



RE-FRAMING SUSTAINABLE DEVELOPMENT: A CRITICAL ANALYSIS



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Who we are, and what we do

Working for the public benefit for a clean, green and sustainable world, CIWEM (The Chartered Institution of Water and Environmental Management) is the only independent, chartered professional body and registered charity with an integrated approach to environmental, social and cultural issues.

CIWEM:

- Supports thousands of members worldwide in nearly 100 countries
 - Is a powerful evidence-based lobbying force in the UK and overseas
 - Provides training and professional development opportunities
 - Provides a forum for debate through conferences, events and publications
 - Works with governments, international organisations, businesses, NGOs, the creative industries and faith groups for a holistic approach to environmental issues
 - Develops partnerships with like minded organisations across the world
 - Supplies independent advice to governments, academics, the media and the general public
 - Brings members from all over the world together under common policy issues
 - Inputs directly into European and UN policy development
 - Promotes and celebrates excellence through a varied awards portfolio
 - Is committed to improving its own environmental performance
 - Is the first chartered professional body to have its Environmental Management System accredited to ISO14001 standard
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Foreword

In June 2012, Rio hosted the greatest failure of collective leadership since the First World War. The Earth's living systems are collapsing because politicians see the environment as a brake on growth and not an opportunity to grow sustainably.

The outcome document, *The Future We Want*, might represent the future that most world leaders want, but it is not the future the world needs. You cannot have a document carrying this title without any mention of planetary boundaries, tipping points, planetary carrying capacity or hope for the future.

'How to be fair to future generations' could have been the subheading of the Rio debates. The difficulties of action today and the unknown possibilities of tomorrow both militate against positive action now. If that is true of the euro crisis, how much truer is it of the global environment? After two years of negotiation, the UN's summit in Rio reached its climax, still mired in the moral and practical difficulties of choosing between pain now or more pain later.

Rio +20 was a ghost of the optimistic, confident meeting of twenty years ago which established sustainable development at the heart of a global economic model. In reality all it has done is generate more meetings, circular arguments and huge frustration. It's one step forward and two steps back. So, it is time to dump the language of diplomacy and obfuscation and recognise they have failed. World leaders continue to seem incapable of making the vital link between the economy and the environment. Why?

Ambitions that seemed possible have been abandoned, forgotten even. But we must believe (I avoid the word hope) that nobody wants to be associated with failure and that there is still time. Is it too much to ask the world's leaders, who performed miracles in developing global markets, weapons of mass destruction and trillion-dollar bailouts, to devote a bit more grunt and grind to defending the living planet and its ecosystems?



Nick Reeves OBE
Executive Director, CIWEM

Purpose

This report proposes a new sustainability paradigm in order to avert environmental and subsequent social and economic collapse.

CIWEM considers that the current emphasis on an integrated consideration of environmental, social and economic components of sustainability is undermined by poor decision making, weak governance and institutional frameworks which, ultimately, allow too great an emphasis on economic growth to the detriment of environmental and resource conservation. The objective of the Rio + 20 Conference held in summer 2012 was to secure renewed political commitment to sustainable development, but ultimately only provided another example of political failings on an international scale that will further delay the urgent action required.

Furthermore, there remains confusion with currently accepted definitions of sustainable development concerning the precise meaning of terms including 'development' and 'future'. Thus, as a global community we are a long way from any kind of sustainable development.

In order to rectify this failure, CIWEM considers that sustainable development must be re-framed to focus more explicitly on the fundamental environmental dimension within culturally sympathetic contexts. The single limiting factor of a so-called sustainable human race is the management and rate of exploitation of a finite planet – its resources and natural environment – of which humankind is a part. If these resources can be managed and conserved appropriately then pressures on people and the environment will be lessened and social and economic benefit will ultimately follow.



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Executive Summary

Sustainable development has been on the international agenda for several decades. However, despite initial optimism, the ideas espoused in the concept and definition have not come to fruition, with no real or tangible improvements for the future of our environment or society. Instead, 'sustainable' has become a word pre-fixed to often un-credible and poor policy and decision making as a means to 'green wash' and develop ill-considered proposals.

This report draws upon both UK and global examples to argue that whilst the aims and concepts of the Brundtland report remain relevant today, its definition of sustainable development has failed due, in the main, to its inability to be tested and its looseness, in meaning all things to all people. As such, the definition will be deconstructed and reframed alongside a suggested process which will assist in reaching the ultimate goal of sustainability. In doing so, this report argues for a stronger, testable definition which is not subject to the same pitfalls as Brundtland. The definition of sustainability is an absolute concept that includes what needs to be achieved, i.e. not passing tipping points relating to environmental limits:

“To be sustainable an action must not lead, or contribute, to depletion of a finite resource or use of a resource exceeding its regeneration rate”.

This is both bold in its approach and provides clarity through having defined finite limits at the heart of the concept. This will help to ensure the term 'sustainability' is not abused and is only used when proven to be valid.

Alongside a reframed definition, this report will propose a new three part process to create a sustainable system. This includes a visioning exercise through question-based learning and whole-systems thinking, a dependency model to map the critical dependencies and vulnerabilities upon which this relies, and finally embedding resilience and sustainable thinking throughout the model to meet the future vision. This embraces the diversity of both the environment and societies. Through adopting such an approach, it is hoped that a culture change can be instilled whereby sustainability is mainstreamed across all levels of decision making.

It is not the aim of this report to reject existing work or efforts being made to develop environmentally, socially, and economically sensitive solutions. It merely argues that it should not be called sustainable unless proven to be so. This will prevent mislabelling and green washing.

Introduction to the concept of sustainability

The concepts of *sustainability* and *sustainable development* have featured on the international policy landscape since the 1960s. Within the UK these ideas have been embedded, providing the lens through which policy is meant to be constructed¹. Figure 1 charts the development of the sustainability agenda mapped against governance setbacks and environmental change.

The concept of sustainability established a firm foundation in 1987 with the publication of the United Nations World Commission on Environment and Development (UN WCED) report *Our Common Future*² (the Brundtland Report). This report aimed to place the environment at the heart of political decision making, linking human development, social equity and economic growth for the first time. It laid the foundations for the 1992 UN Conference on Environment and Development in Rio (the 'Earth Summit') resulting in the production of a range of outcomes and agreements which underpin modern international measures to tackle environmental concerns. This includes the Convention on Biological Diversity and the Framework Convention on Climate Change.

The Earth Summit also produced an action plan (Agenda 21) which integrated work on international, national, regional and local scales. This was framed by the understanding that the **"integration of environment and development concerns, and greater attention to them will lead to the fulfilment of basic needs, improved living standards for all, better protected and managed ecosystems and a safer, more prosperous future"**³. It also established the UN Commission on Sustainable Development which has held a number of sessions building on the framework established in 1992, most recently meeting for the Rio +20 Conference in summer 2012. The outcomes from this meeting are summarised on page 11.

How is sustainable development defined?

The most commonly used and referenced definition of sustainable development remains that which is outlined in the Brundtland Report:

"Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs."⁴

Sustainable development is normally assessed by reference to its "three pillars" - economic growth, human development (social) and environmental protection, at local, national, regional or global levels. Appropriate consideration of the three pillars is vital in order to achieve sustainability. The simplicity of this approach and definition is one of the reasons it has stood the test of time.

Due to its universal recognition and longevity, the Brundtland definition will be the primary reference which will be used throughout this report.



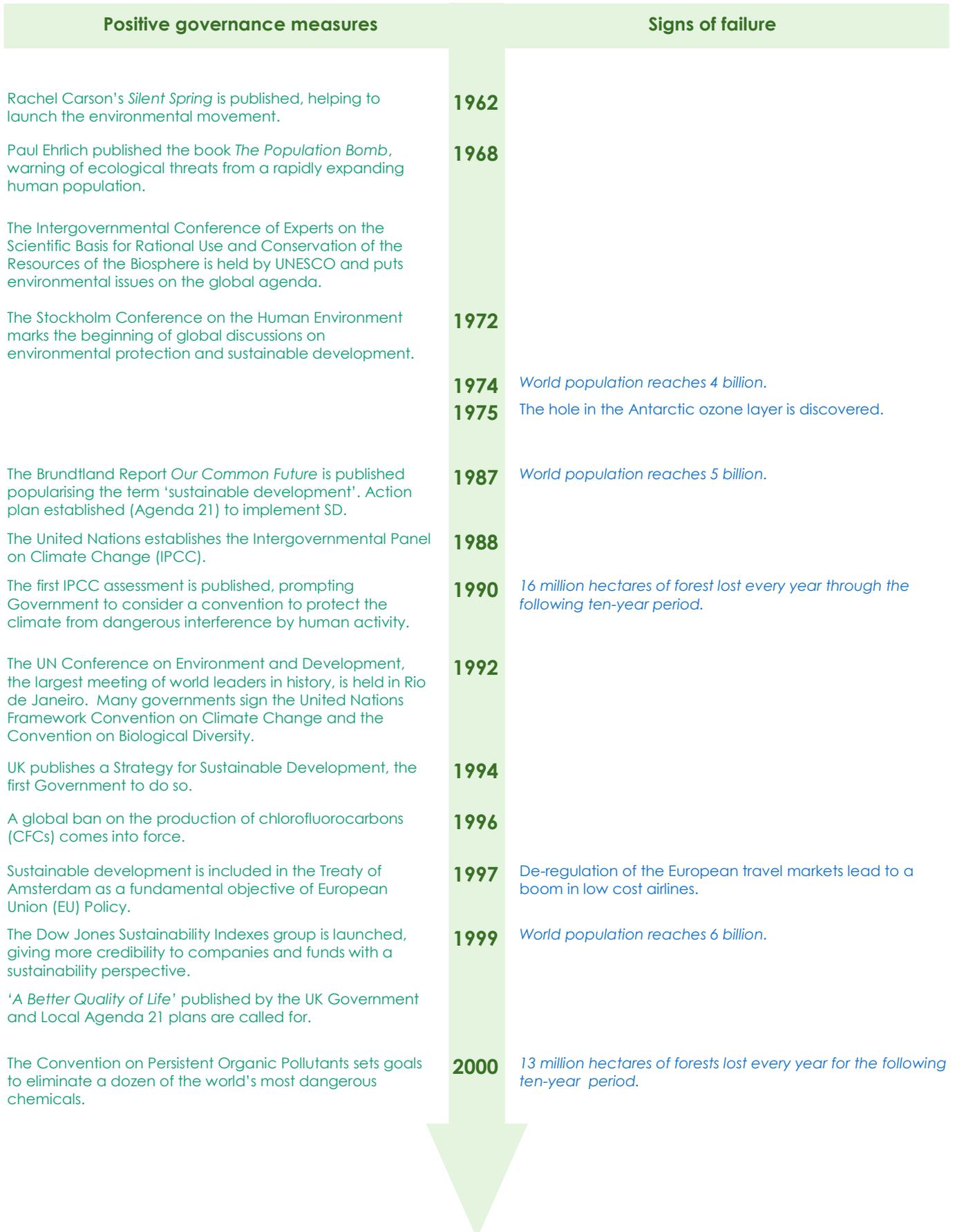
¹ <http://www.defra.gov.uk/environment/economy/sustainable/>

² 1987 *Our Common Future*, Oxford University Press

³ 1992 Agenda 21: The United Nations Programme of Action from Rio

⁴ 1987 *Our Common Future*, Oxford University Press

Figure 1: Charting the development of the sustainability agenda



The UK establishes the Sustainable Development Commission to advise the UK Government and devolved administrations.

Millennium Development Goals established.

EU leaders launch the first EU sustainable development strategy at the Gothenburg Summit.

World Summit on Sustainable Development, Johannesburg.

The UK Government publishes 'Securing the Future' establishing a strategic framework for a consistent approach to SD across the devolved administrations and emphasising the concept of living within environmental limits.

Kyoto Protocol comes into force, limiting carbon emissions of signatory countries.

Al Gore's 'An Inconvenient Truth' released, bringing climate change and planetary limits to a broad audience.

The Stern Review on the Economics of Climate Change released discussing the effect of global warming on the world economy. Although not the first economic report on climate change, it is significant as the largest and most widely known.

Climate Change 2007, the Fourth Assessment Report (AR4) of the United Nations Intergovernmental Panel on Climate Change (IPCC), was the largest and most detailed summary of the climate change situation ever undertaken, produced by thousands of authors, editors, and reviewers from dozens of countries.

The UK passes the Climate Change Act, committing to an 80% reduction in greenhouse gas emissions by 2050.

The G20 group resolves to phase out fossil fuel subsidies.

The UK Coalition Government announces its intentions of becoming the "greenest government ever".

The Economics of Ecosystems and Biodiversity (TEEB) synthesis report released highlighting the economic benefits drawn from biodiversity.

2001

The IPCC states that global average temperatures are rising, and given current trends will rise by 1.4—5.8 degrees Celsius during the next century.

The US announces that it will not ratify the Kyoto protocol.

2002

2005

2006

2007

A series of devastating floods hit the UK throughout the summer of 2007, with the total costs exceeding £3 billion. An independent review of the floods was undertaken by Sir Michael Pitt which led to the production of the Floods and Water Management Act.

The IPCC fourth assessment report found that 'warming of the climate system is unequivocal' with average surface warming likely to be in the range of 2 to 4.5 °C.

2008

Hurricane Katrina hits the US south coast, highlighting vulnerabilities to extreme events under climate change and the important role of natural defences (i.e. wetlands) in offering storm protection.

2009

UN Climate Change Conference held in Copenhagen seen to end in failure.

Series of devastating bush fires across Australia.

2010

Seven year drought in Australia ends with severe flooding.

UN Year of Biodiversity including the 10th Conference of Parties for the International Convention on Biological Diversity held in Nagoya.

The UK's Green Investment Bank is formed; the Bank will be used to fund and drive investment in green infrastructure, including low-carbon projects, in the UK.

The UK Government redrafts and slims down planning guidance in the National Planning Policy Framework with a presumption in favour of sustainable development.

The UK's National Ecosystem Assessment is published as part of Defra's remit to improve valuation of sustainable development in policy appraisal.

New UK Government 'vision' for sustainable development released.

Rio +20 held leading to the promised creation of sustainable development goals, and the strengthening of institutional structures.

Natural Capital Commission tasked with drafting new definition of sustainable development.

New indicators for sustainable development considered by Defra and open for consultation.

Well-being Survey announces initial findings surrounding the quality of life of those in Britain.

Success for the Millennium Development Goals which has led to significant poverty reduction in South America and Southeast Asia.

Government publishes the 'Public Services (Social Value) Act' which requires: "public authorities to have regard to economic, social and environmental well-being in connection with public services contracts; and for connected purposes."

The Ecosystem Markets Taskforce published its final report 'Realising Natures Value' which makes the business case for why nature matters.

2011

The UK Government receives a fierce backlash against plans to sell off some of the nation's forestry estate on the basis of the economic, environmental, cultural and recreational benefits they provide.

The UK Green Investment Bank is unable to borrow, limiting its ability to leverage funding.

The UK Government is forced to reconsider changes to the proposed National Planning Policy Framework based upon its poorly defined use of the term sustainable development.

The UK Sustainable Development Commission abolished as part of a broader government programme of cut backs and de-regulation.

World population reaches 7 billion.

Around half of the world's original forests disappear.

2012

Rio +20 poorly attended by heads of state with weak pledges made and a lack of resources allocated in face of clear evidence calling for urgent action.

Global weather extremes – record rainfall and floods in the UK, extreme flooding in China and Russia, drought and crop failures in the US, and unprecedented ice melt in Greenland.

Failure for the Millennium Development Goals in Sub-Saharan Africa and South Asia where hunger, malnutrition and extreme poverty continue to inflict hardship on approximately one billion people.

2013

Nicholas Stern reports that the risks posed by climate change were underestimated noting "I got it wrong on climate change, it's far, far worse".



Reaching our planetary limits: the importance of living sustainably

Awareness of the carrying capacity of our planet has become increasingly widespread during the past 50 years and has driven the need for a more sustainable approach to the way we live. The controversial 1972 report *Limits to Growth*⁵ by the Club of Rome became a landmark text, as the first to consider the interaction of the Earth with human systems and the prospects for human development within the context of an increasing global population, industrialisation, pollution, food production and resource depletion. It recognised that the life-sustaining role of the Earth could not withstand unrestricted consumption of natural resources and that poorer countries have a right to their own development using a similar path to the more industrialised nations. The UN conference of the same year in Stockholm was the first major international conference on both environmental issues and human development; this has led to the production of legislation at the national level.

Despite 50 years of awareness however, very limited progress has been made in terms of putting humanity and its ways of living on a more sustainable footing. A rising human population is driving demand for food, water, energy and consumer goods. Rapid depletion of minerals (such as rare earths) is jeopardising our ability to benefit from future technological developments, and continued exploitation of fossil fuels puts us on a path of global temperature rise and extreme weather events that the natural world and humankind may not easily adapt to or mitigate for. In contrast with these levels of excessive consumption, 1.1 billion people lack access to safe drinking water and as the population grows, two-thirds of the world's people will face moderate to severe water shortages by 2050. Many scientists regard the rate of loss of global biodiversity as comparable to the mass extinctions of geological time. E.O. Wilson estimates that at the current rate of human destruction of the biosphere, one-half of all species of life will be extinct in 100 years⁶.

⁵ Meadows et al, 1972. *The Limits to Growth: A report for the Club of Rome's project on the predicament of mankind*, Universe Books

⁶ Wilson, E.O., *The Future of Life* (2002)

Rio +20 and 'The Future we Want'

In June 2012, heads of state and high-level officials of more than 190 nations met at the Rio +20 Conference, marking the 20th anniversary of the 1992 Rio Earth Summit. The outcome document, 'The Future we Want' was the culmination of two years of intensive negotiations, and outlined practical and immediate actions to create "a pathway for a sustainable century".

Specific outcomes include:

- The creation of a High Level Forum to act as a watchdog for sustainable development commitments.
- A strategy to define Sustainable Development Goals.
- A new strategic status for the protection of oceans.
- Efforts to outline a new inclusive metric to measure the wealth of countries beyond GDP that incorporates the three pillars of sustainable development.
- A green light to a 'Green Economy' in the context of sustainable development and poverty eradication.
- Calls for greater effort to implement the Convention on Biological Diversity.
- \$323 billion devoted to achieving universal access to sustainable energy by 2030.
- Planting of 100 million trees.
- Empowering 5,000 women entrepreneurs in green economy businesses in Africa.
- Recycling 800,000 tons of PVC per year.
- Upgrading of the United Nations Environment Programme in key areas such as universal membership and improved financial resources.
- Recognition by all 192 governments that "fundamental changes in the way societies consume and produce are indispensable for achieving global sustainable development".

The most recent Rio +20 meeting, held in summer 2012, marked the anniversary of the landmark 'Earth Summit' but was largely met with disillusionment due to a series of frustrations with the negotiating text. However, this weakness was recognised at Rio and one development which has been particularly welcomed is the strengthened role for the United Nations Environment Programme (UNEP). This helps to address institutional weakness when considered alongside the creation of the Forum on Sustainable Development Commitments. These stronger institutions could potentially help to 'police' the rafts of timetables and targets already in place, offering a source of leadership and excellence⁷. The introduction of Sustainable Development Goals (SDGs) which will feed into the Millennium Development Goals (MDGs) in 2015 were seen to be a significant step forward in creating universal targets that integrate all three pillars of sustainable development. The themes of which will be decided by a working group from 30 countries (see appendix 1) by September 2013.

⁷ <http://www.guardian.co.uk/global-development/poverty-matters/2012/jun/27/rio20-reasons-cheerful>

Despite this, many critics continue to point towards the weakness of these pledges in light of mounting scientific evidence highlighting social and environmental decline and impending climate change and biodiversity tipping points. The pursuit of 'sustained growth' within this context merely supports and perpetuates the economic systems which lie at the root of biosphere loss⁸. Developing countries voiced suspicion over this 'one-model-fits-all' approach to economic development being imposed by wealthy nations. No financial support was pledged to these countries, though this was not surprising given the financial crisis. It is expected that this will be addressed in future discussions.

A **tipping point** is the point at which a boundary or limit is exceeded and a system changes from one stable state to another stable state. After the tipping point has been passed, a transition to a new state occurs. This tipping event may be irreversible and the new state may be considerably less favourable for humanity and the biosphere.

This perceived weak leadership has driven many civil society groups to rethink their strategies⁹. A number of initiatives were established at the 'People's Summit' outside the negotiating halls. Many believe this is a positive step forward and that disappointment at Rio was always inevitable when many divergent views have to be accommodated. Ensuring wider change is seen to be a 'cultural process' stemming from stronger institutions and public information that helps people see the world differently. It is hoped governments will take their lead from this pressure¹⁰ and wider cultural change.

The continuing importance of sustainability

Because of these failures and trends, the concept and ideas espoused in the Brundtland definition are increasingly relevant, as noted previously **"integration of environment and development concerns, and greater attention to them will lead to the fulfilment of basic needs, improved living standards for all, better protected and managed ecosystems and a safer, more prosperous future"**¹¹. Sustainability continues to offer the framework through which we can appreciate the services the environment provides; it helps us to recognise the innumerable services from pollination, to sources of medicine, to the absorption and reprocessing of pollution that the natural world provides. The 'one planet living'¹² concept illustrates the extent to which these vital services are currently exploited, equating existing lifestyles to the number of planets (in natural resource terms) required to live to those standards. If everyone in the world lived like an average European we would require three planets. This increases to five for North American levels of consumption.

The extent to which current western lifestyles exceed planetary means clearly illustrates that there has been a global failure on two accounts of sustainability – social and environmental, and the prospects for the remaining pillar, economic, also appear bleak, if nothing else because a healthy economy requires a healthy environment and strong society. The global financial crash and subsequent crippling recession highlight again how living beyond our means, whether they be financial or environmental, ultimately leads to collapse once we pass a vital tipping point. Yet world leaders choose to not recognise this or remain unable to exert sufficient influence on their counterparts if they do.

⁸ <http://www.guardian.co.uk/commentisfree/2012/jun/25/rio-governments-will-not-save-planet>

⁹ <http://www.guardian.co.uk/environment/2012/jun/23/rio-20-earth-summit-document>

¹⁰ <http://www.guardian.co.uk/global-development/poverty-matters/2012/jun/27/rio20-reasons-cheerful>

¹¹ 1992 Agenda 21: The United Nations Programme of Action from Rio

¹² <http://www.oneplanetliving.org/index.html>

We are now at a crossroads where we have the opportunity to consider a different way of doing things and to implement a model which ensures equitable prosperity now and in the future. Sustainability should form the foundation to decision making at all levels and the lens through which we can reframe the future of humankind. This requires leadership beyond market mechanisms, a true balance between economic, environmental and social goals and the strengthening of national and international institutions in order to re-align human processes.

Over the 50 year history of sustainability thinking, this has not happened. Sustainable development has not been delivered in real world terms and has not averted our continuing path of consuming planetary resources beyond regenerative capacity or at a rate that leaves sufficient for future generations. Instead, 'sustainable' is a term prefixed to many proposals and projects as a means to offer a green rubber stamp to short sighted policy and decision making. We need to recognise where we have failed, and re-build and strengthen this largely misused concept to ensure economic, environmental and social systems are resilient to change.

'Interpretations' of Sustainability

Where governments fail to take the initiative, business sometimes chooses to lead. Sustainability is a key challenge to many organisations upon which their survival rests. In a similar fashion to mandatory carbon reporting, business is calling for sustainability to be embedded through 'better' regulation to help make this a reality. This includes integrating sustainability information amongst financial data in annual reports, increasing transparency and raising the profile of this important issue.

Two examples are provided below of exemplary business approaches. These however, are not the norm and such all-encompassing approaches to sustainability should be supported:

Unilever Sustainable Living Plan

Established in 2010, the plan commits to a ten year journey which embeds sustainability across direct operations, suppliers, distributors and - crucially - how consumers use their brands.

Paul Polman, Unilever's CEO highlighted the greatest challenge of the 21st century as providing good standards of living for 7 billion people without depleting the earth's resources or running up massive levels of public debt. To meet this, both business and government need to find new models of growth to ensure an equitable balance between economic and environmental needs. The market has failed and business can begin to meet this challenge as opposed to waiting for governance mechanisms to impose change.

The sustainability plan is clearly embedded into their business strategy, creating an agenda for companies to lead the way on sustainable development. Citizens and communities are given the same weight as shareholders, and environmental management and conservation is key to the prosperity of both business and the global community.

Wessex Water

Wessex Water aims to become a truly sustainable company looking beyond good business practice towards customer matters, community engagement, the environment, employee needs, asset maintenance and finance.

Based upon the 5 principles laid out in 'Securing the Future' (see page XXX) all aspects of the business have been separated into groups known as the five capitals:

- Customers and communities
- Environment
- Employees
- Infrastructure
- Finance

Successes to date have included:

- Continued reduction in water abstraction from the environment – made possible by reducing leakage and encouraging customers to use water wisely.
- Continued design of a water supply grid to add further resilience to supplies and facilitate the transfer of spare water to neighbouring regions in future.
- Meeting all required environmental outputs.
- Named Utility of the Year at the annual utility industry achievement awards.
- Named as the leading water company in the government's Carbon Reduction Commitment league table.



Existing definitions and models

Whilst Brundtland's definition of sustainable development remains the most commonly used, a large number of variations have been produced. A few are highlighted below:

Alternative Definitions

2012 Natural Capital Committee

*"Economists define development as sustainable when **utility** from consumption is non-declining through time... Alternatively, Dasgupta (2007) argues that for development to be sustainable an economy's inclusive (or comprehensive) wealth should not decline over time. In other words, investment in a productive base (its stock of produced human, social and natural capital) should be positive over time, noting possible substitution constraints for some natural capital stocks."*¹³

House of Commons Community and Local Government Committee, The National Planning Policy Framework, Eighth Report of session 2010 – 12:

*"Sustainable development is development that meets the need of the present without compromising the ability of existing communities and future generations to meet their own needs."*¹⁴

The committee goes on to note that economic, environmental and social elements are addressed positively and equally with respect for environmental limits.

2011 UK Government Vision for Sustainable Development:

*"... Stimulating **economic** growth and tackling the deficit, maximising wellbeing in **society** and protecting our **environment**, without negatively impacting on the ability of future generations to do the same."*¹⁵

2005, UK Sustainable Development Strategy 'Securing the Future':

*"to enable all people throughout the world to satisfy their basic needs and enjoy a better quality of life, without compromising the quality of life of future generations"*¹⁶

Other approaches and definitions have been developed which attempt to move beyond the three pillars and begin to offer some idea of limits. The Capitals approach builds upon the importance of intergenerational equity as highlighted by Brundtland. Capital, whether this is human or natural and the amount that is at the disposal of a generation is seen as key to their development. Sustainability is achieved when the stock of capital is left unchanged for future generations¹⁷.

¹³ <http://www.defra.gov.uk/naturalcapitalcommittee/natural-capital/what-is-sustainability/>

¹⁴ House of Commons Community and Local Government Committee, The National Planning Policy Framework, Eighth Report of session 2010 – 12

¹⁵ Defra, Mainstreaming Sustainable Development – The Government's vision and what this means in practice, 2011

¹⁶ The UK Government Sustainable Development Strategy Securing the Future, 2005

¹⁷ Stern, D.I. (1997). "the capital theory approach to sustainability: a critical appraisal". *Journal of economic issues* 31 (1): 145–73.

Modelling the three pillars

In the section below we consider how the 3 pillars of sustainability may be depicted to illustrate the inter-relationship between environmental, social, and economic components. These models can give the impression that the three pillars must be considered equally, however Brundtland notes appropriate consideration of each, dependent on context, should be applied.

Figure 2: Brundtland's 3 Pillars

Figure 2 depicts the frequently used and referenced Brundtland definition of sustainable development. Appropriate consideration of the three pillars is vital in order to build sustainability. It is this model that formed the basis of the definitions outlined previously.

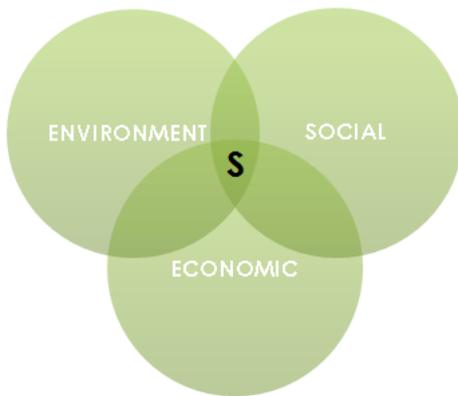
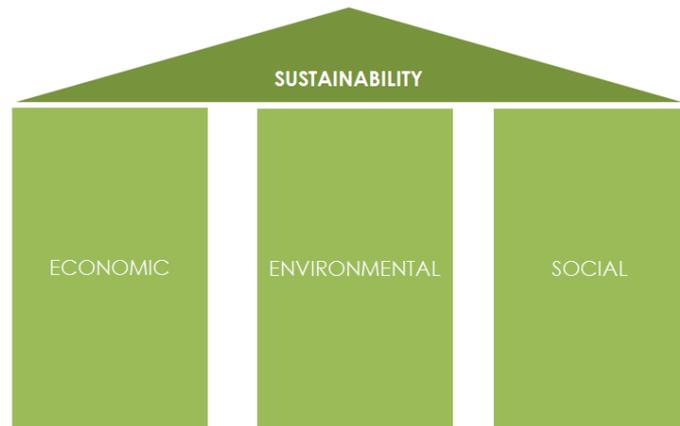
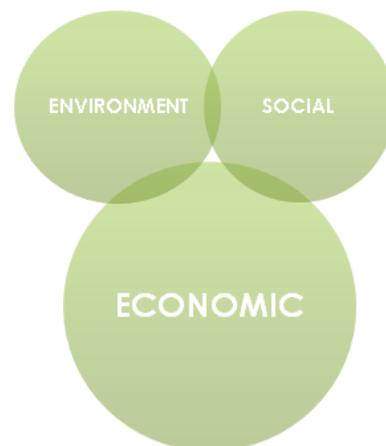


Figure 3: Triple Bottom Line

All of these definitions can be graphically depicted by the Triple Bottom Line¹⁸ (TBL) model which is illustrated on the left. This is the most commonly used approach which in theory, places appropriate consideration on all 3 pillars of sustainability. Where all of these elements interconnect, sustainable development can be achieved.

However, in reality an over emphasis on economic goals at the expense of both environmental and social well being creates inequitable decision making meaning sustainability cannot be achieved, depending on where the emphasis lies. Trying to balance social and environmental goals alongside economic activity is often referred to as weak sustainability.



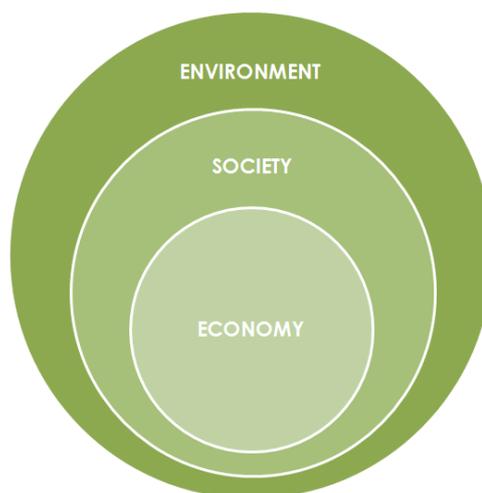
¹⁸ Elkington, J (1997) *Cannibals with Forks: the Triple Bottom Line of 21st Century Business*

Alternative models to the TBL have been proposed, one of which, of particular relevance, is outlined below. These are both based upon the concept of *strong sustainability*:

“Strong sustainability refers to the need for human activity to reflect the asymmetric interdependence of the economic, social, and environmental spheres of life. The health of the worldwide economy is totally reliant on the existence of a healthy society, which is totally reliant on the existence of a healthy environment. The reverse is not true.”¹⁹

Figure 4: The ‘Nested’ or ‘Living Systems Model’²⁰

Figure 4 shows the 3 components of sustainability nested within one another. The model highlights that a functioning economy is dependent upon a healthy society, and both in turn are dependent upon the natural environment. Whilst these elements depend upon one another, the environment is given primacy, as without a healthy and functioning natural world both society and the economy would suffer. Such a model redresses the presently observed weighting in favour of the economy, towards one where the environment is given precedence.



Models provide a simple illustration of the inter-relationship between the three pillars. However, a model does not, and cannot, offer guidance as to how change can be implemented, the tools needed, and the governance and statutory rigour required to ensure their effectiveness, thus leaving us continually vulnerable to inequitable decision making. As noted above, there is no clear vision for how our future might look, we therefore continue to preserve the familiar, rather than 'sell' a new concept or vision of how to live.

¹⁹ <http://nz.phase2.org/glossary>

²⁰ <http://sustainabilityadvantage.com/2010/07/20/3-sustainability-models/>

The next step should be one which moves away from viewing a model in isolation towards considering the principles and processes attached to its successful adoption. The most helpful depiction of such an approach was laid out in *Securing the Future* (UK 2005). Figure 5 outlines five governing principles which must be applied to ensure the essence of sustainable development is put into practice. However, this has still failed to effectively mainstream sustainability across UK Government.

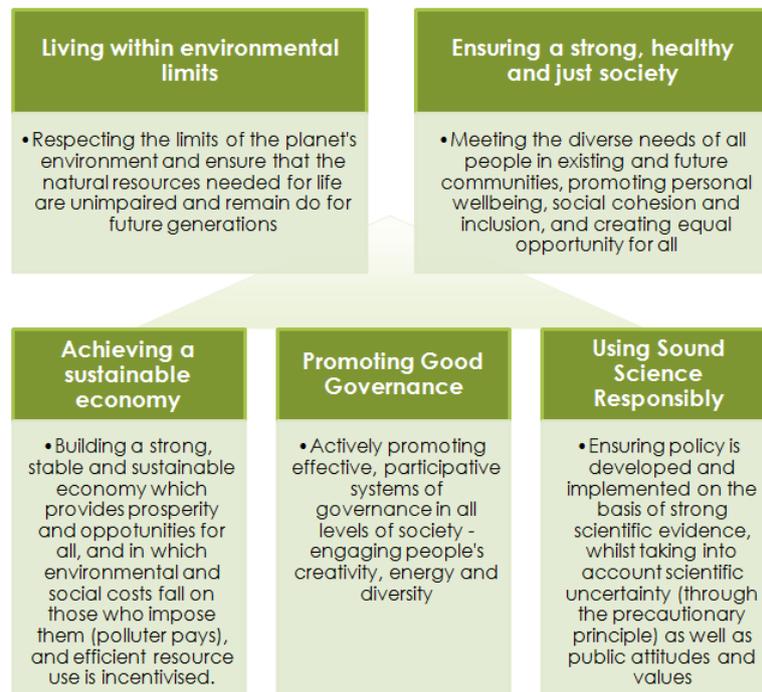


Figure 5: The five governing principles of Sustainable Development by the Sustainable Development Commission / *Securing the Future*

The 5 principles constitute one of a series of different approaches and processes, the CIWEM sustainability tool²¹ outlines a number of these. Such approaches are based upon the concept of integrating social, environmental, and economic issues. It is intended that doing so will lead to more robust and transparent decision making, which is key when determining whether something is sustainable. However, their robustness and the degree to which they are considered appropriately can be questioned.

²¹ <http://www.ciwem.org/policy-and-international/current-topics/sustainable-development/sustainability-tool.aspx>



Where do the problems with the Brundtland definition and existing processes lie?

The failure of the concept of sustainable development to adequately address human and environmental problems leads us to reconsider the definitions and basis on which it is founded. It is important to recognise these in order to identify a workable approach for the future.

- The concept **lacks rigour**, which leaves its adoption and utilisation subjective and open to interpretation and misjudgment. There is a critical need to understand the nature of sustainable development and this has to be relatively straightforward and testable. For far too long, it has been made complicated and somewhat esoteric.
- The word 'development' implies a process of growing, expanding or advancing. When the Brundtland definition was elaborated it was within the context of international-donor language where '**development**' referred (and still does) to **human development**, particularly as it relates to low-income countries. Even in the 2005, *UK Sustainable Development Strategy*²² sustainable development is defined as "to enable all people throughout the world to satisfy their basic needs and enjoy a better quality of life, without compromising the quality of life of future generations". These social goals remain relevant; however, '**development**' as it is actually used in the UK refers to "**infrastructure development**". Further evidence of this is the continued misguided use by UK Government within the National Planning Policy Framework of the "*presumption of sustainable development*". **What is really required is the development of sustainability as opposed to sustainable development**²³. This would create more just relations between human beings, a shared concern for the environment and increased responsibility globally and inter-generationally²⁴.
- The degree to which the three pillars are considered appropriately is questionable. Economic growth is often promoted with due regard to the environmental resources on which it is based only when it does not compromise the overall goal of human development. This confusion between the roots of the definition (social) and its misplaced use (economic) means it is often used incorrectly, and **the three pillars are not appropriately considered**; rather they are skewed greatly towards economic interests²⁵.
- The prospects for sustainable development under **current governance arrangements are poor**²⁶. Whilst the process at the international scale is admirable, the **challenge of implementation** faced by national governments to 'sell' the concept raises a number of issues including lack of responsibility, confusion and the problem posed when taking account of historical injustices i.e. access to resources, colonialism, a drive for economic development and the seduction of industrialised lifestyles.
- Brundtland's definition was based upon the importance of ensuring future generations can meet their needs. However, **there is no vision for how a sustainable**

²² http://archive.defra.gov.uk/sustainable/government/publications/uk-strategy/documents/SecFut_complete.pdf

²³ D. Haley, *The Limits to Sustainability: Art and Ecology*

²⁴ Arts, Culture and sustainability: Visions for the Future, Connect2Culture

²⁵ <http://www.thwink.org/sustain/glossary/Sustainability.htm>

²⁶ <http://www.earthsummit2002.org/es/issues/Governance/Montreal-IEG.pdf>

future will look and as such planning for these future needs is problematic. This is further complicated by a revolution in how we view the world during the last 50 years; it is not orderly but complex and uncertain. This, taken alongside the rapid rate of environmental change and the cascading effect this has in altering our perception of the world around us, means the view or vision of a sustainable 'future' is always altering. This shifts the direction of what action or behaviour is deemed to be sustainable.

- **Sustainability stems from problem-based learning.** This approach defines a problem and seeks solutions, with the assumption that 'everything will be okay'; as such this approach does not challenge the status quo. We have already created our own limits to growth through climate change and environmental degradation. The Earth will stop human endeavour in the foreseeable future as we reach and exceed a number of tipping points. If we reach these points, sustainability ceases to have any meaning. The current approach to applying the definition only acts to **conserve the status quo and deny the need for more fundamental change to the way in which we live our lives or make our decisions**, perpetuating the very culture that destroys us. We require 'whole systems' seeing and thinking and question-based learning in a drive to find solutions²⁷.

<u>PROBLEM-BASED LEARNING</u>	<u>QUESTION-BASED LEARNING</u>
Learning about a subject through seeking solutions to a problem or scenario. This offers a clearly defined process based upon the problem as a starting point.	Questions are the basis from which we seek and acquire knowledge. It is this process of inquiry itself that leads to solutions and new ideas.

- Sustainable development, as it is currently defined, is an outcome and as such it requires a process to make it obtainable. CIWEM believes that focusing on resilience as a first principle of sustainability will help to add this required process to the equation. Resilience is about building in the capacity and responsiveness to deal with challenges in water, food, energy etc. **Building resilience into decision making embeds the capacity to adapt** across all levels and deals with the chaotic elements that affect a sustainable balance.
- The three pillars and triple-bottom-line approach has been criticised due to its inability to reflect the complexity of society. Many proponents have argued for the inclusion of culture as the fourth pillar of sustainability²⁸. This not only helps to shape how we view the space around us, but ultimately, what we do with it. As noted previously, many environmental challenges are a result of poor governance and a change in behaviour and values is required to meet them. A consideration of culture in this context assists trans-disciplinary working, which is fundamental to addressing such sociological phenomena²⁹. **The three pillars outlined by Brundtland have created a culture deficit³⁰**; the Circles of Sustainability Approach³¹ advocates the inclusion of this fourth pillar which provides the tools, practices, guidance and discourses to implement the necessary changes to live sustainably.

²⁷ Arts, Culture and sustainability: Visions for the Future, Connect2Culture

²⁸ Culture: Fourth Pillar of Sustainable Development, (2010) United Cities and Local Government

²⁹ D. Haley, The Limits to Sustainability: Art and Ecology

³⁰ Arts, Culture and sustainability: Visions for the Future, Connect2Culture

³¹ <http://citiesprogramme.com/aboutus/our-approach/circles-of-sustainability>



Where from here? Reframing the concept

Brundtland's definition of sustainable development makes reference to the needs of future generations but, as noted previously this is one of its weaknesses as we cannot predict future needs. As such, when considering a stronger and testable definition of sustainability it is necessary to address relevant timescales and generational equity. In order to address this we have chosen to break timescales into three broad categories: generational, environmental, and political/economic.

Establishing timescales

Generational / Societal Timescales

A key component of the Brundtland definition of sustainable development is ensuring fairness and justice across generations. Generational equity forms a key component of all definitions of sustainable development. This means making sure that there are sufficient resources available for future generations so that they have the potential to satisfy their needs in the same way that current generations have. Brundtland's definition refers to resources for "future" generations and satisfying "...their needs...". This could be interpreted to imply that humankind lives for many millennia on this planet and that even currently abundant resources (e.g. some minerals) may become depleted. This vision is based upon future needs being similar to our own current needs. However, learning from our past human development, it can be anticipated that future needs will look quite different to our own.

The cascading effect of environmental change continues to alter our vision of the future; this is independent of additional interferences such as nuclear war, disease or change in human fertility. If we anticipate that the population continues to increase (albeit at a lower rate) then we will run out of some basic resources (e.g. fossil fuels). Whilst technology may be able to contribute to greater efficiency of resource use with zero emissions and waste, there is a finite limit on a generational timescale.

We cannot think for future generations especially in light of the increasing awareness of the complexities of changing environmental factors. However, we should ensure that they have to opportunity to take care of themselves and that means access to environmental goods and services, resources, and a socially and economically stable society. In order to plan for this vision of a future, we need to determine a suitable timescale which we can look to in order to enable the planning and provision of a resilient world.

When looking retrospectively at technological development or environmental change, a 50 year time period for example, encompasses significant amounts of transformation. It is also a reasonable time frame in which we can project climate models, population growth, and the rate of resource depletion. Thus, for our current actions to be sustainable, we must ensure that the natural resource base and existing environmental

services are not depleted to a level that prevents sufficient potential for those future generations to deal with the situation in which they find themselves.

Environmental Timescales

When looking at environmental timescales it becomes more complex. These timescales are imposed by not only consumption of resources but the natural world's ability to regenerate and replenish. This is complex due to a lack of data on the availability of resources, limited knowledge of certain regeneration rates and the interaction between environmental change and feedback loops (the systems reaction to change i.e. atmospheric gas composition); a few examples are highlighted below:

- The accumulation of greenhouse gases in the atmosphere and the knock-on effect this has for future climate change illustrates how actions now can continue to have an impact for decades to come. The lifetime of greenhouse gases can be hard to determine. This is especially true for carbon dioxide, which can be removed from the atmosphere through various interacting processes such as absorption into the oceans or rock formation, though this can take anything from 50 to thousands of years³². Methane on the other hand has more global warming potential in the short term but can be removed by chemical processes in around 12 years. Factoring in the effects of a number of feedback loops, this becomes increasingly complex.
- The sustainability of global fish stocks is often discussed in reference to this debate. Whilst the UK currently has a stable supply and demand balance, this is vulnerable to changing feed and energy prices. Globally, without serious conservation measures, stocks of all species currently fished for food are predicted to collapse by 2048³³.
- We are likely to reach 'peak phosphorus' by 2030³⁴ and face steep price increases. Phosphorus is essential for life and is commercially used as a fertilizer for intensive agriculture. Volatile markets due to geopolitical interests could reduce food security making large scale agricultural production increasingly vulnerable.
- Within the construction sector it is estimated that within the UK there are 40 years' supply of crushed rock, and only 10 years' supply of sand and gravel³⁵.
- Supplies of lithium, a metal used in the production of batteries are currently abundant, but as new technologies, such as electric cars, become more widespread they are likely to come under increasing pressure.

The examples above offer a small glimpse at the importance of working within planetary boundaries and building resilience and adaptation measures in order to avert and prepare for damaging environmental effects such as feedback loops and resource losses. However, it should be noted that this process itself will put other resources under strain and whilst the economic downturn temporarily reduces some pressure on these factors, increasing population and development still increases concern over security of supplies. The current approach taken by Defra of establishing a series of indicators which identifies 'stocks' as opposed to pure consumption is helpful in planning for the future³⁶. The National Ecosystem Assessment³⁷ (NEA) provided base levels from which to work, though it is acknowledged that this is limited and we remain unable to determine our entire capital of natural resources. As such it is important that we build in flexibility and are adaptive to availability of new data and its potential implications.

³² <http://www.guardian.co.uk/environment/2012/jan/16/greenhouse-gases-remain-air>

³³ Worm, B. et al (2006) *Impacts of biodiversity loss on ocean ecosystem services*. Science, 314: 787

³⁴ Beardsley, Timothy M. (February 2011). "Peak Phosphorus". *BioScience* 61 (2): 91.

³⁵ AEA Technology plc, *Review of the Future Resource Risks Faced by UK Business and an Assessment of Future Viability*, A research report completed for the Department for Environment, Food and Rural Affairs

³⁶ <http://www.defra.gov.uk/news/2012/07/24/sustainable-development-indicators/>

³⁷ <http://uknea.unep-wcmc.org/>

Political / Economic Timescales

Political timescales have long been recognised as a barrier to addressing environmental goals. The five year election cycle in the UK and a preoccupation with ensuring re-election by career politicians means many issues which span beyond this period are neglected. We need to instil a cultural change which gives political leaders the ability and mandate to think ahead and plan further into the future as opposed to becoming preoccupied with short term goals. Despite some credible legislation such as the 2008 Climate Change Act and five year carbon budgets being in place, these continue to be threatened by current and future administrations.

Responsibility for mainstreaming sustainable development has moved in recent years from an independent body (the Sustainable Development Commission) to being housed within Defra and is championed at the ministerial level from relatively non-influential quarters. The size of the challenge is not matched by the capacity available and on several occasions sustainability has been undermined at the expense of purely economic goals. The most recent and apparent example of this is the continued drive and support for a programme of house building in South East England, despite the area facing long-term water stress.

Ensuring the needs of future generations are met could be tackled in a number of ways and some countries have taken positive steps forward in advancing this agenda. Wales are currently consulting on a Sustainable Development Bill as part of their legislative programme. In Hungary, the Commissioner for Fundamental Rights seeks to protect the rights of children and values determined to be in the interest of future generations through offering: *“an opinion on... plans and concepts otherwise directly affecting the quality of life of future generations; and he/she may make proposals for the amendment or making of rules of law affecting fundamental rights and/or the recognition of the binding nature of an international treaty.”*³⁸

Malta has also passed a 'Sustainable Development Act' with the aim to *“mainstream sustainable development across the workings of government, to raise awareness of SD issues and practices across society and to promote adoption thereof”*³⁹. This puts in place the framework for government to lead by example with the hope that the private sector and wider society will follow. The successful adoption of sustainable development principles at government level will provide the credibility and standard against which others can follow.

At an international level a similar approach has been called for. In early 2012, the Foundation for Democracy and Sustainable Development proposed a UN level independent and impartial High Commissioner for Future Generations which would represent an: *“act of faith in our collective ability as people, and to the collective ability of our governments, to overcome one of the most pernicious features of unsustainable development: the short-termism that undermines equity in the present and guarantees unfairness to future generations.”*⁴⁰

An independent figurehead with the sole responsibility of looking to the future and considering the impact and scenarios of different decisions would undoubtedly be beneficial. This would need to be supported by a network of technocrats, scientists and artists to synthesise suitable policy approaches based upon a number of future scenarios.

³⁸ <http://ajbh.hu/allam/eng/index.htm>

³⁹ WEM, Politicians look to the future, Kevin Gatt, March 2013 vol. 8 no.3

⁴⁰Committing to the future we want: a High Commissioner for Future Generations at Rio+20 , Discussion Paper Halina Ward, March 2012

This approach in practice

Whilst all decision making needs to consider these factors, different communities will face a different priority limiting factor, and in some instances this may be more obvious than others. For example, it was noted earlier that the UK currently has a stable supply of fish. However, the UK is fortunate that it has access to diverse food sources unlike 3 billion people globally for whom fish provides essential nutrition⁴¹. For these people, the sustainability of fisheries is their environmental, social, and economic limits.

Reaching environmental limits

Fisheries create livelihoods for over 500 million people in developing countries⁴². As sustainable development was born from the human development agenda this is a useful example to explore. Considering this simplistically it can be deduced that we need sustainable fisheries in order to ensure the livelihoods of communities and future generations. But what is this dependent upon? We next need to consider the elements that create a sustainable fishery and how they can be supported, or be made resilient to change. The impacts on fisheries have been considered widely by many academics but can be briefly summarised as:

- Climate change – Rising ocean temperatures, acidification, salt water intrusion
- Ocean ecosystem – changing migration patterns of fish, the provision of a healthy habitat, the ability to act as a carbon sink.
- Supply and demand / regeneration rates – Overfishing beyond regeneration rates e.g. the collapse of cod fisheries, increasing global population. Overfishing of certain species alters the balance of the ecosystem.
- Price – as a control on demand.
- Energy – impacts on the production of feed and the maintenance of commercial fisheries.
- Fishing methods – bottom trawling, dynamite fishing, electro fishing as opposed to more sustainable methods such as line and pole.

Even through the very simplistic and brief summary above it is clear how reliant each of these elements are upon one another, and how a failure in one area has a cascading and potentially multiplying effect which damages the sustainability of a fishery.

Considering the Brundtland definition of sustainable development, it might be assumed that a sustainable fishery is one that meets the needs of the present without compromising the ability of future generations to meet their own needs.

However, what may be required is a step back; the simplistic list above shows the chaotic elements which implicate the sustainability of a fishery. These need to be addressed through either eliminating the threat such as through widespread adoption of sustainable fishing practices, or made resilient or adaptable to threats, for example via the provision of early warning weather systems, or the diversification of economic activities so communities are less reliant on fishing. This might include activities such as the production of marine algal biofuels. Ultimately, the long term sustainability of fisheries is limited by the health of the natural environment, thus supporting the nested or living systems model. Ignoring the environment in favour of both economic and social goals would continue to place pressure on the finite resources and ultimately lead to a collapse of sustainability.

⁴¹ WorldFish Centre, 2008. The Millennium Development Goals: Fishing for a Future: Reducing poverty and hunger by improving fisheries and aquaculture

⁴² FAO (2009) The State of World Fisheries and Aquaculture

Increasing rigour

Throughout this report it has been argued that the current definition of sustainable development has failed because it has provided insufficient description of the required measures and direction of travel. We now need to reconsider and reframe the concept's use in order to avert environmental, social and economic collapse.

We do not have access to an unlimited supply of natural resources and environmental services, whether this is within the shores of the UK, or those which are traded globally. Our limits have been defined and imposed upon us, and several studies such as the National Ecosystems Assessment⁴³ have helped to begin to define what these are.

Sustainability is an absolute concept. To label something as 'sustainable' it must not exceed its regeneration rate, or reach a point where its use becomes economically unviable. As such, any definition of sustainability should include what needs to be achieved, in other words remove the subjectivity inherent in existing ones.

“To be sustainable an action must not lead, or contribute, to depletion of a finite resource or use of a resource exceeding its regeneration rate”.

To move forwards we must stop perpetuating and promulgating the very culture and ideas that allow weak governance to fail future generations. The sustainability concept should not continue to be sufficiently malleable such that it can effectively be abused as a precursor for business as usual. It must be understood as an absolute concept. This does not mean that existing work should stop, or that where we do not yet know our environmental limits we should not attempt to limit or manage our use to the best of our current knowledge. **It means that such activity cannot be labelled as sustainable.** This approach will increase the credibility of the concept and instil a culture change where the term sustainability can no longer be attached to decision making that has not taken into account appropriate consideration of environmental impacts.

This definition provides a test which can increase the rigour of the concept of sustainability. When considering the nested or 'living systems' model, environmental limits provide the boundary to a healthy and functioning society and economy. Environmental limits can also be easier to define and therefore legislate against for their protection, though as noted earlier, our knowledge is always developing in this area. This approach can therefore provide the starting point which will take us to our ultimate sustainable destination. Once this is accepted we can map out our way there through a series of indicators and processes, which will scope out and agree the changes that are needed and how these can best be achieved.

Applying a rigorous test

'Future States'⁴⁴ has devised a simple tool which allows the application of this definition. The Sustainability Indicator is a software package which allows for a structured and systematic approach to the determination of sustainability. It asks whether any resource would be adversely affected by a decision, policy, strategy, or plan on the basis of authoritative evidence of the specific limit for that resource. This is in terms of scale, severity and magnitude moderated by the level of uncertainty.

The key difference between this model and others widely used (such as Environmental Impact Assessment or Strategic Environmental Assessment) is that it does not attempt to mitigate adverse impacts; instead it clearly highlights an unsustainable action. As noted

⁴³ <http://uknea.unep-wcmc.org/>

⁴⁴ <http://www.futurestates.com/resources.html>

previously, sustainability is an absolute term and should be used in this sense with a clear yes or no answer.

Example from Sustainability Indicator:

Soil

Will the proposed action exceed the rate of soil regeneration?

Will the proposed action lead to a reduction in soil quality?

Minerals

Will the proposed action lead to the reduction of a scarce resource?

Space

Will the proposed action lead to a reduction in landscape quality?

Will the proposed action lead to a reduction in tranquillity or sense of space?

Will the proposed action lead to any incompatibility with local constraints?

Will the proposed action lead to a reduction of undeveloped land?

Water

Will the proposed action lead to increased scarcity of the resource?

Will the proposed action lead to a reduction in water quality?

Air

Will the proposed action lead to a reduction in air quality?

Energy

Will the proposed action lead to the reduction of a scarce resource?

Will the proposed action lead to use of the resource exceeding regeneration?

Food

Will the proposed action lead to a reduction in the potential for food production?

Biodiversity

Will the proposed action lead to a reduction of rare habitats and/or species?

Will the proposed action result in a reduction of scarce habitats and/or species?

Dimensions to consider:

- The effect of the action should be related to the resource at the point of extraction for a finite resource or at the point of generation for a renewable resource;
- Various terms e.g. scarcity need to be defined (parameters are provided in the form of a pop-up on the Indicator);
- The evaluation is based on finite, renewable, and finite/renewable consequences of actions and is a limit-based approach allowing no nuancing, balancing or trade-offs

Whilst this approach could often lead to a decision being deemed unsustainable, doing so does not stop or halt action. Rather, it attempts to de-couple sustainability from its tendency to be used as 'green wash' and ensures something is only labelled as sustainable where there is evidence that this is the case. It is also not seen as a replacement for other approaches which can offer useful guides to suggested action as opposed to determining whether something is sustainable or not.



Creating a sustainable process...

Throughout this report it has been argued that alongside a reframed definition, a process or tool must be established to realise and achieve a sustainable future. Outlined below is a systematic process which should ultimately lead to the 'development of sustainability'.

1) Seeking a new vision for the future

To plan for the future we need to have a vision or visions for how this may look, how we wish to live, and how we plan to meet future needs. However, this can be problematic as technological, social, and environmental change and their interactions with one another alter and reshape how our future may look. This makes planning for the future difficult as there are no ultimate goals to aim for.

Problem-based learning would take these challenges and seek solutions individually, sometimes oversimplifying the problem into single, more manageable issues such as climate change. However, embracing the complexity of these interacting problems could potentially hold the key to a number of solutions and expand our vision or visions of a sustainable future. Whole systems thinking and question based learning helps to creatively reframe questions, explore new approaches and challenge entire systems. In doing so, further problems and questions may arise⁴⁵ which in turn may help us to reconsider new practical approaches and new visions for the future.

In this sense such an approach is a scoping exercise, of where we want to be and how we want to live. Through creating a vision of the end point or future, we can begin to build and add up the pieces upon which it relies. There may also be more than one vision; there could be several diverse options for a sustainable future, all of which should be considered as there is no way of guaranteeing or ensuring that one set vision will work⁴⁶.

⁴⁵ Haley, D. Ecology and the Art of Sustainable Living, Field Journal, vol.4 (1)

⁴⁶ IBID

One of the existing criticisms of the Brundtland definition is that in missing culture as a pillar of sustainability it does not recognise the complexity of modern societies and the importance of values and behaviour in reaching a sustainable future. In seeking a vision or visions of the future, a wider range of actors and communities can be consulted, increasing the diversity of solutions and the promotion of life values. As Richard Slaughter, President of the World Futures Studies Federation and Director of the Australian Foresight Institute, noted:

"...we cannot build tomorrow on the bruises of yesterday... This means a new form of society will have to evolve that integrates consciousness, culture and nature, and thus finds room for art, morals, and science – for personal values, for collective wisdom, and for technical knowhow."⁴⁷

As such, seeking a vision of the future is a useful starting point in the aim to live sustainability. As opposed to considering where we are now and how to move forward we can work backwards from our ultimate destination. This is the first step in establishing a sustainable process.

2) Dependency Modelling

As part of this new whole systems approach we need to move away from dealing purely with threats but to considering how we get to or what needs to go right to reach a chosen future. Through the visioning exercise outlined above we have established a starting point, a sustainable future - the next step is to establish the route to get there.

Dependency modelling helps to map the critical dependencies upon which a chosen scenario relies. These critical dependencies can be chaotic and changes amongst these can affect the ability to reach the final scenario or future. It is only through mapping these dependencies and identifying potential vulnerabilities that we can ensure we reach a sustainable future.

For example, taking a simple scenario such as getting to work:

Using the traditional approach of problem based learning you would need to consider what the risks are, for example, traffic, and plan suitable mitigation measures such as leaving earlier or seeking alternative routes.

However, using question based learning we can consider all of the elements which the successful arrival at work depends upon and these can be mapped. For example, do I need to travel to work? Can I work remotely? What is the method of travel? What is that dependent on? Weather, cost, strikes, traffic, delays, etc. Mapping these critical dependencies helps us to consider what effect a change in one or several dependencies has in achieving the ultimate goal. This will be illustrated further in Figure 6.

Through this process of mapping and identifying potential vulnerabilities we can identify the factors upon which future sustainability is reliant. This will allow decision making to be based upon its role in a future outcome and how it impacts on wider dependencies.

3) Resilience

With a vision for the future determined and the dependencies and vulnerabilities upon which this relies mapped, it is possible to understand how resilient systems may be. Resilience embeds the capacity to adapt and develop in the face of unforeseen changes. Resilience is about having the capacity in place to absorb shocks (fuel shortages, drought, flooding and so on) yet still be able to, more or less, conduct one's activities without great drama or misfortune.

⁴⁷ Richard Slaughter, *Futures Beyond Dystopia: Creating Social Foresight* (RoutledgeFalmer, London, 2004)

In this sense resilience helps to manage the chaotic elements of an unbalanced world, through developing, in governments and communities, a greater flexibility and responsiveness to challenges in water, food, energy, waste, transport, housing and so on. It means adjustment to how hard infrastructure (such as roads and bridges) and soft infrastructure (such as wetlands or forest) are designed and built, and managed. It also means building social resilience (such as social networks, close relationships, access to resources, beliefs and so on). The concept of resilience therefore, is a concept which is potentially easier to engage with than that of sustainability, and which if put in place will assist in helping to establish more sustainable ways of living. However, and crucially, it does not lend itself to abuse in the same way that the term sustainability does.

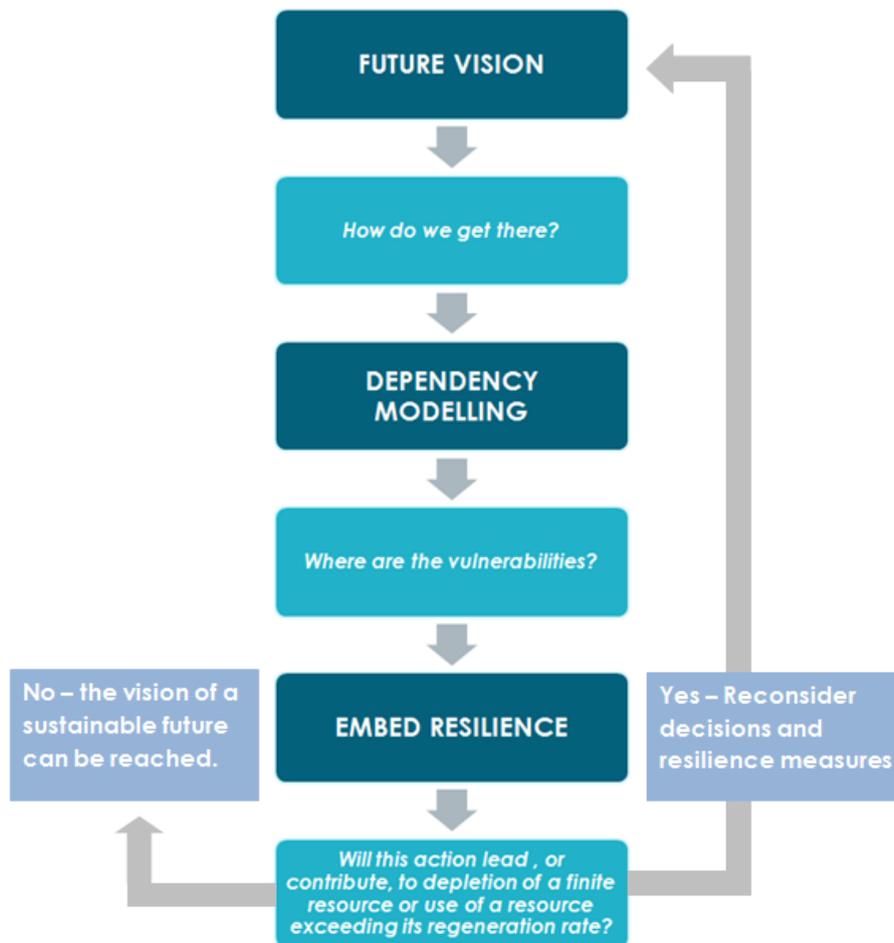
Resilience can therefore provide the third step in our sustainable process. With the vision of a sustainable future set and the elements and factors upon which this relies mapped, resilience can be built in throughout the model, to help reduce vulnerability and reduce the likelihood of the model's collapse. Resilience helps us prepare and adapt across a number of scales in planning for an uncertain and changing future. This should help to alleviate a number of insecurities such as food and water, and through this process of trying, failing and adapting, new solutions and approaches can be discovered.

Looking back at our previous example of getting to work on time, resilience can be applied at a number of levels by a number of actors. Resilience could include having alternative routes planned, or putting in place measures to deal with poor weather such as the provision of snow ploughs and de-icer.

Resilience is ultimately about embedding the capacity to adapt in a changing world. It provides one element of the process which the Brundtland definition lacks, and represents the practical, small steps which lead to a sustainable future. Our responses to extreme events such as Hurricane Katrina highlight our own limits; it is vital that adaptability and whole systems thinking plays a key role in decision making at all levels in order that we are properly equipped to recognise and adapt to these limits.

Modelling a sustainable process

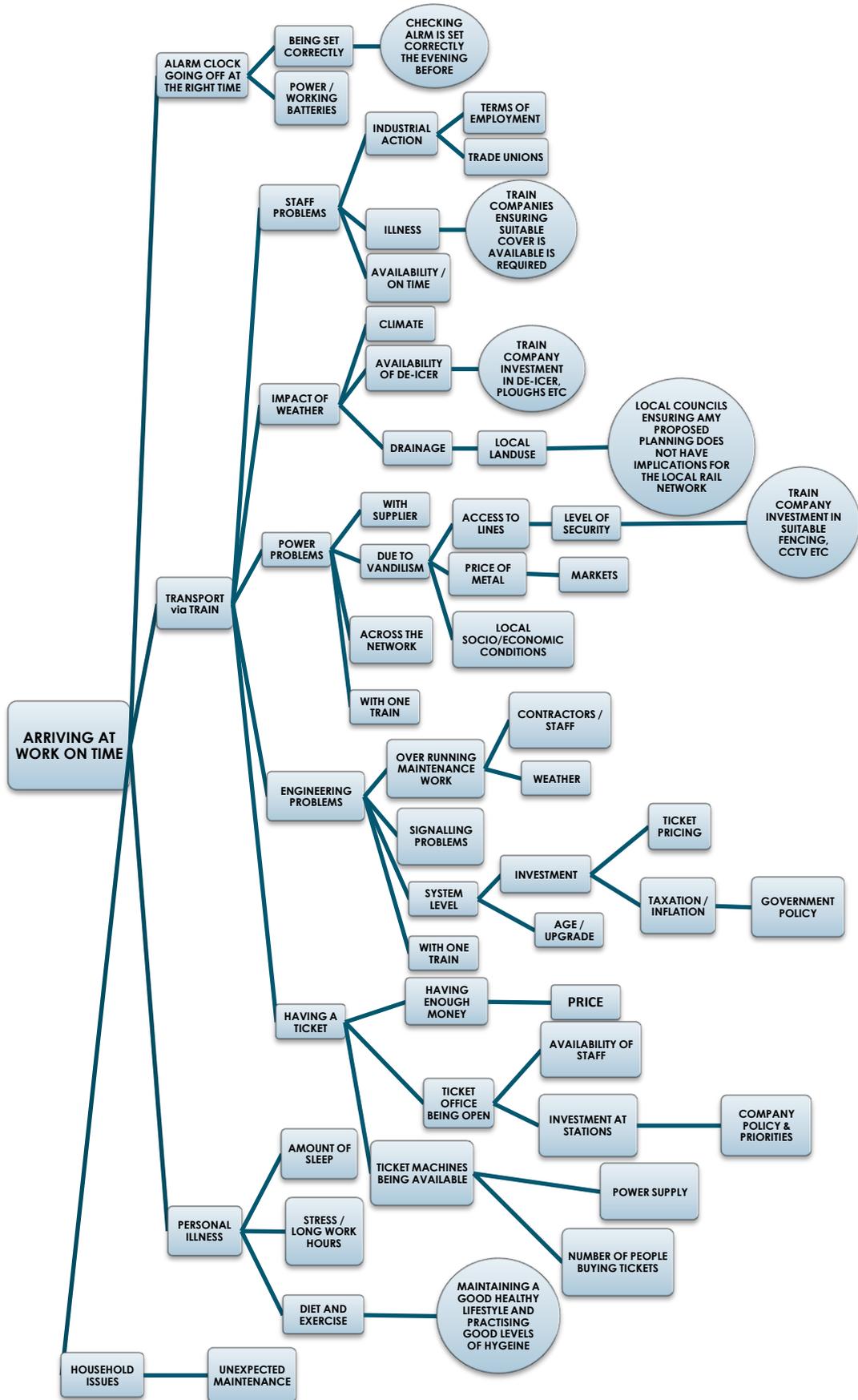
The 3 stages outlined above can be utilised together to create the building blocks to a sustainable future. Such an approach provides the process, tools and vision required to reach the ultimate goal of a sustainable future and this should be the point from which to depart. With the ultimate goal at the forefront of decision making, sustainability can no longer be hijacked to meet short term economic needs.



[Figure 6: A sustainable process in practice](#)

Taking these 3 approaches in turn creates a process with far greater potential for delivering a sustainable outcome. Figure 7 shows a simplified version of this application, using the example of travelling to work illustrating how mapping a whole system allows full consideration of all elements that support the outcome and where resilience (circles) can be used to protect the final outcome.

Figure 7: The framework to sustainability: Dependency Modelling and Resilience



The dependency model can be adapted and altered with the latest available data on resources and regeneration rates; this will ensure an action is only labelled sustainable if it is proven to be so. It also offers a clear illustration of where a change in one area can have a knock on effect throughout the model, and ultimately, the ability to achieve the outcome. Through this approach several models can be joined and layered, for example, in Figure 7, contractors or power companies may have similar compatible models which can be overlaid.

Whilst this process is challenging, it fundamentally questions and alters the way we approach and consider our future sustainability. This marks a clear departure from traditional ways of working with regard to sustainability, which to date have had very limited success. Whilst some may believe such an approach is unobtainable and merely distracts from urgent action it does not mean existing good work must stop and through taking interim measures to build resilience into economic, environmental and social systems we can prepare for our changing future.

This approach whilst maintaining the importance and role for sustainability moves it away from being esoteric, open to interpretation, and of little meaning and resonance to the general public, towards an overall process where a goal is defined, a pathway is established, and the necessary measures are established to take us there are in put in place. This process in itself is sustainability, without the vagueness and misinterpretation which has plagued the concept since its conception.



Conclusion

Sustainable development has been on the international agenda since the 'Earth Summit' several decades ago yet despite initial optimism, the concept has not led to any real or tangible improvements for the environment or society. Human development has not been realised as defined and we continue to approach a number of environmental tipping points. Despite the concept's continued relevance, its openness to interpretation has allowed it to fall victim to misuse and often sustainability is prefixed to poor decision making in order to green wash un-credible and ill-considered policy and project proposals.

This report has argued that the failure to implement sustainable development as defined by Brundtland, or any appreciable progress towards it, should be recognised. These failings have been outlined and include its lack of rigour, its misinterpretation from human to infrastructure development, its lack of vision for a sustainable future and its lack of recognition of the tools required to get us there. The alternative definitions and models considered ultimately fall foul of the same pitfalls as the original concept.

Accepting this failure, a more robust and testable definition is proposed:

“To be sustainable an action must not lead, or contribute, to depletion of a finite resource or use of a resource exceeding its regeneration rate”.

This definition provides a test upon which projects or proposals can be considered. Whilst this has been suggested, it is also recognised that defining sustainability remains problematic. It is not always possible to fully design 'sustainable' from scratch, however it is often possible to recognise a sustainable solution.

Alongside a reframed definition, the lack of process and vision are addressed. Timescales are considered as part of this, which is key when considering the 'needs' of future generations and how they might look not only in terms of resources, but economic and social stability.

This is supported by a 3 stage process that expands our vision for the future through question based learning and whole systems thinking which rejects simple quick fix solutions in favour of long term and meaningful culture change. Through starting with our final destination, a sustainable future, we can map a route to get there by utilising dependency modelling and highlight what that future depends upon. With the route mapped, and potential vulnerabilities highlighted the correct decisions can be made and resilience can be embedded throughout the system. Such an approach embraces both social and environmental diversity, and expands our vision for how we wish to live and how future generations may prosper.

This is not to say that existing efforts should stop, or that efforts to mainstream sustainability have been in vain, it merely attempts to end the bad practice of mislabelling something as sustainable and suggest a new way forward. A systems approach of embedding ever greater resilience, checked against the definition above, allows a clear approach to delivering sustainable development.

The vision for sustainable development outlined at the Earth Summit still remains relevant today: *“integration of environment and development concerns, and greater attention to them will lead to the fulfilment of basic needs, improved living standards for all, better protected and managed ecosystems and a safer, more prosperous future”*⁴⁸.

After 20 years we must begin making this vision a reality.

⁴⁸ 1992 Agenda 21: The United Nations Programme of Action from Rio

CIWEM calls for:

- Increased rigour for the term sustainable development to ensure its appropriate use.
- A bolder approach to sustainability thinking and greater clarity over the concept's use. This can be encouraged through the adoption of a more robust and testable definition such as: ***“To be sustainable an action must not lead, or contribute, to depletion of a finite resource or use of a resource exceeding its regeneration rate”.***
- Better regulation to support a testable definition of sustainable development, coupled with support for those businesses who currently lead the way in both embedding and reporting sustainability targets and measures.
- A new way of thinking which embraces question based learning and whole systems thinking to expand our vision of a sustainable future.
- Recognition of environmental limits as the ultimate constraint to both social and economic development.
- The use of resilience to help plan for and adapt to a changing world.
- The adoption of dependency modeling as a key methodology to map the crucial linkages upon which a sustainable outcome relies.



