Chapter 2
What Is Sustainability?

In this chapter we explore the meaning of sustainability and how it can help and hinder our response to dealing with global warming. Image by Leah-Anne Thompson. Reproduced under licence

2.1 Only One Earth

Growing up as a teenager in rural Gloucestershire I seemed to have missed the swinging sixties. The decade was in fact a heady period of cold war, rapid technological and industrial expansion, and the beginning of consumerism after the long period of post war austerity. Perhaps I was still a little too young to appreciate all of this, I like to think so. However, one thing I do remember as being exciting was the

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space race between the USA and Russia, and the birth of telecommunication satellites such as Telstar in 1962. Telstar was also the name of a hit record by the Tornados later the same year. It was also the period when we first began to see grainy images of our planet from space.

In 1969 Life magazine reproduced the first picture taken by man of planet Earth, taken during the Apollo 8 mission (Fig. 2.1). That picture showed us that while the planet seems vast for those of us on the ground, it is in fact finite which means that all our resources are finite as well. This was a major point in the environmental movement, and the picture of planet Earth with its green land and blue seas become an iconic symbol of environmentalism.

The picture tells us quite bluntly that this is all we have in terms of space and resources, and it has to last humankind forever. Regardless of what the science fiction writers may suggest, once these resources are exhausted or our natural ecosystems are destroyed then there is nowhere else to go. These resources have to last us all on planet Earth forever. So it is important to understand that the word environment is not

Fig. 2.1 The first image of the whole planet Earth taken by man that featured on the cover of Life magazine. Taken at a distance of 30,000km with south at the top with North America in the bottom right. *Source*: http://history.nasa.gov/ap08fj/photos/a/as08-16-2593.jpg. Reproduced with permission of NASA, Washington DC, USA

an abstract term but describes our one and only home. Unfortunately its meaning has become weakened through general use becoming an intangible entity such as the terms arts, heritage etc. But the environment is the place and system which keeps us, and all species that we share the planet with, alive. **Quite simply, without a healthy and well managed environment we can't survive**.

Our environment is in crisis and has been for a long time, so long in fact that we have become immune to the numerous and often quite stark warnings (Sect. 1.1). Pressing environmental concerns include: the hole in the ozone layer, acid rain, accumulation of toxins in the food chain, loss of biodiversity, loss of topsoil and desertification, pollution and acidification of the seas, lakes and rivers, unsustainable exploitation of non-renewable and renewable resources (which can also be depleted) including forests, fish stocks and freshwater. None of these problems have gone away, but we now have a greater problem … this is global warming induced climate change.

Global warming will alter the very nature of the planet's surface on which we live in terms of water availability, food production and also how and where we can live.

According to ecological footprint analysis, if everyone lived as we live here in Ireland or the UK then we would need at least three Earths to support our current lifestyle (Sect. 7.2). Increase that to five Earths for the USA. The problem is that we only have one Earth which we all have to share as equal stakeholders. So how does that work? It's quite simple. It is only poverty of others that has allowed us to live the way in which we do and has possibly stopped the Earth already plummeting into ecological meltdown (Fig. 2.2).

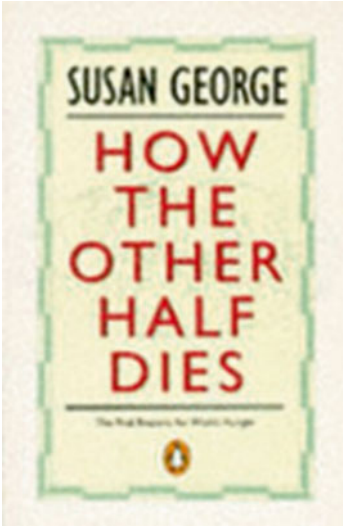


Fig. 2.2 This iconic book by Susan George first published in 1976 explores the inequality between developed and developing nations and led to the concept of global justice. Reproduced with permission of Penguin Books, London

Our lifestyles have evolved largely through the past colonization of developing countries, the exploitation of which has continued in many countries through corporate exploitation and sometimes corruption. **Everyone is entitled to a fair share of the Earth's resources … aren't they**? China and India are both booming economies emerging from extensive poverty, and they have their eyes set on a similar lifestyle to the west. Would this lead us to the brink of ecological disaster? Yet it is inconceivable that others should be denied the lifestyle that we have enjoyed here for so long. So something must be done to make human life (collectively) on Earth both equitable and sustainable.

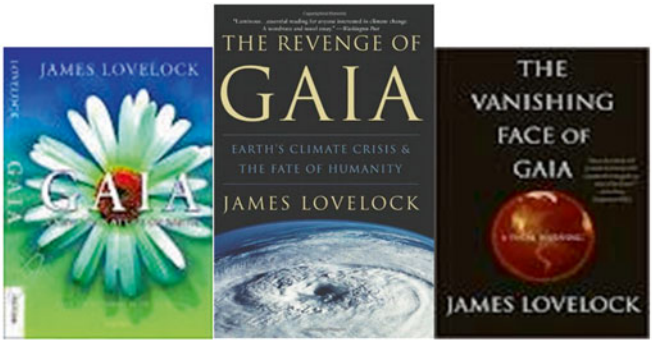
Sustainable

Adjective

1. ***Able to be maintained at a certain rate or level.***
2. ***(esp. of development, exploitation, or agriculture) Conserving an ecological balance by avoiding depletion of natural resources.***

Life began 3.6 billion years ago with bacteria and photosynthetic algae extracting carbon dioxide from the atmosphere and releasing oxygen (a waste product) back into the atmosphere. Plants evolved and continued to remove CO_2 and storing it over millennia as coal, natural gas, and peat. Likewise small creatures removed the CO_2 stored in seawater as carbonate to build shells and exoskeletons and as they died and sank to the bottom of the ocean they built up boundless layers of sedimentary carbonate rocks. So bioforms have changed the planet from its original lifeless state to what we see around us today. The atmosphere, oceans and that thin terrestrial layer on which we all live has all been changed, some may say engineered, by evolving diversity of living species.

The Earth today has evolved into a hugely complex interrelated life form, with the millions of species that comprise the planet ecosystems (including humankind which is just one of those species) linked to each other through numerous delicate relationships. These relationships are also highly dependent on the climate and other physical processes. Gaia was the Greek goddess of the Earth, the mother of all. In 1979 James Lovelock published a book '*Gaia*: *a New Look at Life on Earth*' where he used the term to explain the concept that our planet was in fact a highly complex interrelated system in which all life forms are an important part creating an interdependent giant life form—Earth. Many scientists have dismissed the concept of Gaia as simply a metaphysical description of Earth's inorganic and biological processes. His second book presented the scientific evidence for his theory, but what is clear is that the Earth is still evolving and all life forms are part of this continuing evolution (Lovelock 2000, 2007, 2010).



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The Gaia hypothesis states that temperature, oxidation state, acidity, water are all kept constant automatically and unconsciously by the biota through self-regulating homeostasis which is regulated by active feedback mechanisms.

It seems bizarre in this consumerist society that we currently get our oxygen free, our light free, the air cleaned for free, our heat and energy that drives the planet and its' ecosystems all for free. The energy that grows our food is free, our food is pollinated for free to produce fruit, nuts and seeds, fish are free, and all this relies on a healthy balanced planet which we take completely for granted. James Lovelock concludes that **it is too late to reverse global warming and argues that mankind must prepare to adapt to a very hot future**.

2.2 What Do We Mean by Sustainable?

For our continued existence on planet Earth to be sustainable we need to ensure that our lifestyle does not prevent future generations from also experiencing a full and meaningful life. This doesn't necessarily mean the same wealth or consumerism levels as we have today. Wealth and consumerism are not really prerequisites to a full and meaningful life and many people are happy even at comparatively low consumption levels. Research has supported this idea, as we will see later, but of course a certain level of income and support is needed to prevent poverty and to sustain wellbeing. However, the question is **at what level does this need end and**

consumerism itself becomes the goal rather than wellbeing? This is explored further in Sect. 14.3.

Sustainability and sustainable development are often used interchangeably but they are actually fundamentally different.

- ***Sustainability*** *is the endpoint where civilization can thrive within the limits posed by only having one planet*. Where we are going with this is trying to identify what our individual share is and learning how to survive in a meaningful and complete way within its confines.
- ***Sustainable development*** *is the process of getting from here and now to a point of sustainability*. This book explores your journey to living within your equal share of a single planet Earth.

I suppose that sustainability is the nirvana for an environmentalist. However, it is interesting to look at synonyms for the word nirvana. These include paradise, heaven, illusion and fantasy. So the next important question we have to address is **whether global sustainability could be a reality or is just a fantasy**?

There are hundreds if not thousands of definitions of sustainable development and one of the things I always get my students to do is to create a unique personal definition of their own. The most famous definition is that produced by the Brundtland Commission in 1987 and is without doubt the most quoted environmentally related definition: *Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs*.

In fact the definition in the report is subtly different: '**Humanity has the ability to make development sustainable**—***to ensure that it meets the needs of the present without compromising the ability of future generations to meet their own needs***' (World Commission on Environment and Development 1987).

This iconic definition has received a lot of criticism with many seeing it as weak and ill defined, while others regard it as condescending and paternalistic. It is certainly more survivalist than environmental. Yet sustainability has become to be seen by all stakeholders, whether they be environmentalists or industrialists, as the nucleus on which the environment and we ourselves can live in harmony while both remaining mostly intact. Yet how can this be achieved as sustainability lacks precise structures or systems to achieve the desired outcomes, even if we knew exactly what those outcomes should be? So it remains a largely abstract concept, even though nearly all the discussions we read or hear relating to the environment, biodiversity and even economics have become a discourse on sustainability. So all our discussions about conservation, climate change, population and the environment in general, have become a sort of do-loop, with everything coming back to sustainability. So much so, that the term sustainability is now as widely used as the term environmental, both being equally vague and perhaps today increasingly meaningless. The weakness of the definition has led to cosmetic environmentalism (i.e. promoting

unsustainable activities as sustainable) as well as the inappropriate and misleading use of the term.

> "***Few development interventions or research initiatives these days can successfully attract funding unless the words 'sustainability' or 'sustainable' appear somewhere in the proposal to the funding agency***" (**Bell and Morse** 2008).

So what precisely are the problems with sustainability as a concept? Currently the terms sustainability and sustainable development are closely linked in our minds to global economic, environmental and social crises. So in some sense they have quite negative connotations. Economic growth results in an increase in the rate of production and consumption of both goods and services. This in turn leads to an increase in use of resources, and an increase in the production of waste, by-products and a wide range of pollutants. This will be increasingly evident as we begin to exploit the vast reserves of fossil fuels associated with oil shales and fracking for gas (Sect. 3.2.1.1). Therefore, if the mechanisms of economic growth are not controlled or altered they impact on all of us in an increasingly negative manner through the over exploitation of natural resources, the ability of natural systems to assimilate waste, and an increasingly degraded environment (physical, chemical and biological).

Let's summarize:

- Sustainability addresses the relationship between economic development, its impact on the physical, institutional and intellectual structure of society and the natural world as a whole (i.e. the environment).
- It defines the relationship between dynamic human economic systems and slower changing ecological systems.
- Its objective according to many is to create a system whereby human individuals can flourish, human cultures can develop and diversity, complexity and function of ecological life support systems are protected (Khalili 2011).
- Sustainability is the economic state in which the demands placed upon the environment and natural resources by people and commerce can be met without reducing the capacity of the environment to provide for future generations (Gladwin et al. 1993).

Does this get us any further? Not really, so perhaps it is useful to go back to the very beginning of the concept.

The Nobel Economist Sir John Hicks first conceptualized the concept of sustainability in terms of income in 1946 as '***the amount, whether natural or financial capital, one could consume during a period and still be as well off at the end of that period.***' I suspect that many of us would recognize this basic economic concept from Mary Poppins: expenditure exceeds capital—result misery, expenditure within capital—result happiness. It was not until 1972 that it was first used in context of the future of humankind in the book *Blueprint for Survival*. But it would be another

15 years before the concept took on global significance with the publication of the Brundtland Report (World Commission on Environmental Development 1987). This resulted in a global discourse on what sustainability was and how to define it. For me, it was a definition in 1991 by Solow that has come closest to what I feel sustainability is or could be: '***an obligation or injunction to conduct ourselves so that we leave to the future the options and the capacity to be as well off as we are, not to satisfy ourselves by impoverishing our successors***.' I like this definition as it uses the word obligation and with it brings the moral responsibility that we all have to use our planet wisely, fairly and unselfishly. The concept of sustainability still continues to evolve as our understanding of the complex relationship between economic development and the environment unfolds. The need to define and pursue sustainability is increasingly urgent as the environmental crisis deepens.

'*Human influence on the climate system is clear and growing, with impacts observed on all continents. If left unchecked, climate change will increase the likelihood of severe, pervasive and irreversible impacts for people and ecosystems. However, options are available to adapt to climate change and implementing stringent mitigations activities can ensure that the impacts of climate change remain within a manageable range, creating a brighter and more sustainable future*.'

Intergovernmental Panel on Climate Change (IPCC)
Copenhagen 2nd November, 2014.

More information: http://www.ipcc.ch/index.htm

So where are we right now? Sustainability is currently perceived to be comprised of three interdependent systems the so called economy–ecology–social nexus. All three systems have to be addressed simultaneously if sustainable solutions to the environmental crisis are to be found. **Economic Sustainability** focuses on the portion of natural resources (both renewable and non-renewable) that provides the physical input into the production process for goods and services (i.e. economically the maintenance of the man-made capital). **Environmental Sustainability** focuses of the maintenance of environmental services. Often referred to as the life support system but it is much more than this. **Social Sustainability** addresses poverty and human development. The maintenance of the life support systems is the predominant prerequisite for social sustainability.

The relationship between these three sustainability systems was illustrated at the 2005 World Summit by three interlocking circles (United Nations General Assembly 2005). Note that the social-economic interactions should be equitable, the economic–environmental relations must be viable and that the environmental–social relationship must be bearable. The theory is that sustainability is an equal balance with each sector of equal importance. This is clearly untrue and quite misleading, perhaps even dangerous, as the environment is vital to our survival. This nexus suggests

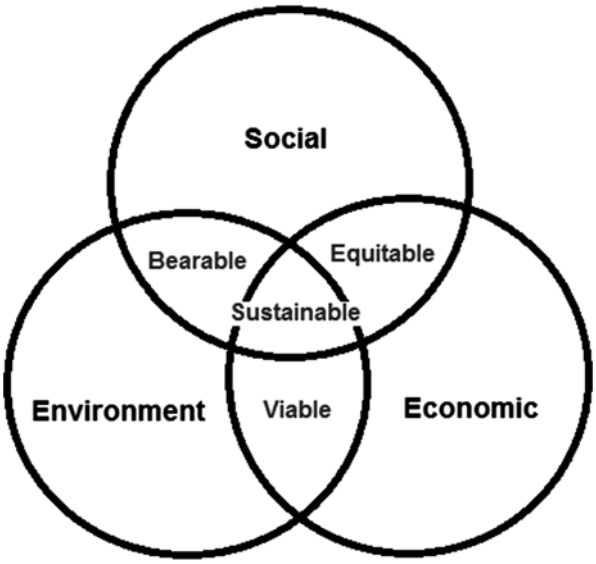

Fig. 2.3 The economy–ecology–social nexus formed the basis of early environmental sustainability theory

Fig. 2.4 The economy–ecology–social nexus has become distorted controlled primarily by economic and social expansion without regard to the biocapacity of the Earth to support it

that there are no limits to growth and that there is always more free resources and capacity to assimilate waste on which to create further growth, which is not the case (Fig. 2.3).

In reality the economic dimension is dominating through continuous growth with the environmental dimension being rapidly depleted. As the environment is limiting and its resources cannot be expanded, Society must flourish within these limits and the economy must then reflect and service the needs of society within those limits. **To create a sustainable society the environmental dimension must gain more importance and for it to be reliably protected** (Fig. 2.4).

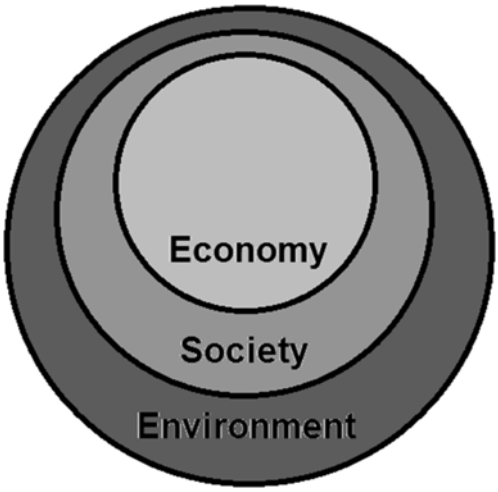

Fig. 2.5 A more sustainable economy–ecology–social nexus design

The reality of the economy–ecology–social nexus is that the economy and social demands far exceeds the Earth's biocapacity … what we need is to radically adjust our understanding of how this relationship really works

A better model of the economy–ecology–social nexus requires the economy to operate within limits set by society (e.g. to reflect values such as fairness, justice and liberty). Society flourishes within limits set by the environment, so that the three elements are not equal but each serves the other (Fig. 2.5). This is not unique and the concept has been widely adopted in water supply using a new management approach known as demand-side management where expansion of water demand has to be satisfied within a limited available volume of water so that any expansion has to be achieved through the conservation of supplies and their better management (Sect. 11.2).

We need to decide on the limits that humankind can exploit the Earth without destroying its ability to be self-sustaining and self-regulating. Limits are needed globally, regionally, nationally, locally and individually. The problem is that we are personally not setting any targets at all, with the ability to pay the only constraint for most of us. Everyone is demanding their rightful share, from the developing nations to industrial manufacturers. **Here lies the conundrum … what is our share**?

2.2.1 Environmental Sustainability

How we view and relate to the environment is often seen as two opposing theories both of which have their routes in the seventeenth century.

- ***Technocentrism*** (also known as cornucopianism, expansionism, shallow environmentalism or weak sustainability)
- ***Ecocentrism*** (i.e. neo-Malthusianism, preservation, steady-stateness, deep ecology or strong sustainability)

Technocentrism centres almost entirely on human wellbeing. Here sustainability is reached if enough investment in manmade and human capital is made to compensate for the degradation of natural capital. It relies heavily on technology solving our environmental problems without causing us to deviate from economic growth. For example, whole planet engineering solutions such as global dimming could in theory allow us to overcome the problem of global warming associated with carbon dioxide emissions, by reducing the energy from the sun getting to the surface of the planet, without having to consider reducing our use of fossil fuels. While technological and scientific advances are critical to dealing with global warming, can they also solve all the problems we now face? Can man actually create an entirely mechanistic planet, rather like a space station, where natural processes are all replaced by computer driven technological systems? Personally I don't think so, and while the environment has absorbed technological mistakes in the past, it is unlikely that it could recover from major damage to whole environmental processes caused by whole planet engineering projects that go wrong. However, many people strongly believe that the fate of humankind should not be left to natural processes.

In contrast, ecocentrism, normally referred to neo-Malthusianism (Sect. 1.2.3), is based on the assumption that natural capital should be maintained and nurtured. Natural capital is sustained when renewable resources are used according to their regeneration rate and impact on the ecosphere. Importantly humankind should not exceed the assimilative capacity of planet Earth. Strict adherents to strong sustainability believe that non-renewables are so valuable that their use should be restricted.

Today we tend to accept a middle-of-the-road approach … ***Sustaincentrism***. This recent concept accepts that resources are finite and defines the extent to which natural systems can absorb and equilibrate human caused disruptions to Earth's ecological processes. This theory accepts that the global ecosystem is finite, non-growing, materially closed, vulnerable to human interference and limited in its regenerative and assimilative capacity. Therefore in order for an economic system to provide goods and services to humanity it must sustain all ecological systems, since a change in one significantly affects the other.

Sustainability has become very discipline biased with different classifications, definitions and functions, making the transfer of policy into action very difficult and often confused. To some extent we have stalled in our attempts to be proactive by uncertainty as what is the best action to take.

There is serious concern over the sustainability of consumption as the result of increasing evidence of long-term damage being done to global environmental and ecological processes. Previously impacts from pollution tended to be local, now they are having regional and possibly global effects.

Significant disagreement developed between environmentalists and industrialists in the 1970s. Environmentalists believe that we have to preserve the natural systems of our planet whatever it takes, and that humankind has no more right to the planet's resources than any other species (i.e. Ecocentrism). This was a very unpopular ideology at that time and coincided with the publication of the book *Small is Beautiful* which gave rise to the idea that we were all doomed to live a low-level alternative existence in order to achieve a sustainable world. The book was even more poignant having been written by a leading industrial economist. However, it was during this period that environmentalism was seen to be, quite wrongly, as against economic development and growth.

'*If we squander the capital represented by living nature around us*, *we threaten life itself*.'
Peace is threatened by the desire for wealth which '… *depends on making inordinately large demands on limited world resources …*'
'*Localization rather than globalization*'
Schumacher*, *E.F.* (*1973*) Small is Beautiful: Economics as if People Matter, *published by Penguin Books

Sustainability is an opportunity to give us a middle way. We cannot simply give up our existing economic model to solve our environmental crises without this leading to the total collapse of society as we know it. **We need a slow ordered transition to a low-energy economy not only to stabilize global warming, but to sustain our ever growing global population and protect them from the increasing threats of, hunger, water shortages, pollution, disease including antibiotic resistant bacteria and many other global threats**.

2.2.2 Stern

The Stern Committee looked at just this problem, how to alter our current global economy without derailing it. The Stern Review on the *Economics of Climate Change* (2006) was carried out for the UK Government (Stern 2007). The review was not primarily about solving climate change, much to the disappointment of some environmentalists, it was largely about how the economic market and economic development would be affected by these changes and how these could be minimized. To a great extent it is about how do we make an ordered transformation from our current resource rich society where energy is plentiful, still relatively

cheap and its use unregulated, to a resource-limited society, generally referred to as a **low-carbon economy**.

> The Stern Review states that '***climate change is the greatest and widest-ranging market failure ever seen, presenting a unique challenge for economics.***'

The report is large and complex, but the key findings are summarized below in bold and the comments that have been added are mine and not those of the committee:

- **The benefits of strong, early action on climate change outweigh the costs**.
  - One of the failings in our attempts to deal with climate change at the national level is that we have tried to make it cost effective. Climate change is perceived to be an economic opportunity where businesses can grow, create jobs and make profits. This is just not feasible where fossil fuel derived energy is cheaper than sustainable options. Tackling climate change should be seen in the same way as other infrastructural development or emergency planning.
- **The scientific evidence points to increasing risks of serious, irreversible impacts from climate change associated with business-as-usual (BAU) paths for emissions**.
  - The review clearly tells us that we have to change both in the way we do business and how we live our lives.
- **Climate change threatens the basic elements of life for people around the world including access to water, food production, health, and use of land and the environment**.
  - There is no scepticism here, but a clear and bold statement of fact.
- **The impacts of climate change are not evenly distributed—the poorest countries and people will suffer earliest and most. And if and when the damages appear it will be too late to reverse the process. Thus we are forced to look a long way ahead**.
  - The problem with this and many other types of global problems is that as long as our own weather is okay and farmers are able to sow and harvest their crops, and our water and electricity supplies remain in good order, then we are lured into a false sense of security. We don't tend to go to those areas most affected by climate change for holidays, so to a great extent it's out of sight and out of mind. But people are suffering on a daily basis from the effects of climate change through severe changes in weather patterns and local climate change. Most of these global warming induced changes are not reversible, so once we lose productive land to desertification, for example, it is essentially

lost for centuries or millennia to come. What you and I emit today in terms of greenhouse gases (GHGs) will continue to have a direct effect on global warming for at least 100 years from now (Sect. 4.2), so we have to start dealing with this problem now.

- **Climate change may initially have small positive effects for a few developed countries, but it is likely to be very damaging for the much higher temperature increases expected by mid-to-late century under BAU scenarios**.
  - There will be a shift in food production from the American mid west to more northern areas. Cooler countries in the northern latitudes will attract more business as it develops a more temperate climate.
- **Integrated assessment modelling provides a tool for estimating the total impact on the economy; our estimates suggest that this is likely to be higher than previously suggested**.
  - The truth is that the current economic model that has evolved was developed in a different era and is no longer suitable for a world in crisis; where resources are rapidly depleting and our environment is on the verge of system collapse from over exploitation. We need a new economic model and this will require a significant rethink about growth and profit, as well as a change in the way we as consumers live our lives.
- **Emissions have been, and continue to be, driven by economic growth; yet stabilisation of greenhouse gas concentration in the atmosphere is feasible and consistent with continued growth**.
  - Economic growth is undoubtedly the primary cause for GHG emissions. Our problem is that the simplest way of sustaining a rapidly growing population is through economic growth. Demand creates employment and sustains communities. So the challenge is to decouple economic growth from emissions or find alternatives to this simple relationship.
- **Central estimates of the annual costs of achieving stabilisation between 500 and 550 ppm CO_2e are around 1 % of global GDP, if we start to take strong action now in 2006/2007. It would already be very difficult and costly to aim to stabilise at 450 ppm CO_2e. If we delay, the opportunity to stabilise at 500–550 ppm CO_2e may slip away**.
  - The reality of us stabilizing the planet's atmospheric CO_2e emissions at 450 ppm is now improbable and we are resetting targets to more realistic goals (Sect. 4.5). So we know that global warming is inevitable and will continue to increase in the short to medium term resulting in significant climate change. What we must do now is centre all our efforts into reducing emissions regardless of whatever these goals might be and simply to mitigate against higher global temperatures.

- **The transition to a low-carbon economy will bring challenges for competitiveness but also opportunities for growth. Policies to support the development of a range of low-carbon and high-efficiency technologies are required urgently**.
  - A lot of work has been going on behind the scenes to develop new technologies, although often linked with promises of new growth markets, especially in the renewable energy sectors. Again we need clear direction about what needs to be done not only at the industrial and commercial levels, but also in the state sectors. Of course the individual will drive this transition.
- **Establishing a carbon price, through tax, trading or regulation, is an essential foundation for climate change policy. Creating a broadly similar carbon price signal around the world, and using carbon finance to accelerate action in developing countries, are urgent priorities for international co-operation**.
  - A stable and realistic price for carbon is a prerequisite for reducing emissions. We cannot expect new innovations without investment and for companies to be able to manufacture and supply them at a profit; also alternative low-carbon energies must be competitive and this requires carbon taxation at a realistic level (Sect. 6.5).
- **Adaptation policy is crucial for dealing with the unavoidable impacts of climate change, but it has been under-emphasised in many countries**.
  - We are so lucky living in northern Europe where climate change so far has had little impact. However, it is not going to be possible to control problems such as flooding by simply building higher and higher defences. We need to build into our planning at every level the potential effects of climate change that may occur quite unexpectedly. We need to prepare ourselves for the changes that will occur both economically and socially not only regionally, but locally and personally,
- **An effective response to climate change will depend on creating the conditions for international collective action**.
  - We are all part of the problem as well as the solution. We are quick to highlight those countries that have the largest carbon footprints, however, we are all consumers and hence emitters of greenhouse gases. Therefore this is a global problem requiring a global solution, which means that everyone is a stakeholder in solving the issue.
- **There is still time to avoid the worst impacts of climate change if strong collective action starts now**.
  - Even a cynical old environmentalist like myself has to believe that we can deal with this issue. It is possible but it is going to require significant changes over the decades to come in our lifestyles and the framework of our society. Some of these changes will be very challenging as we will see in later chapters.

These conclusions from Stern clearly and equitably summarizes where we stood in 2006 in relation global warming and climate change. Yet in all the intervening years our progress in tackling these issues in both developed and developing countries has been painfully slow. But these conclusions are fundamental to how we should respond to the global dilemma of climate change.

The challenge is to decouple economic growth from GHG emissions or find alternatives to this simple relationship.

Stern Committee

2.3 So Where Are We Now Regarding Sustainability?

We seem to have come a long way from our early simple definitions of sustainability. Personally I remain uncertain as to what sustainability is, what its objectives should be, or how these objectives are to be achieved. One problem is that environmentalists are generally suspect of the idea of sustainable development seeing it as an oxymoron, as development inevitably leads to environmental degradation (Redclift 2005).

What does the term sustainability mean now? Has it simply become another buzz word like environmental? What will it mean in the future? Is it simply a way to maintain business as usual in the future, or is it about equality, liberation, and most importantly self-determination? What we need to start considering is taking more control over the rate of economic growth and making it less environmentally damaging. Remember, that ultimately individual consumers control growth. The Earth Charter describes sustainability as "***a sustainable global society founded on respect for nature, universal human rights, economic justice, and a culture of peace***" (The Earth Charter Initiative 2000).

Any definition must be factual, scientific, have a defined endpoint and be quantifiable. Perhaps, the need for an Irish or US constitution shows us that a simple phrase such as '*love they neighbour*' is just not up for the job. So perhaps we will need a global sustainability constitution giving precise agreed actions and endpoints. We all feel we know what sustainability means … it's a personal concept which differs from person to person … but can we actually set a rigid definition? The answer is perhaps we don't have to. Perhaps it is actually impossible to do, and that our inability to agree on a single 'catch all' definition is one of the stumbling blocks that is actually stopping us dealing with the challenges of global warming. What is important is that we all know what is required of us in order to deal with the

problem of global warming and how to survive whatever climate change has in store for us individually and regionally.

It is probably impossible to have a universally acceptable definition of sustainability and sustainable development. It can be as simple or as complex as you want … as long as it personally motivates you to act proactively to deal with the problems of global warming.

2.4 Conclusions

- We must see ourselves as part of the natural system and we cannot exclude humanity in our vision of planet Earth nor must we see humanity in isolation.
- Any resolution of the environmental crisis must ensure continued economic stability, otherwise society will break down and we will enter a global dark age caused by famine and conflict.
- The concept of sustainability is the best mechanism that we have to ensure global stability and fairness, but it needs to have clear aims and objectives.
- We all have a moral responsibility to use our planet wisely, fairly and unselfishly.
- This is a global problem requiring a global solution, which means that everyone is a stakeholder in solving the issue.

The first step was to accept that our climate is changing and the planet does not have the capacity to sustain an unlimited population.

The second step is accepting Solow's definition of sustainability as '*an obligation to conduct ourselves so that we leave to the future the options and the capacity to be as well off as we are, not to satisfy ourselves by impoverishing our successors*' and personally agreeing to individually act to help achieve this.

Homework!

Although we have had repeated conferences on climate change we have singularly failed at the national level to really come to grips with the problems, and in part this is because of the difficulty of seeing what precisely has to be done at the regional or local level. So it is down to you and me to solve this problem from the bottom up;

it will be anyhow when Governments eventually decide what exactly needs to be done. Therefore, let's make a start right now. We have seen that the development of a universal definition of sustainability is proving extremely difficult to achieve. It is, however, much simpler to write a personal definition. Such a definition should be personally inspirational and remind us why we are trying to make a difference by tackling global warming.

So what I would like you to do is to write your own definition of sustainability in no more than 50 words. I would like you to put this along with your population data in a personal portfolio. This can be anything from a computer file to a cardboard folder … you could even use the fridge if you have enough magnets. What is important is that all this material is kept together as it will form part of a personal plan.

To get you started have a look at some personal definitions of sustainability by my undergraduate students from Trinity College Dublin:

http://ournewclimate.blogspot.ie/search/label/Definition%20of%20sustainability

When you are ready then move onto step 3 which looks at the science and evidence for global warming.

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