenny, C., *Getting Better*, (2012), pp. 12, 146 – 147, see also pp. 13 – 14, 79 – 83, 116, 120 – 133, 149 – 174, 204; Sen, A., *Development as Freedom*, (2001), pp. 44, 46, 91, 129, see also pp. 43 – 51, 90, 120, 128, 143 – 145, 255, 258; Milanovic, B., *Global Inequality*, (2016), p. 99, see also pp. 53, 70 – 81, 93 – 94, 98 – 109, 113 – 114, 123 – 125, 217; Atkinson, A., *Inequality*, (2015), pp. 57 – 58, 60, 65 – 68, 74 – 80, 86, 100 – 101, 122, 169 – 172, 205 – 231, 252 – 258, 264 – 266, 290 – 299, 302 – 307 etc.

However, as we have seen, in order to be environmentally sustainable in future the economies which drive this development must shift completely away from dependence on activities that damage God's creation. In practice this will mean two things. First, the energy which is essential for driving these economies must shift to become 100% renewable ***clean energy***, not greenhouse gas emitting. As the British economist Nicholas Stern, the lead author of the *Stern Review on the Economics of Climate Change* (the first rigorous analysis of the economic impacts of climate change), says, to avoid the worst impacts of runaway climate change we must reach ***"essentially zero emissions in the second half of this century, zero-carbon electricity by mid-century"***, or indeed much sooner.[114]

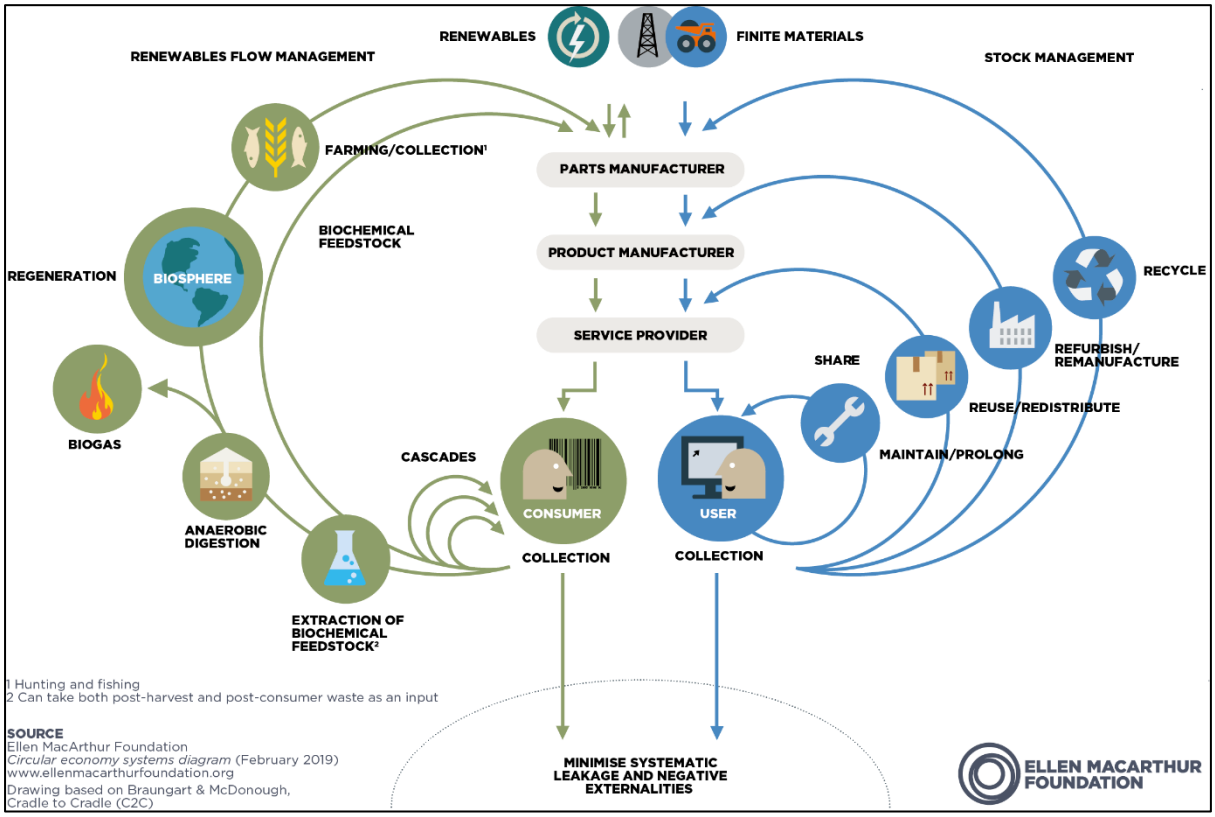

Figure 1.51: The circular economy

Second, rather than continuing to use our current linear economic model which uses polluting methods to extract, consume, and then discard natural resources faster than the planet can replenish them, we must shift to what experts call a ***circular economy***. Just as nothing is wasted in nature but gets broken down and reused in the biosphere, a circular economy would eliminate all pollution, overconsumption and waste and push resources back around the economy in a circular fashion, moving us back into balance with creation as God intended. Specifically, it would ensure that no damaging polluting activity is used in production; that all natural resources are produced in sustainable ways, not taking out more than is put back in; and that waste of all kinds is not discarded, but circulated around the economy as inputs to business. The need to transition to such a circular economy is increasingly widely recognised by

[114] Stern, N., *Why are we Waiting?*, (2016), p. 304, but also see the whole book; *Paris Agreement*, UN Framework Convention on Climate Change, (2015), pp. 4 – 6; *Renewable Energy Sources and Climate Change Mitigation, Summary for Policy Makers and Technical Summary*, Intergovernmental Panel on Climate Change, (2012); *Climate Change and Land, Summary for Policy Makers*, Intergovernmental Panel on Climate Change, (2020), p. 23 etc.

economists, development experts and environmentalists. To take just one example, a report by the UN Environment Programme and other key international agencies, *Green Industrial Policy: Concept, Policies, Country Experiences*, stressed ***"To stay within planetary boundaries, economic growth has to be decoupled from resource use and environmental degradation (Rockström et al. 2009). This can be achieved by a transition from the linear model of economic consumption and production to circular economies in which resources are efficiently used and materials can be reused or recycled at their highest possible value, reducing waste – and keeping the extraction of new resources – to a minimum."*** [115]

A green economy revolution will therefore be dependent on four shifts – to ***strong and fair economies***, ***tax and social spending***, ***clean energy*** and a ***circular economy***. This is the only way in which we can continue to work towards development for all, whilst guaranteeing we remain safely within all the planetary boundaries. It should be stressed that this is not an anti-business approach. Rather it is about phasing down some sectors of the economy whilst phasing up others, creating new businesses, opportunities and jobs, just as economies have always changed and evolved. Indeed, the overwhelming majority of economists and business experts now agree that the green economy revolution will in fact significantly boost businesses and economies and create more jobs and wealth. As another key report from the UN Environment Programme, *Towards a Green Economy*, puts it, ***"Perhaps the most widespread myth is that there is an inescapable trade-off between environmental sustainability and economic progress. There is now substantial evidence that the 'greening' of economies neither inhibits wealth creation nor employment opportunities, and that there are many green sectors which show significant opportunities for investment and related growth in wealth and jobs."*** [116]

So, we can begin to see what will be required for our new global green economy revolution to take shape. It will be dependent on four key economic shifts to ***strong and fair economies***, ***tax and social spending***, ***clean energy*** and a ***circular economy***. But how on earth are we to achieve these shifts? What are the policies and practices that will be required in order to make them happen? We are currently locked in a suicidal economic model, that we seem powerless to change, rapidly leading us towards environmental destruction and global collapse. Even if we have a vision for an alternative future of a green and fair global economy, we seem unable to realise it. What are the specific steps we need to take in order to make these shifts and find our way out of the mess we have made for ourselves?

As Christians, Arise believes we must first go back to basics and consider what the Bible says about how we should engage with poverty, development and the environment. Are there key lessons for us from God's word that are real and relevant for how to run our global economy today, so that it provides for everyone fairly without destroying God's wonderful creation? We should then look at what history can teach us about where nations have got it right with development and the environment in the past. What has worked in the past that we can replicate for the future? In Part 1 of this report we have explored and truly understood the terrible problem the world faces, the prospect of imminent environmental collapse that will undo all the progress in reducing poverty of the past 200 years. We now turn in Parts 2 and 3 to begin

[115] *Green Industrial Policy: Concept, Policies, Country Experiences*, UNEP and various agencies, (2017), p. 121, see also pp. 6 – 7, 120 – 133; *Towards the Circular Economy*, World Economic Forum, (2013); Trentmann, F., *Empire of Things*, (2016), pp. 622 – 675, 682 – 690 etc.
[116] *Towards a Green Economy: A Synthesis for Policy Makers*, UNEP, (2011), pp. 2 – 3, see also pp. 6 – 7, 12 – 13, 33, 38; *Delivering on the Clean Energy Economy*, World Resources Institute, (2012); *Towards a Circular Economy*, Ellen MacArthur Foundation, (2015), pp. 10 – 12 etc.

to chart the solution to that problem, to find the specific steps and policies that will be required to trigger the four shifts we need to transition to a green and fair global economy. An economy that can lift all out of poverty without wrecking the planet.

PART 2: WHERE DO WE NEED TO GO NEXT? – WHAT DOES THE BIBLE SAY?

Having set out the terrible challenge humanity currently faces in Part 1, and the need to rewire our global economy so it can lift all out of poverty without destroying our natural environment, in the rest of this report we now turn to suggest a way forward. We shall consider first what the Bible teaches us and then what we can learn from history, to begin to set out the specific and practical steps to trigger the four shifts we need to transition to a green and fair global economy. Let us start then by looking at the Bible.

DEVELOPMENT

Strong and fair economy

Lead domestically

When God's people first entered the Holy Land over 3000 years ago, God gave them the laws and principles required to run the agriculture-based economy of their day to fairly meet the needs of all, so that there would be ***"no poor people among you".***[117] We find these principles from Leviticus, Numbers and Deuteronomy reaffirmed in other parts of the Bible as well, and there are profound lessons we can draw from them and apply in our world today. First, every human is called to work hard. The primary route out of poverty according to the Bible, and the experience of history, is work. As the book of Proverbs says, ***"Those who work their land will have abundant food … the work of their hands brings them reward"*** and ***"All hard work brings a profit, but mere talk leads only to poverty."*** [118] In modern parlance, nothing is more effective for lifting people out of poverty than a job. This provides the funds individuals need to take care of themselves and their family, and the human dignity of being able to stand on their own feet, rather than being dependent on others.

[117] Deut 15: 4 – 15; Acts 4: 34 – 35

[118] Prov 12: 11, 14, 24, 27; Prov 14: 23, see also Ex 20: 9; Lev 23: 3; Deut 5: 13; Prov 6: 6 – 11; Prov 10: 4 – 5, 26; Prov 13: 4; Prov 15: 19; Prov 18: 9; Prov 20: 4, 13; Col 3: 23; 2 Thess 3: 6 – 15; Titus 3: 14 etc.

Applying this Biblical lesson to our modern world, governments should pursue policies which result in full employment with good jobs available for all their citizens. Crucially, this needs to be balanced against significant periods of holiday, rest and relaxation.[119] Thus, in public policy terms, it is not just important to ensure citizens have jobs, but good jobs with sufficient pay, good protection of employee rights, sensible rather than long working hours, and generous holiday allocation. We see the prophet Jeremiah condemn those who don't pay fair wages, ***"Woe to him who builds his palace by unrighteousness, his upper rooms by injustice, making his own people work for nothing, not paying them for their labour"***, and the book of Deuteronomy ensure working hours for employees are reasonable, ***"the seventh day is a sabbath to the LORD your God. On it you shall not do any work, neither you, nor your son or daughter, nor your male or female servant, nor your ox, your donkey or any of your animals, nor any foreigner residing in your towns, so that your male and female servants may rest, as you do."*** [120] We should all work hard, but work should never be exploitative.

Figure 2.1: The most effective way of lifting people out of poverty is providing jobs with good pay and working conditions. Governments should pursue economic policies that result in full employment.

When the people of God first entered Israel, the land was divided equally amongst them. We read how ***"The land is to be allotted to them as an inheritance based on the number of names. To a larger group give a larger inheritance, and to a smaller group a smaller one; each is to receive its inheritance according to the number of those listed."*** This follows the original situation before the fall – when the world was the way God intended it to be and there was full

[119] Gen 2: 1 – 3; Ex 20: 8 – 11; Ex 23: 12; Lev 23; Num 28: 16 – 29: 39; Deut 5: 12 – 15; Deut 16: 1 – 17; Ezra 6: 19 – 22; Esther 9: 18 – 32; Matt 11: 28 – 30; Mark 6: 31 – 32; Luke 7: 34; John 2: 1 – 11 etc.
[120] Jer 22: 13; Deut 5: 14, see also Ex 23: 12; Lev 19: 13; Lev 25: 53; Deut 24: 14 – 15; Prov 22: 22 – 23; Isa 23; Isa 58: 3; Eze 26 – 28; Hosea 12: 8 – 9; Nahum 3: 16; Mal 3: 5; Matt 10: 10; Luke 10: 7; 1 Tim 5: 18; James 5: 4 etc.

equality between people.[121] Similarly, when Jesus returns to bring his kingdom in full, all will be equal before God once more.[122] Finally, when God first established his new kingdom community through the global church in the New Testament, this also began with radical equality for all, for in the early church in Jerusalem ***"All the believers were together and had everything in common. They sold property and possessions to give to anyone who had need."*** A truly Biblical approach to poverty and economics then, would see an ideal economy of equality for all.[123] However, from this starting ideal of equality in both historical Israel and the early church, there soon emerges some degree of inequality. Interestingly this is not instantly condemned and corrected. We can therefore see that the Bible balances this ideal of equality towards which we should strive, with a practical acceptance that complete equality will not always be possible.[124]

However, when inequality becomes too pronounced and obscene both Old and New Testament give examples of corrective mechanisms to intervene and push the situation back closer to the ideal of equality. Thus, when they entered the Holy Land the Israelites were told to ***"Consecrate the fiftieth year and proclaim liberty throughout the land to all its inhabitants. It shall be a jubilee for you; each of you is to return to your family property and to your own clan … If any of your fellow Israelites become poor and sell themselves to you, do not make them work as slaves. They are to be treated as hired workers or temporary residents among you; they are to work for you until the Year of Jubilee. Then they and their children are to be released, and they will go back to their own clans and to the property of his ancestors."*** Similarly, in the New Testament Paul writes to the Corinthians, ***"Our desire is not that others might be relieved while you are hard pressed, but that there might be equality. At the present time your plenty will supply what they need, so that in turn their plenty will supply what you need. The goal is equality"***.[125]

Throughout both the Old and New Testaments there appears to be a background assumption that from this starting point of full equality, life will go on. There will be buying, selling and trading and this is neither praised nor condemned. Indeed, around the world, markets have emerged naturally in every human society. The Bible appears to accept a generally free market and business activity (capitalism in its broadest sense) neutrally as a fact of life, neither praising nor condemning it. When Jesus described the normality of life – right up to major events in the Old Testament and his own future return in glory – he speaks of how in the everyday way ***"People were eating, drinking, marrying and being given in marriage … buying and selling, planting and building …"*** [126]

---

[121] Gen 1 – 2; Gen 3: 8 – 9, see also John 1: 1 – 4

[122] Rev 21 – 22; Isa 65: 17 – 25, see also 1 Chron 16: 30 – 33; Psalm 96: 10 – 13; Isa 2: 2 – 4; Isa 11; Isa 25: 6 – 9; Isa 35: 5 – 10; Dan 7: 13 – 28; Micah 4: 1 – 8; Matt 6: 10; Matt 19: 28 – 30; Luke 1: 32 – 33; Roms 8: 18 – 25; 1 Cor 15; 2 Cor 5: 19; Col 1: 15 – 20, 23; James 1: 18; 2 Peter 3: 7 – 13; Rev 3: 12; Rev 7: 14 – 17; Rev 12: 10 etc.

[123] Num 26: 53 – 56; Acts 2: 44 – 46, see also Num 33: 54; Num 34: 13; Num 35: 8; Josh 11: 23; Josh 12: 7; Josh 13: 6 – 14: 5; Josh 18: 4 – 19: 51; Psalm 99: 4; Eze 47: 13 – 23; Acts 4: 34 – 35 etc.

[124] Ex 30: 15; Lev 25: 8 – 41, 50 – 54; Deut 15: 1 – 3, 12; Deut 31: 10; Nehemiah 10: 31; Psalm 49: 2, 16; Prov 13: 7; Prov 22: 2; Jer 9: 23; 1 Cor 11: 18 – 22; 1 Tim 6: 17 – 19; James 1: 9 – 11; James 2: 1 – 9 etc.

[125] Lev 25: 8 – 41, 50 – 54; 2 Cor 8: 13 – 15, see also Num 36: 2 – 12; Deut 15: 1 – 3, 12; Deut 31: 10; Ruth 4: 1 – 11; Nehemiah 8: 10; Nehemiah 10: 31; Acts 4: 34 – 35; 1 Cor 11: 18 – 22; 1 Tim 6: 17 – 19 etc.

[126] Luke 17: 26 – 35, see also Lev 25: 8 – 41, 50 – 54; Deut 2: 6, 28; Deut 14: 21, 25 – 26; Deut 15: 1 – 3, 6; Deut 24: 6, 10 – 22; Deut 25: 13 – 16; Deut 28: 12, 44; Nehemiah 10: 31; Matt 10: 29; Matt 13: 44 – 46; Matt 14: 15; Mark 6: 36; Mark 15: 46; Mark 16: 1; Luke 9: 13; Luke 12: 6; John 4: 8; John 6: 5; Acts 7: 16 etc.

However, the Bible is also very clear that if left completely alone markets will produce inequality, exploitation and social ills. The natural law of the market would mean that every field and vineyard would be completely stripped clean leaving nothing for the poor; those who had lost homes and property through ill fortune would never regain them; those who ended up selling themselves into slavery and bonded labour because of their poverty would never be released; those with unpayable debts would never have them cancelled; people's capital assets would be seized as security for debts; and poor labourers would go unpaid or underpaid. Therefore, in each of these examples, and many more, the Bible sees that the state has a role to intervene through sensible law to prevent the pursuit of profit when it will result in human suffering. The people in Israel were instructed in law ***"do not reap to the very edges of your field or gather the gleanings of your harvest"***; ***"in this Year of Jubilee everyone is to return to their own property"***; a bonded labourer and his children ***"are to be released in the Year of Jubilee"***; ***"at the end of every seven years you must cancel debts"***; ***"do not take a pair of millstones – not even the upper one – as security for a debt"***; and pay hired workers ***"their wages each day before sunset"***.[127] A Biblical approach to the market, would therefore be that companies and individuals should be free to buy, sell and trade as they wish, unless their activity harms others, in which case the state should step in through law to prevent it.

This principle – that left alone the market will result in inequality and injustice, unless there is some corrective action through the law – is widely recognised by politicians, economists and academics in our modern world as well. As Martin Ravallion, the academic economist and former director of research at the World Bank, says in his book *The Economics of Poverty*, ***"even the best functioning market mechanism can hardly be expected to address the needs of poor people well, who (by definition) have little purchasing power over commodities, and the market will naturally tend to channel commodities to those with the buying power … Realizing this, there have been various efforts made to try to steer the market economy toward preferred allocations, with less poverty. The idea is to keep the advantages of the market mechanism in tailoring supply to demand but to try to shift its allocation in more equitable ways. This has long been a primary motive for governmental interventions of one sort or another."*** Or as the French economist Thomas Piketty put it in his book *Capital in the Twenty-First Century*, within the free market itself ***"there is no natural, spontaneous process to prevent destabilizing inegalitarian forces from prevailing"***, and indeed without such intervention, ***"When the rate of return on capital significantly exceeds the growth rate of the economy (as it did through much of history until the nineteenth century and as is likely to be the case again in the twenty-first century), then it logically follows that inherited wealth grows faster than output and income. People with inherited wealth need save only a proportion of their income from capital to see the capital grow more quickly than the economy as a whole. Under such conditions, it is almost inevitable that inherited wealth will dominate wealth amassed from a lifetime's labor by a wide margin, and the concentration of capital will attain extremely high levels – levels potentially incompatible with the meritocratic values and principles of social justice fundamental to modern democratic societies."***[128]

One such way that the Bible applies this principle of the law intervening to protect individuals where the market might otherwise cause them harm, is in laws to protect people and companies

[127] Lev 19: 9 – 10; Lev 25: 8 – 41, 50 – 54; Deut 15: 1 – 3, 12; Deut 24: 6, 10 – 22, see also Lev 23: 22; Deut 31: 10; Ruth 2; Nehemiah 10: 31; Hosea 12: 8 – 9; Amos 5: 11; Amos 8: 4 – 6; Nahum 3: 16; James 5: 1 – 6 etc.
[128] Ravallion, M., *The Economics of Poverty*, (2016), p. 1; Piketty, T., *Capital in the Twenty-First Century*, (2013), pp. 21, 26, but also see the whole book; Acemoglu, D. & Robinson, J., *Why Nations Fail*, (2013), pp. 323 – 324 etc.

from being cheated, swindled or defrauded. The book of Leviticus says ***"Do not defraud or rob your neighbour … Do not use dishonest standards when measuring length, weight or quantity. Use honest scales and honest weights"***.[129] Another is in ensuring the market can provide loans and credit for those who need it. The people of Israel in the Old Testament and the early church in the New Testament were to avoid getting into debt or putting up security for each other as far as possible, and were to pay off any debts they did incur, so they would ***"let no debt remain outstanding"***.[130] Where they did need loans, they lent to each other and would ***"charge no interest".***[131] Although they could take something in ***"pledge"*** for a loan,[132] they should not take anything that deprived someone of their livelihood or from a poor person,[133] and in any case it was better not to ***"oppress anyone or require a pledge for a loan"*** altogether.[134] Anything that was taken in pledge for a loan should be returned,[135] and the loan itself cancelled after seven years if it had not been repaid, when ***"Every creditor shall cancel any loan they have made to a fellow Israelite."*** [136] However, beyond their community, the Israelites were told ***"You may charge a foreigner interest"*** [137] and didn't have to cancel loans after seven years.[138] Presumably, even here this interest should have been reasonable and the terms fair, in line with strong Biblical rules not to mistreat foreigners,[139] and not to harm others through business activity.[140] Translating these Biblical principles into today's world, it seems that Christians should certainly loan to each other without charging interest, but in the wider market, individuals and companies can provide loans with interest to those that need credit, but there should be rules and safeguards to prevent this being excessive or exploitative, including, where necessary, writing off unpayable debts. So in summary …

Governments should:

- Pursue economic policies that will result in good jobs for all
- Protect employee rights, ensuring all jobs have sufficient pay, fair treatment, sensible rather than long working hours and generous holiday allocation
- Strive towards complete equality for all
- Recognise that pragmatically this will not always be possible, but …
- Intervene to push back towards equality when inequality becomes too extreme
- Allow the private sector freedom to operate as it chooses (thus ensuring broadly free markets) unless it harms others, at which point the law should intervene to prevent human suffering, exploitation and social ills
- Ban cheating, swindling and defrauding
- Ensure the market can provide loans and credit for those who need it, but in ways that are safeguarded to prevent exploitation of the vulnerable

[129] Lev 19: 13, 35 – 36, see also Lev 6: 2 – 7; Deut 19: 14; Deut 25: 13 – 16; Prov 20: 10, 17, 23; Prov 23: 10 – 11; Eze 45: 10 – 12; Hosea 12: 8 – 9; Amos 8: 4 – 6; Micah 2: 2; Mark 10: 19; 1 Cor 5: 11; 1 Cor 6: 8, 10 etc.
[130] Roms 13: 8, see also Prov 6: 1 – 5; Prov 11: 15; Prov 17: 18; Prov 22: 26 – 27
[131] Ex 22: 25 – 27, see also Lev 25: 35 – 37; Deut 23: 19 – 20; Nehemiah 5; Psalm 15: 5; Eze 18: 7 – 8, 12 – 13, 16 – 17; Eze 22: 12 – 13
[132] Deut 24: 6, 10 – 17; Prov 20: 16; Prov 27: 13
[133] Deut 24: 6, 10 – 17; Nehemiah 5; Job 24: 3
[134] Eze 18: 7 – 8, 12 – 13, 16 – 17
[135] Eze 18: 7 – 8, 12 – 13, 16 – 17; Eze 33: 15
[136] Deut 15: 1 – 3, see also Deut 31: 10; Nehemiah 10: 31
[137] Deut 23: 19 – 20
[138] Deut 15: 1 – 3
[139] Ex 22: 21; Ex 23: 9, 12; Lev 19: 10, 33 – 34; Lev 23: 22; Lev 25: 35; Deut 1: 16; Deut 5: 14; Deut 10: 18 – 19; Deut 14: 28 – 29; Deut 24: 14, 17 – 21; Deut 26: 12; Deut 27: 19
[140] Lev 19: 9 – 10; Lev 25: 8 – 41, 50 – 54; Deut 15: 1 – 3, 12; Deut 24: 6, 10 – 22, see also Lev 23: 22; Deut 31: 10; Ruth 2; Nehemiah 10: 31; Hosea 12: 8 – 9; Amos 5: 11; Amos 8: 4 – 6; Nahum 3: 16; James 5: 1 – 6 etc.

Tax and social spending

Lead domestically

So, a strong and fair economy is essential for ending poverty. It cannot happen without it. However, the Bible is clear that alone it is not enough. There will always be those who get left behind by the market. Therefore, right from the foundation of the model nation of Israel, God says ***"There will always be poor people in the land. Therefore I command you to be openhanded toward your fellow Israelites who are poor and needy in your land",*** for God ***"defends the cause of the fatherless and the widow, and loves the foreigner residing among you, giving them food and clothing. And you are to love those who are foreigners, for you yourselves were foreigners in Egypt."***[141] The ***"widow"***, the ***"fatherless"***, and the ***"foreigner"***, were the poor and marginalised in the agrarian society of their times. They could not provide for themselves because they did not own land, and thus we see these clear Biblical commands that society must help support them. The equivalent in our societies today might be the unemployed, those with medical conditions preventing them from working and those too old for full-time work. It is interesting to note that often such support is not merely distributed in hand-outs, but provision is set aside for the poor and marginalised to be able to work for it. This fits with the emphasis we have seen the Bible places on work in order to provide empowerment and human dignity, and to avoid creating a disempowering dependency culture. Thus the Israelites were instructed, ***"When you reap the harvest of your land, do not reap to the very edges of your field or gather the gleanings of your harvest. Do not go over your vineyard a second time or pick up the grapes that have fallen. Leave them for the poor and the foreigner."***[142]

Translating this Biblical principle into modern policy means that governments must provide generous unemployment and low-income benefits to those who need them, and that, wherever possible, individuals should do some work in order to receive this support, helping build empowerment and dignity. Thus, in effect, rather than free benefits, the state is offering guaranteed jobs. There is a multitude of socially useful work that is needed and the private sector finds difficult to fund: tree planting, community support, rubbish clearing, regeneration, youth work, research, archaeological digs etc. There is no shortage of need. Such work should be considered an honourable social contribution, not a source of shame. Of course, such work and benefits should never be more profitable than conventional employment and every possible support should also be given to help those who find themselves unemployed to get jobs. Several modern nations today have rediscovered and implemented this ancient Biblical principle to some degree, and many modern experts recommend it.[143]

Of course there will always be some members of society for whom work is not a practical option, and there are examples in the Bible where generous support is provided by society without expecting work in return. For instance we read in Deuteronomy, ***"At the end of every three years, bring all the tithes of that year's produce and store it in your towns, so that the Levites (who have no allotment or inheritance of their own) and the foreigners, the fatherless and the widows who live in your towns may come and eat and be satisfied, and so that the***

[141] Deut 15: 4 – 15; Deut 10: 18 – 19, see also Ex 22: 21 – 22; Ex 23: 6, Lev 19: 14; Lev 25: 35; Deut 23: 15 – 16; Deut 24: 17; Deut 27: 19; Psalm 94: 6; Jer 7: 6; Eze 16: 49; Eze 22: 7, 29; Eze 34: 2 – 4, 21 etc.
[142] Lev 19: 9 – 10, see also Ex 23: 10 – 11; Lev 23: 22; Lev 25: 35 – 43; Lev 27: 8; Num 27: 1 – 11; Deut 24: 19 – 22; Ruth 2; 2 Thess 3: 6 – 15; 1 Tim 5: 3 – 16
[143] Sen, A., *Development as Freedom*, (2001), pp. 40, 168 – 170; *Humanity Divided*, UN Development Programme, (2013), pp. 231 – 232; Dietz, R. & O'Neill, D., *Enough is Enough*, (2013), pp. 134 – 136, 196 etc.

LORD your God may bless you in all the work of your hands." [144] The implication for us today is that incapacity benefits and pensions should be provided for those who need them without requiring them to work. Again, this ancient Biblical principle, today often described as 'social protection', has been rediscovered and practiced by nations in recent centuries. As the academic Anthony Atkinson describes in his book, *Inequality: What can be Done?*, in modern times ***"It was the development of the modern employment relationship with the Industrial Revolution that led to pressures for the creation of the key institutions of social protection. Industrial employment meant that many workers came to face a situation where unemployment, sickness, or retirement meant a loss of total earnings. This led towards the end of the nineteenth century, or in the early years of the twentieth century, to the establishment of unemployment insurance, industrial injury benefits, sickness insurance, and old-age pensions."*** [145]

Figure 2.2: Governments should ensure the poor and marginalised in society are provided for and no one is left behind.

Finally, as we come to think about how national governments should pay for these and other services, we see from the very beginning of God's model kingdom of Israel and in the New Testament, that there is a recognition that all in society should pay some form of tax to provide for the common good, and that national authorities have the responsibility to collect this tax. As Paul says in his letter to the Romans, ***"Therefore, it is necessary to submit to the authorities, not only because of possible punishment but also as a matter of conscience. This***

[144] Deut 14: 27 – 29, see also Lev 21: 17 – 22; Deut 16: 9 – 17; Deut 26: 12; Eze 18: 7, 12, 16; Eze 34: 2 – 4, 21; Acts 2: 44 – 45; Acts 4: 34 – 35; Acts 6: 1 – 6; 1 Tim 5: 3 – 14

[145] Atkinson, A., *Inequality*, (2015), p. 264, see also pp. 60, 65 – 68, 74 – 80, 100 – 101, 122, 169 – 172, 205 – 231, 252 – 258, 264 – 266, 290 – 299, 303 – 305, 307; Castles, F., Leibfried, S., Lewis, J., Obinger, H. & Pierson, C. (Eds.), *The Oxford Handbook of the Welfare State*, (2010); *Making Globalization Socially Sustainable*, World Trade Organization, (2011), pp. xii, 40, 199 – 231, 276 – 289 etc.

is also why you pay taxes, for the authorities are God's servants, who give their full time to governing. Give everyone what you owe them: If you owe taxes, pay taxes".[146] This money was used to fund public roles and functions, such as the priests, temple or government officials, that benefitted all in society, but would be hard to fund through the natural operation of the market. For example, in the book of Numbers, God instructs ***"It is the Levites who are to do the work at the tent of meeting and bear the responsibility for any offenses they commit against it. This is a lasting ordinance for the generations to come. They will receive no inheritance among the Israelites. Instead, I give to the Levites as their inheritance the tithes that the Israelites present as an offering to the LORD."*** [147] Tithes which, as we have seen, were also used to support the needy in society more widely.[148]

Interestingly, the Bible is also clear that the primary social support network for those in need is the extended family, and the state and wider society only steps in where the wider family is unable to provide the support needed. For example, Leviticus sets out, ***"If one of your fellow Israelites becomes poor and sells some of their property, their nearest relative is to come and redeem what they have sold. If, however, there is no one to redeem it for them …"*** and ***"they do not acquire the means to repay, what was sold will remain in the possession of the buyer until the Year of Jubilee. It will be returned in the Jubilee, and they can then go back to their property."*** [149] Therefore, the Biblical lessons for our modern context appear to be that national authorities can legitimately tax their populations in order to fund public functions that benefit all in society and provide social services for those in greatest need. However, they should always do this in ways that reinforce and strengthen, rather than undermine, the family as the primary social support network, by only providing social support when immediate family members are unable to do so. This important Biblical emphasis on the role of families has been observed to greater or lesser extents in modern times as well. As the sociologist Mary Daly writes in an essay in the *Oxford Handbook of the Welfare State*¸ ***"Such concerns have found their way to the heart of recent policy, and scholarship reflects this, demonstrating that family provides a lynchpin in the functioning of states and markets and that the degree to which social policy seeks to familialize or defamilialize people and activities is a crucial feature of political and economic systems".***[150] So in summary …

Governments should:

- Ensure the poor and marginalised in society are provided for and no one is left behind
- Provide generous unemployment and low-income benefits, wherever possible, in exchange for socially useful and honourable work the market finds hard to fund, (in effect guaranteed jobs rather than free benefits) thus retaining human dignity and avoiding creating a crippling dependency culture

[146] Roms 13: 6 – 7, see also Ex 30: 12 – 16; Lev 10: 12 – 15; Lev 24: 1 – 9; Num 18: 8 – 32; 2 Kings 12: 4 – 16; 2 Chron 24: 5 – 14; 2 Chron 31: 4 – 12; Nehemiah 10: 32 – 39; Matt 17: 24 – 27; Matt 22: 16 – 21; Mark 12: 14 – 17; Luke 3: 12 – 13; Luke 20: 21 – 25 etc.

[147] Num 18: 8 – 32, see also Ex 30: 12 – 16; Lev 10: 12 – 15; Lev 24: 1 – 9; Deut 14: 27 – 29; Deut 26: 12; 2 Kings 12: 4 – 16; 2 Chron 24: 5 – 14; 2 Chron 31: 4 – 12; Nehemiah 10: 32 – 39; Roms 13: 6 – 7 etc.

[148] Lev 21: 17 – 22; Deut 14: 27 – 29; Deut 16: 9 – 17; Deut 26: 12; Eze 34: 2 – 4, 21; Acts 2: 44 – 45; Acts 4: 34 – 35; Acts 6: 1 – 6; 1 Tim 5: 3 – 14

[149] Lev 25: 25 – 28, 47 – 55, see also Lev 22: 13; Num 27: 1 – 11; Deut 25: 5 – 10; Ruth 2 – 4; Jer 32: 6 – 16; 1 Tim 5: 3 – 14, 16

[150] Daly, M., *Families Versus State and Market*, in Castles, F., Leibfried, S., Lewis, J., Obinger, H. & Pierson, C. (Eds.), *The Oxford Handbook of the Welfare State*, (2010), p. 142, see also pp. 139 – 151, 462 – 478; *Voices of the Poor 1: Can Anyone Hear Us?*, World Bank, (2000); *Voices of the Poor 2: Crying Out for Change*, World Bank, (2000); *Voices of the Poor 3: From Many Lands*, World Bank, (2000); Stiglitz, J., *Globalization and its Discontents*, (2002), pp. 83 – 84 etc.

- Ensure that such work is never a better alternative to conventional jobs and provide every support to help people get back into employment
- Provide incapacity benefits, pensions and similar social protection payments to those who need it without requiring any work
- Collect taxes in order to provide these and other services
- Reinforce, rather than undermine, the family as the primary social support network, by only providing social support when immediate family members are unable to do so

Having drawn out these key Biblical lessons that can help us define the policies we need to continue to successfully drive development through strong and fair economies and taxation and social spending, let us now consider what the Bible teaches us about our relationships with the natural environment.

ENVIRONMENT

A framework to guide humanity's approach to the environment

First, the Bible is clear that all of creation was created by God, for as we read in the very first verse of Genesis, ***"In the beginning God created the heavens and the earth."*** [151] It is also clear that God continues to be active in his creation, upholding and sustaining it, for ***"He covers the sky with clouds; he supplies the earth with rain and makes grass grow on the hills. He provides food for the cattle and for the young ravens when they call."*** [152] Furthermore, God also continues to own creation. It belongs to him, not to us, for ***"To the LORD your God belong the heavens, even the highest heavens, the earth and everything in it."*** [153] We are told repeatedly that God's creation is good, beautiful and wonderful, as Genesis relates, ***"God saw all that he had made, and it was very good."*** [154] Furthermore, not just humanity, but all creation worships God, as David cried ***"Let the heavens rejoice, let the earth be glad; let them say among the nations, 'The LORD reigns!' Let the sea resound, and all that is in it; let the fields be jubilant, and everything in them! Let the trees of the forest sing, let them sing for joy before the LORD"***.[155] We see a clear Biblical principle that creation is good, and has incredible beauty, worth and wonder in its own right, beyond simply what it can provide for human beings. It has inherent value and is worth conserving and treasuring. As Moses told the Israelites, ***"the land you are crossing the Jordan to take possession of is a land of mountains and valleys that drinks rain from heaven. It is a land the LORD your God cares for; the eyes of the LORD your God are continually on it from the beginning of the year to its end"***, and the Psalms declare ***"You, LORD, preserve both people and animals."*** [156]

[151] Gen 1 – 2, see also Ex 20: 11; Nehemiah 9: 6; Job 38 – 41; Psalm 33: 6 – 9; Psalm 102: 25; Prov 8: 22 – 31; Isa 42: 5; Jer 10: 12; Jer 51: 15 – 16; John 1: 1 – 4; Acts 17: 24; Col 1: 16; Hebs 1: 10; Hebs 11: 3; Rev 10: 6 etc.
[152] Psalm 147: 4, 8 – 9, 15 – 18, see also Psalm 65: 9 – 13; Psalm 75: 3; Psalm 104; Psalm 135: 6 – 7; Psalm 136: 25; Isa 40: 26; Jer 5: 24; Jer 10: 13; Jer 14: 22; Jer 51: 16; Col 1: 16 – 17; Hebs 1: 3; Hebs 2: 10 etc.
[153] Deut 10: 14, see also Lev 25: 23; 1 Sam 2: 8; Job 41: 2; Psalm 24: 1; Psalm 50: 10 – 12; Psalm 74: 16; Psalm 89: 9, 11; Psalm 95: 4 – 5; Psalm 135: 6 – 7; Isa 37: 16; Hebs 1: 2; Hebs 2: 10 etc.
[154] Gen 1 – 2, see also 2 Sam 23: 4; Job 38 – 41; Psalm 19: 1 – 6; Psalm 65: 9 – 13; Psalm 104; Psalm 139: 14; Psalm 148; Prov 30: 24 – 31; Matt 6: 26, 28 – 30; Matt 10: 29 – 31; Luke 12: 6 -7, 24, 27 – 28 etc.
[155] 1 Chron 16: 30 – 33, see also Nehemiah 9: 6; Psalm 19: 1 – 6; Psalm 65: 9 – 13; Psalm 69: 34; Psalm 96: 11 – 13; Psalm 97: 6; Psalm 98: 7 – 9; Psalm 103: 22; Psalm 148; Isa 44: 23; Rev 5: 13 etc.
[156] Deut 11: 11 – 12; Psalm 36: 6, see also Gen 1 – 2; Gen 6 – 9: 17; 2 Sam 23: 4; Job 38 – 41; Psalm 19: 1 – 6; Psalm 104; Psalm 148; Matt 6: 26, 28 – 30; Matt 10: 29 – 31; Luke 12: 6 – 7, 24, 27 – 28 etc.

Figure 2.3: Creation was made by God, and still belongs to him. It is good, beautiful and wonderful and has inherent value and worth beyond what it can provide for human beings, and should be conserved and treasured in its own right.

Turning to consider our place in this picture, we see that humanity itself is not separate, but a part of God's creation. As the prophet Isaiah says, God is ***"the Creator of the heavens, who stretches them out, who spreads out the earth with all that springs from it, who gives breath to its people, and life to those who walk on it."*** [157] Nevertheless we are special, created in God's image. We hear in Genesis that ***"God created mankind in his own image, in the image of God he created them; male and female he created them."*** [158] Furthermore, he placed us in a position to rule over creation, for as God said when he created humanity, ***"Be fruitful and increase in number; fill the earth and subdue it. Rule over the fish in the sea and the birds in the sky and over every living creature that moves on the ground."*** [159] We are to work creation and use its natural resources for our food, water, clothing, heating, housing and other needs. Again the Psalms say ***"He makes grass grow for the cattle, and plants for people to cultivate – bringing forth food from the earth: wine that gladdens human hearts, oil to make their faces shine, and bread that sustains their hearts."*** [160] Moreover, we are entirely dependent on creation to provide us with these things that we need, and by extension on creation continuing to remain in a healthy state in order to continue to provide us with these things. We cannot survive without a healthy creation.

However, as we farm creation and use its natural resources, the Bible is clear we should not do this in an exploitative, rapacious and destructive way, but in a balanced and managed fashion, protecting and preserving creation. Genesis tells us how ***"The LORD God took the man and put him in the Garden of Eden to work it and take care of it"*** and Proverbs that ***"The righteous***

[157] Isa 42: 5, see also Gen 1 – 2; Gen 3: 19; Gen 6 – 9: 17; 1 Chron 16: 30 – 33; Job 12: 10; Psalm 8: 3 – 5; Psalm 36: 6; Psalm 96: 11 – 13; Psalm 104; Psalm 139: 13 – 16; Psalm 148; Isa 11: 6 – 9; Isa 45: 12 etc.
[158] Gen 1: 26 – 27, see also Gen 5: 1 – 2; Gen 9: 6; Luke 3: 38; Acts 17: 28 – 29; James 3: 9
[159] Gen 1: 26 – 28, see also Gen 2: 19 – 20; Psalm 8: 3 – 8; Jonah 4: 10 – 11; Matt 6: 26, 28 – 30; Matt 10: 29 – 31; Luke 12: 6 -7, 24, 27 – 28; James 1: 18; James 3: 7
[160] Psalm 104: 14 – 15, see also Gen 1: 29; Gen 2: 16 – 17; Gen 3: 17 – 23; Gen 9: 2 – 3; Deut 8: 7 – 9, 12 – 13; Psalm 65: 9 – 13; Prov 14: 4; Prov 27: 18, 23 – 27; Jer 29: 5, 28; Eze 34: 14, 27, 29; James 3: 7 etc.

care for the needs of their animals".[161] Indeed this is not just a moral exhortation to us, but throughout the Old Testament there are multiple specific laws to limit and prevent human exploitation of the natural environment. Thus there were laws that every seventh day was a Sabbath of rest for people, but also ***"so that your ox and your donkey may rest".*** Similarly, there were laws that every ***"seventh year let the land lie unploughed and unused"***, in part for the poor to gather from, but also so that ***"the wild animals may eat what is left"***, thus ***"The land is to have a year of rest."*** This happened again every fiftieth year in the year of Jubilee. There were also laws to prevent the overexploitation of animals and animal cruelty, for example from a nest the Israelites were told ***"You may take the young, but be sure to let the mother go, so that it may go well with you"***, and to preserve nature, thus if they found themselves besieging a city the Israelites were instructed ***"do not destroy its trees by putting an axe to them, because you can eat their fruit."***[162]

Considering what this looks like in the case of our food, before the fall, and indeed for some considerable time afterwards, humanity was given only plants to eat. We read in Genesis how God said, ***"I give you every seed-bearing plant on the face of the whole earth and every tree that has fruit with seed in it. They will be yours for food. And to all the beasts of the earth and all the birds in the sky and all the creatures that move along the ground – everything that has the breath of life in it – I give every green plant for food."*** [163] Later God expanded this to include meat from animals, as he said to Noah and his sons, ***"The fear and dread of you will fall on all the beasts of the earth, and on all the birds in the sky, on every creature that moves along the ground, and on all the fish in the sea; they are given into your hands. Everything that lives and moves about will be food for you. Just as I gave you the green plants, I now give you everything."*** [164] However, when Jesus comes again to bring his kingdom in full and restores us to that original picture of harmony with God, one another and the rest of creation, it seems there will no longer be any consumption of meat, and that we (and indeed the animals) will return to that essentially vegetarian state. The imagery that the Bible uses of that time points to this, ***"The wolf will live with the lamb, the leopard will lie down with the goat, the calf and the lion and the yearling together; and a little child will lead them. The cow will feed with the bear, their young will lie down together, and the lion will eat straw like the ox. The infant will play near the cobra's den, and the young child will put its hand into the viper's nest. They will neither harm nor destroy on all my holy mountain, for the earth will be filled with the knowledge of the LORD as the waters cover the sea."***[165]

The Bible therefore seems to see humans as primarily eating plants, with permission – to a lesser extent – to also consume some meat. Certainly every person in Biblical times, as in most other historical periods, would have consumed mainly vegetables and cereals, and only small amounts of meat and dairy, compared to those of us living in developed nations today. Amazingly, the vast majority of doctors and dieticians in the world today confirm that the way God has designed our bodies to be healthy is indeed to eat mainly fruit and vegetables (at least a third), and cereal and carbohydrates (at least a third), with a small amount of meat (less than a sixth) and dairy (less than a sixth), and when we do eat meat to eat white meat and fish rather

[161] Gen 2: 15; Prov 12: 10, see also Num 22: 21 – 33; 1 Sam 17: 34 – 35; Prov 27: 18, 23 – 27; Isa 14: 8, 20; Isa 66: 3; Jer 33: 12; Nahum 3: 16; Amos 7: 14; Amos 9: 14; Luke 2: 8 etc.
[162] Ex 23: 10 – 12, 19; Lev 25: 2 – 7, 11 – 12, 20 – 22; Deut 22: 6 – 7; Deut 20: 19 – 20, see also Ex 34: 26; Lev 19: 23 – 25; Lev 22: 27 – 28; Lev 26: 32 – 35, 43; Deut 5: 12 – 14; Deut 14: 21; 2 Chron 36: 21; Neh 10: 31 etc.
[163] Gen 1: 29 – 30, see also Gen 2: 9, 16 – 17; Gen 3: 17 – 23
[164] Gen 9: 2 – 3, see also Deut 14: 4 – 20; Mark 7: 14 – 19; Roms 14; 1 Cor 8
[165] Isa 11: 6 – 9, see also Isa 65: 17 – 25; Roms 8: 19 – 22; Rev 21: 4; Rev 22: 1 – 2

than red meat as much as possible.[166] Furthermore, this is also exactly the kind of diet the world needs to return to today, as current western diets with high red meat consumption are environmentally unsustainable, due to the vast amounts of land and fresh water needed for animal grazing and mono-crop agriculture. The rediscovery of such a 'Biblical diet' is today widely accepted as important by both environmental scientists and health experts.[167]

Overall then, the Biblical picture of humanity's relationship with the environment is as a caring steward placed in authority over the natural world and permitted to use its resources, but never in an exploitative and destructive way, remembering that creation still belongs to God, not to us. As the people of Israel were told by God when they entered the Holy Land, ***"The land must not be sold permanently, because the land is mine and you reside in my land as foreigners and strangers."***[168] This is a powerful concept even for those without a faith, since the vast majority of people recognise that each generation cannot claim to 'own' the land, but must pass on the world in good condition to the next generation, if our children and grandchildren are to survive and flourish. The Bible shows us that before the fall, humanity did indeed live in balance and harmony with both God and the natural world, which effortlessly provided all our needs. We hear how ***"the LORD God had planted a garden in the east, in Eden; and there he put the man he had formed. The LORD God made all kinds of trees grow out of the ground – trees that were pleasing to the eye and good for food."***[169] However, by turning away and rejecting God, humanity fractured not only our perfect relationship with God, but also our relationship with the natural world. The natural world has been in some sense 'broken', so that, although it remains fundamentally 'good', just as we still bear the image of God despite our fallen nature, the effortless provision of all our needs by creation can no longer be taken for granted. This means natural disasters may occur and we must work hard to ensure creation continues to provide us with the things we need to survive. Decay, death and conflict are now a reality, both in our own bodies and for the whole of creation. We read how God said to Adam at the time of the fall, ***"Cursed is the ground because of you; through painful toil you will eat food from it all the days of your life. It will produce thorns and thistles for you, and you will eat the plants of the field. By the sweat of your brow you will eat your food until you return to the ground"***.[170]

Within this overall picture of human sin leading to brokenness in wider creation, the Bible also warns us that this was not just a one-off instance, but that today the land can also continue to become barren and unfruitful when humanity rejects God in multiple acts of rebellion. Thus, the prophet Jeremiah mourns, ***"How long will the land lie parched and the grass in every field be withered? Because those who live in it are wicked, the animals and birds have perished."***[171] In the Old Testament this was most obvious in the context of idolatry, but also when people rejected God's standards of justice and his law more widely, including his laws to respect and preserve his creation. The idea that the land will continue to bounteously give us all that we

---

[166] *The Eatwell Guide*, National Health Service, www.nhs.uk/live-well/eat-well/the-eatwell-guide. Similar sources of information exist for other countries.
[167] *The Elephant in the Boardroom*, World Resources Institute, (2017), pp. 16 – 22; *Changing Climate, Changing Diets*, Chatham House, (2015); Berners-Lee, M. & Clark, D., *The Burning Question*, (2013), pp. 155 – 159, 191 – 192 etc.
[168] Lev 25: 23, see also Gen 1 – 2; Gen 3: 17 – 23; Gen 6 – 9: 17; Deut 11: 11 – 17; Deut 8: 7 – 20; Psalm 8: 3 – 8; Psalm 148; Prov 12: 10; Jer 33: 12; Eze 34: 11 – 16, 26 – 31; Amos 9: 14; James 1: 18 etc.
[169] Gen 1 – 2, see also John 1: 1 – 4
[170] Gen 3: 17 – 23, see also Gen 5: 29; Deut 32: 10; Isa 41: 17 – 20; Isa 49: 8 – 10; Jer 2: 6; Hosea 4: 1 – 3; Hosea 6: 7; Roms 5: 14; Roms 8: 19 – 22; 1 Cor 15: 21 – 22; Rev 21: 4 – 5
[171] Jer 12: 4, see also Lev 25: 18 – 19; Lev 26; Deut 11: 9 – 17; Deut 28; 2 Sam 21: 1, 14; 2 Chron 7: 13 – 14; Jer 3: 2 – 3; Jer 23: 10; Eze 5: 16 – 17; Eze 14: 13; Hosea 4: 1 – 3; Joel 1 – 2; Micah 7: 13 etc.

need, even if we reject God, behave with injustice, and mistreat his creation, is not Biblical. Furthermore, as we have seen, when environmental destruction happens as a result of our actions, it is the poorest and most vulnerable people in our world that are hit hardest. We know that we are to bless and care for those in poverty[172] and love our global neighbour as ourselves.[173] So this is yet another Biblical reason for us as Christians to care for creation.

Wonderfully, the Bible teaches us that God is outworking a plan for the healing and restoration of all broken relationships. The Bible shows again and again that God is concerned with preserving not just humanity, but the whole of his 'good' creation. The Psalms tell us ***"The LORD is good to all; he has compassion on all he has made"***, and in the story of Noah we hear how in the ark God saved not just humanity but ***"two of all living creatures, male and female, to keep them alive"***, and that afterwards his covenant to never again bring such a flood, was not just with humanity but was ***"my covenant between me and you and all living creatures of every kind."*** [174] Therefore Jesus' death and resurrection was not just to open the way for humanity to be reconciled and restored to God, but for the whole of creation as well. Paul tells us that God's plan was ***"through him to reconcile to himself all things, whether things on earth or things in heaven, by making peace through his blood, shed on the cross … This is the gospel that you heard and that has been proclaimed to every creature under heaven"***, and elsewhere that ***"the creation waits in eager expectation for the children of God to be revealed. For the creation was subjected to frustration, not by its own choice, but by the will of the one who subjected it, in hope that the creation itself will be liberated from its bondage to decay and brought into the freedom and glory of the children of God. We know that the whole creation has been groaning as in the pains of childbirth right up to the present time."*** [175]

When Jesus comes again, ushering in his kingdom in full, it will not be to burn up creation and whisk those who know him off to a 'heaven' in the sky, but to bring heaven to earth, and redeem and restore the whole of his creation in a very earthy and real way, as he originally intended it to be. Just as Jesus' body was renewed and transformed, but still very real and physical after his death and resurrection,[176] and ours too will be renewed and transformed into our heavenly but still physical bodies when he comes again,[177] so the whole of creation, whilst it may similarly pass through some sort of tribulation, will be renewed, restored, healed and transformed as the new heaven and earth, in the way God always intended it to be. Revelation says ***"There will be no more death or mourning or crying or pain, for the old order of things has passed away"***, and Isaiah tells us how ***"The wolf and the lamb will feed together, and the lion will eat straw like the ox … They will neither harm nor destroy on all my holy***

[172] Lev 25: 35 – 37; Deut 10: 17 – 18; Deut 15: 4 – 11; Psalm 12: 5; Psalm 82: 3 – 4; Psalm 146: 7 – 9; Prov 14: 31; Prov 29: 7; Isa 58; Matt 11: 2 – 6; Matt 19: 21; Mark 10: 21; Luke 7: 17 – 22; Luke 10: 25 – 37; Luke 12: 33; Luke 14: 12 – 14; Luke 18: 22; Luke 19: 8; Acts 10: 1 – 4; Gal 2: 10; James 1: 27 etc.
[173] Lev 19: 18; Deut 6: 5; Deut 10: 12; Deut 11: 13; Josh 22: 5; Matt 7: 12; Matt 19: 19 Matt 22: 34 – 40; Mark 12: 28 – 34; Luke 6: 31; Luke 10: 25 – 28; Roms 13: 8 – 10; Gal 5: 14; James 2: 8; 1 John 4: 7 – 21
[174] Psalm 145: 9 – 11, 15 – 17, 21; Gen 6 – 9: 17, see also Lev 26: 32 – 35, 43; Deut 11: 12; 2 Chron 36: 20 – 21; Psalm 36: 6; Psalm 104; Psalm 136: 25; Isa 11: 6 – 9; Eze 36: 1 – 15; Matt 6: 26, 28 – 30; Matt 10: 29 – 31; Luke 12: 6 -7, 24, 27 – 28 etc.
[175] Col 1: 15 – 20, 23; Roms 8: 19 – 22, see also 1 Chron 16: 30 – 33; Psalm 96: 10 – 13; Psalm 98: 7 – 9; Psalm 148: 6; Isa 11: 6 – 9; Isa 49: 8 – 10; Isa 51: 3; Eze 47: 1 – 12; Matt 19: 28; Acts 3: 21; 2 Cor 5: 19; James 1: 18; Rev 3: 12; Rev 21 – 22 etc.
[176] Matt 28; Mark 16; Luke 24; John 20 – 21; Acts 1: 1 – 9; Acts 2: 31 – 33; Acts 13: 37; Roms 6: 3 – 11; 1 Cor 15; 2 Cor 4: 7 – 14; Phil 3: 20 – 21; Col 1: 15 – 22; 1 Tim 3: 16; 1 Pet 3: 18
[177] Roms 6: 3 – 11; 1 Cor 15; 2 Cor 4: 7 – 14; 2 Cor 5: 1 – 7, 17; Phil 3: 20 – 21; Col 1: 15 – 22

mountain".[178] Finally, whilst the Bible begins with a garden, it ends with a garden city, where John saw ***"the river of the water of life, as clear as crystal, flowing from the throne of God and of the Lamb down the middle of the great street of the city. On each side of the river stood the tree of life, bearing twelve crops of fruit, yielding its fruit every month. And the leaves of the tree are for the healing of the nations. No longer will there be any curse."*** [179] So we do not see just a return to the old pre-fall state, but a dynamic forward moving restored kingdom of God, in which God, humanity and creation move forward together in a restored relationship. The Bible then provides us with a rich framework to guide humanity's approach to the environment. So, in summary …

Governments should:

- Recognise that creation is good, beautiful and wonderful and has inherent value and worth beyond what it can provide for human beings, and should be conserved and treasured in its own right
- Recognise that humanity should farm creation and use its natural resources to provide the food, clean water, fresh air, clothing, housing and many other things we need in order to survive
- Acknowledge that humanity is entirely dependent on the environment remaining healthy in order to continue to provide us with these things we need to survive
- Ensure that as humanity farms creation and uses its natural resources, we should never do so in environmentally exploitative, rapacious and destructive ways, but in a balanced and managed fashion, protecting and preserving the environment, and not leave this up to chance but …
- Pass and enforce laws that prevent the exploitation of the natural environment for its own sake, and also …
- Pass and enforce laws that prevent people from damaging the environment in ways which harm others
- Promote a diet that is healthy and is also good for people and planet, that is based upon mainly fruit and vegetables (at least a third), and cereal and carbohydrates (at least a third), with a small amount of meat (less than a sixth) and dairy (less than a sixth), and eating white meat and fish rather than red meat wherever possible. This should include legislation requiring shops and restaurants to provide more and better labelled vegetarian and vegan options
- Recognise that each generation cannot claim to ultimately 'own' creation, but is merely a steward, and should pass it on in good condition to future generations
- Recognise that failing to follow God's standards and Biblical principles of justice, including these principles for the proper care and preservation of the environment, will result in creation turning barren and failing to give us what we need to survive

Taken together then, we see that the Bible gives us fundamental principles for how poverty and inequality can be tackled through strong and fair domestic economies, which can be taxed in order to meet the basic needs of all. The Bible also provides us with a rich framework to guide humanity's approach to the environment, enabling us to draw out specific principles, both for us and our decision makers. We will next see how lessons can be learnt from history since Biblical times, about how to best put those principles into practice.

[178] Rev 21 – 22; Isa 65: 17 – 25, see also 1 Chron 16: 30 – 33; Psalm 96: 10 – 13; Psalm 98: 7 – 9; Psalm 148: 6; Isa 11: 6 – 9; Isa 66: 22; Eze 47: 1 – 12; Roms 8: 19 – 22; 2 Cor 5: 19; Col 1: 15 – 20, 23; 2 Pet 3: 7 – 13; James 1: 18; Rev 3: 12; Rev 16; Rev 6 – 9 etc.
[179] Rev 22, see also Eze 47: 1 – 12; Zech 14: 5 – 11; Rev 3: 12

PART 3: WHERE DO WE NEED TO GO NEXT? – WHAT DOES HISTORY TEACH US?

Transitioning to a green and fair global economy will require four key economic shifts to ***strong and fair economies***, ***tax and social spending***, ***clean energy*** and a ***circular economy***, as we saw in Part 1. We have also seen in Part 2 that the Bible has crucial lessons to teach us on the specific steps and policies that will be required to trigger these shifts. We now turn in Part 3 to look at what we can learn from history about where nations have got it right with development and the environment in each of these four areas in the past, that might also prove to be crucial steps for the future.

DEVELOPMENT

Strong and fair economy

Lead domestically

Creating strong and fair domestic economies is primarily a task that national governments must lead. Whilst each nation of course faces its own unique set of historical, political, social and economic circumstances, there are nevertheless some common lessons we can draw from the nations which have delivered the most dramatic achievements in developing their economies and reducing poverty in recent decades. As the former Chief Economist and Senior Vice President at the World Bank Justin Yifu Lin says in *The Quest for Prosperity*, future economic historians ***"will be amazed by the rapid-growth path followed by a small number of countries such as Brazil, China, India, Indonesia, the Republic of Korea, Malaysia, Mauritius, Singapore, Thailand, and Vietnam where the industrialization process quickly transformed their subsistence agrarian economies and lifted several hundred million people out of poverty in a single generation."*** [180]

[180] Yifu Lin, J., *The Quest for Prosperity*, (2014), pp. 6 – 7, see also pp. xii – xv, 19 – 20, 32, 75 – 101, 110, 113 – 114, 140 – 141, 159 – 160, 167 – 168, 242; Rodrik, D., *One Economics, Many Recipes*, (2007), pp. 13 – 55, 85 – 88, 104, 106, 109 – 110, 204, 219 – 220, 226; Sachs, J., *The Age of Sustainable Development*, (2015), pp. 81, 95 – 98 etc.

Figure 3.1: There are many lessons to learn from countries like Singapore, Brazil, China, India, Indonesia, South Korea, Malaysia, Mauritius, Thailand or Vietnam, which have rapidly developed in recent decades, lifting hundreds of millions out of poverty.

Furthermore, the menu of policies they have used is the same as those used by Britain, Europe, the US, Australia, New Zealand, Japan and other parts of the developed world in the nineteenth and twentieth centuries when they were going through their own period of rapid economic development, and indeed the policies which every nation which has successfully developed has used.[181]

Industrial and economic development strategy

Our first lesson is that it is essential that nations develop their own national domestic businesses and sectors (eventually to a stage where they become world class and can compete with the very best internationally), rather than just welcome foreign companies. As they do this, nations must move further and further up the value chain. This means moving from mainly agriculture and the export of natural resources and commodities, such as crops, coffee, timber, minerals or sugar, where all developing (essentially pre-industrial) economies start; up to labour intensive assembly; to simple manufacturing; to more advanced manufacturing; and eventually into services and the knowledge economy. In 2008, the Commission on Growth and Development, a panel of world leading development economists tasked by leading nations and the World Bank with identifying the polices that have been most successful for economic development, issued their conclusions in the seminal *Growth Report*. This stresses precisely this fundamental point, that ***"Growth entails a structural transformation of the economy, from agriculture to manufacturing, from a rural workforce to an urban one."*** [182] In the twenty-first century, this whole process of transition must be driven by modern clean energy (not fossil fuels) and the

[181] Landes, D., *The Wealth and Poverty of Nations*, (1998), pp. 256 – 275; Chang, H-J., *Kicking Away the Ladder*, (2002); Findlay, R. & O'Rourke, K., *Power and Plenty*, (2009), pp. 347, 395 – 402, 425 – 428, 466 – 467, 483 – 489, 492 – 493, 520 – 526

[182] Commission on Growth and Development, *The Growth Report*, (2008), p. 6, see also pp. 2, 9, 14, 21, 25 – 26, 45; Chang, H-J., *Bad Samaritans*, (2008), pp. 7, 14 – 15, 19 – 21, 29, 31, 41 – 45, 47, 49 – 58, 68, 210 – 222; *Global Value Chain Development*, WTO, (regular report) etc.

sustainable use of natural resources (a 'circular economy', rather than our current 'extract, consume and throw away' model), if it is to be environmentally and economically sustainable.

At every stage in this transition, governments should be aiming not only to develop domestic industries to service the needs of the domestic economy as fully as possible, but to also have a strong emphasis on engaging in international trade and boosting exports to the world.[183] As they do this, nations should make full use of their maximum comparative advantage, focusing on what they can do best and what the world wants, and provide particular support for those sectors. Governments will also want to encourage as much diversity in the economy as possible as they go through this process. Overreliance on just one or two sectors, and even just one or two massive companies, will introduce significant vulnerability and have a hugely distorting effect on the economy, and indeed on democracy and the political process in a country. A key study by the UN Conference on Trade and Development, which is backed up by many similar studies by other international institutions and economists, emphasises these key points, that ***"The analyses show that developing countries need to diversify their export base away from less sophisticated primary commodities into high-productivity sectors such as manufacturing in order to enjoy faster growth"*** and furthermore that ***"the message is not necessarily to completely specialize in agriculture or manufacturing but promoting diversification within and between sectors."*** [184] Finally, there needs to be recognition that this process of transition takes many years; no nation can jump straight from a poor rural economy to an advanced industrial knowledge economy in a single leap.

This is the route that all nations that have successfully developed have taken. It is absolutely essential to note that none of this will just happen. It requires a hugely intentional and proactive government, with a clear industrial and economic development strategy. This is especially the case in developing countries where the economy is nascent and there is no advanced flourishing private sector just waiting to be released. The state has to be massively involved to get the economy kick started in the first place, and the domestic private sector built up, established and thriving. After a long-period where this crucial lesson was neglected by 'Washington Consensus' economic thinking, it is now increasingly widely accepted by economists and development experts. Justin Yifu Lin again explains this in *The Quest for Prosperity*, ***"there is virtually no example in history of any successful catch-up economy in which the government did not play an active role in facilitating its industrial upgrading and diversification. A close look at the history of capitalism reveals that even Britain and the United States, conventionally believed to have succeeded by adopting laissez-faire policies when other countries were stuck with outdated mercantilist strategies, actually promoted their national industries through various forms of active government interventions that included tariffs, subsidies and other measures. Many of today's other rich countries also used extensive government intervention to jumpstart their process of modern economic growth. In the nineteenth century, Germany and Japan kick-started their industrialization with state-owned enterprises in textiles, steel, and shipbuilding. After World War II, Austria,***

[183] Findlay, R. & O'Rourke, K., *Power and Plenty*, (2009), pp. 311 – 546; Rodrik, D., *One Economics, Many Recipes*, (2007), pp. 2 – 3, 39, 50, 87 – 88, 120, 204, 219 – 222, 238; Bernstein, W., *A Splendid Exchange*, (2008) etc.

[184] *Estimating the Impact of Trade Specialization and Trade Policy on Poverty in Developing Countries*, UNCTAD, (2015), pp. 4 – 5, 7; see also *The Resource Curse Revisited*, Chatham House, (2015), pp. 1 – 3, 27 – 33, 35 – 38, 42 – 43; Yifu Lin, J., *The Quest for Prosperity*, (2014), pp. 8, 10 – 11, 17, 66, 97, 116, 133 – 134, 158 – 160, 241 etc.

Finland, France, the Republic of Korea, Norway, and Singapore also used state-owned enterprises to modernize their economies." [185]

It therefore follows that a proactive dialogue and positive working relationship between government and business leaders to work together for national economic development is essential. This should be done through transparent dialogue and working groups to enable a constructive working relationship whilst ensuring there is no personal or political benefit for those in government. Getting the balance right between close dialogue between public and private sectors which doesn't degenerate into corruption is increasingly recognised as key by economists, such as Dani Rodrik, who in his book *One Economics, Many Recipes*, stresses that ***"the policy setting has to be one in which public officials are able to elicit information from the business sector on an ongoing basis about the constraints that exist and the opportunities that are available. It cannot be one in which the private sector is kept at arm's length and autonomous bureaucrats issue directives."*** However ***"industrial policy is open to corruption and rent-seeking."*** As a result ***"the critical institutional challenge, therefore, is to find an intermediate position between full autonomy and full embeddedness. Too much autonomy for the bureaucrats and you have a system that minimizes corruption but fails to provide incentives that the private sector really needs. Too much embeddedness for the bureaucrats and they end up in bed with (and in the pockets of) business interests."*** [186]

The government's economic development strategy will also have to be highly flexible and evolving. The policies set out in this section are those that have been repeatedly and most successfully used by nations as they developed. However, they are not a magic formula. Nations should select and apply the policies that are useful and helpful at the right time, choosing the right economic path for the nation according to the unique national context, rather than holding doggedly to any one particular market ideology. The Chinese premier Deng Xiaoping famously described this process as ***'Crossing the river by feeling for the stones'***, when China began its economic transformation in the late 1970s. This highly pragmatic approach is increasingly recognised as essential by development economists.[187] Critical for enabling this to happen effectively, is rigorous monitoring of tight targets and indicators for economic success and development, including specific targets for particular sectors and businesses that have been prioritised for support. If a policy is not working, or companies fail to achieve as desired, then the policy should be changed and support withdrawn. Inevitably some things that are tried will not work. It is impossible to avoid this. It is a natural part of the process. What is key is spotting things that aren't working quickly, shutting them down and diverting policies and resources to other areas that are working better. As the economists Ha-Joon Chang and Ilene Grabel put it in their book *Reclaiming Development*, ***"Selective industrial policies have not succeeded everywhere. Nearly all of the instances of policy failure are marked by the absence of appropriate mechanisms of accountability, performance review and oversight. Failure has occurred when the government has granted trade protection and/or subsidies to certain industries without monitoring performance and without tying support to performance guidelines. In these contexts, selective industrial***

[185] Yifu Lin, J., *The Quest for Prosperity*, (2014), pp. 66 – 67, but also see the whole book, Chang, H-J., *Globalisation, Economic Development and the Role of the State*, (2003); Mazzucato, M., *The Entrepreneurial State*, (2015) etc.

[186] Rodrik, D., *One Economics, Many Recipes*, (2007), p. 111, see also pp. 19, 110 – 116; *How do State-Business Relations Shape Sustainable Development?*, Institute of Development Studies, (2017); Chang, H-J., *Globalisation, Economic Development and the Role of the State*, (2003), pp. 317, 322 – 325 etc.

[187] Ravallion, M., *The Economics of Poverty*, (2016), pp. 508 – 518; Rodrik, D., *One Economics, Many Recipes*, (2007); Easterly, W., *The White Man's Burden*, (2007) etc.

policy usually did not lead to enhanced performance. Successful experiences with selective industrial policy are very much tied to the government's commitment to monitoring and performance. For example, in Korea and Japan firms had to prove that they were using state support to increase productivity and/or exports. If they failed to do so, they were penalized through the withdrawal of state support in subsequent periods." [188]

Targeted policies to move up the value chain from agriculture, to manufacturing, to services and the knowledge economy

Delving into specific policies, governments first need to create the right environment for business to thrive by enforcing contracts and private property rights. As the development economist Dani Rodrik says, every country that has successfully developed has ***"protected property rights of investors and entrepreneurs to some extent and enforced contracts"***. This is a key point he rightly describes as one of just a few ***"higher-order principles of sound economic governance"*** which are essential requirements for economic development in every context.[189] In many of the world's developing countries, this also includes tackling the issue of land ownership by formalising the legal ownership by various communities (especially indigenous traditional groups) of the land they live on, often for thousands of years, with modern deeds of ownership.[190] Recognising the reality that the economies of poorer nations are still overwhelmingly based on agriculture and the export of natural resources, all successful developing nations have focused on first reforming their agricultural sectors in the early stages. This has meant boosting productivity through modern farming techniques, which in today's world must also be environmentally sustainable. This is widely recognised by development economists, such as Jeffrey Sachs, who in his book *Common Wealth* writes, ***"The escape from extreme poverty requires four basic types of investment. The first is a boost to productivity of the core livelihood, agriculture. This is the hallowed Green Revolution that initially lifts smallholder farmers out of subsistence … The boost of farm production has very often been the deus ex machina that triggers the long-term growth process."*** [191]

Countries that are blessed with valuable natural resources and commodities such as crops, coffee, minerals, timber or sugar, are fortunate as these can provide an extra boost at the start of the process of economic development. However, it is essential that nations take the money generated from such exports and re-invest it in sovereign wealth funds. Thus, the profits generated are not spent, but permanently saved and invested, providing a perpetual increasing economic return which can be used to help drive the process of economic development and going up the value chain to more advanced manufacturing, services and knowledge economies. Sitting back and living off the proceeds of natural resource and commodities exports is no substitute for genuine economic development, and leads to the infamous 'resource curse', where nations never move beyond this stage and remain trapped in low levels of poverty.

---

[188] Chang, H-J. & Grabel, I., *Reclaiming Development*, (2014), p. 76, see also pp. 79, 90 – 91; Mazzucato, M., *The Entrepreneurial State*, (2015), pp. 1, 5, 9 – 10, 25; *Global Value Chains and South-South Trade*, UN Conference on Trade and Development, (2015), p. 46 etc.

[189] Rodrik, D., *One Economics, Many Recipes*, (2007), pp. 87, 39, see also pp. 15, 21, 29, 31 – 32, 57, 100, 156 – 157, 184, 188 – 189; Acemoglu, D. & Robinson, J., *Why Nations Fail*, (2013), pp. 28 – 36, 43, 70 – 79, 88, 102 – 104, 120 – 121, 194 – 198, 202, 208, 216, 221 – 222, 243 – 244, 259, 297, 410, 429 – 430, 453; Green, D., *From Poverty to Power*, (2012), pp. 57 – 63 etc.

[190] *Common Ground*, Oxfam and various agencies, (2016); *Community Rights, Corporate Wrongs*, Friends of the Earth, (2011); *Plan of Implementation of the World Summit on Sustainable Development*, UN, (2002), pp. 4, 6, 23 etc.

[191] Sachs, J., *Common Wealth*, (2008), pp. 230 – 231, see also pp. 42, 210, 219, 255; Ravallion, M., *The Economics of Poverty*, (2016), pp. 30 – 31, 460 – 469, 473 – 474, 478 – 487; Rodrik, D. (Ed.), *In Search of Prosperity*, (2003), pp. 98, 101, 153, 162 – 166, 209, 240 – 241, 300 – 301, 308 – 309 etc.

Figure 3.2: Nations that have developed successfully, have done so through a proactive and flexible industrial and economic development strategy, which has moved their economy up the value chain from agriculture, to manufacturing, to services and the knowledge economy.

The need for resource rich developing countries to move beyond natural resource exports was a major conclusion in a 2015 report by the London-based international affairs think tank Chatham House, which is also backed up by multiple other international institutions, development experts and economists. The report found that the key to success for natural resource endowed poor countries was precisely that ***"Such economies achieve growth while diversifying away from the extractive sector, thereby reducing their vulnerability to falls in resource prices and the eventual depletion of reserves. The key point here is that revenue from extractives is not income. It is simply the reshuffling of a country's portfolio of assets: exchanging resources below ground for cash above ground. Overall success is determined by the extent to which a country can capitalize on such reshuffling – namely, by investing the cash productively and by forging linkages between the extractive sector and the rest of the economy. On the basis of such premises, this paper argues that while it is not inevitable, the resource curse is alive and active. Numerous resource-exporting countries have failed to diversify their economies away from the extractive sector even if they have developed other economic sectors; they remain dependent on extractive revenues."*** [192]

Absolutely essential to moving up the value chain is the transfer of technology, both the scientific and technical, and the latest best practice in business processes and know-how. Nations that have enjoyed rapid periods of economic development have largely done so by replicating the very best ideas and technologies from more developed nations in their own countries in order to achieve rapid catch up. As the development economist Ha-Joon Chang observes in his book, *Globalisation, Economic Development and the Role of the State*, ***"In the history of industrialisation, technology transfer has always played a key role. Technology transfer during the 16th and the 17th centuries from the then more advanced economies of Continental Europe (especially Venice and the Low Countries) was critical in Britain's transition from a backward raw material producer to a leading manufacturing nation … After the British Industrial Revolution, the effectiveness of technology transfer from Britain (and to a lesser extent from the Low Countries) became the key determinant of a country's prosperity"***.[193]

One key strategy that has helped to achieve this has been attracting and allowing Transnational Companies (TNCs) to operate within a country: Foreign Direct Investment (FDI). However, this should crucially only be allowed on terms that extract the maximum benefit for the developing country. Thus, insisting on joint national/TNC ownership; a high proportion of staff to be nationals; local content requirements; preventing TNC operation where they might undermine significant domestic industries; extracting the maximum amount of tax etc. have all been used successfully as strategies to gain the maximum benefit of inward investment and technology transfer from TNCs, whilst avoiding them undermining the local domestic economy. This is a widely recognised model used by many successful developing countries. The 2008 *Growth Report* from the Commission on Growth and Development stresses, ***"As well as money, FDI can bring a familiarity with foreign production techniques, overseas markets and international supply chains. This expertise may be worth more than the capital itself … A multinational may train a local recruit, who later joins to leave another firm. It may share technology with a supplier, who then serves rival customers"***, or there may be ***"obligations***

[192] *The Resource Curse Revisited*, Chatham House, (2015), p. 2, but also see the whole report; Collier, P., *The Plundered Planet*, (2010); Helm, D., *Natural Capital*, (2016), pp. 14, 50 – 51, 93, 223 – 225, 243 – 244 etc.
[193] Chang, H-J., *Globalisation, Economic Development and the Role of the State*, (2003), p 27, see also pp. 65 – 66, 138, 273 – 304; Sachs, J., *The End of Poverty*, (2005), pp. 18, 31, 39 – 43, 49, 62 – 64, 155, 161 – 162, 169, 180, 186, 252 – 253, 257 – 259; Yifu Lin, J., *The Quest for Prosperity*, (2014), pp. 28 – 29, 32 – 33, 81, 90, 98 – 99, 109 – 120, 140 – 141, 150, 160, 165 – 166, 176, 209 – 233, 238, 243, 245, 250 etc.

on the foreign investor to hire and train local staff as managers, even letting them advance to positions beyond their home country. A common organizational form for doing this is the joint venture", and many other such mechanisms.[194]

In close connection with this policy, many successful developing countries created industrial clusters/zones (sometimes specifically export zones) to attract TNCs and create hubs of economic activity, which could then be used to benefit the rest of the country. As Justin Yifu Lin says in *The Quest for Prosperity*, ***"From anywhere in the world and with a simple click of the mouse, one can instantly visit the jewelry zone in Thailand, the leather zone in Turkey, the single-commodity zone for tea in Zimbabwe, the single-factory export orientated units in India, or the single-company zones in the Dominican Republic … I propose that developing countries with poor infrastructure and an unfriendly business environment rely on the power and magic of industrial parks and export-processing zones, which are more manageable and realistic alternatives to the dream of building excellent infrastructure rapidly across the entire country and improving the business environment for the entire economy. The parks and zones also have the benefits of encouraging industrial clustering."*** [195]

In addition to the transference of already existing technology and ideas, it is also critical to provide extensive public investment into new research and development to advance domestic technology and economic development. There is a crucial role for public funding here, as private capital is often too short-term, needs to see a quicker return and is wary of investing in long-term early stage technological development. However, public funds can play a key role as a natural partner in the patient early stages of technological development, which can then 'crowd in' far larger amounts of finance from the private sector, once that technology becomes rapidly commercially scalable. In the classic study in this area, the economist Marianna Mazzucato, in her book *The Entrepreneurial State*, assembles a wide range of evidence to prove this point, not least from the world's largest economy. As she says in her introduction, ***"the United States is not what it seems. The preacher of the small State, free-market doctrine has for decades been directing large public investment programs in technology and innovation that underlie its past and current economic successes. From the Internet to biotech and even shale gas, the US State has been the key driver of innovation-led growth – willing to invest in the most uncertain phase of the innovation cycle and let business hop on for the easier ride down the way. If the rest of the world wants to emulate the US model they should do as the United States actually did, not as it says it did: more State not less. A key part of this lesson should be to learn how to organize, direct and evaluate State investments, so that they can be strategic, flexible and mission-orientated."*** [196]

In addition, in the early stages as a strong and fair economy is being built and different sectors of that economy are developing, the use of tariffs and some export and import bans can be essential. As the development economists, Ha-Joon Chang and Ilene Grabel put it in their study *Reclaiming Development*, ***"Extensive infant industry protections were central to economic development in Britain in the eighteenth century and the USA in the nineteenth***

[194] Commission on Growth and Development, *The Growth Report*, (2008), p. 42, see also pp. 8 – 9, 23, 43; Chang, H-J., *Bad Samaritans*, (2008), pp. 14, 29 – 30, 59 – 60, 80, 82, 88 – 102; Yifu Lin, J., *The Quest for Prosperity*, (2014), pp. xiii – xiv, 94, 140 – 141, 147 – 160, 166 – 170, 176, 202, 205 – 206, 219 – 220, 245 etc.
[195] Yifu Lin, J., *The Quest for Prosperity*, (2014), pp. 147, 174, see also pp. xiii – xiv, 93, 147 – 148, 151 – 152, 172 – 175, 200, 205 – 206, 219 – 220, 228 – 229, 245; Rodrik, D., *One Economics, Many Recipes*, (2007), pp. 24, 28, 87 – 88, 92, 108, 114, 119 – 120, 167; Easterly, W., *The Elusive Quest for Growth*, (2002), pp. 187 – 191 etc.
[196] Mazzucato, M., *The Entrepreneurial State*, (2015), p. 1, but also see the whole book; Chang, H-J., *Kicking Away the Ladder*, (2002), pp. 18, 31, 33, 37, 39 – 41, 50, 61, 63, 65; *Benchmarking Productive Capacities in Least Developed Countries*, UN Conference on Trade and Development, (2016), pp. 28 – 30 etc.

and early twentieth centuries. Nearly all other industrialized countries also used tariffs, export subsidies and other measures of trade protection during the most important moments in their economic development (though not to as great an extent as in Britain or the USA.) During their development, the governments of today's industrialized countries used different combinations of the following policy tools: tariff levies; tariff rebates on imported inputs used in the production of exports; export subsidies; restrictions on the export of raw materials used by key industries; government regulation of the quality of goods produced for export; and government provision of information on export markets and marketing assistance. Many other countries later used these same policies successfully (e.g. Brazil, India and the East Asian newly industrializing countries)".[197]

Tax breaks,[198] subsidies[199] and public sector procurement[200] have all also been used as highly successful policies. State owned enterprises (especially in natural monopolies) have also played a key role.[201] All of these policies have been used extensively by developing nations as hugely important elements of their industrial development strategy, to get national businesses to a stage where they can fairly compete domestically and on the global scale. Some governments have also successfully combined this with maintaining an intentionally undervalued, competitive currency to boost exports.[202] Another absolutely crucial and widely recognised area has been developing ***"the infrastructure – the roads, rail, power transmission, port services, connectivity, water, sewerage, and the rest – that is necessary for any economy to develop"***, as the economist Jeffrey Sachs puts it.[203] Successful countries have also heavily invested in the right kind of education and technical training to build up a skilled domestic workforce for emerging industries. This has included scholarships to send citizens abroad to study, train and be exposed to cutting edge ideas at world class institutions (linked to employment on their return so those skills are captured for the nation), as well as developing national colleges and technical institutions at home.[204]

---

[197] Chang, H-J. & Grabel, I., *Reclaiming Development*, (2014), p. 62, see also pp. 10 – 12, 43, 58, 61 – 69, 75; Findlay, R. & O'Rourke, K., *Power and Plenty*, (2009), pp. 347, 395 – 402, 425 – 428, 466 – 467, 483 – 489, 492 – 493, 520 – 526; Landes, D., *The Wealth and Poverty of Nations*, (1998), pp. 256 – 275 etc.

[198] Commission on Growth and Development, *The Growth Report*, (2008), pp. 25, 48; *Global Value Chains and South-South Trade*, UN Conference on Trade and Development, (2015), pp. 45, 47; Chang, H-J., *Globalisation, Economic Development and the Role of the State*, (2003), p. 65 etc.

[199] Chang, H-J. & Grabel, I., *Reclaiming Development*, (2014), pp. 11, 62 – 69, 75; Commission on Growth and Development, *The Growth Report*, (2008), pp. 3, 16, 25, 30, 34, 48 – 49; Yifu Lin, J., *The Quest for Prosperity*, (2014), pp. 66 – 67, 100, 176, 244 etc.

[200] *Achieving the Global New Deal we Need*, UNCTAD, (2017) pp. 2 – 3; *Green Industrial Policy and Trade*, UN Industrial Development Organization and other agencies, (2017), pp. 10, 15 – 16, 24 – 25, 47, 49 – 52, 54, 60, 68, 91 – 109, 123, 125 – 127, 133 – 134; Mazzucato, M., *The Entrepreneurial State*, (2015), p. 80 etc.

[201] Chang, H-J., *Bad Samaritans*, (2008), pp. 14 – 15, 26, 29, 58 – 60, 103 – 121; Yifu Lin, J., *The Quest for Prosperity*, (2014), pp. 67, 100, 202 – 203; Commission on Growth and Development, *Post-Crisis Growth in Developing Countries*, (2010), p. 26 etc.

[202] *Making Trade Work for Least Developed Countries*, UNCTAD, (2016), p. 64; Chang, H-J. & Grabel, I., *Reclaiming Development*, (2014), pp. 168 – 179; Commission on Growth and Development, *The Growth Report*, (2008), pp. 7, 16, 49 – 52, 69 etc.

[203] Sachs, J., *The Age of Sustainable Development*, (2015), p. 129, see also pp. 3, 8 – 9, 75 – 78, 81, 87 – 88, 90, 92, 108, 130, 154 – 157, 251, 291; Collier, P., *The Bottom Billion*, (2008), pp. 58 – 61, 65, 87, 107 – 108, 177, 182; Chang, H-J., *Kicking Away the Ladder*, (2002), pp. 18, 30 – 31, 34, 37, 40, 45, 47, 61, 63 – 64 etc.

[204] Sen, A., *Development as Freedom*, (2001), pp. 41 – 49, 271 – 274, 292 – 297; Easterly, W., *The Elusive Quest for Growth*, (2002), pp. 168, 171, 289; Jacobs, M. & Mazzucato, M. (Eds.), *Rethinking Capitalism*, (2016), pp. 22, 212 – 213 etc.

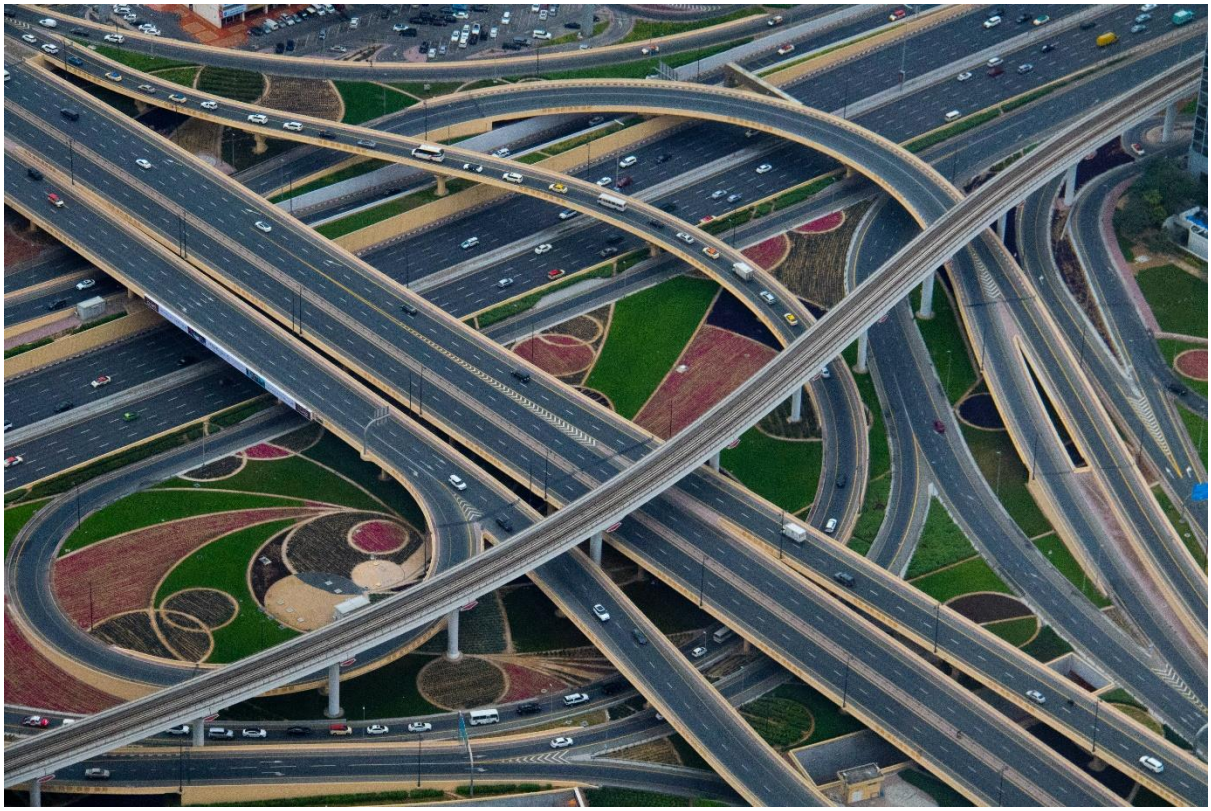

Figure 3.3: Investing in infrastructure such as roads, rail lines, power networks, water, ports, and online connectivity, is essential for national economic development.

To help finance their economic transition, developing countries should do everything possible to promote and encourage a high level of domestic savings, borrowing and investment via domestic banks and financial institutions, thus building the strength of the national finances. A special report of the Commission on Growth and Development, *Post-Crisis Growth in Developing Countries*, which supplemented the Commission's original *Growth Report*, stresses ***"Resilient countries, therefore, tend to have high levels of saving, which allows them to finance investment from domestic sources. This spares a country from the risks of a 'sudden stop' of foreign capital. The Growth Report pointed out that 'there is no case of a sustained high investment path not backed up by high domestic savings.' It recommended that countries open up to foreign capital 'only in step with their financial-market maturity.'"***[205] As this implies, developing countries should attract foreign investment but only of the right kind and at the right time. This means welcoming patient, stable and long-term capital, but using capital controls, limits on currency convertibility, pegged exchange rates and other tools to prevent short-term money which floods in but can rapidly and dangerously flood out again. This is increasingly widely recognised as crucial by development economist and experts.

The former World Bank Chief Economist Joseph Stiglitz notes in book, *Globalization and its Discontents* that in the 1980s and 90s, ***"Western banks benefited from the loosening of capital market controls in Latin America and Asia, but those regions suffered when inflows of speculative hot money (money that comes into and out of a country, often overnight, often little more than betting on whether a currency is going to appreciate or depreciate) that had***

[205] Commission on Growth and Development, *Post-Crisis Growth in Developing Countries*, (2010), p. 30, see also pp. 1, 26 – 27; Chang, H-J. & Grabel, I., *Reclaiming Development*, (2014), pp. 39, 116 – 124, 133; Rodrik, D. (Ed.), *In Search of Prosperity*, (2003), pp. 155, 157, 224, 321 etc.

poured into countries suddenly reversed. The abrupt outflow of money left behind collapsed currencies and weakened banking systems." [206] Governments also need to set strong direction over the national financial sector and investment, through targets and various policy measures to ensure private finance goes to the sectors that need it for national economic development.[207]

Policies for maturing the economy

It is also crucial for governments to maintain macroeconomic stability, using whatever policies are necessary to avoid dramatic inflation, banking collapses, depletion of foreign currency reserves, spiralling debt, mass unemployment etc. in order to give the private sector the stable financial environment it needs to develop and thrive.[208] A key part of this is to establish a central bank where one doesn't exist already. Alongside these macro-level policies for national economic development, governments should also pursue policies that promote local level economic flourishing. This includes a real focus on developing and growing Small and Medium Enterprises (SMEs), widely recognised by exerts as the backbone of any economy. As the Zambian economist and World Bank consultant Dambisa Moyo rightly stresses in her book *Dead Aid*, ***"The entrepreneurs (their small and medium-sized enterprises) are the life-blood of any economy, and the crucial emerging private sector in poor countries is the engine for private-sector-led growth."*** [209] A major part of this is to reduce and simplify regulation making it quick and easy to register and set up a new business. A key paper by the think tank Chatham House rightly stresses this, drawing attention to a seminal World Bank study in 2002 which led to the Bank's annual *Doing Business* report on how easy it is to set up and run businesses in different countries around the world, ***"An initial project on The Regulation of Entry, led by Djankov et al. (2002), placed the spotlight firmly on the barriers to starting a new business, tallying both the time and the financial costs of starting a formal business in a sample of 85 countries. The work highlighted massive variances across countries. At one end, would-be entrepreneurs in Canada could register a business in two steps, taking only two days at a cost of 1.5% of per capita GDP. At the other extreme, entrepreneurs in the Dominican Republic had to complete 20 steps, taking 80 days and costing 463% of GDP per capita. The high costs of entry are difficult to rationalize. But this analysis appears to have spurred substantial reforms, which lowered the costs of registering. For example, in Sri Lanka, registering a business took eight steps and an average of 23 days in 1999, but in 2012 this improved to five steps taking seven days."*** [210] The regulation and red tape required to run a business day-to-day should also be reduced as much as possible.[211]

---

[206] Stiglitz, J., *Globalization and its Discontents*, (2002), p. 7, see also pp. 16 – 17, 93 – 96, 99 – 101, 123 – 125, 236 – 237, 251; Sachs, J., *The End of Poverty*, (2005), pp. 17, 39 – 40, 43, 59, 72, 85, 161 – 162, 164 – 165, 169, 178, 264; Collier, P., *The Bottom Billion*, (2008), pp. 87 – 91, 95 etc.

[207] Rodrik, D., *One Economics, Many Recipes*, (2007), pp. 18 – 19, 117 – 118, 120 – 121, 123 – 130, 158, 226; Chang, H-J. & Grabel, I., *Reclaiming Development*, (2014), pp. 11, 75, 153 – 163; Stiglitz, J., *Making Globalization Work*, (2006), p. 49 etc.

[208] Commission on Growth and Development, *The Growth Report*, (2008), pp. 4 – 5, 21, 24, 29, 34, 53 – 54, 71 – 73, 76; *Making Trade Work for Least Developed Countries*, UN Conference on Trade and Development, (2016), pp. 63 – 64; Easterly, W., *The Elusive Quest for Growth*, (2002), pp. 226 – 229 etc.

[209] Moyo, D., *Dead Aid*, (2010), p. 124, see also pp. 125, 140; *Transforming our World: The 2030 Agenda for Sustainable Development*, UN General Assembly, (2015), pp. 10, 19; *Doing Business*, World Bank, (annual report) etc.

[210] *Registering for Growth*, Chatham House, (2013), p. 4; *Doing Business*, World Bank, (annual report); Easterly, W., *The White Man's Burden*, (2007), p. 97 etc.

[211] Green, D., *From Poverty to Power*, (2012), pp. 125, 140, 151; *Doing Business*, World Bank, (annual report); *UNCTAD Findings on Services, Development and Trade*, UN Conference on Trade and Development, (2014), pp. 10 – 11, 26 etc.

If SMEs fail it is crucial to have quick and easy bankruptcy laws enabling them to be wound up rapidly and a new initiative begun.[212] In many nations, helping SMEs (and indeed the vast majority of the population) to have access to capital, insurance, banking and other essential financial services they so often lack, is also critical.[213] Governments also need to create and provide access to markets to enable SMEs to sell their products and services.[214] In many developing countries a significant effort should also be made to formalise the (often very large) informal economy. This means giving all SMEs full legal identity with its associated protections and opportunities as well as its obligations, such as paying tax and ensuring good conditions and fair pay for employees. A report on the subject by the London-based international affairs think tank Chatham House, *Registering for Growth*, found that ***"Low- and lower-middle-income countries typically have a large informal sector, very high self-employment rates and low levels of tax collection … For governments in developing countries, getting firms to register should not be simply a cost-benefit calculation involving a trade-off between enforcement costs and tax collection. Registration can also improve the attitude of small business owners towards the state and, more importantly, help stimulate economic growth."*** These findings are backed up by multiple other studies.[215]

If economic development is to be successful in driving down poverty, it needs to be fair as well as strong, and indeed making it fairer increases its strength. Thus, successful nations have made use of policies, such as setting minimum wages, maximum wages and establishing ratios between the highest and lowest paid employee in any company to prevent obscene levels of inequality emerging. There is growing recognition of the importance of such steps from politicians, economists, activists and other experts.[216] Successful nations have also allowed, established and supported trade unions, with appropriate checks and balances. Trade unions have played a critical role in ensuring strong and fair economic development. They need to be strengthened again after several decades where their role has been weakened. As the economists Michael Jacobs and Marianna Mazzucato, point out in their book *Rethinking Capitalism*, ***"Employees have in effect become too weak, as trade unions have lost powers and membership, and deregulated, 'flexible' labour markets have allowed employers to bargain wages and working conditions down. Crucially, as experience of legal minimum wages has shown, raising wages tends to force firms to invest in improving productivity, which strengthens economic performance. Public policy therefore has an important role in***

[212] *Doing Business*, World Bank, (annual report); *Making Globalization Socially Sustainable*, World Trade Organization, (2011), p. 136; Ferguson, N., *The Ascent of Money*, (2009), pp. 60 – 62 etc.
[213] Yifu Lin, J., *The Quest for Prosperity*, (2014), pp. 100, 109 – 110, 138 – 139, 161, 232; see also Goetzmann, W., *Money Changes Everything*, (2017); *Voices of the Poor 1: Can Anyone Hear Us?*, World Bank, (2000) pp. 166 – 169; *Voices of the Poor 2: Crying Out for Change*, World Bank, (2000), pp. 45, 47, 49, 56 – 59, 69, 207, 216 – 218, 268 – 269; *Voices of the Poor 3: From Many Lands*, World Bank, (2000), pp. 43, 61 – 63, 73 – 74, 134 – 135, 139, 168, 199 – 200, 207 – 208, 283, 434, 488 – 489
[214] *Voices of the Poor 2: Crying Out for Change*, World Bank, (2000), pp. 49, 267; *Voices of the Poor 3: From Many Lands*, World Bank, (2000), pp. 92, 400, 434; *Transforming our World: The 2030 Agenda for Sustainable Development*, UN General Assembly, (2015), pp. 15, 20; *Plan of Implementation of the World Summit on Sustainable Development*, UN, (2002), pp. 4, 24 – 26, 37 etc.
[215] *Registering for Growth*, Chatham House, (2013), p. 1, see also the rest of the report; *Humanity Divided*, UN Development Programme, (2013), pp. 246 – 247; *How Developing Countries can Take Control of Their own Tax Destinies*, Tax Justice Network, (2014), p. 6 etc.
[216] *Even it Up*, Oxfam, (2014), pp. 22, 26, 64, 73, 75 – 80, 115 – 116; Pickett, K. & Wilkinson, R., *The Spirit Level*, (2010), pp. 184, 245 – 246, 249 – 251, 254, 271; Atkinson, A., *Inequality*, (2015), pp. 73 – 74, 79, 148 – 153, 250 – 252, 303 etc.

regulating labour markets, promoting both trade union membership and employee ownership of capital".[217]

As part of encouraging a healthy and diverse economy, governments should encourage more cooperatives and employee owned companies rather than just relying on private and share-holder owned companies. They should also restrict how large a proportion of total shares any one party can hold. This is not because there is anything fundamentally wrong with the share-holder model, but because greater diversity and more democratic business models in the mix will be healthy for the economy as a whole. Multiple studies have pointed to the benefits of such models.[218] As the national economy develops and moves up through the value chain, some sectors and businesses that have previously provided widespread employment will decline, whilst new ones will open up at each stage, in the familiar process of 'creative destruction'. Governments must ease the pain for communities whose jobs and livelihoods are caught up in this process, through helping them to retrain and find new employment, and through providing a social safety net of basic services as they transition (which we will turn to later). A key report from the World Trade Organization, *Making Globalization Socially Sustainable*, stresses precisely this point, ***"Labour markets need to be sufficiently flexible to permit reallocating workers from less-productive to more-productive establishments without intervening long spells of unemployment. As part of this flexibility, safety nets need to be in place so that workers adversely impacted by reallocation can be assisted in finding new employment without distorting the process of reallocation."*** [219]

If and when the economy experiences slow downs, recessions and hard times, governments should invest in significant 'counter-cyclical spending' through mass employment and public works programmes on infrastructure and other key priorities for economic development. This provides both immediate support for those negatively affected and crucial stimulus to get the economy going again. These are the kinds of policies we saw many governments around the world deploy effectively in the wake of the 2008-9 global financial crisis and the 2020 Covid-19 outbreak. The former World Bank Chief Economist Joseph Stiglitz stresses this key point again and again in his book *The Price of Inequality*, ***"Since the time of the great British economist John Maynard Keynes, governments have understood that when there is a shortfall of demand – when unemployment is high – they need to take action to increase either public or private spending" … "an expansion of spending can actually expand production by creating jobs that will be filled by people who would otherwise be unemployed" … "Government investments – in infrastructure, education and technology – underpinned growth in the last century, and they can form the basis of growth in this century. These investments will expand the economy and make private investment even more attractive. As the economic historian Alex Fields has pointed out, the decades of 1930s, 40s, 50s, and 60s***

[217] Jacobs, M. & Mazzucato, M. (Eds.), *Rethinking Capitalism*, (2016), pp. 22 – 23, see also pp. 144, 147, 198; Stiglitz, J., *The Price of Inequality*, (2012), pp. 38, 64 – 65, 80, 281 – 282; *Even it Up*, Oxfam, (2014), pp. 15, 26, 56, 74 – 75, 77, 116 etc.

[218] Pickett, K. & Wilkinson, R., *The Spirit Level*, (2010), pp. 252 – 264; Raworth, K., *Doughnut Economics*, (2017), pp. 88 – 89, 188 – 191, 278; Porritt, J., *Capitalism as if the World Matters*, (2007), pp. 208 – 210 etc.

[219] *Making Globalization Socially Sustainable*, World Trade Organization, (2011), p. 136, see also pp. 21 – 47, 51, 78; *Green Industrial Policy: Concept, Policies, Country Experiences*, UN Environment Programme and various agencies, (2017), pp. 11, 58 – 62, 77, 81 – 82; *Making Trade Work for Least Developed Countries*, UN Conference on Trade and Development, (2016), p. 75 etc.

were periods of high productivity increases – higher than the decades before and after – and much of this success had to do with public investments." [220]

Figure 3.4: When the economy experiences slow downs, governments should invest in significant 'counter-cyclical spending' through mass employment and public works programmes on infrastructure and other key priorities for economic development.

As the economy develops, other policies will become more important. Governments will want to act to prevent monopolies and cartels building up in order to keep the market competitive and fair and prevent an unhealthy concentration of power.[221] Some of the policies which were effective in kick starting and building up domestic industries and sectors in the early stages, such as tariffs; import and export bans; subsidies; undervalued currencies; local content requirements for Transnational Corporations (TNCs); preventing TNCs operating where they might undermine significant domestic industries etc. may well need to be scaled back and phased out once an advanced economy has been established and domestic industries are ready to compete fairly on a global level. Such policies are appropriate to protect infant domestic industries and economies as they grow, rather than forcing them to immediately compete with massive multinationals which have had much longer to develop (and in almost every case enjoyed significant protection from their own governments when they were doing so). However, in the long-term, to be sustainable, businesses need to be able to survive and thrive without permanent support from governments, and economies need to gradually open up and

[220] Stiglitz, J., *The Price of Inequality*, (2012), pp. 86, 230, 283, see also pp. 231 – 237, 282; Commission on Growth and Development, *Post-Crisis Growth in Developing Countries*, (2010), pp. 30 – 33; Jacobs, M. & Mazzucato, M. (Eds.), *Rethinking Capitalism*, (2016), pp. 21, 28 – 34, 105 – 106, 119 – 133, 148, 210 – 211 etc.
[221] Acemoglu, D. & Robinson, J., *Why Nations Fail*, (2013), pp. 35 – 40, 102 – 103, 187 – 188, 193 – 194, 197, 208, 221, 322 – 325, 333; Stiglitz, J., *Making Globalization Work*, (2006), pp. 199 – 203, 286; Sen, A., *Development as Freedom*, (2001), pp. 120 - 121 etc.

be able to engage and compete openly in the global market on equal terms. As the Oxfam development expert, Duncan Green, noted when reviewing the history of nations that had achieved successful economic development in his book *From Poverty to Power*, ***"As economies developed and became more complex, and industries achieved industrial competitiveness, the costs and benefits of state intervention in both agriculture and industry shifted, and governments started to reduce their role and to open up the economy – exactly the sequence that rich countries pursued at an earlier stage of their development. Deregulation and liberalisation are thus better seen as the outcomes of successful development, rather than as initial conditions."*** [222]

Finally, throughout this long process of building a strong and fair economy, it is essential that the policies and approaches being used to encourage national development are communicated in schools as well as explained more widely in society through publicly funded information and education campaigns. This helps people to understand the national economic development strategy and why some short-term sacrifices, like foregoing immediate consumption in favour of greater savings, and buying national products in order to boost domestic industries, are very much in their interests and will help lift their nation out of poverty. So in summary …

Governments should:

Industrial and economic development strategy

- Develop domestic industries and businesses
- Develop these further and further up the value chain, moving from agriculture and the export of natural resources; to labour intensive assembly; to simple manufacturing; more advanced manufacturing and eventually into services and the knowledge economy
- Develop industries that meet domestic need but also boost exports and engage in international trade
- Pursue a diverse economy
- Ensure economic development is powered by clean energy and the sustainable use of natural resources (circular economy)
- Drive economic development through a proactive and intentional government industrial and economic development strategy
- Build a positive partnership between government and business to work together to pursue this strategy
- Be flexible to adopt and change policies at different times within this strategy, choosing the right economic path for the nation, rather than holding doggedly to any one particular market ideology
- Include targets and indicators for specific sectors and businesses that have been prioritised for support within this strategy. If a policy is not working or companies fail to achieve as desired, then the policy should be changed and support withdrawn

Targeted policies to move up the value chain from agriculture, to manufacturing, to services and the knowledge economy

- Enforce private property rights and contracts
- Formalise with full legal deeds the ownership of the land by the communities that dwell upon it, especially indigenous communities
- Reform and modernise the agricultural sector, boosting productivity

[222] Green, D., *From Poverty to Power*, (2012), p. 152, see also p. 117; Commission on Growth and Development, *The Growth Report*, (2008), pp. 7, 49, 68; Rodrik, D., *One Economics, Many Recipes*, (2007), pp. 115, 216 – 217, 219 – 220 etc.

- Invest the profits from natural resource and commodity exports in sovereign wealth funds to help drive the process of economic development and moving up the value chain to more advanced manufacturing, services and knowledge economies
- Focus on securing the transfer of technology, both scientific/technical and best practice in business processes, from more advanced economies
- Attract and allow Transnational Companies to operate, but only on terms that extract maximum value in technology transfer and tax for the nation
- Create industrial clusters and export zones
- Invest public money in research and development to advance domestic technology and industry
- Use tariffs, export bans and import bans to support the early stage development of new sectors and domestic businesses
- Use tax breaks to support the early stage development of new sectors and domestic businesses
- Use subsidies to support the early stage development of new sectors and domestic businesses
- Use public procurement to support the early stage development of new sectors and domestic businesses
- Establish some state owned industries, especially in areas of natural monopoly
- Maintain an undervalued competitive currency to boost exports
- Build infrastructure such as ports, roads, railways, airports, electricity and good phone and internet connections
- Develop a skilled domestic workforce for new industries through establishing education and technical training at home and sending citizens to study abroad
- Encourage domestic savings, borrowing and investment via domestic banks and financial institutions, thus strengthening the national finances
- Attract stable, long-term foreign investment, but use capital controls, limits on currency convertibility, pegged exchange rates and other tools to prevent destabilising short-term capital which can flood in and out quickly
- Provide strong direction to the financial sector to ensure investment goes where it is needed for national economic development

Policies for maturing the economy

- Maintain macroeconomic stability
- Establish a central bank
- Focus on supporting Small and Medium Enterprises (SMEs) as the backbone to the economy
- Make it quick and easy to set up a new business
- Reduce and simplify red tape and bureaucracy in the daily running of a business
- Establish quick and easy bankruptcy laws so if a business fails it can be wound up rapidly and a new initiative begun
- Provide access to financial services such as banking, capital and insurance for SMEs and all citizens
- Create and provide access to markets
- Formalise the informal sector
- Set a minimum wage, a maximum wage and establish a ratio between the highest and lowest paid employee in any company
- Allow, establish and support trade unions
- Restrict the amount of shares any one interest can hold in a company

- Support the development of more cooperatives and employee owned companies
- Generously support and retrain any community that finds the area of the economy on which they depend for a livelihood declining as strong and fair economies are built, so they can find employment in new areas that are opening up
- Invest in counter-cyclical spending through mass employment and public works programmes on infrastructure and other key priorities to provide job security and re-stimulate the economy during recession and slow downs
- Prevent monopolies and cartels
- Make short-term use of tariffs, subsidies, tax breaks, public procurement and other stimulation mechanisms to help business sectors as they develop, but phase these out over the long-term when industries are ready to compete internationally
- Explain the national industrial and economic development strategy in schools and through public information campaigns so citizens understand and can get behind it

Support internationally

Whilst national governments pursue the actions above to play the leading role in securing their own national economic development, the international community can do a lot to support them. First and foremost, this is the right thing to do morally to help lift millions out of poverty around the world. It is also in the interests of the international community to do this. Developed countries trade far more with other developed nations than they ever do with poorer nations. Increasing the wealth of countries vastly increases mutually beneficial trade. Development also decreases widespread economic migration, and increases peace and stability, reducing conflict and global terrorism.

As a first step, the international community should reform the rules of the World Trade Organization (WTO) and various major bilateral trade agreements to give developing countries maximum freedom to pursue the full range of the policies outlined in the previous section in the early stages of their economic development. These are the same policies that every developed country used successfully themselves in the past, and which are currently constrained by some of these international agreements. Once again the economist Joseph Stiglitz notes this, when he explains in his book *Making Globalization Work*, that ***"Increasingly, a government's inability to control the actions of individuals or companies is also limited by international agreements that impinge on the right of sovereign states to make decisions. A government that wants to ensure that banks lend a certain fraction of their portfolio to underserved areas, or to ensure that accounting frameworks accurately reflect a company's true status, may find it is unable to pass the appropriate laws. Signing on to international trade agreements can prevent governments from regulating the influx and outflow of hot, speculative money, even though capital market liberalization can lead to economic crisis."*** [223]

Alongside this, the international community should not attempt to force market liberalisation or any other ideological economic model on developing countries, but instead allow them the freedom to use whatever policies work best to develop their economies. This means ensuring particular economic policies are not pushed as conditions for loans through the 'hard levers' of

[223] Stiglitz, J., *Making Globalization Work*, (2006), pp. 20 – 21, see also pp. 56, 76 – 81, 84 – 85, 129 – 131; Rodrik, D., *One Economics, Many Recipes*, (2007), pp. 122 – 150, 204, 213 – 216, 223 – 236, 240; Chang, H-J., *Globalisation, Economic Development and the Role of the State*, (2003), pp. 292 – 293, 325 – 328 etc.

institutions like the World Bank, International Monetary Fund or regional development banks. It also means ensuring such policies are not pushed through the 'soft levers' of economic and technical advice that the international community may be giving to developing nations as part of overseas aid programmes. The devastating impacts of such policies have been brought into ever greater recognition by multiple studies by academics and institutions. In one of the most moving cases, a key finding of *Voices of the Poor*, a study surveying grassroots communities in dozens of countries across the developing world conducted by the World Bank, was that ***"Poor people from several countries expressed deep concern over the economic upheavals and policy changes that are buffeting their lives … Depending on the country, poor people mentioned privatization, factory closures, the opening of domestic markets, currency devaluation, inflation, reductions in social services, and other related changes as having depleted their assets and increased their insecurity … Poor people adopt a wide range of coping strategies that help in the short term but lead to increased vulnerability and a depleted asset base. Mothers serve fewer meals, women accept demeaning and very low paid work, men migrate, children are withdrawn from school, health care is deferred, housing crumbles, and old people stay in bed to conserve energy. When crises are prolonged, people deplete their savings, sell their property, and assume more and more debt. People also said they lose sleep, become less social, and sometimes turn to activities outside the law."*** In summary ***"Economy-wide policies and market downturns can have sharply adverse effects on poor people's livelihoods, ability to purchase food, and access to basic services. In some places, the opening of domestic markets to international competition has forced small producers to compete with lower-priced foreign goods or has made key imported inputs unaffordable. In other places, people have found themselves pushed into the low end of the informal sector as policy and market changes have led to factory closures and the collapse of large farms and agro-industries."*** [224]

At the same time, developed nations should be scrapping their own subsidies and opening up their economies to developing nation exports to help accelerate their economic development. There is much that could be improved here; the current situation is shameful. Martin Meredith is but one amongst many who have called for this, pointing out in his work *The State of Africa* that ***"industrialised countries operate a system of subsidies and tariff barriers that have a crippling effect on African producers. The total value of their agricultural subsidies amounts to more than 1 billion dollars a day – $400 billion a year – nearly as much as the gross domestic product of the whole of sub-Saharan Africa. Western surpluses produced at a fraction of their real cost are then dumped on African markets, undermining domestic producers. Simultaneously, African products face tariff barriers imposed by industrialised countries, effectively shutting them out of Western markets."*** [225]

The international community should also scrap or significantly weaken patent law and intellectual property rights, except in the creative industries, including reforming the *Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPs)* and relevant World Trade Organization rules. Such agreements and laws are touted as incentivising innovation. In reality there is little evidence for this. Getting new products to market first and best; drawing heavily from open source academic and state funded research; public brand recognition and industry secrecy, are all seen by business leaders as much more important for

[224] *Voices of the Poor 3: From Many Lands*, World Bank, (2000), pp. 471 – 472, 288, see also pp. 333 – 361, 471 – 476; *Voices of the Poor 2: Crying Out for Change*, World Bank, (2000), pp. 169 – 171; Stiglitz, J., *Globalization and its Discontents*, (2002); Chang, H-J., *Bad Samaritans*, (2008) etc.
[225] Meredith, M., *The State of Africa*, (2013), pp. 695, see also p. 696; Collier, P., *The Bottom Billion*, (2008), pp. 159 – 160; Moyo, D., *Dead Aid*, (2010), pp. xi, 114 – 119 etc.

stimulating innovation. Instead, tough patent and intellectual property law hinders the natural free flow of technology and ideas to poorer countries, which we have seen is critical for economic development. Once again this is especially pertinent since the world's developed countries made extensive use of technology transfer (and sometimes outright theft of technology and ideas) during their own process of economic development. Ha-Joon Chang is only one among many development economists to sound the warning that unless the current system of patents and intellectual property rights is radically reformed ***"developing countries are likely to find it difficult to develop their own technological capabilities. With severe restrictions on their opportunities to imitate and make minor improvements – routes that have been so crucial in the development of technological capabilities in the now advanced countries"***.[226]

The international community can further help to facilitate and accelerate the natural process of the adoption of the latest business thinking and technology, through proactively training, mentoring and supporting civil servants, entrepreneurs and business people from developing countries.[227] The international community should live up to commitments they have already made to cancel the historic and unpayable debt of the world's poorest nations, often lent and borrowed decades ago under dubious conditions, to release these nations, rather than hold them back, as they develop strong and fair domestic economies. This should be additional to overseas aid budgets. They should also ban future irresponsible lending and create an international bankruptcy mechanism to enable nations that are trying to do the right thing, but have become crippled with historic unpayable debt, to wipe the slate clean and have a fresh start.[228]

The international community has a further key role to play by reforming and providing much tougher regulation of their financial sectors to prevent recurrences of events like the 2008 financial crisis, which have hugely detrimental effects on developing countries. In practice this means: 1) preventing predatory lending and overly risky behaviour; 2) increasing capital reserve requirements to restrict reckless lending and ensure reserves are higher; 3) separating regular 'high street' banking from riskier commercial international finance; and 4) ensuring no bank becomes 'too big to fail'. Individual firms and staff should also be held legally accountable for criminal behaviour and reckless actions. As the British economist Diane Coyle observes, ***"There is as close to consensus as I've ever experienced in the economics profession that the financial sector should not be allowed to retain the structure and behaviours that caused the crisis – although as yet politicians have done nothing fundamental. The banks are too big, too connected to each other so that when one failed the whole system came tumbling down, and too similar so that each went awry in the same way. They have served low-income customers very poorly indeed. Plenty of reforms have been suggested. Through breakups enforced by antitrust agencies and through regulations such as higher capital requirements, banks should be made smaller."*** [229]

---

[226] Chang, H-J., *Globalisation, Economic Development and the Role of the State*, (2003), p. 298, see also pp. 273 – 304; *Even it Up*, Oxfam, (2014), pp. 23, 94 – 95, 119; *Making Trade Work for Least Developed Countries*, UN Conference on Trade and Development, (2016), p. 13 etc.

[227] *UNCTAD Findings on Services, Development and Trade*, UNCTAD, (2014), p. 22; Easterly, W., *The White Man's Burden*, (2007), p. 322; Collier, P., *The Bottom Billion*, (2008), pp. 111 – 115 etc.

[228] *Transforming our World: The 2030 Agenda for Sustainable Development*, UN General Assembly, (2015), pp. 26, 29; Sachs, J., *The End of Poverty*, (2005), pp. 59, 85, 99 – 102, 106 – 107, 280 – 281, 342 – 343; Ghani, A. & Lockhart, C., *Fixing Failed States*, (2009), pp. 18, 160 – 163 etc.

[229] Coyle, D., *The Economics of Enough*, (2011), p. 277, see also pp. 85 – 92, 217, 226 – 228, 256 – 257, 277 – 279; Goldin, I., *Divided Nations*, (2014), pp. 10 – 18, 53, 78 – 81, 130; Stiglitz, J., *The Price of Inequality*, (2012), pp. xiv – xvi, 34 – 36, 40, 80, 89 – 90, 119, 167 – 169, 175, 178, 191 – 202, 246 – 248, 269 – 270 etc.

Figure 3.5: The international community can support nations as they develop, through tougher regulation of financial markets, to prevent destabilising global economic crises.

As well as actioning this in their own nations, the international community should also work collaboratively through global institutions, such as the G20 or the International Monetary Fund, to agree global deals establishing international rules in these areas and to spot and manage global economic shocks when they do occur. If the worst happens, the lessons from history indicate that it is better for governments to guarantee and bail out major banks and create extra credit to restore confidence in the system as they did in 2008 and 2009, rather than allowing them to fail and collapse triggering global depression as happened in 1929. As the economist Stephanie Kelton wrote in an essay in the book *Rethinking Capitalism*, looking back on the 2008 – 2009 financial crisis, ***"the full-blown catastrophe that the financial crash could have triggered has been averted; an economic depression like the one experienced after the 1929 crash did not materialise … the answer can only be found in the prompt reaction – partly intentional but partly automatic – of fiscal and monetary policy variables. This is what really differentiated the present crisis from that of 1929: the combination of aggressive liquidity provision, actively enforced by central banks, plus large public deficits, mainly due to a mechanical reaction of government budgets to the economic downturn prevented a new Great Depression."*** [230] Ideally, tougher regulation and the reforms outlined above should decrease the frequency of this scenario occurring. All of these approaches should be taught in schools as well as promoted more widely in society throughout the international community, through publicly funded information and education campaigns, so that current and future

[230] Kelton, S., *The Failure of Austerity: Rethinking Financial Policy*, in Jacobs, M. & Mazzucato, M. (Eds.), *Rethinking Capitalism*, (2016), p. 28, see also pp. 3, 29 – 34; Commission on Growth and Development, *Post-Crisis Growth in Developing Countries*, (2010), pp. 7 – 8, 16 – 17, 25 – 26, 32 – 34, 37; Piketty, T., *Capital in the Twenty-First Century*, (2013), pp. 472 – 473, 547 – 553 etc.

generations understand how their nations can help developing nations to lift themselves out of poverty. So in summary …

The international community should:

- Reform the rules of the World Trade Organization (WTO) to give developing countries maximum freedom to pursue protectionist and other policies in the early stages of their economic development
- Not force economic liberalisation or any other ideological model onto developing nations, either overtly through the multinational system or covertly through technical advice and support, but allow them the freedom to choose the economic path that works for them
- Scrap subsidies and open up their own economies to developing nation exports
- Scrap or significantly weaken patent law and intellectual property rights (except in the creative industries), including reforming the *Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPs)* and relevant WTO rules, to support the transfer of technology and ideas to developing countries
- Provide generous training, mentoring and support for developing country civil servants, entrepreneurs and business people
- Cancel unpayable developing country debt, and treat this as additional to, rather than part of, overseas aid
- Ban future irresponsible lending
- Create an international bankruptcy mechanism to allow nations crippled with historic unpayable debt to wipe the slate clean and start afresh
- Provide tougher regulation of the financial sector to: 1) prevent predatory lending and overly risky behaviour; 2) increase capital reserve requirements; 3) separate regular from commercial banking; and 4) ensure no bank becomes 'too big to fail'. Ensure individual companies and staff are held legally accountable for criminal behaviour and reckless actions. Work together through global institutions to agree global deals to establish international rules in these areas
- Work together to spot and manage global economic shocks when they do occur through guaranteeing and bailing out major banks and creating extra credit to restore confidence in the system
- Teach these approaches in schools and through public information campaigns so that current and future generations understand how their nations can and are helping developing nations lift themselves out of poverty

Tax and social spending

As we have seen, a strong and fair economy is an essential pre-requisite for wide-scale poverty reduction. However, as we have also seen, it is not enough in itself. Governments also need to tax that economy and redistribute the proceeds through the provision of services to ensure all benefit and no one is left behind.[231] Once more, this is a process that must be led domestically but which the international community can also support. Furthermore, it should be noted that all the lessons from history in this area help to reduce both absolute poverty and relative inequality within nations. Tax and social spending policies should not be delayed until after a strong and fair economy has been developed. They should be implemented at the same

[231] Sachs, J., *Common Wealth*, (2008), pp. 255 – 268; Deaton, A., *The Great Escape*, (2013), pp. 93 – 100, 105, 115 – 125, 143 – 149, 151; Castles, F., Leibfried, S., Lewis, J., Obinger, H. & Pierson, C. (Eds.), *The Oxford Handbook of the Welfare State*, (2010) etc.

time as the policies for developing a strong and fair economy outlined above. Indeed, there is a growing wealth of evidence that taxation and social spending policies also significantly contribute to the development of strong and fair economies, helping to develop, for instance, a better educated, healthier, wealthier workforce with fewer social costs.[232]

Lead domestically

There are many lessons to learn from countries that have effectively driven down poverty and inequality through tax and social spending. Starting with Bismarck's welfare reforms in Germany in the 1880s (one of the first examples of states using tax money to provide basic social protection), nations throughout Europe, North America, Oceania and Latin America took on the provision of a growing amount of social spending from the late nineteenth century and throughout the first half of the twentieth century. This intensified even further after the Second World War and spread to Asia and Africa, as new independent governments emerged from the end of colonialism. Today, virtually all nations around the world attempt to tax and provide basic services to some degree or other. There are hundreds of nations we can turn to for lessons on how to do this effectively.

First, we see that nations need to establish and implement an effective taxation system. As a key report from the UN Development Programme on tackling inequality, *Humanity Divided*, stresses, ***"a well-functioning tax administration system remains critical for mobilizing resources. Successful tax administration reforms have moved towards coherent systems, in semi-autonomous revenue authorities protected from political interference, and with independence in operations and human resource management (Cornia et al., 2011). There is mostly only anecdotal evidence on the impact of revenue authorities, but this points towards an improvement in the effectiveness of revenue collection and of managerial and staff capacity (IMF et al., 2011). Creating and updating reliable databases of taxpayers is also an important mechanism to improve the effectiveness of tax authorities. Segmenting the taxpayer population between small, medium and large taxpayers, who have very different needs, can also help enable a better allocation of administrative resources and facilitate compliance. Generally, it is more important to allocate resources and staff to ensure compliance of large taxpayers, while the tax collection for small enterprises needs to be simplified."*** [233] Taxation should be on a progressive sliding-scale so the poorest pay little or nothing and the richest pay the most. This is a key principle, widely recognised by economists, experts and leading development agencies like Oxfam, who in their report, *Working for the Many*, strongly recommended, ***"Governments must also prioritize progressive tax policies that fight inequality, taxing everyone according to their means",*** for all the evidence ***"underlines a double imperative for governments: to ensure progressive taxation that can redistribute once when collected and again when spent on inequality-busting public services."*** [234]

[232] Stiglitz, J., *The Price of Inequality*, (2012), pp. 5 – 6, 22 – 23, 92; *Even it Up*, Oxfam, (2014), pp. 9 – 10, 39 – 40, 66; *Inclusive Growth and Development Report*, World Economic Forum, (regular report) etc.
[233] *Humanity Divided*, UNDP, (2013), p. 247, see also pp. 244 – 246; Murphy, R., *The Joy of Tax*, (2015), pp. 25 – 27, 128 – 206; *Owning Development: Taxation to Fight Poverty*, Oxfam, (2011); etc.
[234] *Working for the Many*, Oxfam, (2014), pp. 19, 2, but also see the whole report; Piketty, T., *Capital in the Twenty-First Century*, (2013), pp. 335, 373 – 374, 443 – 444, 455, 471 – 473, 493 – 539, 572 – 573; *Poverty and Shared Prosperity*, World Bank, (regular report) etc.

A balance needs to be struck here so that tax is not set at a level that disincentivises business and entrepreneurial activity. This can be helped by ensuring that as far as possible, tax is focused on capital and unearned inherited wealth as opposed to income. Socially, nations should encourage work and achievement, and try not to penalise people for working hard. However, they should prevent spiralling inequality and social incohesion through the emergence of a new financial aristocracy who have inherited their fortunes or simply live off the interest generated by large sums of capital and have no need to work at all. The Bible's lessons on good work for all and avoiding creating dependency and a non-working culture (which we saw earlier) are fair and apply to those at the top as much as to those at the bottom. This approach is now being espoused by growing numbers of economists and development experts, perhaps most famously in recent years by the French economist Thomas Piketty, who concludes in his book *Capital in the Twenty-First Century*, ***"the ideal policy for avoiding an endless inegalitarian spiral and regaining control over the dynamics of accumulation would be a progressive global tax on capital. Such a tax would also have another virtue: it would expose wealth to domestic scrutiny, which is a necessary condition for effective regulation of the banking system and international capital flows. A tax on capital would promote the general interest over private interests while preserving economic openness and the forces of competition."*** [235]

Activity that is socially bad (smoking, unhealthy foods, environmental damage etc.) should be discouraged by taxing it as heavily as possible, and conversely, activity that is good (healthy foods, social causes etc.) should be taxed as little as possible. The former senior researcher for the UN Development Programme Kate Raworth, is one of a growing number of economists and politicians to stress this point in her book *Doughnut Economics*, ***"Governments have historically opted to tax what they could, rather than what they should, and it shows. Tax windows and you'll get dark houses, as Britain discovered in the eighteenth and nineteenth centuries; tax employees and you'll head for a jobless economy, as many countries are discovering today."*** Instead what is needed, among other taxing of social undesirable activity, is ***"The long-advocated switch from taxing labour to taxing non-renewable resources".*** [236] When it comes to public spending, governments may cautiously borrow money to invest in some of the areas listed above under Strong and fair economy, since this should generate increased economic returns for the nation, and thus the debt can be paid off. However, all state social spending of the kind outlined in this section needs to be funded from tax, not borrowing, which can trap a nation in spiralling debt. For, as the British economist Diane Coyle says in her work, *The Economics of Enough*, ***"in almost every rich economy governments have already borrowed some money to finance welfare, health, and pension systems, and will have to borrow a great deal more in the future to continue with these systems."*** [237]

We have already seen in the lessons from the Bible that tax should be used to fund social spending in the areas of unemployment benefits (in the form of guaranteed state funded jobs) and social protection (pensions and disability benefits). In addition, nations that have successfully lifted themselves out of poverty and dramatically reduced inequality, have used

[235] Piketty, T., *Capital in the Twenty-First Century*, (2013), p. 471, see also pp. 373 – 376, 444, 446, 455, 473, 493 – 534, 539, 541 – 544, 556, 572 – 573; *The Case for a Billionaire Tax*, Oxfam, (2016); Murphy, R., *The Joy of Tax*, (2015), pp. 123, 180 – 187 etc.
[236] Raworth, K., *Doughnut Economics*, (2017), pp. 237 – 238; Murphy, R., *The Joy of Tax*, (2015), pp. 63 – 64; *Resilient People, Resilient Planet*, UN Secretary-General's High-Level Panel on Global Sustainability, (2012), p. 54 etc.
[237] Coyle, D., *The Economics of Enough*, (2011), p. 93; see also Ferguson, N., *The Great Degeneration*, (2012), pp. 40 – 48; Stiglitz, J., *Globalization and its Discontents*, (2002), pp. 241, 251 etc.

social spending to provide universal and decent education and healthcare for all citizens as significant factors in helping to achieve this. Again the UN Development Programme's key *Humanity Divided* report stresses, ***"The provision of basic social services such as education, health and nutrition is a key function of governments and an important instrument to promote human development and to ensure a more equal distribution of outcomes"***, and that ***"it is critical to focus public expenditure on the universal provision of social services, with a particular emphasis on the sectors and groups experiencing the greatest disadvantages. Improvements in the distribution of education, health and nutrition outcomes also require specific service delivery programmes and modalities, such as early childhood interventions or integrated health systems that cut across sectors and deliver cohesive packages of services tailored to the specific needs of the groups left behind. Moreover, the effective implementation of these programmes requires capable institutions equipped with adequate human resources to deliver services, strong local governments that ensure that services reach the most marginalized communities, and the ability to coordinate across sectors so that services are comprehensive."*** [238]

Figure 3.6: Governments should ensure the provision of key basic services such as education and healthcare for all their citizens.

Most development experts would add that for developing nations, the provision of basic water, sanitation and hygiene (WASH) systems for the poorest should also be seen as an essential basic public service. As a seminal study surveying grassroots communities in dozens of countries across the developing world conducted by the World Bank, *Voice of the Poor*,

[238] *Humanity Divided*, UNDP, (2013), pp. 252, 13, see also pp. 2, 12, 93 – 94, 227, 238, 253 – 259; Deaton, A., *The Great Escape*, (2013), pp. 115 – 149, 151; Sen, A., *Development as Freedom*, (2001), pp. 39, 41 – 51, 63, 90 – 91, 120, 128 – 129, 133 – 134, 143 – 145, 258, 288; Sachs, J., *The Age of Sustainable Development*, (2015), pp. 3, 59, 90, 107 – 108, 125 – 129, 227 – 228, 236 – 238, 243, 251 – 316, 498 – 499; Milanovic, B., *Global Inequality*, (2016), pp. 221 – 222; *Working for the Many*, Oxfam, (2014) etc.

stresses, ***"People in many communities speak forcefully of the lack of adequate and safe water as an acute deprivation. Water shortages and difficulties accessing safe drinking water appear most serious and widespread in the African countries. However, poor women and men from all the regions describe daily struggles to obtain water for human use. There are problems of distance, quantity, seasonality, quality and safety of supply; environmental issues like flooding, siltation and pollution; questions of maintenance; and often combinations of these. Water is also critical for animals and crops."*** [239] In their provision of basic services, states should also seek to specially target the most vulnerable and the communities left farthest behind.[240]

It should not, however, be assumed that the state is the best or only provider of such services. Most nations will probably have a mixed economy of state, private sector and civil society groups all providing basic services in a nationally appropriate combination. Nevertheless, in our modern world we do widely accept that states have a moral responsibility to ensure the development needs of all their citizens are met, and that they are the ultimate guarantor of these if all else fails. Some of these needs, such as health and education, states may provide directly, others, such as food or housing, states will often provide by ensuring a strong and fair economy that provides good jobs or via the cash provision of unemployment and incapacity benefits and pensions. Either way, to effectively eliminate poverty, modern states need to be the ultimate guarantor to catch those the market fails. This is clearly articulated in the *International Covenant on Economic, Social and Cultural Rights*, one of the key international human rights instruments, which sets out basic rights and services, such as healthcare, education, social protection or a decent standard of living, and concludes that states have the ultimate responsibility for ensuring their provision for all, stressing ***"Each State Party to the present Covenant undertakes to take steps, individually and through international assistance and co-operation, especially economic and technical, to the maximum of its available resources, with a view to achieving progressively the full realization of the rights recognized in the present Covenant by all appropriate means"***.[241] The importance of these values of care for all in society and ensuring all are provided for and none left behind must be taught in schools through the formal education system and reinforced in wider society through publicly funded information and education campaigns. So in summary …

Governments should:

- Establish and implement an effective tax system
- Apply a progressive sliding-scale in tax, so the poorest pay least and the richest most
- Tax capital and unearned inherited wealth rather than earned income, as far as possible
- Tax socially undesirable activity and not socially desirable activity, as far as possible
- Borrow and invest money for developing a strong and fair economy but only fund social spending from tax not borrowing
- Provide good education for all citizens

[239] *Voices of the Poor 2: Crying Out for Change*, World Bank, (2000), p. 73, see also pp. 72 – 75, 80 – 81; *Voices of the Poor 1: Can Anyone Hear Us?*, World Bank, (2000), pp. 47 – 48, 83; *Voices of the Poor 3: From Many Lands*, World Bank, (2000), pp. 32 – 33, 43, 63, 98, 156 – 157, 164, 174, 185, 283 – 284, 297, 349, 404 – 407, 421; *Progress on Drinking Water, Sanitation and Hygiene*, WHO/UNICEF Joint Monitoring Programme, (annual report); Sachs, J., *The End of Poverty*, (2005), pp. 184 – 185, 233 – 238 etc.

[240] *Owning Development: Taxation to Fight Poverty*, Oxfam, (2011), pp. 9, 48; Castles, F., Leibfried, S., Lewis, J., Obinger, H. & Pierson, C. (Eds.), *The Oxford Handbook of the Welfare State*, (2010), pp. 448 – 461; Micklethwait, J. & Wooldridge, A., *The Fourth Revolution*, (2014), pp. 241 – 246 etc.

[241] *International Covenant on Economic, Social and Cultural Rights*, UN, (1966), Article 2; see also Green, D., *From Poverty to Power*, (2012), pp. 40 – 41; Collier, P., *Wars, Guns and Votes*, (2009), pp. 216 – 217 etc.

- Provide good healthcare for all citizens (covering both physical and mental health)
- Ensure good water, sanitation and hygiene (WASH) services are provided for all citizens
- Target the communities who are most left behind in all social support provision
- Recognise that a mixed economy of state, private sector and civil society may be needed to deliver effective social services, however …
- Be the ultimate guarantor of all the development needs considered in this section for all citizens if all else fails, either directly providing them (often healthcare and education) or through cash benefits to enable their purchase (often food and housing)
- Teach these values of care for all in society and ensuring none are left behind, in schools through the formal education system and in society through public information campaigns

Support internationally

Once again, whilst the primary role in taxing and redistributing to meet basic needs and drive down poverty must be with the individual nation itself, the international community can do a lot to support this. First, in the area of capturing sufficient tax to fund social spending, nations should practice complete global tax transparency. This means signing up to, implementing and significantly strengthening the internationally recognised *Multilateral Competent Authority Agreement* and its *Standard for Automatic Exchange of Financial Account Information in Tax Matters* to enable financial information of residents to be automatically shared each year, and tax avoidance (especially for tax owing to developing nations) to be identified and shut down. The international community should also create a new international agreement to prevent the shifting of money out of countries and into 'tax havens' (countries charging low or zero tax rates), to avoid paying a fair amount of tax. The international community is feeling increasing pressure to agree such laws from tax and development experts who can see the important benefits they would bring in tackling poverty. As Kate Raworth says in her book, *Doughnut Economics*, the international community must ***"end the extraordinary injustice of tax loopholes, offshore havens, profit sharing, and special exemptions that allow many of the world's richest people and largest corporations – from Amazon to Zara – to pay negligible tax in the countries in which they live and do business. At least $18.5 trillion is hidden by wealthy individuals in tax havens worldwide, representing an annual loss of more than $156 billion in tax revenue, a sum that could end extreme income poverty twice over. At the same time, transnational corporations shift around $660 billion of their profits each year to near-zero tax jurisdictions such as the Netherlands, Ireland, Bermuda and Luxembourg."*** [242]

This global agreement should also set standard minimum percentage rates for national taxes, and corresponding percentage rates of government income, to spend on basic services at a significant and healthy level in every country. This would prevent the 'race to the bottom' whereby nations compete with each other to cut tax rates in order to attract investment and international corporations, and thereby undermine the amount they have to spend on basic services, thus driving up poverty and inequality in society. A good start has been made in this area through the OECD's *Two-Pillar Solution to Address the Tax Challenges Arising from the Digitalisation of the Economy*. This commits all nations that sign up, to taxing large multinationals at a minimum of 15%. Every nation should sign up to this agreement. However, global deals on tax need to go much further. Drawing together all the many lessons from the Bible and from history, both domestically and internationally, that we have seen so far in this

[242] Raworth, K., *Doughnut Economics*, (2017), pp. 276 – 277; see also *Tax Avoidance and Evasion*, Tax Justice Network, (2017); *Tax Battles*, Oxfam, (2016) etc.

report, Arise suggests a revised global tax and social spending agreement should commit every nation to collect in tax, and spend through government spending, an annual amount equivalent to at least 45% of the national economy. One third of this amount would come from income taxes (income tax, national insurance etc.), one third from wealth taxes (land tax, inheritance tax, council tax, wealth tax etc.) and one third from other taxes (corporation taxes, taxes on goods and services etc.). Income and wealth taxes must be significantly progressive so the poorest pay less and the richest more. Taxes on income and on returns from wealth should be set at the same level. Various specific types of income, wealth and other taxes and levels should be negotiated and standardised between nations as part of this global agreement. At least two thirds of this income should be spent on healthcare, education and social protection (pensions, benefits etc.), in order to provide healthcare and education for all and support the unemployed, sick and elderly in society. The other third should be spent on other government functions. These levels and proportions of taxation and expenditure would match those in the most economically successful developed countries with the greatest levels of social development and lowest levels of inequality.[243] Governments would then need to develop their own national tax and social spending laws to implement this international agreement in every nation. The international community should also help by training and capacity building developing country civil servants in the establishment of good tax systems and the effective provision of basic services.[244]

Whilst developing nations are still establishing strong and fair economies and taxation and social spending systems of their own, the international community can help fill the gap by the generous provision of overseas aid to help provide basic services and meet immediate development needs. This should be at the internationally agreed level of 0.7% of Gross Domestic Product from all developed nations. As Jeffrey Sachs explains in his book *The Age of Sustainable Development*, ***"the UN General Assembly in 1970 formally adopted the goal that high-income countries should contribute 0.7 percent of their national income to ODA [Official development Assistance]."*** Of course, ***"Aid is not a permanent need or solution. Countries that receive aid can reach a level of income through economic growth whereby they soon 'graduate' from the need for aid entirely. China and Korea are two examples of countries that relied on aid when they were poor and then graduated from aid and indeed more recently became significant donor countries. Roughly speaking, graduation from aid can occur when a country passes from low-income to middle-income status."*** But until countries reach that point ***"aid can work"*** and indeed it is ***"vital when people are very poor and facing life-or-death challenges, such as malaria, AIDS, safe childbirth, safe water, sanitation, or growing enough food to stay alive."*** [245]

Aid should be provided for the sole aim of poverty reduction. It should be focused on the poorest and should not discriminate on the basis of ethnicity, religion, gender, age or in any other way. It should not be 'tied' or linked in any way to supporting developed country exports

[243] See lessons from all sections on tax and social spending and Piketty, T., *Capital in the Twenty-First Century*, (2013), pp. 474 – 534; Kenny, C., *Getting Better*, (2012), pp. 12 – 14, 79 – 83, 116, 120 – 133, 146 – 147, 149 – 174, 204; Collier, P., *Wars, Guns and Votes*, (2009), pp. 154, 172, 174 – 176 etc.
[244] Collier, P., *The Bottom Billion*, (2008), pp. 111 – 115; Deaton, A., *The Great Escape*, (2013), pp. 321 – 322; *World Development Report 2011*, World Bank, (2011), (most recent World Development Report focused on conflict), pp. 30, 34 – 35, 272, 275 etc.
[245] Sachs, J., *The Age of Sustainable Development*, (2015), pp. 172, 501, see also pp. 108 – 109, 171 – 175, 281 – 282, 299 – 305, 498 – 502; *Accountability and Ownership*, Oxfam, (2016); *Global Trends: Challenges and Opportunities in the Implementation of the Sustainable Development Goals*, UN Development Programme, (2017), pp. 60 – 63 etc.

or foreign policy.[246] All aid should be harmonised and coordinated by the national government when it comes into a developing nation, behind a single national development plan. This should be nationally developed and owned, with significant input from poor communities who are directly affected.[247] As far as possible, all aid should be channelled into national budgets and spent by the national government to make it efficient and help reinforce and strengthen the national authorities in their legitimate role. Where concerns about corruption and good governance are so great that they cannot be addressed through rigorous monitoring, then the international community may choose to deliver aid into a nation via alternative routes, such as UN agencies or Non-Governmental Organisations (NGOs) operating in the field. In which case a lead agency should be identified to play the coordinating role the government would normally play, and to liaise with the national government until the situation has improved and aid can be transferred to be channelled through the national finances. These are principles widely held by the international community.[248] Aid should come in the form of grants not loans to avoid saddling poor countries with future debt crises. Aid commitments should be stable, consistent and committed over multiple years, not short-term 'stop and start', to help with financial planning.[249] All aid should be fully transparent, rigorously monitored and independently evaluated and scrutinised to prevent corruption and for effective impact.[250] Finally, as we have seen, aid should only ever be seen as short-term. It plays a crucial role in meeting an immediate need, but it is no substitution for developing nations building strong and fair economies and taxing them in order to redistribute and meet the basic needs of the poorest. No nation in the world has ever developed as a result of aid alone. Therefore, a sliding scale of phasing down and graduating from aid when it is no longer needed should be in place for all nations.

Alongside major aid programmes, the international community will need to provide short-term emergency humanitarian relief in contexts of natural disasters or conflict. A significant proportion of that humanitarian support should be invested in Disaster Risk Reduction (DRR), rebuilding and planning in ways that minimises destruction from future predictable, cyclical disasters. All the principles set out above for best practice in aid should be equally applied in these contexts. Moving beyond government aid and humanitarian programmes, the international community should also implement policies and practices which facilitate and

[246] *Code of Conduct for the International Red Cross and Red Crescent Movement and Non-Governmental Organisations (NGOs) in Disaster Relief*, ICRC, (1994), p. 3; *The Paris Declaration on Aid Effectiveness and the Accra Agenda for Action*, Organisation for Economic Co-operation and Development, Development Assistance Committee, (2005, 2008), pp. 5, 18; *Busan Partnership for Effective Development Co-operation*, Organisation for Economic Co-operation and Development, Development Assistance Committee, (2011), p. 5 etc.

[247] *Rome Declaration on Harmonisation*, Organisation for Economic Co-operation and Development, Development Assistance Committee, (2003); *The Paris Declaration on Aid Effectiveness and the Accra Agenda for Action*, Organisation for Economic Co-operation and Development, Development Assistance Committee, (2005, 2008), pp. 3 – 4, 15 – 17, 20; *Busan Partnership for Effective Development Co-operation*, Organisation for Economic Co-operation and Development, Development Assistance Committee, (2011), pp. 3, 5 etc.

[248] *Accountability and Ownership*, Oxfam, (2016), pp. 1, 21 – 22, 27 – 30, 37 – 38; *The New Deal for Engagement in Fragile States*, International Dialogue on Peacebuilding and Statebuilding, (2011); *Rome Declaration on Harmonisation*, Organisation for Economic Co-operation and Development, Development Assistance Committee, (2003) etc.

[249] *Busan Partnership for Effective Development Co-operation*, Organisation for Economic Co-operation and Development, Development Assistance Committee, (2011), p. 7; *The Paris Declaration on Aid Effectiveness and the Accra Agenda for Action*, Organisation for Economic Co-operation and Development, Development Assistance Committee, (2005, 2008), pp. 1, 15, 20 – 21; *Plan of Implementation of the World Summit on Sustainable Development*, UN, (2002), p. 48 etc.

[250] Easterly, W., *The White Man's Burden*, (2007), pp. 113 – 15, 26, 169 – 171, 323 – 325, 332 – 333; *Core Humanitarian Standard*, Core Humanitarian Standard Alliance, (2014), pp. 2, 9, 11, 13 – 14; *Humanitarian Charter and Minimum Standards in Humanitarian Response*, The Sphere Project, (2011), pp. 5 – 6, 10, 24 etc.

strengthen major private financial flows to support developing countries. These include charitable giving through the important work of many Non-Governmental Organisations; money sent home from diaspora communities from Africa, Asia and Latin America working overseas, known as 'remittances'; or philanthropy and social investment from wealthy individuals.[251]

Figure 3.7: The international community should provide generous overseas aid to poorer nations, to support their development and help them respond to humanitarian emergencies.

At the international level, all nations should abide by, promote, uphold and further strengthen international norm setting standards on development, such as the *Sustainable Development Goals.* They should do the same for international standards for best practice in the delivery of aid such as the *Busan Partnership for Effective Development Co-operation; Paris Declaration on Aid Effectiveness; Accra Agenda for Action; Rome Declaration on Harmonisation; Code of Conduct for the International Red Cross and Red Crescent Movement and Non-Governmental Organisations (NGOs) in Disaster Relief; Core Humanitarian Standard* and the *Humanitarian Charter and Minimum Standards in Humanitarian Response.* Such agreements have a powerful norm setting effect, establishing and advancing what is considered normal and appropriate and providing internationally agreed standards against which nations can be held to account. Finally, these methods for supporting developing nations to collect finance and use it to provide basic services should be taught in schools as well as promoted more widely in

[251] *Global Trends: Challenges and Opportunities in the Implementation of the Sustainable Development Goals*, UNDP, (2017), pp. 70 – 72; Naím, M., *The End of Power*, (2013), pp. 60, 205 – 211; Eberly, D., *The Rise of Global Civil Society*, (2008), pp. 51 – 58 etc.

society through publicly funded information and education campaigns, so that current and future generations understand why and how their nation is helping to lift poorer countries out of poverty. So in summary …

The international community should:

- Practice complete global tax transparency by signing up to, implementing and significantly strengthening the *Multilateral Competent Authority Agreement* and its *Standard for Automatic Exchange of Financial Account Information in Tax Matters*
- Reduce the opportunities for multinational companies to avoid tax, by signing up to, implementing and significantly strengthening the *Two-Pillar Solution to Address the Tax Challenges Arising from the Digitalisation of the Economy*
- Negotiate a new global tax and social spending agreement that: 1) prevents the shifting of money out of countries where people are resident or companies are operating into 'tax havens', and; 2) commits every nation to collect in tax, and spend through government spending, an annual amount equivalent to at least 45% of the national economy, one third from income taxes (income tax, national insurance etc.), one third from wealth taxes (land tax, inheritance tax, council tax, wealth tax etc.) and one third from other taxes (corporation taxes, taxes on goods and services etc.). As part of this agreement, income and wealth taxes must be significantly progressive so the poorest pay less and the richest more. Taxes on income and on returns from wealth should be set at the same level. Various specific types of income, wealth and other taxes and levels should be negotiated and standardised between nations. At least two thirds of this income should be spent on healthcare, education and social protection (pensions, benefits etc.). The other third to be spent on other government functions
- Ensure all national governments develop their own national tax and social spending laws to implement this international agreement
- Train and capacity-build developing nation civil servants in tax collection and the provision of social services
- Give generous overseas aid of at least 0.7% of Gross National Income to bridge the gap and fund basic services whilst nations are still developing
- Ensure aid is solely targeted on poverty reduction, not supporting developed country exports or foreign policy, or discriminating on the basis of ethnicity, religion, gender, age or in any other way
- Ensure all aid is harmonised and coordinated by the national government at a country level behind a single national development plan that is nationally developed and owned, with significant input from poor communities
- Ensure aid is channelled into national budgets and spent by the national government to make it efficient and help reinforce and strengthen the national authorities in their legitimate role. Where concerns about corruption and good governance prevent this, deliver aid into a nation via UN agencies and Non-Governmental Organisations (NGOs), with a lead agency playing the coordinating role until the situation has improved and aid can be transferred back through the national finances
- Require aid to come as grants not loans
- Ensure aid is stable, consistent and committed over multiple years to aid financial planning
- Make aid fully transparent, rigorously monitored and independently evaluated
- Ensure aid is only ever short-term with a sliding scale for phasing down and exiting from aid as nations develop

- Provide humanitarian relief in the context of disasters, with a significant proportion invested in Disaster Risk Reduction (DRR)
- Support private financial flows for development such as charitable giving through NGOs; remittances from diaspora communities; philanthropy and social investment
- Pass, support, publicise and strengthen international norm setting standards and agreements on development and aid such as the *Sustainable Development Goals*
- Teach these approaches in schools and through public information campaigns so that current and future generations understand why and how their nation is helping to lift poorer countries out of poverty

ENVIRONMENT

Having considered what history can teach us about the specific steps we need to take to trigger the shifts towards strong and fair economies and taxation and social spending, which have been so crucial for successful development, let us now turn to see what we can learn from history about how to successfully tackle the environment. Now that we realise the harmful impact our economic model is having on the environment, the ideal approach would be to follow the Biblical principle we saw earlier in Part 2 and use the law to prevent individuals and companies from engaging in activities that harm God's creation and other people. Where we have seen some positive change in the environment in the past it has been in large part precisely because legislation prevented damaging environmental activity, such as: the *Montreal Protocol* outlawing the use of chlorofluorocarbons (CFCs), Europe and North America's reduction in greenhouse gas emissions, slowing and reversing deforestation in temperate countries, and the growing amount of protected land and territorial waters. As the academic Mark Mazower puts it in his study on the international community, *Governing the World*, from the 1970s, ***"developed-country governments were doing more domestically for the environment in the 1970s than ever before … Able to push things through the European Economic Community more easily than the UN, Europeans started regulating everything from acid rain to noise pollution. Thus the 1970s saw significant environmental diplomacy: as many treaties were drawn up in a single decade as in the previous forty years. One consequence was that the seas became markedly cleaner as agreements were reached to control marine dumping and land-based sources of marine pollution as well … At the same time, American public opinion and scientific research propelled international cooperation over the ozone layer. Despite pressure from the aerosol industry, US lawmakers banned CFCs in aerosols, and after American companies protested that any future action needed to be international rather than unilateral, the UN again became heavily involved. UNEP-sponsored research uncovered a vast seasonal hole over Antarctica that was growing each year, and at Montreal in late 1987, UNEP brokered an agreement. It fell short of a total ban. But it was remarkable all the same for being the first time that countries committed themselves by treaty to protect the atmosphere even at some cost to their own economies."*** [252]

Adopting this approach today would mean simply banning greenhouse gas emissions to trigger the shift to ***clean energy***, and banning polluting activity, the unsustainable extraction of natural resources and all non-recyclable waste in order to trigger the shift to a ***circular economy***. We would then allow the market to adapt to these new laws, innovating and developing alternative ways for providing all that we need. This approach would appear to be the right one to trigger

[252] Mazower, M., *Governing the World*, (2013), pp. 336 – 337; Juniper, T., *How many Lightbulbs does it take to Change a Planet?*, (2008); *Bounding the Planetary Future*, Tellus Institute, (2015), pp. 8 – 9 etc.

a shift to a ***circular economy*** where much of the technology that is required already exists, what is needed is political will. However, for ***clean energy***, in some areas the alternatives simply don't exist yet, or not in a form where they can be rapidly scaled up to pick up the shortfall. So, a straight ban now would leave millions without access to energy, transportation and many goods, faster than the market could innovate and technology advance to provide them.

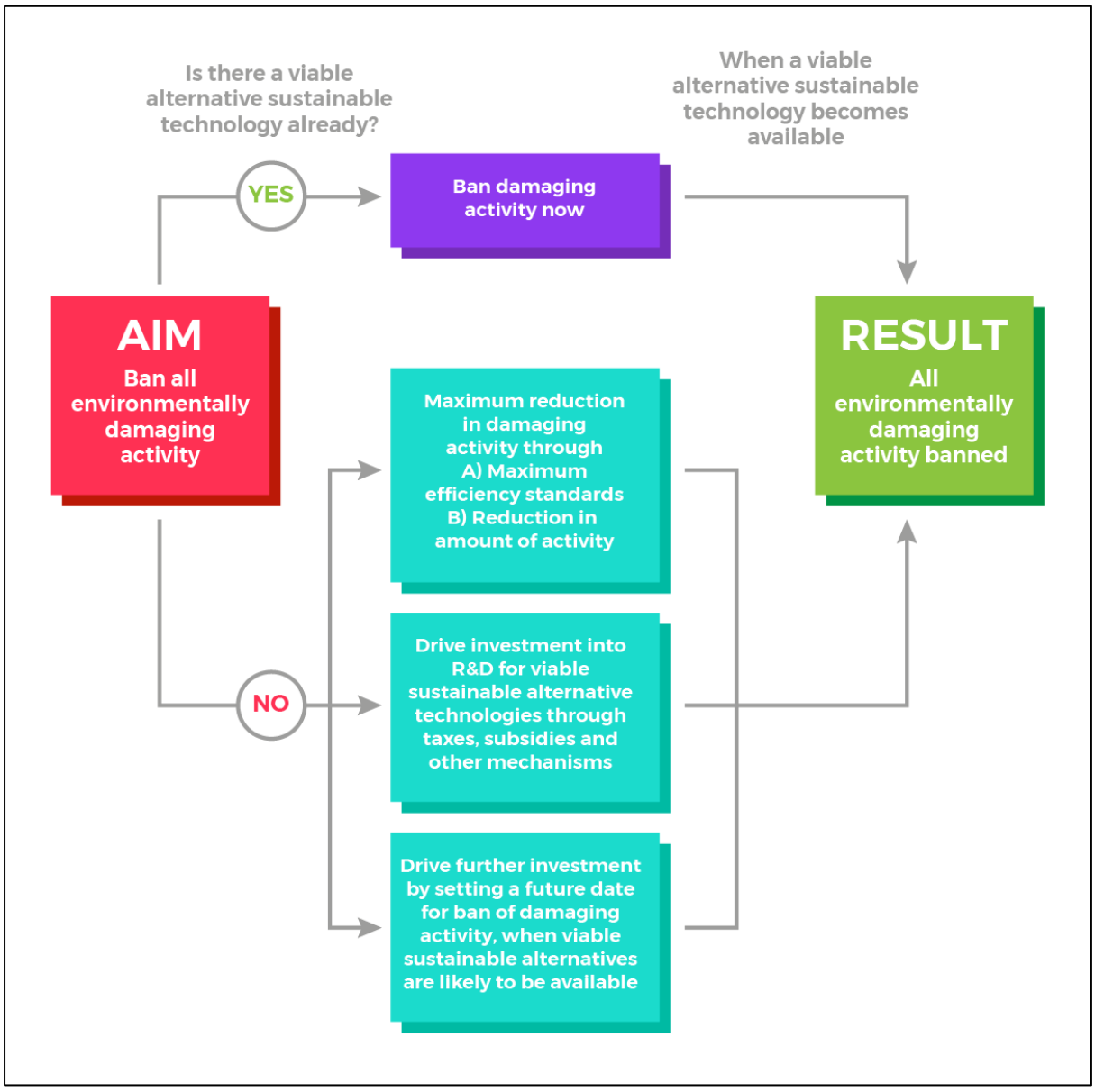

Figure 3.8: Process for moving as rapidly as possible to banning all environmentally damaging activity, whilst still ensuring access for all to modern energy, goods and services.

In recent decades as the environmental challenge has become clearer, the people of the world (even the most committed environmental activists) have shown again and again, that even in the face of disaster they are not going to give up a modern lifestyle with access to energy, travel and manufactured goods. As the late Sir John Houghton, the first chair of the Intergovernmental Panel on Climate Change, put it in his book *Global Warming, The Complete Briefing*, ***"most people that have them would not be prepared to be without the technical aids***

– electricity, central heating, refrigerator, washing machine, television and so on – that give the freedom, the interest and the entertainment that is so much taken for granted. Moreover, increasing numbers of people in the developing world are also taking advantage of and enjoy these aids to a life of less drudgery and more freedom." [253] Therefore, a straight ban isn't ever going to be accepted. On the other hand, people don't actively want to damage our natural environment. If there are alternative options that are not costly or inconvenient then they will be welcomed. The world therefore needs a transition path to move smoothly, but also as rapidly as possible, through this great shift, to the point where all environmentally damaging activity can be banned because alternatives are available. Logically the way forward then is for ...

1) Governments to set out clearly and unambiguously that they will ban environmentally damaging activities as soon as possible, with specific dates and a tight timeframe, which should consist of …
2) Banning damaging activity now where there is already an alternative
3) Minimising damage in areas where there is currently no viable alternative through a) driving up efficiency standards, to minimise waste and leakage, and b) reducing overall use of that activity
4) Using taxes, subsidies and other mechanisms to drive investment into alternative technologies in those areas where there aren't currently viable alternatives, in order to develop and scale them up as fast as possible
5) Setting future dates for the banning of those environmentally damaging activities, which are in line with projections for when alternatives will be available

Clean energy

High-level strategy

Looking first at clean energy, if we follow this process then the governments of the world need to first announce clearly and unambiguously that they will rapidly transition towards banning all greenhouse gas emitting forms of energy, moving the world to 100% clean energy as fast as possible. Here significant progress has already been made. The framework for this agreement already exists in the landmark 2015 *Paris Agreement* under the *UN Framework Convention on Climate Change* which commits governments to ***"Holding the increase in the global average temperature to well below 2°C above pre-industrial levels and pursuing efforts to limit the temperature increase to 1.5°C above pre-industrial levels, recognizing that this would significantly reduce the risks and impacts of climate change"***. And therefore, ***"In order to achieve the long-term temperature goal set out in Article 2, Parties aim to reach global peaking of greenhouse gas emissions as soon as possible, recognizing that peaking will take longer for developing country Parties, and to undertake rapid reductions thereafter in accordance with best available science, so as to achieve a balance between anthropogenic emissions by sources and removals by sinks of greenhouse gases in the second half of this century"***.[254] In summary, the world's governments are committed to remain below 1.5 degrees of average warming above pre-industrial levels and to reach 'net zero' emissions by 2050. (Net

[253] Houghton, J., *Global Warming, The Complete Briefing, Fifth Edition*, (2015), p. 220; see also Porritt, J., *Capitalism as if the World Matters*, (2007), pp. 293 – 308, 336 – 337, 346; Berners-Lee, M. & Clark, D., *The Burning Question*, (2013), pp. 2, 85, 109, 121 – 125, 131 – 136 etc.

[254] *Paris Agreement*, UN Framework Convention on Climate Change, (2015), pp. 3 – 4, but also see the whole agreement; *UNFCCC Convention*, UNFCCC, (1992); *The Emissions Gap Report*, UN Environment Programme, (annual report); Houghton, J., *Global Warming, The Complete Briefing, Fifth Edition*, (2015), pp. 263 – 290 etc.

zero means that any remaining greenhouse gas emissions are offset by other actions such as tree planting that remove the equivalent amounts of greenhouse gas from the atmosphere.)

Figure 3.9: The world must move away from the use of all fossil fuels, and transition to 100% clean energy as rapidly as possible.

This is a great start but is not ambitious enough. The level of national emissions cuts commitments under this deal are currently a long way from being sufficient. Therefore, as well as implementing the *Paris Agreement,* governments also need to significantly strengthen it by bringing forward the target date to move to 100% clean energy by 2030 (with tough intermediate targets), in order to ensure the world stays below 1.5 degrees of warming, whilst still maintaining energy access for all. This is not as ambitious as it sounds. The proportion of total energy provision coming from 100% clean energy worldwide is already growing at a staggering rate, many cities, companies and organisations have already made a 2030 commitment, the US is committed to a 50% cut on greenhouse gas emissions by 2030,[255] the European Union to a 55% cut by 2030,[256] and the UK a 78% cut by 2035.[257] Many other nations are also actively considering more ambitious targets. Having agreed a significantly strengthened *Paris Agreement*, governments then need to put it into effect in every nation by bringing in national climate change laws and action plans with tight targets and timeframes to meet a 100% clean energy target by 2030. Ultimately most of the economic activity will be driven by the private sector. However, this won't just happen without this clear, proactive national government plan with targets and policies that unleash the finances, ingenuity and dynamism of the private sector to drive this transition to 100% clean energy.

Following the steps laid out in the previous section, these national action plans should specify, for each greenhouse gas emitting sector (***electricity generation, transport, gas heating and cooking, industrial processes, agriculture*** and ***deforestation***), how they will …

[255] *Biden pledges to slash greenhouse gas emissions in half by 2030*, CNBC, (Apr 2021), www.cnbc.com/2021/04/22/biden-pledges-to-slash-greenhouse-gas-emissions-in-half-by-2030.html

[256] *EU Agrees to Slash Carbon Emissions by 2030*, The New York Times, (Dec 2020), www.nytimes.com/2020/12/11/world/europe/eu-climate-emissions.html

[257] *UK enshrines new target in law to slash emission by 78% by 2035*, Gov.uk, (Apr 2021), www.gov.uk/government/news/uk-enshrines-new-target-in-law-to-slash-emissions-by-78-by-2035#:~:text=The%20UK%20government%20will%20set,today%20(Tuesday%2020%20April)

1) immediately ban greenhouse gas emitting forms of energy where there are clean energy alternatives already available
2) where immediately scalable clean energy alternatives are not currently available use quotas and targets to scale down greenhouse gas emitting forms of energy and scale up clean energy over a tight time period leading to a future ban[258]
3) cut subsidies and massively increase taxes on greenhouse gas emitting energy to drive the transition[259]
4) invest funds generated from these 'carbon taxes' (and indeed from the public finances more widely) into research and development of clean energy technology to speed the transition

There are some specific areas where clean energy technologies are least developed, which must have particular focus, and we will consider those later in this section, sector-by-sector. However, generally even where clean energy technology is already available, such as renewable electricity generation, electric vehicles or heating, funds should continue to be channelled for research and development in order to continually improve and make these areas ever more powerful, efficient and effective, generating more power from smaller inputs, greater range from smaller vehicle batteries etc. On top of these public funds, a strengthened *Paris Agreement* and national climate change laws will also drive a much larger source of funds from the private sector into clean energy research and development, as investors see there is no future in other forms of energy.[260]

In addition to publicly funded research into clean energy technology, governments should also use many of the policies to grow a vibrant, clean energy industry, which we saw worked successfully for developing Strong and fair economies. This might include tariffs, tax breaks, subsidies, public procurement, some state owned enterprises and a positive dialogue and partnership between government and the private sector, as key elements in their national plan to transition to 100% clean energy. As a key report by various UN and other international agencies, *Green Industrial Policy: Concept, Policies, Country Experiences*, says, ***"In many ways, steering investment towards a green economy is not that different from steering them towards conventional industrial policy objectives, such as higher value added and enhanced productivity. As Schwarzer (2013:vi) puts it, '…green industries are essentially infant industries, with all the characteristics of conventional infant industries and subject to the same opportunities and challenges of promoting them.'… Also the available instruments are very similar, including information and coordination platforms, regulations, standards and labels, differential taxes and credit subsidies."*** [261]

[258] *Early Insights on Long-Term Climate Strategies*, World Resources Institute, (2017), pp. 7 – 11, 14, 16 – 18, 22; Stern, N., *Why are we Waiting?*, (2016), pp. 23 – 28, 30 – 31, 35 – 36, 40, 223 – 225, 228 – 230, 233, 239; *Renewable Energy Policies in a Time of Transition*, International Energy Agency and various agencies, (2018) etc.

[259] *Climate Change 2022, Mitigation of Climate Change, Working Group 3, Sixth Assessment Report, Summary for Policy Makers*, Intergovernmental Panel on Climate Change, (2022), pp. 14 – 17, 60; *Green Industrial Policy: Concept, Policies, Country Experiences*, UN Environment Programme and various agencies, (2017), pp. 5, 11 – 12, 14, 17, 29, 45, 47, 61 – 63, 71 – 76, 93, 102 – 119, 141, 148, 181, 209, 211; Helm, D., *The Carbon Crunch*, (2012), pp. 9 – 10, 70 – 72, 114, 175 – 182, 186 – 194, 196, 209 – 211, 214, 241 – 243 etc.

[260] Helm, D., *The Carbon Crunch*, (2012), pp. 10, 211 – 213, 244 – 245; *Scaling Technologies to Decarbonize Energy*, World Economic Forum, (2015); *Delivering on the Clean Energy Economy*, World Resources Institute, (2012) etc.

[261] *Green Industrial Policy: Concept, Policies, Country Experiences*, UNEP and various agencies, (2017), p. 11, but also see the whole report; Mazzucato, M., *The Entrepreneurial State*, (2015) pp. 121 – 177; *Two Degrees of Innovation*, World Resources Institute, (2011) etc.

Electricity generation

Let us turn then to consider what these national action plans for banning fossil fuel energy and getting to 100% clean energy as rapidly as possible should look like in each of the major sectors of greenhouse gas generation. First, in the area of ***electricity generation***, clean energy alternatives are already available for all areas, except arguably for 'baseload' energy. (This is the power needed at times when the sun is not shining or the wind is not blowing, and renewable clean energy is therefore not available.) Therefore, there should be an immediate rapid timetable towards a ban for all forms of fossil fuel generated energy production except for a small percentage required for baseload energy. In practice this means first an immediate ban on coal, especially coal power plants. This is by far the dirtiest, most polluting form of fossil fuel. As the political advisor and economist Dieter Helm puts it in his book *The Carbon Crunch*, ***"all fossil fuels are not equally bad and, of these, coal bears the lion's share of responsibility. Coal is worse than oil, and much worse than gas."*** And therefore, ***"Getting out of coal is an absolute and immediate priority".***[262]

The remaining forms of fossil fuel energy should be rapidly scaled down and progressively banned as fast as renewable energy can come on stream to replace them. Economists, scientists, engineers, politicians, business people and others note how rapidly renewable energy is now being scaled up and deployed as a real tipping point is reached. To give just one example, in their report *Renewable Energy Policies in a Time of Transition*, the International Energy Agency and other agencies found that ***"Renewables have experienced a remarkable evolution over the past decade. Indisputably, they now form the leading edge – in combination with energy efficiency – of a far-reaching global energy transition. Spurred by innovation, increased competition, and policy support in a growing number of countries, renewable energy technologies have achieved massive technological advances and sharp cost reductions in recent years. Consequently, the growth in their deployment has come to outpace that of any other energy source."*** [263]

Renewable energy will come from a combination of sources: solar, wind, hydropower, geothermal and wave and tidal energy. Solar power perhaps has the greatest potential. As the British economist Nicholas Stern, the lead author of the *Stern Review on the Economics of Climate Change*, says in his book *Why are we Waiting?*, ***"Enough solar energy hits the earth every 90 minutes to power the planet for a year. It is thus no surprise that solar energy technologies are rapidly becoming utilized. Solar photovoltaic, in particular, is one of the fastest-growing energy technologies"*** [264] Wind energy is also key. The anthology, *Drawdown*, details the top 100 most effective technologies for tackling climate change, and begins this list with wind power. As the book's authors say, ***"Wind energy is at the crest of initiatives to address global warming in the coming three decades"***, and taking just one example, ***"In the United States, the wind energy potential of just three states – Kansas, North***

[262] Helm, D., *The Carbon Crunch*, (2012), pp. 32, 10, see also pp. 33 – 48, 55, 66, 68 – 69, 195, 198, 200 – 201, 206 – 211; Hansen, J., *Storms of my Grandchildren*, (2011), pp. 172 – 193, 205, 238 – 249, 269; *Re-Powering Markets*, International Energy Agency, (2016), pp. 21, 27 – 28 etc.
[263] *Renewable Energy Policies in a Time of Transition*, IEA and various agencies, (2018), p. 11, but also see the whole report; Hawken, P. (Ed.), *Drawdown*, (2017), pp. 1 – 36; *Towards a Green Economy: A Synthesis for Policy Makers*, UN Environment Programme, (2011), pp. 11 – 16, 26, 38 etc.
[264] Stern, N., *Why are we Waiting?*, (2016), pp. 50 – 51, see also pp. 38, 42, 52 – 55, 79 – 80, 86, 98, 117, 123, 228 – 229; *Renewable Energy Sources and Climate Change Mitigation, Summary for Policy Makers and Technical Summary*, Intergovernmental Panel on Climate Change, (2012), pp. 8 – 26, 34 – 45, 60 – 71, 103 – 158; *An Energy Revolution is Possible*, Friends of the Earth, (2016) etc.

Dakota and Texas – would be sufficient to meet electricity demand from coast to coast." [265] Hydropower is another key source of renewable energy. As the Intergovernmental Panel on Climate Change rightly says in its report *Renewable Energy Sources and Climate Change Mitigation*, ***"Hydropower is a renewable energy source where power is derived from the energy of water moving from higher to lower elevations. It is a proven, mature, predictable and cost-competitive technology."*** [266]

Figure 3.10: Renewable clean energy is best provided by a combination of sources: wind, solar, hydropower, geothermal and wave and tidal energy.

Tidal, wave or ocean current driven energy are also important sources of clean energy. Turning again to *Drawdown*, the book's authors explain, ***"Wave-and tidal-energy systems harness natural oceanic flows to generate electricity." "The appeal of wave and tidal energy is its consistency: No energy storage is required." "The opportunity of marine-based energy is massive, but realizing it will require substantial investment and expanded research."*** [267] Finally, geothermal is also widely recognised by environmentalists, scientists and energy policy experts as a major renewable option in many countries depending on national circumstances. As a key report from the environmental agency Friends of the Earth, A*n Energy Revolution is Possible*, says, ***"There are a range of different methods for using the heat***

[265] Hawken, P. (Ed.), *Drawdown*, (2017), p. 2 – 3, see also pp. ix, 1 – 4, 23; *Delivering on the Clean Energy Economy*, World Resources Institute, (2012); *Status of Power System Transformation*, International Energy Agency, (annual report) etc.

[266] *Renewable Energy Sources and Climate Change Mitigation, Summary for Policy Makers and Technical Summary*, IPCC, (2012), p. 80, see also pp. 8 – 26, 34 – 45, 81 – 87, 103 – 158; *Renewable Energy Policies in a Time of Transition*, International Energy Agency and various agencies, (2018), pp. 14, 17, 29, 57 – 59, 72, 74, 89; *An Energy Revolution is Possible*, Friends of the Earth, (2016) etc.

[267] Hawken, P. (Ed.), *Drawdown*, (2017), pp. 12 – 13, see also pp. 187; Houghton, J., *Global Warming, The Complete Briefing, Fifth Edition*, (2015), p. 333; *Tracking Clean Energy Progress*, International Energy Agency, (annual report) etc.

naturally created within the Earth's core for useful purposes. In areas where the local geology allows relatively easy access to high temperatures, usually along geological fault lines, geothermal electricity has been generated for decades. For example, 25% of Iceland's electricity comes from geothermal power, though as they also use geothermal heat directly to heat buildings, it accounts for 66% of Iceland's total primary energy use. In parts of the world which have suitable resources there is the potential to significantly expand the use of geothermal power. Geothermal power can reliably generate electricity constantly, regardless of weather or seasons." [268]

Currently, in many countries, large fossil fuel power plants generate electricity which is pumped into a national grid. In contrast, renewable energy lends itself much better to local, decentralised generation (even to the household level) by multiple small units. This significantly reduces the 'baseload' energy requirement, since it reduces the vast amounts of energy currently lost in transporting electricity long distances through a national grid. Instead it makes energy immediately and locally available where needed, and facilitates the charging of smaller battery units at local and household level to provide energy. It also reduces the need for vast solar or wind farms, since much smaller units can be integrated subtly and less visibly at a local level. Governments should therefore focus on decentralised local renewable energy provision in their national action plans.[269] In addition, all energy grids should be updated to become 'smart grids'. These use modern digital technology and real time information to predict and detect energy demands, and areas of wastage, and direct energy flows to the most needed areas when they are required. Thus, they help energy grids to use energy in the most efficient way possible, rather than their current hugely wasteful fashion. The 'baseload' energy challenge can further be reduced, and ultimately removed, by focusing a significant part of clean energy research and development onto improving battery storage to enable power generated by renewable energy sources to be stored in larger amounts for longer periods. This is widely recognised as a top challenge for research and development investment by scientists, environmentalists and engineers.[270] A part of clean energy research and development should also be focused on producing energy directly from hydrogen and oxygen (and other similar technologies) through hydrogen fuel cells to again further help with the 'baseload' issue and potentially revolutionise safe clean energy in a much wider way over the long-term.[271]

If all of this is not sufficient to provide 'baseload' energy, then the following solutions should be considered in the short-term, depending on national circumstances, to 'keep the lights on' until clean renewable decentralised energy is able to provide 100% of national energy needs.[272] First, nuclear power may be an option for some countries. A caution here is that historically it has taken multiple years (sometimes decades) for nuclear power plants to be constructed and

[268] *An Energy Revolution is Possible*, Friends of the Earth, (2016), p. 8, but also see the whole report; *Renewable Energy Sources and Climate Change Mitigation, Summary for Policy Makers and Technical Summary*, Intergovernmental Panel on Climate Change, (2012), pp. 8 – 26, 34 – 45, 71 – 80, 103 – 158; Hawken, P. (Ed.), *Drawdown*, (2017), pp. 6 – 7 etc.
[269] *Renewable Energy Policies in a Time of Transition*, IEA and various agencies, (2018), pp. 5, 14 – 15, 19 – 20, 23, 26 – 27, 60, 65 – 68, 72 – 75, 88, 90; *The Future Electricity Grid*, World Resources Institute and various agencies, (2016); *Green Industrial Policy: Concept, Policies, Country Experiences*, UN Environment Programme and various agencies, (2017), pp. iii, 7, 28, 30 – 31, 157 – 158, 181 etc.
[270] Lynas, M., *The God Species*, (2012), pp. 79 – 80; *Scaling Technologies to Decarbonize Energy*, World Economic Forum, (2015), pp. 6, 17 – 18; Helm, D., *The Carbon Crunch*, (2012), pp. 77 – 78, 215, 223 – 224 etc.
[271] Sachs, J., *Common Wealth*, (2008), pp. 99 – 100; Hawken, P. (Ed.), *Drawdown*, (2017), pp. 194 – 195; Jacobs, M. & Mazzucato, M. (Eds.), *Rethinking Capitalism*, (2016), p. 174 etc.
[272] Goodall, C., *Sustainability: All that Matters*, (2012), pp. 109 – 112; *Re-Powering Markets*, International Energy Agency, (2016), pp. 30, 32 – 33, 45 – 48, 73 – 120, 173 – 217, 237 – 238

become operational. Therefore, unless a nation's nuclear power infrastructure is relatively developed, it may be more effective to go straight to commissioning more decentralised local renewable energy with improved battery storage. For some nations however, nuclear power may be a short-term option.[273] In other contexts, fitting Carbon Capture and Storage (CCS) technology (which captures and stores carbon, eliminating all emissions), to existing fossil fuel power plants may be an option. However, CCS technology is in its infancy, so again CCS should only be considered as a short-term option where it can genuinely be applied faster than simply moving straight to decentralised local renewable energy provision.[274] Finally, another option for some nations may be moving rapidly from coal to gas, as a less polluting form of fossil fuel energy (or 'bridging fuel') for 'baseload' energy, in order to rapidly decrease their greenhouse gas emissions. However, once again this is only a short-term measure, and unless nations already have the gas infrastructure in place it may be quicker to simply move straight to decentralised local renewable energy with improved battery storage.[275] Ultimately, using a combination of the policies above, all nations should be moving towards 100% clean energy in energy production as rapidly as possible, phasing out and banning all greenhouse gas emitting forms of energy production.

Transport

Turning next to the area of ***transport***; the construction of new cars, trucks, lorries and trains which use fossil fuels should be immediately banned, since electric alternatives are already available. After a short period (perhaps five years), this ban should extend to existing vehicles, with a heavily subsidised package to support any of the public still using petrol vehicles to upgrade to electric alternatives. This should be combined with investing in the national infrastructure to support these alternatives, such as the widespread availability of charge points for cars, trucks and lorries, and wires and rails for electric trains. As one key report from the International Energy Agency says, ***"The use of renewable energy in transport offers numerous benefits, such as enhanced energy security, reduced transport-related carbon emissions and increased opportunities for sustainable economic growth and jobs"***, and another report from the UN Environment Programme adds that ultimately ***"the complete global fleet should be electric."*** [276] When it comes to flights and shipping there are no viable alternatives to fossil fuel energy currently widely available. Therefore, a focus on providing clean energy powered flights and shipping technology should be a major priority for research and development. In the meantime, the use of biofuels should be considered to power flights and shipping. In general biofuels should not be encouraged as a renewable energy option because of the problems associated with land use change and agriculture. However, limiting them to flights and shipping until other clean energy options become available makes this risk

[273] Berners-Lee, M. & Clark, D., *The Burning Question*, (2013), pp. 184 – 188; Hawken, P. (Ed.), *Drawdown*, (2017), pp. 18 – 21; Lynas, M., *The God Species*, (2012), pp. 70 – 73, 81, 124 – 125, 130, 167 – 182 etc.

[274] *Renewable Energy Sources and Climate Change Mitigation, Summary for Policy Makers and Technical Summary*, Intergovernmental Panel on Climate Change, (2012), pp. 7, 19, 21, 37, 122 – 123, 132 – 144, 147, 163; *Climate Change 2022, Mitigation of Climate Change, Working Group 3, Sixth Assessment Report, Summary for Policy Makers*, Intergovernmental Panel on Climate Change, (2022), pp. 19 – 20, 32, 36 – 38; *Global Warming of 1.5^{0}C, Summary for Policy Makers*, Intergovernmental Panel on Climate Change, (2018), pp. 14 – 15, 21; *Scaling Technologies to Decarbonize Energy*, World Economic Forum, (2015), pp. 4, 6 – 7, 18 – 19; Juniper, T., *How many Lightbulbs does it take to Change a Planet?*, (2008), pp. 43 – 44 etc.

[275] Helm, D., *The Carbon Crunch*, (2012), pp. 10, 151 – 152, 155, 195 – 213, 243; *10 Questions to Ask About Integrated Resources Planning*, World Resources Institute, (2014), p. 14 etc.

[276] *Renewable Energy Policies in a Time of Transition*, International Energy Agency and various agencies, (2018), p. 41, see also pp. 5, 11 – 13, 17 – 18, 20, 22 – 23, 38 – 55, 93, 95, 100 – 102; *Towards a Pollution Free Planet*, UN Environment Programme, (2017), p. 56, see also p. 52; *Can Transport Deliver GHG Reductions at Scale?*, World Resources Institute, (2016) etc.

manageable. The British economist Nicholas Stern is just one of many economists and engineers to stress ***"the use of advanced biofuels in air transport and some combination of biofuels, electrification, and perhaps carbon capture and storage (CCS) for sea transportation".***[277]

Figure 3.11: All cars, trucks, lorries and trains should transition to become 100% electric as rapidly as possible.

Buildings and industrial processes

Turning to ***gas heating and cooking***; governments should immediately ban new buildings which use this technology, since it is already possible to meet these needs through electricity generated from clean sources. National programmes should be put in place to convert existing building stock to use clean energy generated electricity for heating/hot water/cooking, again ensuring there is no gap in provision. Put simply, ***"heating and other energy using sectors need to be electrified"***, according to a report on *Green Industrial Policy* by the UN Environment Programme and various key international agencies; a sentiment widely shared by economists and environmental experts.[278] In the area of ***industrial processes***, in some cases, fossil fuels are still directly burnt to produce sufficient heat. This should be immediately banned, as it is possible to generate significant heat from clean energy generated electricity as we saw when we considered electricity generation. Significant greenhouse gas emissions also

[277] Stern, N., *Why are we Waiting?*, (2016), p. 42, see also p. 69; Juniper, T., *What has Nature ever done for us*?, (2013), pp. 65 – 67; *Renewable Energy and Energy Efficiency in Developing Countries*, UN Environment Programme and various agencies, (2017), p. 49 etc.

[278] *Green Industrial Policy: Concept, Policies, Country Experiences*, UNEP and various agencies, (2017), p. 6, see also p. 70; Hawken, P. (Ed.), *Drawdown*, (2017), pp. 22, 83 – 106; *Renewable Energy Policies in a Time of Transition*, International Energy Agency and various agencies, (2018), pp. 5, 11 – 13, 17 – 20, 22 – 37, 93 – 95, 100 – 102 etc.

occur from ***agriculture*** and ***deforestation***. We will look at those areas in our next section on the Circular economy.

Across all sectors

Across all sectors, the maximum possible energy efficiency and emissions standards should be applied to minimise waste, leakage and the amount of power needed. As the British environmental activist Tony Juniper says, ***"Making our energy use more efficient is the quickest route of all to cutting emissions"***. Relying on energy efficiency alone is not sufficient, as multiple studies have shown that energy (and hence money) saved in one area of the economy tends to be spent in another area, thus not reducing the overall level of emissions. However, used in combination with all the other policies outlined in this section, it makes a powerful and important contribution.[279] Where greenhouse gas emissions remain in the short-term (perhaps in some 'baseload' energy, flights and shipping etc.) until a transition to 100% clean energy has been obtained, those that generate and use it should be required by law to pay to 'offset' those emissions, offsetting payments should be required by law, in addition to also paying 'carbon taxes' as discussed earlier in this section. Whilst carbon taxes are used to fund new clean energy technology, offsetting should be used to fund tree planting in developing country rainforests (or similar projects) to the scale necessary to absorb an equivalent amount of greenhouse gases to those generated. If all these steps fail to reduce greenhouse gas emissions rapidly enough, then governments may need to go even further, using quotas or rationing to reduce the use of fossil fuel generated energy, whilst allowing as much use of clean energy as desired. This is recognised as a necessary policy if others fail by many academics and environmental activists and economists, such as Rob Dietz and Dan O'Neill, who write in their book *Enough is Enough*, ***"Ration schemes provide each person or company with the right to use a specified amount of a resource. For instance, each person could be allocated a certain number of kilowatt-hours of electricity per month. Such a scheme could decrease both the quantity of resources drawn from mines (e.g., coal and uranium) and the amount of wastes flowing into the environment (e.g., carbon dioxide and nuclear waste)."*** [280]

Finally, to ensure public understanding and buy in and to nudge public behaviour in ways which drive the transition even faster, governments should invest in public information and education campaigns (as well as teaching it in schools as part of the national curriculum) on the need to transition to 100% clean energy, and how individuals can support this in their own lives. As Jonathan Porritt, the British founder of the leading sustainability charity Forum for the Future and former leader of the Green Party and Friends of the Earth, writes in his book *Capitalism as if the World Matters*, ***"Whichever way one looks at this, education is absolutely at the heart of the transformation process – starting in our own homes, workplaces, leisure centres, professional bodies or institutions, clubs, trade unions and so on. And it's as much a re-education of the heart that we are talking about here as the continuing education of the mind … In terms of more formal educational systems in our schools, colleges and universities, the battle is already well and truly joined in most Organisation for Economic Co-operative Development (OECD) countries. Two priorities emerge as regards 'education for sustainable development' (ESD) on the formal curriculum: competing for space and***

[279] Juniper, T., *How many Lightbulbs does it take to Change a Planet?,* (2008), p. 48, see also pp. 47 – 50, 130 – 131; Stern, N., *Why are we Waiting?*, (2016), pp. 30, 42 – 43, 46 – 50, 69 – 70, 74, 81, 86, 101, 103, 119, 125 – 127, 224, 226, 232, 236, 239, 262, 266, 280, 323; Berners-Lee, M. & Clark, D., *The Burning Question*, (2013), pp. 1, 36, 47 – 63, 73 – 74, 108, 114 – 115, 119, 151 etc.

[280] Dietz, R. & O'Neill, D., *Enough is Enough*, (2013), p. 64, see also p. 143; Porritt, J., *Capitalism as if the World Matters*, (2007), p. 30; Lynas, M., *Six Degrees*, (2008), pp. 278 – 279 etc.

funds to find creative and intelligent ways of enabling young people to learn and experience what it means, in practice, to be a citizen of our living Earth; and making sure that all places of learning embody that heightened awareness about responsibility to the world and its people in their design, construction, management and engagement with their surrounding communities." [281] So, in summary …

Governments should:

High-level strategy

- Sign up to and significantly strengthen the *Paris Agreement* in order to set a rapid global path to ban all greenhouse gas emitting forms of energy and move to 100% clean energy by 2030 at the latest (with tough intermediate targets) whilst keeping the lights on and providing energy access for all
- Develop national climate change laws and action plans to implement a significantly strengthened *Paris Agreement* in every nation that … 1) immediately bans greenhouse gas emitting forms of energy where there are clean energy alternatives already available; 2) where they are not, uses quotas and targets to scale down greenhouse gas emitting forms of energy and scale up clean energy over a tight time period leading to a future ban, and 3) cuts subsidies and massively increases taxes on greenhouse gas emitting energy
- Invest significant public funds into research and development to improve and scale up clean energy technology
- Use many of the policies to grow a vibrant clean energy industry from the Strong and fair economies sections of Parts 2 and 3, including tariffs, tax breaks, subsidies, public procurement, some state owned enterprises and a positive partnership between government and the private sector

Electricity generation

- Immediately ban coal fired power plants
- Set a very rapid timetable towards a ban of the remaining forms of fossil fuel generated energy production as fast as renewable energy can come on stream to replace it, except (if necessary) for a small percentage required for 'baseload' energy
- Use a mix of solar, wind, hydropower, geothermal, tidal, wave or ocean current driven energy to provide this renewable energy, depending on national circumstances
- Ensure this renewable energy is generated in a local decentralised manner, so energy is immediately and locally available to reduce the need for large national grid 'baseload' energy
- Update all energy grids to become 'smart grids', so they use modern digital technology and real time information to predict and detect energy demands, and areas of wastage, and direct energy flows to the most needed areas when they are required
- Focus significant clean energy research and development resources onto improving battery storage technology to enable power generated by renewable sources to be stored in larger amounts for longer periods in order to reduce and remove the need for fossil fuel generated 'baseload' energy as rapidly as possible
- Focus part of clean energy research and development resources towards producing energy directly from hydrogen and oxygen (and other similar technologies) to again further help with the 'baseload' issue
- If there is still a need for 'baseload' energy that renewable sources can't yet meet, then nuclear power, fossil fuel plants with Carbon Capture and Storage (CCS), or moving from

[281] Porritt, J., *Capitalism as if the World Matters*, (2007), p. 332, see also pp. 333 – 335; *Agenda 21*, UN, (1992), pp. 79, 84, 320 – 328; *Plan of Implementation of the World Summit on Sustainable Development*, UN, (2002), p. 11 etc.

coal to gas, as a less polluting 'bridging fuel', may be used as options depending on national circumstances, but only in the short-term until these needs can be fully met by renewable sources

Transport

- Immediately ban the construction of new cars, trucks, lorries and trains which use fossil fuels, since electric alternatives are already available
- After a short period (perhaps five years) ban the remaining fossil fuel cars, trucks, trains and lorries
- Provide a heavily subsidised package to support any of the public still using petrol vehicles to upgrade to electric alternatives
- Invest in the national infrastructure to support these alternatives, such as the widespread availability of charge points for cars and wires and rails for electric trains
- Use biofuels for flights and shipping until other renewable energy alternatives are available
- Invest in research into clean energy planes and boats
- Extend ban to fossil fuel planes and boats once clean energy alternatives become available

Buildings and industrial processes

- Immediately ban new buildings which use fossil fuels for heating/hot water/cooking, since it is already possible to meet these needs through clean energy generated electricity
- Launch a national programme to completely convert existing building stock to use clean energy generated electricity for heating/hot water/cooking
- Ban the burning of fossil fuels for industrial processes and use clean energy alternatives instead

Across all sectors

- Apply the maximum possible energy efficiency and emissions standards across all sectors to minimise waste, leakage and the amount of power used
- Require compulsory carbon offsetting for all use of fossil fuels, to fund tree planting in developing country rainforests (or similar projects) of the equivalent amount required to absorb the emissions generated
- Use quotas and rationing for the use of fossil fuel generated energy if the above steps are not reducing emissions fast enough
- Publicise and explain the need to transition to 100% clean energy, and how individuals can support this in their own lives through school education and public information campaigns

Circular economy

Having considered the steps outlined above to shift our modern global economy to becoming based on 100% clean renewable energy, we now need to also apply the other lessons from history to shift that economy from a linear model, which uses polluting methods to extract, consume, then discard natural resources, to a completely circular economy. Beginning at the input end, the use of polluting chemicals in agricultural and manufacturing processes should be banned where there is a non-damaging alternative. Where there is no viable alternative, then the same approach should be applied in the short-term as we saw with fossil fuels; to drive down their usage and scale up investment in research into clean alternatives until these do become viable and the polluting chemical can be banned. There should be ongoing environmental screening of all chemicals used in agricultural and manufacturing processes. If

any which were previously thought to be benign turn out to be environmentally damaging the same process should be applied to them. This process should also be applied to the greenhouse gases which are produced through agricultural and manufacturing processes beyond just the use of fossil fuels. There is growing momentum from experts around the world for such an approach, as the environmental activist Annie Leonard says in her study of runaway global consumption and pollution, *The Story of Stuff*, ***"Rather than focus on reducing any one population's (like children's) exposure to hazardous chemicals, the simplest solution is to phase out toxics altogether and replace them with safe materials. This approach is far more effective, since the level of hazard in a chemical is controllable, while exposure is not, especially with chemicals that persist, disperse, and build up throughout ecosystems."*** [282]

In addition, the extraction of any biosphere resource (through fishing, agriculture, hunting, logging, the use of fresh water etc.) in ways which are not properly managed and replenished, taking out more than they put back in and hence consuming limited natural capital, should also be banned. This can be done immediately, since the technologies to manage all these processes sustainably, whilst also enhancing their productivity, are all already available. One of the major recommendations from the 2012 report of the UN Secretary-General's High-Level Panel on Global Sustainability, *Resilient People, Resilient Planet*, was precisely that, ***"Governments and international organizations should work to create a new green revolution — an 'ever-green revolution' — for the twenty-first century that aims to at least double productivity while drastically reducing resource use and avoiding further loss of biodiversity, topsoil loss and water depletion and contamination."*** [283] At the same time, all further human settlement and expansion for agriculture, or any other purpose, into currently wild lands should also be banned; halting deforestation and protecting biodiversity and natural habitats. The British environmentalist, Tony Juniper, is just one of many to make this point in his book *What has Nature ever done for us?*, which charts many of the innumerable economic and social benefits the natural environment provides, ***"During the last two centuries or so, we humans have converted about 70 per cent of the planet's grasslands, about half the savannah biome and nearly half of the deciduous forests. While there is still scope for expansion into new virgin land to increase the area of soil available for food production, there are very important reasons as to why those wilder places should remain as they are"***. We have now reached ***"the stage where it is unwise to convert more natural habitats"***.[284] Again this can come into immediate effect, since the technologies to manage existing agricultural and waste land sustainably, whilst also boosting production, already exist.

Alongside preventing this human incursion into wild lands, steps should also be taken to limit the spread of other invasive species, which have historically been a major cause of biodiversity loss. Indeed the nations of the world are in theory already committed to this under the 1992 *UN Convention on Biological Diversity*, which commits nations to ***"Prevent the introduction***

[282] Leonard, A., *The Story of Stuff*, (2010), p. 107, see also pp. 70 – 71, 95 – 96, 98 – 99, 102, 104 – 107, 114, 119 – 129, 143, 326; *Towards a Pollution Free Planet*, UN Environment Programme, (2017); *Energy and Air Pollution*, International Energy Agency, (2016) etc.
[283] *Resilient People, Resilient Planet*, UN Secretary-General's High-Level Panel on Global Sustainability, (2012), p. 40, see also pp. 13, 38 – 42; *Blueprints for a Greener Footprint*, World Economic Forum, (2016); *Ecological Farming: The Seven Principles of a Food System that has People at its Heart*, Greenpeace, (2015) etc.
[284] Juniper, T., *What has Nature ever done for us*?, (2013), pp. 37 – 38, see also pp. 72 – 75, 93, 218 – 219, 224, 238 – 243, 287 – 288; *Protected Planet Report*, Protected Planet, (bi-annual flagship report); Helm, D., *Natural Capital*, (2016), pp. 11 – 12, 183 – 184, 202 – 219 etc.

of, control or eradicate those alien species which threaten ecosystems, habitats or species".[285] Today's challenge is to close the gap between such statements and reality. The world needs to move beyond just stabilising the current situation, to positively investing in reforestation, the restoration of natural habitats and re-wilding programmes to begin to improve key environmental indicators and planetary boundaries, such as biodiversity. This is widely recognised as essential by scientists and environmental experts. As the Oxford economist and chair of the world's first Natural Capital Committee, Dieter Helm, says in his book *Natural Capital*, ***"Holding the line on the destruction of nature would be a great improvement, but it is far from ideal: the optimal level of natural capital is almost certainly much higher than the current depleted state of nature. We can do much better by improving those natural capital assets that have additional economic benefits if they are restored and enhanced, and thereby yield a higher level of sustainable economic growth."*** This means ***"large-scale, ambitious restorations, focusing on systems and infrastructures. It is about wide-ranging and integrated river, landscape and marine improvements considered in the round, rather than as a series of smaller-scale projects, valuable though they are."*** [286]

Figure 3.12: To drive towards a circular economy, all waste should be banned; ending landfills, waste incineration and dumping at sea, and instead requiring 100% recycling or breaking products down safely and returning them to the natural environment.

[285] *UN Convention on Biological Diversity*, UNCBD, (1992), p. 6, but also see the whole convention; *Plan of Implementation of the World Summit on Sustainable Development*, UN, (2002), pp. 19, 27; *Protected Planet Report*, Protected Planet, (bi-annual flagship report) etc.

[286] Helm, D., *Natural Capital*, (2016), pp. 10 – 11, 202, see also pp. 8 – 13, 201 – 219, 247; Hawken, P. (Ed.), *Drawdown*, (2017), pp. ix, 41, 107 – 134; *Agenda 21*, UN, (1992), pp. 16, 55, 81, 93 – 97, 107 – 110, 151, 169, 206 etc.

Turning to industry, laws should be passed banning the manufacture of products that can't be completely recycled continuously or safely returned to the natural environment. There should also be laws to require products to be built with much more durability and a longer expected product life. Kate Raworth rightly stresses this point in her book, *Doughnut Economics*, ***"Taxes and subsidies can move markets, as we have seen, but the transformation from degenerative to regenerative industrial design needs to be backed by regulation too. At its most simple, it means phasing out the use of 'red list' chemicals and polluting production processes, while phasing in the use of life-friendly chemistry only, along with net-zero and net-positive industrial standards. The world's most progressive enterprises are already aiming to perform to such standards: economy-wide regulations requiring regenerative design will ultimately help to move those ambitious business practices from being a rare exception to becoming the industry norm."*** [287] At the waste end of the economy, all waste should be banned; ending landfills, waste incineration and dumping at sea, and instead requiring 100% recycling or breaking products down safely and returning them to the natural environment. All biosphere waste should be composted. Creating such a ***"zero-waste society"*** is one of the key proposals put forward by the British environmental activist, Tony Juniper, in his book *How many Lightbulbs does it take to Change a Planet?* As he says, ***"The emphasis must be placed on phasing out waste"***, for ***"It would be much better for the planet if we moved towards a zero-waste society."*** This is a call that many other environmentalists, scientists, politicians and economists would back.[288]

To support this, 'extended producer responsibility' laws should be passed that require producers to take responsibility for the safe recycling of their products (and all containers and packaging) once the customer has finished with them. Such laws massively incentivise companies to reduce packaging, as well as design products for durability and easy recycling, rather than passing the cost of dealing with their product waste to society. There is growing momentum for such laws among politicians, environmental experts and economists. As a key report on *Green Industrial Policy: Concept, Policies, Country Experiences* by various UN agencies puts it, ***"extended producer responsibility is the prime concept to guide industry towards more circularity, because it incentivises producers to improve their products to increase circularity … Extended producer responsibility means that the costs of disposal and recovery of input materials should be borne by producers at the end of a product's lifetime. Companies can then either take products back or pay fees that cover the cost of recycling or waste management. Fees should vary, according to the treatment necessary for the input materials to be recovered. This would provide an incentive for producers to improve their product design (Wilts 2016). If companies use more resistant materials to make products reliable and durable, their payments for product disposal would be reduced (Bocken et al. 2016)."*** [289]

Traditional linear extractive businesses should be given every support to adjust their model and way of working, as well as to retrain their workforce to help them comply with the new laws and become completely circular. Most designers, environmentalists and business groups

[287] Raworth, K., *Doughnut Economics*, (2017), p. 238; see also *A Global Redesign?*, Chatham House, (2012), pp. 8, 15 – 16; Webster, K., *The Circular Economy, Second Edition*, (2017); Braungart, M. & McDonough, W., *Cradle to Cradle*, (2009) etc.

[288] Juniper, T., *How many Lightbulbs does it take to Change a Planet?*, (2008), pp. 158 – 159, 162, see also pp. 156 – 167; Leonard, A., *The Story of Stuff*, (2010); Webster, K., *The Circular Economy, Second Edition*, (2017) etc.

[289] *Green Industrial Policy: Concept, Policies, Country Experiences*, UNEP various agencies, (2017), p. 127; Juniper, T., *How many Lightbulbs does it take to Change a Planet?*, (2008), pp. 165 – 167; *Bending the Curve*, Tearfund, (2018), pp. 17 – 18 etc.

would agree with a report by the London-based think tank Chatham House, *A Global Redesign?*, which stressed, ***"Incorporating Circular Economy practices can require multiple companies to adjust their operations."*** And that ***"Companies will take the lead on translating Circular Economy concepts into practical and profitable business models, but may need practical support in key areas. For example, clear metrics that are affordable to implement would help to encourage the participation of small and medium-sized businesses. Small businesses will also need guidance in areas such as the recovery, reuse and remanufacture of goods and materials."*** [290] Governments should also consider using many of the other policies to grow new circular economy businesses which we saw worked successfully for developing Strong and fair economies. This might include tariffs, tax breaks, subsidies, public procurement, some state owned enterprises and a positive dialogue and partnership between government and the private sector.

All of these laws should be applied by every government at the national level. However, the nations of the world should also negotiate and agree a new global agreement on the circular economy, similar to the *Paris Agreement* on climate change. This should incorporate all the laws outlined above into a single global agreement …

1) banning polluting chemicals
2) banning the unsustainable use of biosphere resources in fishing, agriculture, hunting, logging, fresh water etc.
3) banning further human expansion into wild lands
4) preventing invasive species
5) investing in conservation, re-wilding and reforestation programmes
6) banning the manufacture of products that can't be completely recycled continuously or safely returned to the natural environment
7) ending waste by requiring 100% recycling, or breaking products down safely and returning them to the natural environment
8) extending producer responsibility for the collection and recycling of products and packaging at the end of their product life

Such a new global agreement should thus revise, strengthen and incorporate the existing global agreements on the environment such as the *Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal*; the *Chemicals Convection*; the *Convention on International Trade in Endangered Species of Wild Fauna and Flora*; the *Convention on the Conservation of Migratory Species of Wild Animals*; the *Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter*; the *Globally Harmonised System of Classification and Labelling of Chemicals*; the *Rotterdam Convention on Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade*; the *Stockholm Convention on Persistent Organic Pollutants*; the *Strategic Approach to International Chemicals Management*; the *UN Convention on Biological Diversity*; the *UN Convention to Combat Desertification*; the *Vienna Convention for the Protection of the Ozone Layer;* and *The Montreal Protocol on Substances that Deplete the Ozone Layer* into a single global agreement on the circular economy.

Finally, as in other sections, all these approaches should be taught in schools as well as promoted more widely in society through publicly funded information and education campaigns, so that current and future generations understand and support the critical

[290] *A Global Redesign?*, Chatham House, (2012), pp. 15 – 16, see also pp. 17 – 19; Braungart, M. & McDonough, W., *Cradle to Cradle*, (2009); *Green Industrial Policy and Trade*, UN Industrial Development Organization and other agencies, (2017), pp. 136 – 151 etc.

importance of moving to a circular economy model. As the Ellen MacArthur Foundation, one of the great champions of the circular economy, put it in their report *Towards a Circular Economy*, ***"Education can play an important role in preparing future professionals for a new economic paradigm, particularly to create the skill base to drive circular innovation. Governments should encourage the integration of circular economy and systems thinking into school and university curriculums."*** [291] So in summary …

Governments should:

- Ban the use of polluting chemicals which are environmentally damaging in agricultural and manufacturing processes where there is a non-damaging alternative. Where there is no viable alternative, they should:
- Apply the same approach as that outlined above to shift to clean energy to drive down the amount of usage and scale up investment in research into clean alternatives until these do become viable and the polluting chemical can be banned
- Screen all chemicals used in agricultural and manufacturing processes. If any which were previously thought to be benign turn out to be environmentally damaging, the same process should be applied to them
- Ban the production of any biosphere resource (fishing, agriculture, hunting, logging, fresh water etc.) in ways which are not properly managed and replenished, so that more is not taken out than put back in
- Ban all further human settlement and expansion into currently wild lands
- Prevent invasive species
- Invest in conservation, re-wilding and reforestation programmes
- Ban the manufacture of products that can't be completely recycled continuously or safely returned to the natural environment
- Ban the dumping of waste in landfills or at sea and require 100% recycling or breaking products down safely and returning them to the natural environment instead
- Require all biosphere waste to be composted
- Extend producer responsibility to make businesses responsible for the safe collection and recycling of the packaging they use for their products, and of the products themselves at the end of their life
- Support businesses to adjust their model and way of working and retrain their workforce to comply with the new laws and become completely circular
- Use the policies under Strong and fair economies (such as tariffs, tax breaks, subsidies, public procurement, some state owned enterprises and a positive dialogue and partnership between government and the private sector) to grow new circular economy businesses
- Apply all of the above circular economy laws at the national level, but also …
- Negotiate and agree a new global agreement on the circular economy (similar to the *Paris Agreement* on climate change) to apply all the above laws globally. This should revise, strengthen and incorporate existing global agreements on the environment
- Teach these approaches in schools and promote them more widely through public information campaigns so that current and future generations understand and support the critical importance of moving to a circular economy

[291] *Towards a Circular Economy*, Ellen MacArthur Foundation, (2015), p. 17; see also Webster, K., *The Circular Economy, Second Edition*, (2017), pp. 156 – 171; *Agenda 21*, UN, (1992), pp. 21, 84, 92, 117 – 118, 169, 320 – 328 etc.

Provide generous support to help developing nations shift to clean energy and a circular economy

Every nation in the world needs to make these shifts to clean energy and a circular economy. However, the world's richer developed nations have significantly greater resources and capacity to be able to do this. They should therefore provide support to help poorer nations as they also make this great transition. First and foremost, this is morally the right thing to do. It is also very much in the interests of richer nations. Environmental challenges cross national boundaries and are increasingly global. If poorer nations cannot be supported and helped in the area of the environment, then the impacts of this failure will be felt in developed nations as well, through a changing climate, deforestation, growing global poverty, environmental refugees, and growing political instability as resources become scarcer.

First then, developed nations should do all they can to facilitate and accelerate the transfer of clean energy and circular economy technology and skills to developing economies. The latest assessment report by the Intergovernmental Panel on Climate Change makes precisely this point, ***"International cooperation on technology development and transfer accompanied by capacity building, knowledge sharing, and technical and financial support can accelerate the global diffusion of mitigation technologies, practices and policies"***.[292] Richer nations should also provide generous training, mentoring and support for developing country entrepreneurs and business people working in clean energy and the circular economy, and for civil servants overseeing the transition of their nations.

In addition, there are specific issues pertinent to developing countries that also need to be addressed. For millions of the poorest people in the world, the challenge is not transitioning from using fossil fuels to clean energy so much as providing access to energy in the first place. As a key briefing from the environmental group Friends of the Earth says, ***"nearly one in five of the world's population does not have access to electricity, and many more suffer from inconsistent or poor quality access … The vast majority of those without electricity or clean cooking fuel access live in Africa and developing Asia."*** A real push, therefore, is needed for universal energy access for all people in the world, provided by local decentralised renewable energy.[293] Furthermore, millions of the poorest people around the world mainly use firewood and kerosene stoves for cooking and heating, resulting in greenhouse gas emissions, deforestation and harmful local health impacts. A concerted effort to provide ecostoves as alternatives would make a significant difference. A key report from the International Energy Agency found, ***"Almost all biomass-related emissions in the residential sector occur in developing countries and are closely linked to the burning of fuelwood and charcoal in inefficient cookstoves: more than 2.7 billion people rely on such traditional use of biomass, with significant impacts on human health."*** Therefore, ***"Cleaner cookstoves are a very cost-effective way of tackling household air pollution".*** A finding with which the overwhelming majority of environmental, energy and development experts would agree.[294]

---

[292] *Climate Change 2022, Mitigation of Climate Change, Working Group 3, Sixth Assessment Report, Summary for Policy Makers*, IPCC, (2022), p. 62, see also pp. 3, 13, 17, 42, 49, 52, 56, 60 – 61, 63; *Transforming our World: The 2030 Agenda for Sustainable Development*, UN General Assembly, (2015), pp. 8 – 10, 19, 23 – 24; *UN Framework Convention on Climate Change*, UNFCCC, (1992), pp. 10, 13 – 15, 22 etc.

[293] *Energy: Access and Sufficiency*, FOE, (2016), p. 1, but also see the whole report; *Renewable Energy and Energy Efficiency in Developing Countries*, UN Environment Programme and various agencies, (2017); *Strategies for Expanding Universal Access to Electricity Services for Development*, World Resources Institute, (2017) etc.

[294] *Energy and Air Pollution*, IEA, (2016), pp. 73, 55, but also see the whole report; Hawken, P. (Ed.), *Drawdown*, (2017), pp. 44 – 45; *Renewable Energy and Energy Efficiency in Developing Countries*, UN Environment Programme and various agencies, (2017), pp. 24 – 25, 61, 71 etc.

Developing countries are already experiencing the impact of a changing environment which hits the poorest first and hardest. Therefore, they need support both with the transition to clean energy and a circular economy, and to adapt to the impacts of a changing environment. Most environmentalists, development experts and diplomats would agree with the latest assessment report by the Intergovernmental Panel on Climate Change which stresses, ***"Adaptation, in response to current climate change, is reducing climate risks and vulnerability mostly via adjustment of existing systems. Many adaptation options exist and are used to help manage projected climate change impacts, but their implementation depends upon the capacity and effectiveness of governance and decision-making processes."*** [295] The international community should support the provision of decent education for women and girls and access to health services and family planning for all, to limit population growth and the inevitable resulting greater burden on the natural environment. As we have seen, the success of such policies in reducing population growth is widely documented by demographers, UN agencies and development experts.[296]

Figure 3.13: Developing countries need support to adapt to the impacts of climate change, which they are already experiencing.

In order to fund these priority areas for developing countries, the international community should provide significant 'climate finance' in addition to overseas aid. This should be significantly greater than the $100 billion per year currently envisioned under the *Paris*

[295] *Climate Change 2022, Impacts, Adaptation and Vulnerability, Working Group 2, Sixth Assessment Report, Summary for Policy Makers*, IPCC, (2022), p. 22, see also pp. 7 – 9, 23 – 35; *Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation, Summary for Policy Makers*, IPCC, (2012); *Paris Agreement*, UN Framework Convention on Climate Change, (2015), pp. 8 – 13; *The Adaptation Gap*, UN Environment Programme, (annual report) etc.

[296] Meadows, D., Meadows, D. & Randers, J., *Limits to Growth, The 30-Year Update*, (2010), pp. 28 – 36, 239; Sachs, J., *Common Wealth*, (2008), pp. 41, 46, 177 – 200 etc.

Agreement to help the world's poorest countries, which have done the least to cause climate change but are being hit the hardest by it. As the *Paris Agreement* says, ***"As part of a global effort, developed country Parties should continue to take the lead in mobilizing climate finance from a wide variety of sources, instruments and channels, noting the significant role of public funds, through a variety of actions, including supporting country-driven strategies, and taking into account the needs and priorities of developing country Parties. Such mobilization of climate finance should represent a progression beyond previous efforts."*** [297] The international community should also stop funding any fossil fuel or extractive linear economic activity with its traditional overseas aid budget, and instead support the development of new clean energy infrastructure and circular economy businesses, helping developing countries leapfrog the dirty phase of industrialisation and move straight to a green economy. Finally, these methods for supporting developing nations to shift to clean energy and a circular economy should be taught in schools as well as promoted more widely in society through publicly funded information and education campaigns, so that current and future generations understand why and how their nation is helping poorer countries to shift to clean energy and a circular economy. So, in summary …

The international community and developing country governments should:

- Facilitate and accelerate clean energy and circular economy technology transfer to developing countries
- Train, mentor and support developing country entrepreneurs and business people working in clean energy and the circular economy, and civil servants overseeing the transition of their nations to a green economy
- Provide energy access for all people who currently lack it in developing nations through local decentralised renewable energy
- Finance poor communities to switch from using kerosene stoves and firewood to ecostoves
- Provide decent education for women and girls, and access to health services and family planning for all
- Support developing countries to adapt to the impacts of a changing environment that they are already experiencing
- Provide significant 'climate finance', additional to overseas aid and significantly greater than the $100 billion per year currently envisioned under the *Paris Agreement*, to help poor nations transition to clean energy and a circular economy, and adapt to the impacts of a changing environment that they are already experiencing
- Stop overseas aid budgets from funding any fossil fuel or extractive linear, non-circular, economic activity
- Teach these methods for supporting developing nations to shift to clean energy and a circular economy in schools and through public information campaigns, so that current and future generations understand why and how their nation is helping poorer countries to shift to clean energy and a circular economy

[297] *Paris Agreement*, UN Framework Convention on Climate Change, (2015), p. 13, but also see the whole agreement; *UN Framework Convention on Climate Change*, UNFCCC, (1992), pp. 14 – 15, 22 – 23; *The Future We Want*, UN General Assembly, (2012), pp. 48 – 51 etc.

Future proof against natural shocks

In this report we have looked at how human beings are damaging the environment and causing it to change in negative ways, at a faster rate than the slow natural cycles of climatic change. However, there are also natural events which can have a sudden and devastating impact on our environment, such as a major meteor strike, significant volcanic eruption, or the outbreak of deadly disease. These certainly have happened many times in the past, and indeed recently, as we saw with Covid-19.

Figure 3.14: The international community should invest in early warning systems and mitigating actions to future proof against natural shocks such as major meteor strikes, volcanic eruption and the outbreak of virulent diseases, like Covid-19.

So it is important that governments should also invest in early warning systems and mitigating actions to help minimise and avoid such natural events. They should also invest significant public funds into research and development into technology that just generally advances society in socially positive directions (and prohibit scientific research that is dangerous or bad for society), whether linked to natural shocks or not, in order to keep society progressing. As the economists Michael Jacobs and Marianna Mazzucato put it in their volume *Rethinking Capitalism*, ***"By setting societal missions, and using their own resources to co-invest with long-term capital, governments can do far more than 'level the playing field', as the orthodox view would allow. They can help tilt the playing field towards the achievement of publicly chosen goals."*** [298] So, in summary …

[298] Jacobs, M. & Mazzucato, M. (Eds.), *Rethinking Capitalism*, (2016), p. 20, see also pp. 21, 98 – 118, 183 – 184; Atkinson, A., *Inequality*, (2015), pp. 118 – 123, 303; Raworth, K., *Doughnut Economics*, (2017), pp. 85 – 86 etc.

The international community should:

- Invest in early warning monitoring systems and mitigating actions for major meteor strikes, volcanic eruption and the outbreak of virulent disease
- Take appropriate mitigating actions to minimise and avoid such events
- Invest public funds in research and development into technology that generally advances society in socially positive directions, and prohibit scientific research that is dangerous or bad for society

CONCLUSION: FOUR SHIFTS FOR A GREEN AND FAIR GLOBAL ECONOMY

In this report we have seen in Part 1 that the world has witnessed enormous positive changes in development over the past 200 years, driven by the roll out of the industrial revolution and strong and fair economies around the world. However, we have also witnessed the terrible flip side of this process, as those same economies, driven by fossil fuels and overconsumption of limited natural resources, have also caused appalling environmental destruction. If we continue unchanged along this path, we will fall off a cliff. If we continue to overconsume and pollute the natural environment on a global scale, we will face a collapse into a new global dark age which will cause massive human suffering and loss of life and wipe out all the gains in development that have been achieved over the last 200 years. On the other hand, going backwards to a pre-industrial world is not desirable either. That was a world of widespread conflict, poor social justice standards and crushing poverty. So is there another way?

We still need ***strong and fair economies*** which we can ***tax and provide social spending*** to meet basic needs. However, in the future these economies need to be powered – not by fossil fuels – but by renewable ***clean energy***. They also need to move away from the overconsumption of our current 'extract, use, throw away' linear economic model to an environmentally sustainable ***circular economy***. This would eliminate all pollution, overconsumption and waste and push resources back around the economy in a circular fashion. But how are we to achieve these shifts? What are the policies and practices that will be required in order to make them happen? Well, we need more than just one or two limited actions. We need a new economic paradigm, a new world view and economic orthodoxy, which captures the best of what works but also embraces what we need to do that is new in order to drive the green economy revolution. That is why Arise has launched the Four Shifts campaign (www.ariseuk.org/campaigns/4-shifts).

Four Shifts economics captures the two great shifts that the world needs to secure a safe environmental ***ceiling*** that keeps us well within planetary boundaries: clean energy and the circular economy. It then holds them together with the two great shifts on development which are necessary for guaranteeing the social ***floor*** which lifts all out of poverty and below which no one should be allowed to fall: strong and fair economies which nations can tax and provide

social spending to meet basic needs. There are many specific actions under each of these shifts that governments need to take. These are captured in the boxes at the end of each section in Parts 2 and 3, and collected together in the Appendix. Taken together these changes would transform our global economy to bring about a green economy revolution. Arise's Four Shifts campaign (www.ariseuk.org/campaigns/4-shifts) brings these together into a simple overall framework which the world can understand and we as individual Christians can sign up to and campaign for, so that we can work together to transform our world one step at a time.

SHIFT ONE: CLEAN ENERGY *From polluting fossil fuels to **clean energy**.* **Strengthen the global Paris Agreement on climate change** to scale down the use of fossil fuels to zero emissions and scale up clean energy to 100% by 2030, banning the future use of fossil fuels. Bring in **national climate change laws** to implement it in every sector (energy, transport, buildings, industry etc.) in every nation.	**SHIFT TWO: CIRCULAR ECONOMY** *From overconsumption and waste to the **circular economy**.* Agree a **global circular economy law** to ban polluting activity, further human expansion into wild lands, the production of natural resources that takes out more than it puts back in, and all waste, in order to trigger the shift to a circular economy. Bring in **national circular economy laws** to implement it in every nation.
SHIFT THREE: STRONG AND FAIR ECONOMIES *From aid and welfare dependent to self-sufficient and thriving **strong and fair economies**.* Every government to develop a proactive **national industrial and economic development strategy** to create a diverse national economy that progressively moves up the value chain from agriculture to manufacturing to services to the knowledge economy, using whatever policies are most effective at each stage.	**SHIFT FOUR: TAX AND SOCIAL SPENDING** *From economies that only work for the richest to societies which **tax and provide social spending** to also help the poorest.* Agree a **global tax and social spending agreement** for every nation to collect tax at an amount equivalent to at least 45% of the national economy, one third from income taxes, one third from wealth taxes and one third from other taxes. Spend at least two thirds of this on healthcare, education and social protection (pensions, benefits etc.). Bring in **national tax and social spending laws** to implement it in every nation.

Four Shifts economics

This is not an impossible dream. Indeed it is the only real choice open to us, and it has already begun. As we have seen in this report, in recent decades strives forward have included: the *Montreal Protocol* outlawing the use of chlorofluorocarbons (CFCs); Europe and North America's reduction in greenhouse gas emissions; the slowing and reversing of deforestation, especially in temperate countries; the growing amount of protected land and territorial waters;

the many international environmental treaties; the already rapidly growing share of the world's energy that is provided by renewable technology; and the 2015 *Paris Agreement* on climate change. All of these are big steps forward along this path. The green economy revolution has already begun!

Only by continuing to pursue these types of policies, the kind outlined under Four Shifts economics, can the world continue to improve standards of social justice and development as God would want (and indeed drive them even further and faster), whilst also finally returning us to the proper and safe balance with our natural environment that the Bible describes. All of the scientific evidence we have considered shows us that the environmental crisis we are witnessing is coming to a head now, in our lifetimes. We are the first generation in history to truly understand the choice we face between collapse and a new green economy revolution. We are the generation that gets to choose which way the world will go, and that future generations will look back at and hold responsible, one way or another. Governments, businesses and the world can only hope to make this transition if we as individual Christians first find our voice, stand up and call for these four great shifts. If we Arise! Get involved and do something amazing with your life that will make a difference and change the world forever. Join us and support Arise's Four Shifts campaign (www.ariseuk.org/campaigns/4-shifts).

APPENDIX: POLICY PROPOSALS

DEVELOPMENT

Strong and fair economy

Lead domestically

Governments should:

- Pursue economic policies that will result in good jobs for all
- Protect employee rights, ensuring all jobs have sufficient pay, fair treatment, sensible rather than long working hours and generous holiday allocation
- Strive towards complete equality for all
- Recognise that pragmatically this will not always be possible, but …
- Intervene to push back towards equality when inequality becomes too extreme
- Allow the private sector freedom to operate as it choose (thus ensuring broadly free markets) unless it harms others, at which point the law should intervene to prevent human suffering, exploitation and social ills
- Ban cheating, swindling and defrauding
- Ensure the market can provide loans and credit for those who need it, but in ways that are safeguarded to prevent exploitation of the vulnerable

Industrial and economic development strategy

- Develop domestic industries and businesses
- Develop these further and further up the value chain, moving from agriculture and the export of natural resources; to labour intensive assembly; to simple manufacturing; more advanced manufacturing and eventually into services and the knowledge economy
- Develop industries that meet domestic need but also boost exports and engage in international trade
- Pursue a diverse economy
- Ensure economic development is powered by clean energy and the sustainable use of natural resources (circular economy)
- Drive economic development through a proactive and intentional government industrial and economic development strategy
- Build a positive partnership between government and business to work together to pursue this strategy

- Be flexible to adopt and change policies at different times within this strategy, choosing the right economic path for the nation, rather than holding doggedly to any one particular market ideology
- Include targets and indicators for specific sectors and businesses that have been prioritised for support within this strategy. If a policy is not working or companies failing to achieve as desired, then the policy should be changed and support withdrawn

Targeted policies to move up the value chain from agriculture, to manufacturing, to services and the knowledge economy

- Enforce private property rights and contracts
- Formalise with full legal deeds the ownership of the land by the communities that dwell upon it, especially indigenous communities
- Reform and modernise the agricultural sector, boosting productivity
- Invest the profits from natural resource and commodity exports in sovereign wealth funds to help drive the process of economic development and moving up the value chain to more advanced manufacturing, services and knowledge economies
- Focus on securing the transfer of technology, both scientific/technical and best practice in business processes, from more advanced economies
- Attract and allow Transnational Companies to operate, but only on terms that extract maximum value in technology transfer and tax for the nation
- Create industrial clusters and export zones
- Invest public money in research and development to advance domestic technology and industry
- Use tariffs, export bans and import bans to support the early stage development of new sectors and domestic businesses
- Use tax breaks to support the early stage development of new sectors and domestic businesses
- Use subsidies to support the early stage development of new sectors and domestic businesses
- Use public procurement to support the early stage development of new sectors and domestic businesses
- Establish some state owned industries, especially in areas of natural monopoly
- Maintain an undervalued competitive currency to boost exports
- Build infrastructure such as ports, roads, railways, airports, electricity and good phone and internet connectivity
- Develop a skilled domestic workforce for new industries through establishing education and technical training at home and sending citizens to study abroad
- Encourage domestic savings, borrowing and investment via domestic banks and financial institutions, thus strengthening the national finances
- Attract stable, long-term foreign investment, but use capital controls, limits on currency convertibility, pegged exchange rates and other tools to prevent destabilising short-term capital which can flood in and out quickly
- Provide strong direction to the financial sector to ensure investment goes where it is needed for national economic development

Policies for maturing the economy

- Maintain macroeconomic stability
- Establish a central bank
- Focus on supporting Small and Medium Enterprises (SMEs) as the backbone to the economy
- Make it quick and easy to set up a new business

- Reduce and simplify red tape and bureaucracy in the daily running of a business
- Establish quick and easy bankruptcy laws so if a business fails it can be wound up rapidly and a new initiative begun
- Provide access to financial services such as banking, capital and insurance for SMEs and all citizens
- Create and provide access to markets
- Formalise the informal sector
- Set a minimum wage, a maximum wage and establish a ratio between the highest and lowest paid employee in any company
- Allow, establish and support trade unions
- Restrict the amount of shares any one interest can hold in a company
- Support the development of more cooperatives and employee owned companies
- Generously support and retrain any community that finds the area of the economy on which they depend for a livelihood declining as strong and fair economies are built, so they can find employment in new areas that are opening up
- Invest in counter-cyclical spending through mass employment and public works programmes on infrastructure and other key priorities to provide job security and re-stimulate the economy during recession and slow downs
- Prevent monopolies and cartels
- Make short-term use of tariffs, subsidies, tax breaks, public procurement and other stimulation mechanisms to help business sectors as they develop, but phase these out over the long-term when industries are ready to compete internationally
- Explain the national industrial and economic development strategy in schools and through public information campaigns so citizens understand and can get behind it

Support internationally

The international community should:

- Reform the rules of the World Trade Organization (WTO) to give developing countries maximum freedom to pursue protectionist and other policies in the early stages of their economic development
- Not force economic liberalisation or any other ideological model onto developing nations, either overtly through the multinational system or covertly through technical advice and support, but allow them the freedom to choose the economic path that works for them
- Scrap subsidies and open up their own economies to developing nation exports
- Scrap or significantly weaken patent law and intellectual property rights (except in the creative industries), including reforming the *Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPs)* and relevant WTO rules, to support the transfer of technology and ideas to developing countries
- Provide generous training, mentoring and support for developing country civil servants, entrepreneurs and business people
- Cancel unpayable developing country debt, and treat this as additional to, rather than part of, overseas aid
- Ban future irresponsible lending
- Create an international bankruptcy mechanism to allow nations crippled with historic unpayable debt to wipe the slate clean and start afresh
- Provide tougher regulation of the financial sector to: 1) prevent predatory lending and overly risky behaviour; 2) increase capital reserve requirements; 3) separate regular from commercial banking; and 4) ensure no bank becomes ‘too big to fail’. Ensure individual companies and staff are held legally accountable for criminal behaviour and reckless

actions. Work together through global institutions to agree global deals to establish international rules in these areas
- Work together to spot and manage global economic shocks when they do occur through guaranteeing and bailing out major banks and creating extra credit to restore confidence in the system
- Teach these approaches in schools and through public information campaigns so that current and future generations understand how their nations can and are helping developing nations lift themselves out of poverty

Tax and social spending

Lead domestically

Governments should:

- Ensure the poor and marginalised in society are provided for and no one is left behind
- Provide generous unemployment and low-income benefits, wherever possible, in exchange for socially useful and honourable work the market finds hard to fund, thus retaining human dignity and avoiding creating a crippling dependency culture
- Ensure that such work is never a better alternative to conventional jobs and provide every support to help people get back into employment
- Provide incapacity benefits, pensions and similar social protection payments to those who need it without requiring any work
- Collect taxes in order to provide these and other services
- Reinforce, rather than undermine, the family as the primary social support network, by only providing social support when immediate family members are unable to do so
- Establish and implement an effective tax system
- Apply a progressive sliding-scale in tax, so the poorest pay least and the richest most
- Tax capital and unearned inherited wealth rather than earned income, as far as possible
- Tax socially undesirable activity and not socially desirable activity, as far as possible
- Borrow and invest money for developing a strong and fair economy but only fund social spending from tax not borrowing
- Provide good education for all citizens
- Provide good healthcare for all citizens (covering both physical and mental health)
- Ensure good water, sanitation and hygiene (WASH) services are provided for all citizens
- Target the communities who are most left-behind in all social support provision
- Recognise that a mixed economy of state, private sector and civil society may be needed to deliver effective social services, however …
- Be the ultimate guarantor of all the development needs considered in this section for all citizens if all else fails, either directly providing them (often healthcare and education) or through cash benefits to enable their purchase (often food and housing)
- Teach these values of care for all in society and ensuring none are left behind, in schools through the formal education system and in society through public information campaigns

Support internationally

The international community should:

- Practice complete global tax transparency by signing up to, implementing and significantly strengthening the *Multilateral Competent Authority Agreement* and its *Standard for Automatic Exchange of Financial Account Information in Tax Matters*

- Reduce the opportunities for multinational companies to avoid tax, by signing up to, implementing and significantly strengthening the *Two-Pillar Solution to Address the Tax Challenges Arising from the Digitalisation of the Economy*
- Negotiate a new global tax and social spending agreement that: 1) prevents the shifting of money out of countries where people are resident or companies are operating into 'tax havens', and; 2) commits every nation to collect in tax, and spend through government spending, an annual amount equivalent to at least 45% of the national economy, one third from income taxes (income tax, national insurance etc.), one third from wealth taxes (land tax, inheritance tax, council tax, wealth tax etc.) and one third from other taxes (corporation taxes, taxes on goods and services etc.). As part of this agreement, income and wealth taxes must be significantly progressive so the poorest pay less and the richest more. Taxes on income and on returns from wealth should be set at the same level. Various specific types of income, wealth and other taxes and levels should be negotiated and standardised between nations. At least two thirds of this income should be spent on healthcare, education and social protection (pensions, benefits etc.). The other third to be spent on other government functions
- Ensure all national governments develop their own national tax and social spending laws to implement this international agreement
- Train and capacity-build developing nation civil servants in tax collection and the provision of social services
- Give generous overseas aid of at least 0.7% of Gross National Income to bridge the gap and fund basic services whilst nations are still developing
- Ensure aid is solely targeted on poverty reduction, not supporting developed country exports or foreign policy, or discriminating on the basis of ethnicity, religion, gender, age or in any other way
- Ensure all aid is harmonised and coordinated by the national government at a country level behind a single national development plan that is nationally developed and owned, with significant input from poor communities
- Ensure aid is channelled into national budgets and spent by the national government to make it efficient and help reinforce and strengthen the national authorities in their legitimate role. Where concerns about corruption and good governance prevent this, deliver aid into a nation via UN agencies and Non-Governmental Organisations (NGOs), with a lead agency playing the coordinating role until the situation has improved and aid can be transferred back through the national finances
- Require aid to come as grants not loans
- Ensure aid is stable, consistent and committed over multiple years to aid financial planning
- Make aid fully transparent, rigorously monitored and independently evaluated
- Ensure aid is only ever short-term with a sliding scale for phasing down and exiting from aid as nations develop
- Provide humanitarian relief in the context of disasters, with a significant proportion invested in Disaster Risk Reduction (DRR)
- Support private financial flows for development such as charitable giving through NGOs; remittances from diaspora communities; philanthropy and social investment
- Pass, support, publicise and strengthen international norm setting standards and agreements on development and aid such as the *Sustainable Development Goals*
- Teach these approaches in schools and through public information campaigns so that current and future generations understand why and how their nation is helping to lift poorer countries out of poverty

ENVIRONMENT

A framework to guide humanity's approach to the environment

Governments should:

- Recognise that creation is good, beautiful and wonderful and has inherent value and worth beyond what it can provide for human beings, and should be conserved and treasured in its own right
- Recognise that humanity should farm creation and use its natural resources to provide the food, clean water, fresh air, clothing, housing and many other things we need in order to survive
- Acknowledge that humanity is entirely dependent on the environment remaining healthy in order to continue to provide us with these things we need to survive
- Ensure that as humanity farms creation and uses its natural resources, we should never do so in environmentally exploitative, rapacious and destructive ways, but in a balanced and managed fashion, protecting and preserving the environment, and not leave this up to chance but …
- Pass and enforce laws that prevent the exploitation of the natural environment for its own sake, and also …
- Pass and enforce laws that prevent people from damaging the environment in ways which harm others
- Promote a diet that is healthy and is also good for people and planet, that is based upon mainly fruit and vegetables (at least a third), and cereal and carbohydrates (at least a third), with a small amount of meat (less than a sixth) and dairy (less than a sixth), and eating white meat and fish rather than red meat wherever possible. This should include legislation requiring shops and restaurants to provide more and better labelled vegetarian and vegan options
- Recognise that each generation cannot claim to ultimately 'own' creation, but is merely a steward, and should pass it on in good condition to future generations
- Recognise that failing to follow God's standards and Biblical principles of justice, including these principles for the proper care and preservation of the environment, will result in creation turning barren and failing to give us what we need to survive

Clean energy

Governments should:

High-level strategy

- Sign up to and significantly strengthen the *Paris Agreement* in order to set a rapid global path to ban all greenhouse gas emitting forms of energy and move to 100% clean energy by 2030 at the latest (with tough intermediate targets) whilst keeping the lights on and providing energy access for all
- Develop national climate change laws and action plans to implement a significantly strengthened *Paris Agreement* in every nation that … 1) immediately bans greenhouse gas emitting forms of energy where there are clean energy alternatives already available; 2) where they are not, uses quotas and targets to scale down greenhouse gas emitting forms of energy and scale up clean energy over a tight time period leading to a future ban, and 3) cuts subsidies and massively increases taxes on greenhouse gas emitting energy
- Invest significant public funds into research and development to improve and scale up clean energy technology
- Use many of the policies to grow a vibrant clean energy industry outlined under Strong and fair economies, including tariffs, tax breaks, subsidies, public procurement, some

state owned enterprises and a positive partnership between government and the private sector
- Use many of the policies to grow a vibrant clean energy industry from the Strong and fair economies sections of Parts 2 and 3, including tariffs, tax breaks, subsidies, public procurement, some state owned enterprises and a positive partnership between government and the private sector

Electricity generation

- Immediately ban coal fired power plants
- Set a very rapid timetable towards a ban of the remaining forms of fossil fuel generated energy production as fast as renewable energy can come on stream to replace it, except (if necessary) for a small percentage required for 'baseload' energy
- Use a mix of solar, wind, hydropower, geothermal, tidal, wave or ocean current driven energy to provide this renewable energy, depending on national circumstances
- Ensure this renewable energy is generated in a local decentralised manner, so energy is immediately and locally available to reduce the need for large national grid 'baseload' energy
- Update all energy grids to become 'smart grids', so they use modern digital technology and real time information to predict and detect energy demands, and areas of wastage, and direct energy flows to the most needed areas when they are required
- Focus significant clean energy research and development resources onto improving battery storage technology to enable power generated by renewable sources to be stored in larger amounts for longer periods in order to reduce and remove the need for fossil fuel generated 'baseload' energy as rapidly as possible
- Focus part of clean energy research and development resources towards producing energy directly from hydrogen and oxygen (and other similar technologies) to again further help with the 'baseload' issue
- If there is still a need for 'baseload' energy that renewable sources can't yet meet, then nuclear power, fossil fuel plants with Carbon Capture and Storage (CCS), or moving from coal to gas, as a less polluting 'bridging fuel', may be used as options depending on national circumstances, but only in the short-term until these needs can be fully met by renewable sources

Transport

- Immediately ban the construction of new cars, trucks, lorries and trains which use fossil fuels, since electric alternatives are already available
- After a short period (perhaps five years) ban the remaining fossil fuel cars, trucks, trains and lorries
- Provide a heavily subsidised package to support any of the public still using petrol vehicles to upgrade to electric alternatives
- Invest in the national infrastructure to support these alternatives, such as the widespread availability of charge points for cars and wires and rails for electric trains
- Use biofuels for flights and shipping until other renewable energy alternatives are available
- Invest in research into clean energy planes and boats
- Extend ban to fossil fuel planes and boats once clean energy alternatives become available

Buildings and industrial processes

- Immediately ban new buildings which use fossil fuels for heating/hot water/cooking, since it is already possible to meet these needs through clean energy generated electricity

- Launch a national programme to completely convert existing building stock to use clean energy generated electricity for heating/hot water/cooking
- Ban the burning of fossil fuels for industrial processes and use clean energy alternatives instead

Across all sectors

- Apply the maximum possible energy efficiency and emissions standards across all sectors to minimise waste, leakage and the amount of power used
- Require compulsory carbon offsetting for all use of fossil fuels, to fund tree planting in developing country rainforests (or similar projects) of the equivalent amount required to absorb the emissions generated
- Use quotas and rationing for the use of fossil fuel generated energy if the above steps are not reducing emissions fast enough
- Publicise and explain the need to transition to 100% clean energy, and how individuals can support this in their own lives through school education and public information campaigns

Circular economy

Governments should:

- Ban the use of polluting chemicals which are environmentally damaging in agricultural and manufacturing processes where there is a non-damaging alternative. Where there is no viable alternative, they should:
- Apply the same approach as that outlined above to shift to clean energy to drive down the amount of usage and scale up investment in research into clean alternatives until these do become viable and the polluting chemical can be banned
- Screen all chemicals used in agricultural and manufacturing processes. If any which were previously thought to be benign turn out to be environmentally damaging, the same process should be applied to them
- Ban the production of any biosphere resource (fishing, agriculture, hunting, logging, fresh water etc.) in ways which are not properly managed and replenished, so that more is not taken out than put back in
- Ban all further human settlement and expansion into currently wild lands
- Prevent invasive species
- Invest in conservation, re-wilding and reforestation programmes
- Ban the manufacture of products that can't be completely recycled continuously or safely returned to the natural environment
- Ban the dumping of waste in landfills or at sea and require 100% recycling or breaking products down safely and returning them to the natural environment instead
- Require all biosphere waste to be composted
- Extend producer responsibility to make businesses responsible for the safe collection and recycling of the packaging they use for their products, and of the products themselves at the end of their life
- Support businesses to adjust their model and way of working and retrain their workforce to comply with the new laws and become completely circular
- Use the policies under Strong and fair economies (such as tariffs, tax breaks, subsidies, public procurement, some state owned enterprises and a positive dialogue and partnership between government and the private sector) to grow new circular economy businesses
- Apply all of the above circular economy laws at the national level, but also …

- Negotiate and agree a new global agreement on the circular economy (similar to the *Paris Agreement* on climate change) to apply all the above laws globally. This should revise, strengthen and incorporate existing global agreements on the environment
- Teach these approaches in schools and promote them more widely through public information campaigns so that current and future generations understand and support the critical importance of moving to a circular economy

Provide generous support to help developing nations shift to clean energy and a circular economy

The international community and developing country governments should:

- Facilitate and accelerate clean energy and circular economy technology transfer to developing countries
- Train, mentor and support developing country entrepreneurs and business people working in clean energy and the circular economy, and civil servants overseeing the transition of their nations to a green economy
- Provide energy access for all people who currently lack it in developing nations through local decentralised renewable energy
- Finance poor communities to switch from using kerosene stoves and firewood to ecostoves
- Provide decent education for women and girls, and access to health services and family planning for all
- Support developing countries to adapt to the impacts of a changing environment that they are already experiencing
- Provide significant 'climate finance', additional to overseas aid and significantly greater than the $100 billion per year currently envisioned under the *Paris Agreement*, to help poor nations transition to clean energy and a circular economy, and adapt to the impacts of a changing environment that they are already experiencing
- Stop overseas aid budgets from funding any fossil fuel or extractive linear, non-circular, economic activity
- Teach these methods for supporting developing nations to shift to clean energy and a circular economy in schools and through public information campaigns, so that current and future generations understand why and how their nation is helping poorer countries to shift to clean energy and a circular economy

Future proof against natural shocks

The international community should:

- Invest in early warning monitoring systems and mitigating actions for major meteor strikes, volcanic eruption and the outbreak of virulent disease
- Take appropriate mitigating actions to minimise and avoid such events
- Invest public funds in research and development into technology that generally advances society in socially positive directions, and prohibit scientific research that is dangerous or bad for society

BIBLIOGRAPHY

DEVELOPMENT

Development

- Acemoglu, D. & Robinson, J., *Why Nations Fail*, (London: Profile Books, 2013)
- Barro, R. & Lee, J-W., *Barro-Lee Estimates of Educational Attainment for the Population Aged 15 – 64 from 1950 to 2015*, (Sep 2021), www.barrolee.com
- Chatham House, www.chathamhouse.org, multiple reports and papers, especially …
    - *Human Development as Positive Freedom*, (Chatham House, Feb 2014), www.chathamhouse.org/sites/files/chathamhouse/home/chatham/public_html/sites/default/files/20140200CAGEDevelopmentEscosura.pdf
    - *The Resource Curse Revisited*, (Chatham House, Aug 2015), www.chathamhouse.org/sites/files/chathamhouse/publications/research/20150804ResourceCurseRevisitedStevensLahnKooroshyFinal.pdf
- Cohen, J. & Easterly, W. (Eds.), *What Works in Development?*, (Washington DC: Brookings Institute Press, 2009)
- Collier, P., *The Bottom Billion*, (New York: Oxford University Press, 2008)
- Collier, P., *Wars, Guns and Votes*, (London: Bodley Head, 2009)
- Commission on State Fragility, Growth and Development, *Escaping the Fragility Trap*, (Apr 2018), www.theigc.org/wp-content/uploads/2020/10/Escaping-the-fragility-trap_Oct-2020.pdf
- Dahl, R. A., *On Democracy, Second Edition*, (New Haven: Yale University Press, 2015)
- Deaton, A., *The Great Escape*, (Woodstock: Princeton University Press, 201)
- Diamond, J., *Guns, Germs and Steel*, (London: Vintage, 2017)
- Easterly, W., *The White Man's Burden*, (Oxford: Oxford University Press, 2007)
- Eberly, D., *The Rise of Global Civil Society*, (New York: Encounter Books, 2008)
- Ferguson, N., *The Ascent of Money*, (London: Penguin Books, 2009)
- Findlay, R. & O'Rourke, K., *Power and Plenty*, (Woodstock: Princeton University Press, 2009)
- Food and Agriculture Organisation (FAO), www.fao.org/home/en, multiple reports and papers, especially …
    - *The State of Food Security and Nutrition in the World*, (FAO, IFAD, UNICEF, WFP & WHO, annual report), access via www.fao.org/publications/sofi
    - *FAO Stat*, (FAO), www.fao.org/faostat/en/#data
- Fukuyama, F., *Political Order and Political Decay*, (London: Profile Books, 2015)

- Ghani, A. & Lockhart, C., *Fixing Failed States*, (New York: Oxford University Press, 2009)
- Goetzmann, W., *Money Changes Everything*, (Woodstock: Princeton University Press, 2017)
- Goldin, I., *Divided Nations*, (Oxford: Oxford University Press, 2014)
- Green, D., *From Poverty to Power, Second Edition*, (Rugby: Practical Action Publishing, 2012)
- Harari, Y. N., *Sapiens*, (London: Vintage, 2014)
- Institute of Development Studies (IDS), www.ids.ac.uk, multiple reports and papers, especially …
    - *Equality, Security and Sustainability*, (IDS, Feb 2017), https://opendocs.ids.ac.uk/opendocs/bitstream/handle/123456789/12824/ER219_EqualitySecurityandSustainabilityInSearchofVirtuousCircles.pdf;jsessionid=7061457AFAC457DB8609DCE4519F28E7?sequence=1
    - *How do State-Business Relations Shape Sustainable Development?,* (IDS, Mar 2017), https://opendocs.ids.ac.uk/opendocs/bitstream/handle/123456789/12928/PB141_AGID719_StateBusiness_Online.pdf?sequence=1
    - *State-Business Relations Beyond Growth*, (IDS, Dec 2016), https://opendocs.ids.ac.uk/opendocs/bitstream/handle/123456789/12686/ER215_StateBusinessRelationsBeyondGrowthBringinginDevelopment.pdf?sequence=1&isAllowed=y
- International Food Policy Research Institute (IFPRI), www.ifpri.org, multiple reports and papers, especially …
    - *Global Hunger Index*, (IFPRI, annual report), access via www.ifpri.org/publications
- Kenny, C., *Getting Better*, (New York: Basic Books, 2012)
- Landes, D., *The Wealth and Poverty of Nations*, (London: Little, Brown and Company, 1998)
- Marr, A., *A History of the World*, (London: Pan Books, 2013)
- Marshall, T., *Prisoners of Geography*, (London: Elliott and Thompson Ltd, 2015)
- Mazower, M., *Governing the World*, (London: Penguin Books, 2013)
- Meredith, M., *The State of Africa*, (London: Simon & Schuster, 2013)
- Morris, I., *Foragers, Farmers and Fossil Fuels*, (Woodstock: Princeton University Press, 2015)
- Morris, I., *Why the West Rules – For Now*, (London: Profile Books, 2011)
- Mortimer, I., *Centuries of Change*, (London: Bodley Head, 2014)
- Moyo, D., *Dead Aid*, (London: Penguin Books, 2010)
- Naím, M., *The End of Power*, (New York: Basic Books, 2013)
- Osborne, R., *Of the People, By the People*, (London: Bodley Head, 2011)
- Overseas Development Institute (ODI), www.odi.org, multiple reports and papers
- Overy, R. (Ed.), *The Times Complete History of the World, Ninth Edition*, (London: Times Books, 2015)
- Oxfam, www.oxfam.org, multiple reports and papers, especially …
    - *A Different Route*, (Oxfam, Nov 2015), www.oxfam.org/sites/www.oxfam.org/files/file_attachments/bp-different-route-asia-inclusive-sustainable-development-131115-en.pdf

    - *Common Ground*, (Oxfam and various agencies, Mar 2016), www.oxfam.org/sites/www.oxfam.org/files/file_attachments/bp-common-ground-land-rights-020316-en_0.pdf
    - *Raising the Bar*, (Oxfam, Feb 2017), www.oxfam.org/sites/www.oxfam.org/files/dp-raising-the-bar-business-sdgs-130217-en_0.pdf
    - *The Time is Now*, (Oxfam, May 2016), www.oxfam.org/sites/www.oxfam.org/files/file_attachments/bp-time-is-now-human-economy-africa-100516-en_0.pdf
- Pomeranz, K., *The Great Divergence*, (Woodstock: Princeton University Press, 2000)
- Ravallion, M., *The Economics of Poverty*, (New York: Oxford University Press, 2016)
- Rosling, H., *Factfulness*, (London: Sceptre, 2018)
- Sachs, J., *The Age of Sustainable Development*, (Chichester: Columbia University Press, 2015)
- Sachs, J., *The End of Poverty*, (London: Allen Lane, 2005)
- Save the Children, www.savethechildren.net, multiple reports and papers
- Sen, A., *Development as Freedom*, (Oxford: Oxford University Press, 2001)
- Trentmann, F., *Empire of Things*, (London: Allen Lane, 2016)
- UN Development Programme (UNDP), www.undp.org, multiple reports and papers, especially …
    - *Getting to the Last Mile in Least Developed Countries*, (UNDP, Nov 2016), www.undp.org/content/undp/en/home/librarypage/sustainable-development-goals/getting-to-the-last-mile-in-least-developed-countries.html
    - *Global Trends: Challenges and Opportunities in the Implementation of the Sustainable Development Goals*, (UNDP, Mar 2017), www.undp.org/content/undp/en/home/librarypage/sustainable-development-goals/global-trends--challenges-and-opportunities-in-the-implementatio.html
    - *Human Development Report*, (UNDP, annual flagship report), access via http://hdr.undp.org/en/global-reports
- UN-Habitat, www.unhabitat.org, multiple reports and papers, especially …
    - *Urban Indicators Database*, (UN Habitat), https://data.unhabitat.org/
    - *World Cities Report*, (UN-Habitat, annual report), access via www.unhabitat.org/knowledge/research-and-publications
- Watson, A., *The Evolution of International Society*, (London: Routledge, 1992)
- WHO/UNICEF Joint Monitoring Programme for Water Supply, Sanitation and Hygiene (JMP), www.washdata.org,multiple reports and papers, especially …
    - *Progress on Drinking Water, Sanitation and Hygiene*, (WHO/UNICEF Joint Monitoring Programme, annual report), access via www.washdata.org/reports
    - WHO/UNICEF Joint Monitoring Programme for Water Supply, Sanitation and Hygiene, data, www.washdata.org/data
- World Bank, www.worldbank.org, multiple reports and papers, especially …
    - *The Changing Wealth of Nations*, (World Bank, regular report), access via https://openknowledge.worldbank.org/
    - *Voices of the Poor 1: Can Anyone Hear Us?*, (World Bank, 2000), http://documents.worldbank.org/curated/en/131441468779067441/pdf/multi0page.pdf
    - *Voices of the Poor 2: Crying Out for Change*, (World Bank, 2000), http://documents.worldbank.org/curated/en/501121468325204794/pdf/multi0page.pdf

    - *Voices of the Poor 3: From Many Lands*, (World Bank, 2000), http://documents.worldbank.org/curated/en/864691468233712217/pdf/multi0page.pdf
    - *World Development Indicators*, (World Bank), https://databank.worldbank.org/source/world-development-indicators
    - *World Development Report*, (World Bank, annual flagship report), access via http://www.worldbank.org/en/publication/wdr/wdr-archive
- World Health Organization (WHO), www.who.int, multiple reports and papers, especially …
    - *World Health Statistics*, (WHO, annual report), access via www.who.int/gho/publications/world_health_statistics/en/
- World Vision, www.wvi.org, multiple reports and papers, especially …
    - *The Natural Environment in Development and Wellbeing*, (World Vision, May 2013), www.wvi.org/sites/default/files/The%20Natural%20Environment%20in%20Development%20and%20Well-Being.pdf

International standards on development

- *Code of Conduct for the International Red Cross and Red Crescent Movement and Non-Governmental Organisations (NGOs) in Disaster Relief*, (ICRC, 1994), www.icrc.org/eng/assets/files/publications/icrc-002-1067.pdf
- *Core Humanitarian Standard*, (CHS Alliance, 2014), https://corehumanitarianstandard.org/files/files/Core%20Humanitarian%20Standard%20-%20English.pdf
- *Humanitarian Charter and Minimum Standards in Humanitarian Response*, (The Sphere Project, 2011), www.sphereproject.org/resources/download-publications/?search=1&keywords=&language=English&category=22
- OECD Development Assistance Committee (OECD DAC), www.oecd.org/dac/developmentassistancecommitteedac.htm
    - *Busan Partnership for Effective Development Co-operation*, (OECD DAC, 2011), www.oecd.org/dac/effectiveness/49650173.pdf
    - *The Paris Declaration on Aid Effectiveness and the Accra Agenda for Action*, (OECD DAC, 2005, 2008), www.oecd.org/dac/effectiveness/34428351.pdf
    - *Rome Declaration on Harmonisation*, (OECD DAC, 2003), www.oecd.org/dac/effectiveness/31451637.pdf
- Sustainable Development Goals (SDGs), www.un.org/sustainabledevelopment, multiple reports and papers, especially …
    - *Progress towards the Sustainable Development Goals*, (UN Economic and Social Council, annual report), access via https://unstats.un.org/sdgs
    - *The Sustainable Development Goals Report*, (UN, annual report), access via https://unstats.un.org/sdgs
    - *Transforming our World: The 2030 Agenda for Sustainable Development*, (UN General Assembly, 25 Sep 2015), www.un.org/ga/search/view_doc.asp?symbol=A/RES/70/1&Lang=E

Building a strong and fair economy

- Bernstein, W., *A Splendid Exchange*, (London: Atlantic Books, 2008)
- Chang, H-J., *Bad Samaritans*, (London: Random House Business Books, 2008)

- Chang, H-J., *Globalisation, Economic Development and the Role of the State*, (London: Zed Books, 2003)
- Chang, H-J., *Kicking Away the Ladder*, (London: Anthem Press, 2002)
- Chang, H-J. & Grabel, I., *Reclaiming Development*, (London: Zed Books, 2014)
- Chatham House, www.chathamhouse.org, multiple reports and papers, especially …
    - *Preventing Crises and Promoting Economic Growth*, (Chatham House, Apr 2011), www.chathamhouse.org/sites/files/chathamhouse/public/Research/International%20Economics/r0411_ipc.pdf
    - *Registering for Growth*, (Chatham House, Jul 2013), www.chathamhouse.org/sites/files/chathamhouse/public/Research/International%20Economics/0713bp_woodruff.pdf
- Commission on Growth and Development, *Post-Crisis Growth in Developing Countries*, (Washington DC: World Bank, 2010)
- Commission on Growth and Development, *The Growth Report*, (Washington DC: World Bank, 2008)
- Collier, P., *Catching Up*, (London: Commonwealth Secretariat, 2011)
- Easterly, W., *The Elusive Quest for Growth*, (London: MIT, 2002)
- International Monetary Fund (IMF), www.imf.org, multiple reports and papers, especially …
    - *Fiscal Monitor*, (IMF, annual report), access via www.imf.org/en/Publications/FM
    - *Global Financial Stability Report*, (IMF, annual report), access via www.imf.org/en/Publications/GFSR
    - *World Economic Outlook*, (IMF, annual report), access via www.imf.org/en/publications/weo
- Jacobs, M. & Mazzucato, M. (Eds.), *Rethinking Capitalism*, (Chichester: Wiley-Blackwell, 2016)
- Mazzucato, M., *The Entrepreneurial State*, (New York: Public Affairs, 2015)
- Micklethwait, J. & Wooldridge, A., *The Fourth Revolution*, (London: Allen Lane, 2014)
- Organisation for Economic Co-operation and Development (OECD), www.oecd.org, multiple reports and papers
- Oxfam, www.oxfam.org, multiple reports and papers, especially …
    - *Steps Towards a Living Wage in Global Supply Chains*, (Oxfam, Dec 2014), www.oxfam.org/sites/www.oxfam.org/files/file_attachments/ib-steps-towards-living-wage-global-supply-chains-101214-en.pdf
- Rodrik, D. (Ed.), *In Search of Prosperity*, (Woodstock: Princeton University Press, 2003)
- Rodrik, D., *One Economics, Many Recipes*, (Woodstock: Princeton University Press, 2007)
- Stiglitz, J., *Globalization and its Discontents*, (London: Allen Lane, 2002)
- Stiglitz, J., *Making Globalization Work*, (London: Allen Lane, 2006)
- UN Conference on Trade and Development (UNCTAD), http://unctad.org, multiple reports and papers, especially …
    - *Achieving the Global New Deal we Need*, (UNCTAD, Dec 2017), , http://unctad.org/en/PublicationsLibrary/presspb2017d12_en.pdf
    - *Benchmarking Productive Capacities in Least Developed Countries*, (UNCTAD, May 2016), http://unctad.org/en/PublicationsLibrary/webaldc2015d9_en.pdf
    - *Boosting Investment in Productive Capacities for Trade*, (UNCTAD, Dec 2015), http://unctad.org/en/PublicationsLibrary/presspb2015d17_en.pdf

  - *Commodities and Development Report*, (UNCTAD, regular report), access via https://unctad.org/en/Pages/SUC/Commodities/Commodities-Strategic-Reports.aspx
  - *Estimating the Impact of Trade Specialization and Trade Policy on Poverty in Developing Countries*, (UNCTAD, Dec 2015), http://unctad.org/en/PublicationsLibrary/webaldc2015d6_en.pdf
  - *Global Value Chains and South-South Trade*, (UNCTAD, Oct 2015), http://unctad.org/en/PublicationsLibrary/gdsecidc2015d1_en.pdf
  - *Growth and Poverty Eradication*, (UNCTAD, Nov 2013), http://unctad.org/en/PublicationsLibrary/presspb2013d4_en.pdf
  - *Handbook of Statistics*, (UNCTAD, annual report), https://unctad.org/en/Pages/Publications/Handbook-of-Statistics.aspx
  - *If you care about Least Developed Countries, Care about Non-Tariff Measures*, (UNCTAD), http://unctad.org/en/PublicationsLibrary/ditc2015misc4_en.pdf
  - *Making Trade Work for Least Developed Countries*, (UNCTAD, 2016), http://unctad.org/en/PublicationsLibrary/aldc2015d5_en.pdf
  - *New Innovation Approaches to Support the Implementation of the Sustainable Development Goals*, (UNCTAD, 2017), http://unctad.org/en/PublicationsLibrary/dtlstict2017d4_en.pdf
  - *Regional Trade Agreements, Integration and Development*, (UNCTAD, Jul 2017), http://unctad.org/en/PublicationsLibrary/ser_rp2017d1_en.pdf
  - *Statistical Tables on the Least Developed Countries*, (UNCTAD, annual report), access via https://unctad.org/en/Pages/publications.aspx
  - *The Least Developed Countries Report*, (UNCTAD, annual report), access via https://unctad.org/en/Pages/Publications/TheLeastDevelopedCountriesReport.aspx
  - *Trade and Development Report*, (UNCTAD, annual report), https://unctad.org/en/Pages/Publications/TradeandDevelopmentReport.aspx
  - *Trade, Income Distribution and Poverty in Developing Countries*, (UNCTAD, Jul 2012), http://unctad.org/en/PublicationsLibrary/osgdp20121_en.pdf
  - *UNCTAD Findings on Services, Development and Trade*, (UNCTAD, 2014), http://unctad.org/en/PublicationsLibrary/ditctncd2013d8_en.pdf
- UN Development Programme (UNDP), www.undp.org, multiple reports and papers, especially …
  - *Barriers and Opportunities at the Base of the Pyramid*, (UNDP, Aug 2014), www.undp.org/content/undp/en/home/librarypage/poverty-reduction/private_sector/barriers-and-the-opportunities-at-the-base-of-the-pyramid---the-.html
  - *Macroeconomic Policy for Growth and Poverty Reduction*, (UNDP, Jul 2011), www.undp.org/content/dam/undp/library/Poverty%20Reduction/Macroeconomic%20Policy%20for%20Growth%20and%20Poverty%20Reduction.pdf
- UN Industrial Development Organization (UNIDO), www.unido.org, multiple reports and papers, especially …
  - *Industrial Development Report*, (UNIDO, annual flagship report), www.unido.org/resources/publications/flagship-publications/industrial-development-report-series
  - *Trade Capacity Building Resource Guide*, (UNIDO, 2017), www.unido.org/sites/default/files/files/2017-12/Trade_Capacity_Building_Resource_Guide.pdf
- World Economic Forum (WEF), www.weforum.org, multiple reports and papers, especially …

  - *Enabling Trade*, (WEF, Jan 2015), http://www3.weforum.org/docs/WEFUSA_EnablingTrade_Report2015.pdf
  - *Geo-economics: Seven Challenges to Globalization*, (WEF, Feb 2015), http://www3.weforum.org/docs/WEF_Geo-economics_7_Challenges_Globalization_2015_report.pdf
  - *Inclusive Growth and Development Report*, (WEF, regular report), access via www.weforum.org/reports
  - *Investing in Inclusiveness, Sustainability and Growth*, (WEF, Jan 2016), http://www3.weforum.org/docs/WEF_2016_Investing_Inclusiviness_Sustainability.pdf
  - *New Growth Models*, (WEF, Jan 2014), http://www3.weforum.org/docs/GAC/2014/WEF_GAC_NewGrowthModels_ChallengesStepsGrowth_Report_2014.pdf
- World Bank, www.worldbank.org, multiple reports and papers, especially …
  - *Doing Business*, (World Bank, annual report), access via https://openknowledge.worldbank.org/
  - *Global Economic Prospects*, (World Bank, annual report), access via https://openknowledge.worldbank.org/
  - *Global Financial Development Report*, (World Bank, annual report), access via https://openknowledge.worldbank.org/
- World Trade Organization (WTO), www.wto.org, multiple reports and papers, especially …
  - *Global Value Chain Development*, (WTO, regular report), access via www.wto.org/english/res_e/publications_e/publications_e.htm
  - *Making Globalization Socially Sustainable*, (WTO, 2011), www.wto.org/english/res_e/booksp_e/glob_soc_sus_e.pdf
  - *The Role of Trade in Ending Poverty*, (World Bank & WTO, 2015), www.wto.org/english/res_e/booksp_e/worldbankandwto15_e.pdf
  - *World Trade Report*, (WTO, annual flagship report), www.wto.org/english/res_e/reser_e/wtr_e.htm
  - *World Trade Statistical Review*, (WTO, annual report), www.wto.org/english/res_e/statis_e/wts_e.htm
- Yifu Lin, J., *The Quest for Prosperity*, (Woodstock: Princeton University Press, 2014)

Tax and social spending; overseas aid and inequality

- Atkinson, A., *Inequality*, (London: Cambridge University Press, 2015)
- Castles, F., Leibfried, S., Lewis, J., Obinger, H. & Pierson, C. (Eds.), *The Oxford Handbook of the Welfare State*, (Oxford: Oxford University Press, 2010)
- Chatham House, www.chathamhouse.org, multiple reports and papers, especially …
  - *Tax Competition and the Myth of the 'Race to the Bottom'*, (Chatham House, Feb 2013), www.chathamhouse.org/sites/files/chathamhouse/public/Research/International%20Economics/0213bp_troeger.pdf
- Organisation for Economic Co-operation and Development (OECD), www.oecd.org, multiple reports and papers, especially …
  - *Multilateral Competent Authority Agreement on Automatic Exchange of Financial Account Information*, (OECD, Oct 2014), www.oecd.org/ctp/exchange-of-tax-information/multilateral-competent-authority-agreement.pdf
  - *Standard for Automatic Exchange of Financial Account Information in Tax Matters, Second Edition*, (OECD, Mar 2017), www.oecd.org/tax/exchange-of-tax-

information/standard-for-automatic-exchange-of-financial-account-information-in-tax-matters-second-edition-9789264267992-en.htm
    - *Two-Pillar Solution to Address the Tax Challenges Arising from the Digitalisation of the Economy*, (OECD, Oct 2021), www.oecd.org/tax/beps/statement-on-a-two-pillar-solution-to-address-the-tax-challenges-arising-from-the-digitalisation-of-the-economy-october-2021.pdf
- Institute of Development Studies (IDS), www.ids.ac.uk, multiple reports and papers, especially …
    - *A Review of Tax Experiments*, (IDS, Oct 2014), https://opendocs.ids.ac.uk/opendocs/bitstream/handle/123456789/4810/ER97%20A%20Review%20of%20Tax%20Experiments%20From%20the%20Lab%20to%20the%20Field.pdf?sequence=1
    - *Building Tax Capacity in Developing Countries*, (IDS, Jul 2015), https://opendocs.ids.ac.uk/opendocs/bitstream/handle/123456789/6522/PB96.pdf?sequence=3
    - *Designing Social Protection as an Effective and Sustainable Investment*, (IDS, Aug 2011), www.ids.ac.uk/files/dmfile/InFocus17.pdf
    - *Inequality: Trends, Harms and New Agendas*, (IDS, Sep 2015), https://opendocs.ids.ac.uk/opendocs/bitstream/handle/123456789/7075/ER144_InequalityTrendsHarmsandNewAgendas.pdf?sequence=1
    - *The Future of Social Protection*, (IDS, Dec 2015), https://opendocs.ids.ac.uk/opendocs/bitstream/handle/123456789/7168/PB106_AGID260_SocProtec_online2.pdf?sequence=3
    - *Where Next for Social Protection?*, (IDS, Mar 2015), https://opendocs.ids.ac.uk/opendocs/bitstream/handle/123456789/5945/ER124_WhereNextforSocialProtection.pdf?sequence=5
    - *Will Changes to the International Tax System Benefit Low Income Countries?*, (IDS, Jan 2014), https://opendocs.ids.ac.uk/opendocs/bitstream/handle/123456789/3359/RRB6.pdf?sequence=1
- Milanovic, B., *Global Inequality*, (London: Belknap, Harvard, 2016)
- Murphy, R., *The Joy of Tax*, (London: Bantam Press, 2015)
- Oxfam, www.oxfam.org, multiple reports and papers, especially …
    - *Accountability and Ownership*, (Oxfam, Sep 2016), www.oxfam.org/sites/www.oxfam.org/files/file_attachments/bp-accountability-and-ownership-140916-en.pdf
    - *An Economy for the 1%*, (Oxfam, Jan 2016), www.oxfam.org/sites/www.oxfam.org/files/file_attachments/bp210-economy-one-percent-tax-havens-180116-en_0.pdf
    - *Asia at a Crossroads*, (Oxfam, Jan 2015), www.oxfam.org/sites/www.oxfam.org/files/file_attachments/bn-asia-crossroads-inequality-200115-en.pdf
    - *Development Finance Institutions and Responsible Corporate Tax Behaviour*, (Oxfam and various agencies, Nov 2016), www.oxfam.org/sites/www.oxfam.org/files/bp-dfis-responsible-corporate-tax101116-en.pdf
    - *Even it Up*, (Oxfam, Oct 2014), www.oxfam.org/sites/www.oxfam.org/files/file_attachments/cr-even-it-up-extreme-inequality-291014-en.pdf

  - *Extreme Wealth is not Merited*, (Oxfam, Nov 2015), www.oxfam.org/sites/www.oxfam.org/files/file_attachments/dp-extreme-wealth-is-not-merited-241115-en.pdf
  - *Opening the Vaults*, (Oxfam, Mar 2017), www.oxfam.org/sites/www.oxfam.org/files/bp-opening-vaults-banks-tax-havens-270317-en_0.pdf
  - *Owning Development: Taxation to Fight Poverty*, (Oxfam, Sep 2011), www.oxfam.org/sites/www.oxfam.org/files/file_attachments/rr-owning-development-domestic-resources-tax-260911-en_3.pdf
  - *Still Broken*, (Oxfam and various agencies, Nov 2015), www.oxfam.org/sites/www.oxfam.org/files/file_attachments/bn-still-broken-corporate-tax-101115-embargo-en.pdf
  - *Tax Battles*, (Oxfam, Dec 2016), www.oxfam.org/sites/www.oxfam.org/files/bp-race-to-bottom-corporate-tax-121216-en.pdf
  - *The Case for a Billionaire Tax*, (Oxfam, Dec 2016), www.oxfam.org/sites/www.oxfam.org/files/file_attachments/dp-case-for-billionaire-tax-100117-en.pdf
  - *Wealth: Having it All and Wanting More*, (Oxfam, Jan 2015), www.oxfam.org/sites/www.oxfam.org/files/file_attachments/ib-wealth-having-all-wanting-more-190115-en.pdf
  - *Working for the Many*, (Oxfam, Apr 2014), www.oxfam.org/sites/www.oxfam.org/files/file_attachments/bp182-public-services-fight-inequality-030414-en_1.pdf
- Pickett, K. & Wilkinson, R., *The Spirit Level*, (London: Penguin Books, 2010)
- Piketty, T., *Capital in the Twenty-First Century*, (London: Belknap, Harvard, 2013)
- Stiglitz, J., *The Great Divide*, (London: Penguin Books, 2016)
- Stiglitz, J., *The Price of Inequality*, (London: Allen Lane, 2012)
- Tax Justice Network, www.taxjustice.net, multiple reports and papers, especially …
  - *Country-by-Country Reporting*, (TJN, Dec 2016), www.taxjustice.net/wp-content/uploads/2016/12/Access-to-CbCR-Dec16-1.pdf
  - *Fixing the International Tax System*, (TJN, Nov 2017), www.taxjustice.net/wp-content/uploads/2017/11/Fixing-the-International-Tax-System-TJN-Briefing.pdf
  - *Global Taxation*, (TJN, Nov 2016), www.taxjustice.net/wp-content/uploads/2016/11/Global-Taxation-Financing-Education.pdf
  - *How Developing Countries can Take Control of Their own Tax Destinies*, (TJN, Jul 2014), www.taxjustice.net/wp-content/uploads/2014/07/Krishen-How-Developing-Countries-can-take-Control-of-their-own-Tax-Destinies.pdf
  - *Inequality*, (TJN, Jul 2012), www.taxjustice.net/cms/upload/pdf/Inequality_120722_You_dont_know_the_half_of_it.pdf
  - *Lobbyism in International Tax Policy*, (TJN, Nov 2017), www.taxjustice.net/wp-content/uploads/2017/11/TJN2017-CBCR-Historical-Roots.pdf
  - *Tax Avoidance and Evasion*, (TJN , Nov 2017), www.taxjustice.net/wp-content/uploads/2017/11/Tax-dodging-the-scale-of-the-problem-TJN-Briefing.pdf
  - *The Cost of Tax Abuse*, (TJN, Nov 2011), www.taxjustice.net/wp-content/uploads/2014/04/Cost-of-Tax-Abuse-TJN-2011.pdf
  - *The Professionals*, (TJN, Nov 2017), www.taxjustice.net/wp-content/uploads/2017/11/The-Enablers-of-Tax-Avoidance-TJN-Briefing.pdf
- UN Development Programme (UNDP), www.undp.org, multiple reports and papers, especially …

    - *Humanity Divided*, (UNDP, Nov 2013), www.undp.org/content/dam/undp/library/Poverty%20Reduction/Inclusive%20development/Humanity%20Divided/HumanityDivided_Full-Report.pdf
- World Bank, www.worldbank.org, multiple reports and papers, especially …
    - *Poverty and Shared Prosperity*, (World Bank, regular report), access via https://openknowledge.worldbank.org/
- World Inequality Database, www.wid.world, multiple reports and papers, especially …
    - *World Inequality Report*, (World Inequality Database, regular report), access via www.wid.world/methodology/#library-key-reports

ENVIRONMENT

Environment

- Beyers, B. & Wackernagel, M., *Ecological Footprint*, (Gabriola Island: New Society Publishers, 2019)
- Chatham House, www.chathamhouse.org, multiple reports and papers, especially …
    - *Ending Global Deforestation*, (Chatham House, Sep 2013), www.chathamhouse.org/sites/default/files/public/Research/Energy%2C%20Environment%20and%20Development/0913pr_deforestation.pdf
    - *Global Impacts of the Illegal Wildlife Trade*, (Chatham House, Feb 2014), www.chathamhouse.org/sites/default/files/public/Research/Africa/0214Wildlife.pdf
    - *Tackling Illegal Logging and the Related Trade*, (Chatham House, Jul 2015), www.chathamhouse.org/sites/default/files/publications/research/20150715IllegalLoggingHoareFinal.pdf
- Diamond, J., *Collapse*, (London: Penguin Books, 2006)
- Food and Agriculture Organization (FAO), www.fao.org/home/en, multiple reports and papers, especially …
    - *Global Forest Resources Assessment 2020*, (FAO, 2020), www.fao.org/3/ca9825en/ca9825en.pdf
    - *The State of the World's Forests*, (FAO & UNEP, annual report), access via www.fao.org/publications/sofo
- Forum for the Future, www.forumforthefuture.org, multiple reports and papers
- Friends of the Earth (FOE), www.foei.org, multiple reports and papers, especially …
    - *A Wolf in Sheep's Clothing*, (FOE, Oct 2012), www.foei.org/wp-content/uploads/2013/12/Wolf-in-Sheeps-Clothing-for-web.pdf
    - *Community Rights, Corporate Wrongs*, (FOE, Oct 2011), www.foei.org/wp-content/uploads/2013/12/community-rights.pdf
    - *Financialization and Biodiversity*, (FOE, Sep 2014), www.foei.org/wp-content/uploads/2014/10/Financialization-biodiversity.pdf
    - *Financialization of Nature*, (FOE, Nov 2015), www.foei.org/wp-content/uploads/2015/10/Financialization-of-Nature-brochure-English.pdf
    - *FOEI Positions on Key Trade and Investment Issues*, (FOE, Mar 2016), www.foei.org/wp-content/uploads/2016/05/foe-trade-doc.pdf
    - *FOEI Position Paper on the Financialization of Nature*, (FOE, Nov 2014), www.foei.org/wp-content/uploads/2014/11/05-foei-position-paper-ENG-lr.pdf

    - *Getting into a Bind*, (FOE, Oct 2016), www.foei.org/wp-content/uploads/2016/10/Camisa-Once-Varas-INGLES-Q.pdf
    - *Overconsumption?*, (FOE, Sep 2009), www.foei.org/wp-content/uploads/2014/08/Overconsumption_Sep09.pdf
- Future Earth Initiative, www.futureearth.org, multiple reports and papers
- Global Footprint Network, www.footprintnetwork.org, multiple reports and papers
- Goodall, C., *Sustainability: All that Matters*, (London: Hodder & Stoughton, 2012)
- Greenpeace, www.greenpeace.org/international, multiple reports and papers, especially …
    - *An Impending Storm*, (Greenpeace, Sep 2013), www.greenpeace.org/archive-international/Global/international/publications/forests/2013/JN455-An-Impending-Storm.pdf
    - *Hidden Consequences*, (Greenpeace, May 2011), www.greenpeace.org/archive-international/Global/international/publications/toxics/Water%202011/Hidden%20Consequences.pdf
    - *Intact Forest Landscapes*, (Greenpeace, Jun 2011), www.greenpeace.org/archive-international/Global/international/publications/forests/2011/IntactForestLandscapes.pdf
    - *Pesticides and our Health*, (Greenpeace, May 2015), www.greenpeace.org/archive-international/Global/international/publications/agriculture/2015/Pesticides-and-our-Health.pdf
- Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES), www.ipbes.net, multiple reports and papers, especially …
    - *Global Assessment Report on Biodiversity and Ecosystems, Summary for Policymakers*, (IPBES, May 2019), www.ipbes.net/global-assessment
- International Union for Conservation of Nature (IUCN), www.iucn.org, multiple reports and papers, especially …
    - *An Introduction to the IUCN Red List of Ecosystems*, (IUCN, 2016), https://portals.iucn.org/library/sites/library/files/documents/2016-035.pdf
    - *The IUCN Red List of Threatened Species*, (IUCN, 2015), https://cmsdocs.s3.amazonaws.com/keydocuments/IUCN_Red_List_Brochure_2015_LOW.pdf
- Juniper, T., *What has Nature ever done for us*?, (London: Profile Books, 2013)
- Kolbert, E., *The Sixth Extinction*, (London: Bloomsbury, 2014)
- Leonard, A., *The Story of Stuff*, (London: Constable, 2010)
- Lynas, M., *The God Species*, (London: Fourth Estate, 2012)
- McKibben, B., *Falter*, (London: Headline, 2019)
- Meadows, D., Meadows, D. & Randers, J., *Limits to Growth, The 30-Year Update*, (Abingdon: Earthscan, 2010)
- Millennium Ecosystems Assessment, www.millenniumassessment.org/en/index.html, multiple reports and papers, especially …
    - *Ecosystems and Human Well-Being: Overall Synthesis Report of the Millennium Ecosystems Assessment*, (Millennium Ecosystems Assessment, 2005), www.millenniumassessment.org/documents/document.356.aspx.pdf
    - *Living Beyond Our Means: Statement from the Board of the Millennium Ecosystems Assessment*, (Millennium Ecosystems Assessment, 2005), www.millenniumassessment.org/documents/document.429.aspx.pdf
- Oxfam, www.oxfam.org, multiple reports and papers, especially …

    - *A Safe and Just Space for Humanity*, (Oxfam, Feb 2012), www.oxfam.org/sites/www.oxfam.org/files/file_attachments/dp-a-safe-and-just-space-for-humanity-130212-en_5.pdf
- Rees, M., *Our Final Century*, (London: Arrow Books, 2004)
- Rockström, J. & Wijkman, A., *Bankrupting Nature*, (Abingdon: Routledge, 2012)
- Sachs, J., *Common Wealth*, (London: Allen Lane, 2008)
- Skidelsky, E. & Skidelsky, R., *How Much is Enough?*, (London: Penguin Books, 2013)
- Stockholm Environment Institute, www.sei-international.org, multiple reports and papers
- Stockholm Resilience Centre, www.stockholmresilience.org, multiple reports and papers, especially …
    - *Planetary Boundaries: Exploring the Safe Operating Space for Humanity*, (Ecology and Society 14 (2), 2009), www.ecologyandsociety.org/vol14/iss2/art32/
    - *Planetary Boundaries: Guiding Human Development on a Changing Planet*, (Science, Vol 347, Issue 6223, Feb 2015), http://science.sciencemag.org/content/347/6223/1259855
- UN Conference on Sustainable Development, https://sustainabledevelopment.un.org/rio20
    - *Resilient People, Resilient Planet*, (UN Secretary-General's High-Level Panel on Global Sustainability, 2012), https://en.unesco.org/system/files/GSP_Report_web_final.pdf
    - *The Future We Want*, (UNGA, Jul 2012), www.un.org/ga/search/view_doc.asp?symbol=A/RES/66/288&Lang=E
- UN Development Programme (UNDP), www.undp.org, multiple reports and papers, especially …
    - *Biodiversity and the 2030 Agenda for Sustainable Development*, (UNDP, Dec 2016), www.undp.org/content/undp/en/home/librarypage/environment-energy/ecosystems_and_biodiversity/biodiversity-and-the-2030-agenda-for-sustainable-development---p.html
    - *Planetary Health*, (UNDP, Jun 2017), www.undp.org/content/undp/en/home/librarypage/hiv-aids/issue-brief---planetary-health.html
- UN Environment Programme (UNEP), www.unenvironment.org, multiple reports and papers, especially …
    - *Frontiers*, (UNEP, annual report), access via www.unenvironment.org/resources
    - *Global Environmental Outlook 6: Summary for Policy Makers*, (UNEP, 2019), www.unenvironment.org/resources/assessment/global-environment-outlook-6-summary-policymakers
    - *Keeping Track of our Changing Environment*, (UNEP, 2011), http://wedocs.unep.org/bitstream/handle/20.500.11822/8059/-Keeping%20Track%20of%20Our%20Changing%20Environment_%20%20%20From%20Rio%20to%20Rio%2b20%20%281992-2012%29-20111093.pdf?sequence=3&isAllowed=y
- UN Population Fund (UNFPA), www.unfpa.org, multiple reports and papers, especially …
    - *State of World Population*, (UNFPA, annual flagship report), access via www.unfpa.org/publications
- World Database on Protected Areas, www.protectedplanet.net, multiple reports and papers, especially …

    - *Protected Planet Report*, (Protected Planet, bi-annual flagship report), access via www.livereport.protectedplanet.net
    - *UN List of Protected Areas*, (Protected Planet, regular report), access via www.protectedplanet.net/c/united-nations-list-of-protected-areas
- World Resources Institute (WRI), www.wri.org, multiple reports and papers, especially …
    - *The Elephant in the Boardroom*, (WRI, Mar 2017), www.wri.org/sites/default/files/The_Elephant_In_The_Boardroom.pdf
- World Wildlife Fund (WWF), http://wwf.panda.org/, multiple reports and papers, especially …
    - *Living Blue Planet*, (WWF & ZSL, 2015), http://wwf.panda.org/knowledge_hub/all_publications/?306011/The-Living-Blue-Planet-Report
    - *Living Planet Index*, (WWF & ZSL), http://stats.livingplanetindex.org/
    - *Living Planet Report*, (WWF & ZSL, bi-annual flagship report), access via http://wwf.panda.org/knowledge_hub/all_publications/

International standards on environment

- *Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal*, (UN, 1989), www.basel.int/Portals/4/Basel%20Convention/docs/text/BaselConventionText-e.pdf
- *Chemicals Convention*, (ILO, 1990), www.ilo.org/dyn/normlex/en/f?p=NORMLEXPUB:12100:0::NO::P12100_INSTRUMENT_ID:312315
- *Convention on International Trade in Endangered Species of Wild Fauna and Flora*, (CITES, 1973), www.cites.org/sites/default/files/eng/disc/CITES-Convention-EN.pdf
- *Convention on the Conservation of Migratory Species of Wild Animals*, (UN, 1979), www.cms.int/sites/default/files/instrument/CMS-text.en_.PDF
- *Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter*, (UN, 1972), www.imo.org/en/OurWork/Environment/LCLP/Documents/LC1972.pdf
    - *1996 Protocol to the Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter*, (UN, 1996), www.imo.org/en/OurWork/Environment/LCLP/Documents/PROTOCOLAmended2006.pdf
- *Declaration of the UN Conference on the Human Environment*, (UN, 1972), www.un-documents.net/unchedec.htm
- *Globally Harmonised System of Classification and Labelling of Chemicals, Seventh Revised Edition*, (UN, 2017), www.unece.org/fileadmin/DAM/trans/danger/publi/ghs/ghs_rev07/English/ST_SG_AC10_30_Rev7e.pdf
- *Johannesburg Declaration on Sustainable Development*, (UN, 2002), www.un-documents.net/jburgdec.htm
    - *Plan of Implementation of the World Summit on Sustainable Development*, (UN, 2002), www.un.org/esa/sustdev/documents/WSSD_POI_PD/English/WSSD_PlanImpl.pdf
- *Rio Declaration on Environment and Development*, (UN, 1992), www.un.org/documents/ga/conf151/aconf15126-1annex1.htm

    - *Agenda 21*, (UN, 1992), https://sustainabledevelopment.un.org/content/documents/Agenda21.pdf
- *Rotterdam Convention on Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade*, (UN, 1998), www.pic.int/TheConvention/Overview/TextoftheConvention/tabid/1048/language/en-US/Default.aspx
- *Stockholm Convention on Persistent Organic Pollutants*, (UN, 2001), http://chm.pops.int/TheConvention/Overview/TextoftheConvention/tabid/2232/Default.aspx
- *Strategic Approach to International Chemicals Management*, (UN, 2006), www.saicm.org/Portals/12/Documents/saicmtexts/New%20SAICM%20Text%20with%20ICCM%20resolutions_E.pdf
- *UN Convention on Biological Diversity*, (UNCBD, 1992), www.cbd.int/doc/legal/cbd-en.pdf
    - *Global Biodiversity Outlook 5, Summary for Policymakers*, (UNCBD, 2020), www.cbd.int/gbo/gbo5/publication/gbo-5-spm-en.pdf
    - *Strategic Plan for Biodiversity, 2011 – 2020*, (UNCBD, Oct 2010), www.cbd.int/decision/cop/?id=12268
- *UN Convention to Combat Desertification*, (UNCCD, 1994), https://www2.unccd.int/sites/default/files/relevant-links/2017-01/UNCCD_Convention_ENG_0.pdf
- UN Framework Convention on Climate Change (UNFCCC), www.unfccc.int/2860.php
    - *Paris Agreement*, (UNFCCC, 2015), www.unfccc.int/files/essential_background/convention/application/pdf/english_paris_agreement.pdf
    - *UNFCCC Convention*, (UNFCCC, 1992), www.unfccc.int/files/essential_background/background_publications_htmlpdf/application/pdf/conveng.pdf
- *Vienna Convention for the Protection of the Ozone Layer*, (UN, 1985), http://ozone.unep.org/en/handbook-vienna-convention-protection-ozone-layer/2205
    - *The Montreal Protocol on Substances that Deplete the Ozone Layer*, (UN, 1987, incorporating adjustments in 1990, 1992, 1995, 1997, 1999, 2007 and 2016), http://ozone.unep.org/sites/ozone/files/Publications/Handbooks/Montreal-Protocol-English.pdf

Climate change and clean energy

- Berners-Lee, M. & Clark, D., *The Burning Question*, (London: Profile Books, 2013)
- Chatham House, www.chathamhouse.org, multiple reports and papers, especially …
    - *Changing Climate, Changing Diets*, (Chatham House, Nov 2015), www.chathamhouse.org/sites/files/chathamhouse/publications/research/CHHJ3820%20Diet%20and%20climate%20change%2018.11.15_WEB_NEW.pdf
    - *Climate Change and Health*, (Chatham House, Dec 2011), www.chathamhouse.org/sites/files/chathamhouse/public/Research/Global%20Health/bp1211mcmichael.pdf
    - *Livestock – Climate Change's Forgotten Sector*, (Chatham House, Dec 2014), www.chathamhouse.org/sites/files/chathamhouse/field/field_document/20141203LivestockClimateChangeForgottenSectorBaileyFroggattWellesleyFinal.pdf
- Climate Action Network (CAN), www.climatenetwork.org, multiple reports and papers
- Extinction Rebellion, *This is Not a Drill*, (London: Penguin Books, 2019)

- Friends of the Earth (FOE), www.foei.org, multiple reports and papers, especially …
  - *An Energy Revolution is Possible*, (FOE, Sep 2016), www.foei.org/wp-content/uploads/2016/09/foe-energy-revolution-full-reportNEWdraft2.pdf
  - *Decade Zero*, (FOE, Nov 2016), www.foei.org/wp-content/uploads/2016/11/08-FoEI-decade-zero-ENG-lr.pdf
  - *Don't Trade Away the Climate*, (FOE, Nov 2015), www.foei.org/wp-content/uploads/2015/11/foe-climate-trade-booklet-EN-web.pdf
  - *Energy: Access and Sufficiency*, (FOE, Nov 2016), www.foei.org/wp-content/uploads/2016/11/ENERGY-SUFFICIENCY-EN-FINAL.pdf
  - *Is World Trade Law a Barrier to Saving our Climate?*, (FOE, Apr 2009), www.foei.org/wp-content/uploads/2014/08/climate-change-wto-law.pdf
- Hansen, J., *Storms of my Grandchildren*, (London: Bloomsbury, 2011)
- Hawken, P. (Ed.), *Drawdown*, (New York: Penguin Books, 2017)
- Helm, D., *The Carbon Crunch*, (New Haven: Yale University Press, 2012)
- Houghton, J., *Global Warming, The Complete Briefing, Fifth Edition*, (Cambridge: Cambridge University Press, 2015)
- Intergovernmental Panel on Climate Change (IPCC), www.ipcc.ch, multiple reports and papers, especially …
  - *Climate Change 2021, The Physical Science Basis, Working Group 1, Sixth Assessment Report, Summary for Policy Makers*, (IPCC, 2021), https://www.ipcc.ch/report/ar6/wg1/downloads/report/IPCC_AR6_WGI_SPM_final.pdf
  - *Climate Change 2022, Impacts, Adaptation and Vulnerability, Working Group 2, Sixth Assessment Report, Summary for Policy Makers*, (IPCC, 2022), https://report.ipcc.ch/ar6wg2/pdf/IPCC_AR6_WGII_SummaryForPolicymakers.pdf
  - *Climate Change 2022, Mitigation of Climate Change, Working Group 3, Sixth Assessment Report, Summary for Policy Makers*, (IPCC, 2022), https://report.ipcc.ch/ar6wg3/pdf/IPCC_AR6_WGIII_SummaryForPolicymakers.pdf
  - *Climate Change and Land, Summary for Policy Makers*, (IPCC, 2020), https://www.ipcc.ch/site/assets/uploads/sites/4/2020/02/SPM_Updated-Jan20.pdf
  - *Global Warming of 1.5^{0}C, Summary for Policy Makers*, (IPCC, 2018), www.ipcc.ch/site/assets/uploads/sites/2/2019/05/SR15_SPM_version_report_LR.pdf
  - *Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation, Summary for Policy Makers*, (IPCC, 2012), www.ipcc.ch/pdf/special-reports/srex/SREX_FD_SPM_final.pdf
  - *Renewable Energy Sources and Climate Change Mitigation, Summary for Policy Makers and Technical Summary*, (IPCC, 2012), www.ipcc.ch/pdf/special-reports/srren/SRREN_FD_SPM_final.pdf
  - *The Ocean and Cryosphere in a Changing Climate, Summary for Policy Makers*, (IPCC, 2019), https://www.ipcc.ch/site/assets/uploads/sites/3/2022/03/01_SROCC_SPM_FINAL.pdf
- International Energy Agency, (IEA), www.iea.org, multiple reports and papers, especially …
  - *CO2 Emissions from Fuel Combustion*, (IEA, annual report), access via https://webstore.iea.org/
  - *Electricity Information*, (IEA, annual report), access via https://webstore.iea.org/

  - *Energy and Air Pollution*, (IEA, 2016), www.iea.org/publications/freepublications/publication/WorldEnergyOutlookSpecialReport2016EnergyandAirPollution.pdf
  - *Energy Technology RD&D Budgets 2018, Overview*, (IEA, 2018), www.iea.org/publications/freepublications/publication/EnergyTechnologyRDD2018Overview.pdf
  - *Key World Energy Statistics*, (IEA, annual report), access via https://webstore.iea.org/
  - *Renewable Energy Policies in a Time of Transition*, (IEA and various agencies, 2018), www.iea.org/publications/freepublications/publication/IRENA_IEA_REN21_Policies_2018.pdf
  - *Renewables*, (IEA, annual report), access via https://webstore.iea.org/
  - *Renewables Information*, (IEA, annual report), access via https://webstore.iea.org/
  - *Re-Powering Markets*, (IEA, 2016), www.iea.org/publications/freepublications/publication/REPOWERINGMARKETS.PDF
  - *Status of Power System Transformation*, (IEA, annual report), access via https://webstore.iea.org/
  - *Tracking Clean Energy Progress*, (IEA, annual report), access via https://webstore.iea.org/
  - *World Energy Balances*, (IEA, annual report), access via https://webstore.iea.org/
  - *World Energy Outlook*, (IEA, annual flagship report), access via https://webstore.iea.org/world-energy-outlook
- Juniper, T., *How many Lightbulbs does it take to Change a Planet?*, (London: Quercus, 2008)
- Klein, N., *This Changes Everything*, (London: Penguin Books, 2014)
- Kolbert, E., *Field Notes from a Catastrophe*, (London: Bloomsbury, 2015)
- Lynas, M., *High Tide*, (London: Harper Perennial, 2005)
- Lynas, M., *Six Degrees*, (London: Harper Perennial, 2008)
- Met Office, www.metoffice.gov.uk, multiple reports and papers, especially …
  - *Safe Keeping*, (Met Office, 2009), www.metoffice.gov.uk/binaries/content/assets/mohippo/pdf/p/9/wcc3.pdf
  - *Together*, (Met Office), www.metoffice.gov.uk/binaries/content/assets/mohippo/pdf/0/m/together.pdf
- Met Office Hadley Centre (MOHC), www.metoffice.gov.uk/climate-guide/science/science-behind-climate-change/hadley, multiple reports and papers
- NASA, www.nasa.gov, multiple reports and papers
- Oxfam, www.oxfam.org, multiple reports and papers, especially …
  - *A Sign of Things to Come*, (Oxfam, Sep 2014), www.oxfam.org/sites/www.oxfam.org/files/file_attachments/rr-eci-a-sign-of-things-to-come-190914-en.pdf
  - *Business Among Friends*, (Oxfam, May 2014), www.oxfam.org/sites/www.oxfam.org/files/file_attachments/bp185-business-among-friends-corporate-tax-reform-120514-en_0_1.pdf
  - *Extreme Weather, Extreme Prices*, (Oxfam, Sep 2012), www.oxfam.org/sites/www.oxfam.org/files/file_attachments/20120905-ib-extreme-weather-extreme-prices-en_3.pdf

    - *Feeding Climate Change*, (Oxfam, Jun 2016), www.oxfam.org/sites/www.oxfam.org/files/file_attachments/bp-feeding-climate-change-270616-en.pdf
- Robinson, M., *Climate Justice*, (London: Bloomsbury, 2018)
- Royal Society, www.royalsociety.org, multiple reports and papers, especially …
    - *Climate Change: Evidence and Causes*, (The Royal Society, Feb 2014), www.royalsociety.org/~/media/Royal_Society_Content/policy/projects/climate-evidence-causes/climate-change-evidence-causes.pdf
    - *Climate Updates*, (The Royal Society, Nov 2017), www.royalsociety.org/~/media/policy/Publications/2017/27-11-2017-Climate-change-updates-report.pdf
    - *Climate Updates: References*, (The Royal Society, Nov 2017), www.royalsociety.org/~/media/policy/Publications/2017/27-11-2017-Climate-change-updates-report-references-document.pdf
    - *Modelling Earth's Future*, (The Royal Society, Oct 2013), www.royalsociety.org/~/media/policy/Publications/2013/modeling-earths-future/2013-10-01-modelling-future.pdf
    - *Resilience to Extreme Weather*, (The Royal Society, Nov 2014), www.royalsociety.org/~/media/policy/projects/resilience-climate-change/resilience-full-report.pdf
    - *Taking Joint Action on Disasters, Development and Climate Change*, (The Royal Society, Mar 2015), www.royalsociety.org/~/media/policy/Publications/2015/02-03-2015-international-framework-statement-resilience.pdf
- Stern, N., *Why are we Waiting?*, (London: MIT, 2016)
- Thunberg, G., *No one is too Small to make a Difference*, (London: Penguin Books, 2019)
- Tyndall Centre for Climate Change Research, www.tyndall.ac.uk, multiple reports and papers
- UN Conference on Trade and Development (UNCTAD), http://unctad.org, multiple reports and papers, especially …
    - *The Energy-Transformation Nexus*, (UNCTAD, Nov 2017), http://unctad.org/en/PublicationsLibrary/presspb2017d5_en.pdf
- UN Development Programme (UNDP), www.undp.org, multiple reports and papers, especially …
    - *Energy Access Situation in Developing Countries*, (UNDP, Nov 2009), www.undp.org/content/dam/undp/library/Environment%20and%20Energy/Sustainable%20Energy/energy-access-situation-in-developing-countries.pdf
    - *Preparing Low-Emission Climate-Resilient Development Strategies – Executive Summary*, (UNDP, Apr 2011), www.undp.org/content/undp/en/home/librarypage/environment-energy/low_emission_climateresilientdevelopment/preparing-lecrds---executive-summary.html
- UN Environment Programme (UNEP), www.unenvironment.org, multiple reports and papers, especially …
    - *Renewable Energy and Energy Efficiency in Developing Countries*, (UNEP and various agencies, 2017), https://wedocs.unep.org/bitstream/handle/20.500.11822/22149/1_Gigaton_Third%20Report_EN.pdf?sequence=1&isAllowed=y
    - *The Adaptation Gap*, (UNEP, annual report), access via www.unenvironment.org/explore-topics/climate-change/what-we-do/climate-adaptation/world-adaptation-science-programme-12

    - *The Emissions Gap Report*, (UNEP, annual report), access via www.unenvironment.org
- World Economic Forum (WEF), www.weforum.org, multiple reports and papers, especially …
    - *Global Energy Architecture Performance Index Report*, (WEF, annual report), access via www.weforum.org/reports
    - *Scaling Technologies to Decarbonize Energy*, (WEF, Oct 2015), http://www3.weforum.org/docs/WEF_GAC_Decarbonizing_Energy_White_Paper.pdf
    - *Scaling Up Climate Action through Value Chain Mobilization*, (WEF, Feb 2016), http://www3.weforum.org/docs/WEF_2016_Scaling_Up_Climate_Action.pdf
- World Meteorological Organisation (WMO), https://public.wmo.int/en, multiple reports and papers, especially …
    - *Atlas of Health and Climate*, (WMO, 2012), https://library.wmo.int/pmb_ged/wmo_1098_en.pdf
    - *Atlas of Mortality and Economic Losses from Weather, Climate and Water Extremes*, (WMO, 2014), https://library.wmo.int/pmb_ged/wmo_1123_en.pdf
    - *Climate for You*, (WMO, 2011), https://library.wmo.int/pmb_ged/wmo_1071_en.pdf
    - *United in Science*, (WMO, annual report), access via https://library.wmo.int/
    - *Weather, Climate and the Air we Breathe*, (WMO, Mar 2009), https://library.wmo.int/pmb_ged/wmo_1035_en.pdf
    - *Weather Extremes in a Changing Climate*, (WMO, 2011), https://library.wmo.int/pmb_ged/wmo_1075_en.pdf
    - *WMO Statement on the State of the Global Climate*, (WMO, annual report), access via https://library.wmo.int/
- World Resources Institute (WRI), www.wri.org, multiple reports and papers, especially …
    - *10 Questions to Ask About Electricity Tariffs*, (WRI, Apr 2014), www.wri.org/sites/default/files/wri_10questions_paper3_final_041714.pdf
    - *10 Questions to Ask About Integrated Resources Planning*, (WRI, May 2014), www.wri.org/sites/default/files/wri_10questions_integrated_resources_planning.pdf
    - *10 Questions to Ask About Scaling On-Grid Renewable Energy*, (WRI, Jan 2014), www.wri.org/sites/default/files/wri_10questions_paper_final_041714.pdf
    - *Building Climate Equity*, (WRI, Jun 2015), www.wri.org/sites/default/files/building-climate-equity-072014.pdf
    - *Can Transport Deliver GHG Reductions at Scale?*, (WRI, Sep 2016), www.wri.org/sites/default/files/Can_Transport_Deliver_GHG_Reductions_at_Scale.pdf
    - *Delivering on the Clean Energy Economy*, (WRI, Nov 2012), www.wri.org/sites/default/files/pdf/delivering_clean_energy_economy.pdf
    - *Early Insights on Long-Term Climate Strategies*, (WRI, Sep 2017), www.wri.org/sites/default/files/early-insights-on-long-term_-climate-strategies.pdf
    - *Examining the Alignment between the Intended Nationally Determined Contributions and Sustainable Development Goals*, (WRI, Sep 2016), www.wri.org/sites/default/files/WRI_INDCs_v5.pdf
    - *Grounding Green Power*, (WRI, May 2011), www.wri.org/sites/default/files/grounding_green_power.pdf

  - *Strategies for Expanding Universal Access to Electricity Services for Development*, (WRI, Feb 2017), www.wri.org/sites/default/files/Strategies_for_Expanding_Universal_Access_to_Electricity_Services_for_Development.pdf
  - *The Future Electricity Grid*, (WRI and various agencies, May 2016), www.wri.org/sites/default/files/The_Future_Electricity_Grid.pdf
  - *The PRIMAP-hist national historical emissions time series (1850-2018)*, (Climate Watch, WRI, 2022), www.climatewatchdata.org/data-explorer/historical-emissions?historical-emissions-data-sources=cait&historical-emissions-gases=all-ghg&historical-emissions-regions=All%20Selected&historical-emissions-sectors=total-including-lucf%2Ctotal-including-lucf&page=1
  - *Turning Points*, (WRI, Nov 2017), www.wri.org/sites/default/files/turning-points-trends-countries-reaching-peak-greenhouse-gas-emissions-over-time.pdf
  - *Two Degrees of Innovation*, (WRI, Sep 2011), www.wri.org/sites/default/files/two_degrees_of_innovation.pdf
  - *Utility-Scale Renewable Energy*, (WRI, Feb 2015), www.wri.org/sites/default/files/WRI14_Factsheets_Utility_Scale_v4.pdf

Green economy and circular economy

- Braungart, M. & McDonough, W., *Cradle to Cradle*, (London: Vintage, 2009)
- Chatham House, www.chathamhouse.org, multiple reports and papers, especially …
  - *A Global Redesign?*, (Chatham House, Mar 2012), www.chathamhouse.org/sites/default/files/public/Research/Energy%2C%20Environment%20and%20Development/bp0312_preston.pdf
- Collier, P., *The Plundered Planet*, (London: Allen Lane, 2010)
- Coyle, D., *The Economics of Enough*, (Woodstock: Princeton University Press, 2011)
- Dietz, R. & O'Neill, D., *Enough is Enough*, (Abingdon: Earthscan, 2013)
- Ellen MacArthur Foundation, www.ellenmacarthurfoundation.org, multiple reports and papers, especially …
  - *A New Textiles Economy*, (Ellen MacArthur Foundation, Nov 2017), www.ellenmacarthurfoundation.org/assets/downloads/publications/A-New-Textiles-Economy_Full-Report_Updated_1-12-17.pdf
  - *Circular Consumer Electronics*, (Ellen MacArthur Foundation, Apr 2018), www.ellenmacarthurfoundation.org/assets/downloads/Circular-Consumer-Electronics-2704.pdf
  - *Delivering the Circular Economy*, (Ellen MacArthur Foundation, Jun 2015), www.ellenmacarthurfoundation.org/assets/downloads/publications/EllenMacArthurFoundation_PolicymakerToolkit.pdf
  - *Intelligent Assets*, (Ellen MacArthur Foundation, Feb 2016), www.ellenmacarthurfoundation.org/assets/downloads/publications/EllenMacArthurFoundation_Intelligent_Assets_080216-AUDIO-E.pdf
  - *The New Plastics Economy*, (Ellen MacArthur Foundation, Dec 2017), www.ellenmacarthurfoundation.org/assets/downloads/publications/NPEC-Hybrid_English_22-11-17_Digital.pdf
  - *Towards a Circular Economy*, (Ellen MacArthur Foundation, Dec 2015), www.ellenmacarthurfoundation.org/assets/downloads/TCE_Ellen-MacArthur-Foundation_9-Dec-2015.pdf
- Friends of the Earth (FOE), www.foei.org, multiple reports and papers, especially …
  - *Transforming our Economy*, (FOE, Jan 2018), www.foei.org/wp-content/uploads/2018/01/foei-transforming-our-economy-EN.pdf

- Global Green Growth Institute, www.gggi.org, multiple reports and papers
- Green Economy Coalition, www.greeneconomycoalition.org, multiple reports and papers, especially …
    - *Global Goals that Work*, (Green Economy Coalition, Jul 2016), http://measurewhatmatters.info/wp-content/uploads/2016/07/MWM_Global_Goals_That_Work_Report-0031.pdf
    - *Taking the Green Economy into the Mainstream*, (Green Economy Coalition, Oct 2014), www.greeneconomycoalition.org/assets/reports/GEC-Reports/Taking-the-green-economy-mainstream-The-story-of-the-transition-F.pdf
    - *The Green Economy Barometer*, (Green Economy Coalition, annual report), access via www.greeneconomycoalition.org/publications
    - *The Wealth of Nature*, (Green Economy Coalition, Nov 2017), www.greeneconomycoalition.org/assets/reports/webWealthofNature.pdf
- Greenpeace, www.greenpeace.org/international, multiple reports and papers, especially …
    - *Diverse Farming Protects Against Climate Change*, (Greenpeace, Jan 2010), www.greenpeace.org/archive-international/Global/international/planet-2/report/2010/1/diverse-farming-protects-again.pdf
    - *Ecological Farming: Drought-resistant Agriculture*, (Greenpeace, Jul 2010), www.greenpeace.org/archive-international/Global/international/publications/agriculture/2010/Drought_Resistant_Agriculture.pdf
    - *Ecological Farming: The Seven Principles of a Food System that has People at its Heart*, (Greenpeace, May 2015), www.greenpeace.org/archive-international/Global/international/publications/agriculture/2015/Food%20and%20Farming%20Vision.pdf
- Helm, D., *Natural Capital*, (London: Yale University Press, 2016)
- Jackson, T., *Prosperity Without Growth, Second Edition*, (Abingdon: Routledge, 2017)
- Maxton, G. & Randers, J., *Reinventing Prosperity*, (Vancouver: Greystone Books, 2016)
- Porritt, J., *Capitalism as if the World Matters*, (London: Earthscan, 2007)
- Raworth, K., *Doughnut Economics*, (London: Random House Business Books, 2017)
- Tearfund, www.tearfund.org, multiple reports and papers, especially …
    - *Bending the Curve*, (Tearfund, 2018), https://learn.tearfund.org/~/media/files/tilz/circular_economy/2018-tearfund-bending-the-curve-en.pdf?la=en
    - *Closing the Loop*, (Tearfund, 2016), https://learn.tearfund.org/~/media/files/tilz/circular_economy/2016-tearfund-closing-the-loop-en.pdf?la=en
    - *Going Full Circle*, (Tearfund, 2017), https://learn.tearfund.org/~/media/files/tilz/circular_economy/2017-tearfund-going-full-circle-en.pdf?la=en
    - *The Sharing Economy in Developing Countries*, (Tearfund, Apr 2017), https://learn.tearfund.org/~/media/files/tilz/circular_economy/2017-tearfund-the-sharing-economy-in-developing-countries-en.pdf?la=en
    - *Virtuous Circle*, (Tearfund, 2016), https://learn.tearfund.org/~/media/files/tilz/circular_economy/2016-tearfund-virtuous-circle.pdf?la=en
    - *Why Advocate on Waste and a Circular Economy?*, (Tearfund, 2017), https://learn.tearfund.org/~/media/files/tilz/circular_economy/2017-tearfund-why-advocate-on-waste-and-a-circular-economy-en.pdf?la=en

- Tellus Institute, www.tellus.org, multiple reports and papers, especially …
  - *A Great Transition? Where we Stand*, (Tellus Institute, Oct 2014), www.tellus.org/pub/Raskin_A_Great_Transition_Where_We_Stand.pdf
  - *Bounding the Planetary Future*, (Tellus Institute, Apr 2015), www.tellus.org/pub/Rockstrom-Bounding_the_Planetary_Future.pdf
  - *Contours of a Resilient Global Future*, (Tellus Institute, Dec 2013), www.tellus.org/pub/Contours%20of%20a%20Resilient%20Global%20Future.pdf
  - *Economics for a Full World*, (Tellus Institute, Jun 2015), www.tellus.org/pub/Daly-Economics-for-a-Full-World.pdf
  - *Game On*, (Tellus Institute, Mar 2013), www.tellus.org/pub/Tellus_Perspective_Game_On.pdf
  - *Great Transition: The Promise and Lure of the Times Ahead*, (Tellus Institute, 2002), www.tellus.org/images/GTI_publications/Great_Transition.pdf
  - *Premises for a New Economy*, (Tellus Institute, Jan 2012), www.tellus.org/pub/GTI%20Perspective%20-%20Premises%20for%20a%20New%20Economy.pdf
  - *Principles for a New Economy*, (Tellus Institute, 2012), www.tellus.org/pub/Principles%20for%20a%20New%20Economy%202012.pdf
  - *The Century Ahead*, (Tellus Institute, Aug 2010), www.tellus.org/pub/The%20Century%20Ahead%20-%20Searching%20for%20Sustainability.pdf
  - *The Degrowth Alternative*, (Tellus Institute, Feb 2015), www.tellus.org/pub/Kallis-The-Degrowth-Alternative.pdf
  - *The Great Transition: Journey of an Idea*, (Tellus Institute, 2011), www.tellus.org/pub/The%20Great%20Transition%20-%20Journey%20of%20an%20Idea.pdf
- UN Conference on Trade and Development (UNCTAD), http://unctad.org, multiple reports and papers, especially …
  - *Can Green Growth really work and what are the true (Socio-) Economics of Climate Change?*, (UNCTAD, Jul 2015), http://unctad.org/en/PublicationsLibrary/osgdp2015d4_en.pdf
- UN Development Programme (UNDP), www.undp.org, multiple reports and papers, especially …
  - *Green Economy in Action*, (UNDP, Aug 2012), www.undp.org/content/dam/aplaws/publication/en/publications/environment-energy/www-ee-library/mainstreaming/Green%20Economy%20in%20Action/Green%20Economy%20Compilation%20Report.pdf
  - *Protecting Biodiversity in Production Landscapes*, (UNDP, Dec 2011), www.undp.org/content/undp/en/home/librarypage/environment-energy/ecosystems_and_biodiversity/biodiversity_agribusiness_supplychains.html
- UN Environment Programme (UNEP), www.unenvironment.org, multiple reports and papers, especially …
  - *Green Industrial Policy: Concept, Policies, Country Experiences*, (UNEP, 2017), http://wedocs.unep.org/bitstream/handle/20.500.11822/22277/Green_industrial_policy.pdf?sequence=1&isAllowed=y
  - *Towards a Green Economy: A Synthesis for Policy Makers*, (UNEP, 2011), https://wedocs.unep.org/bitstream/handle/20.500.11822/22027/GER_synthesis_en.pdf?sequence=1&isAllowed=y,%20French||https://wedocs.unep.org/bitstrea

m/handle/20.500.11822/22027/GER_synthesis_fr.pdf?sequence=2&isAllowed=y,%20Arabic||https://wedocs.unep.o
    - *Towards a Pollution Free Planet*, (UNEP, 2017), http://wedocs.unep.org/bitstream/handle/20.500.11822/21800/UNEA_towardspollution_long%20version_Web.pdf?sequence=1&isAllowed=y
- UN Industrial Development Organization (UNIDO), www.unido.org, multiple reports and papers, especially …
    - *Circular Economy*, (UNIDO), www.unido.org/sites/default/files/2017-07/Circular_Economy_UNIDO_0.pdf
    - *Green Industrial Policy and Trade*, (UNIDO and various agencies, 2017), www.unido.org/sites/default/files/files/2017-12/PAGE_GITA.pdf
    - *Making it Green*, (UNIDO, 2016), www.unido.org/sites/default/files/2017-01/UNIDO-MakingItGreen-OnePage_0.pdf
    - *Practitioner's Guide to Strategic Green Industrial Policy,* (UNIDO, 2016), www.unido.org/sites/default/files/2016-11/practitioners_guide_to_green_industrial_policy_1__0.pdf
- Webster, K., *The Circular Economy*, *Second Edition*, (Cowes: Ellen MacArthur Foundation Publishing, 2017)
- World Economic Forum (WEF), www.weforum.org, multiple reports and papers, especially …
    - *Blueprints for a Greener Footprint*, (WEF, Jan 2016), http://www3.weforum.org/docs/WEF_Blueprint_for_a_Greener.pdf
    - *Intelligent Assets: Unlocking the Circular Economy Potential*, (WEF, Feb 2016), http://www3.weforum.org/docs/WEF_Intelligent_Assets_Unlocking_the_Cricular_Economy.pdf
    - *The Future Availability of Natural Resources*, (WEF, Nov 2014), http://www3.weforum.org/docs/WEF_FutureAvailabilityNaturalResources_Report_2014.pdf
    - *Towards the Circular Economy*, (WEF, Oct 2013), http://www3.weforum.org/docs/WEF_ENV_TowardsCircularEconomy_Report_2014.pdf
- World Resources Institute (WRI), www.wri.org, multiple reports and papers, especially …
    - *Building an Inclusive Green Economy for All*, (WRI, Jun 2012), www.wri.org/sites/default/files/pdf/building_inclusive_green_economy_for_all.pdf
- World Trade Organization (WTO), www.wto.org, multiple reports and papers, especially …
    - *Harnessing Trade for Sustainable Development and a Green Economy*, (WTO, 2011), www.wto.org/english/res_e/publications_e/brochure_rio_20_e.pdf

The world has seen massive positive change over the last 200 years since the industrial revolution. The number of people in the world living in extreme poverty has dropped from over 90% to less than 10%. This has been driven by our expanding global economy which has created wealth, jobs and the modern world. However, at the same time the impact on the environment over the past 200 years has been devastating. That same global economy is driven by fossil fuels and overconsumption of limited natural resources. Greenhouse gas emissions have increased by more than 5000%, and the total wildlife on earth, on which we all depend for survival, has dropped by over two thirds during the last 50 years alone. If we carry on we will unleash terrible environmental destruction leading to a global collapse undoing all the positive gains of the last 200 years.

We need to rewire our global economy to be green and fair, so it still creates jobs and lifts people out of poverty, but does so without wrecking the planet. What we need is 4 Shifts, two to secure a safe environmental ceiling and two to guarantee a fair developmental social floor.

1. **From polluting fossil fuels to clean energy**
2. **From overconsumption and waste to the circular economy**
3. **From aid and welfare dependent to self-sufficient and thriving strong and fair economies**
4. **From economies that only work for the richest to societies which tax and provide social spending to also help the poorest**

Arise is a global movement, mobilising Christians to campaign and take practical action to help the world make these 4 Shifts. Arise's 4 Shifts report explains why 4 Shifts economics is needed and what it looks like.

ARISE

ARISEUK.ORG