



# Additional Materials

## Safeguarding the Future

sustainable development training  
for the professional business



### Aquaculture for the Future

sustainable development  
training for the Aquaculture  
sector

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# Aquaculture for the Future

## Professional Practice for Sustainable Development:

### Background

Professional Practice for Sustainable Development, or PP4SD as it is usually called, originated out of a seminar held by the UK national, non-governmental Council for Environmental Education (CEE) and the Environment Agency, in 1998. The purpose of the day was to find out if there was support for training for professionals, which would enable them to be more confident and competent in integrating sustainable development principles into their working practice.

There was unanimous support for the idea and a working group comprising CEE, the Environment Agency, the Institution of Environmental Sciences (IES) and the Natural Step developed a proposal for inter-professional learning. The proposal was submitted to the Environmental Action Fund (England) for grant aid and was successful. The IES has hosted and supported the management of PP4SD UK since it began.

When the UK PP4SD project began in 1999, the first task was to agree expectations, outcomes and outputs for the first three years. The idea of producing a Foundation Course in sustainable development emerged as the path the group wished to follow. The concept of systems thinking would underpin the training. Developing the Foundation Course was a real inter-professional learning process. The process started with the group producing a Framework that would be used to guide activities. The process also generated two documents, one on the business case for Continuing Professional Development (CPD) in sustainable development and a second on guidance in developing cross professional learning opportunities and tools. These are both available on the Downloads page of the PP4SD website at [www.pp4sd.org.uk](http://www.pp4sd.org.uk)

For phase two, the original group changed and expanded, but the goal remained the same: the integration of sustainable development principles into professional training. The project worked with the financial sector and the land-based sector to prepare CPD materials that are now on the web.

Now in phase three, PP4SD continues to extend the professional sectors in which it works and continues to organise cross-professional events. A recent example is a 'Skills for Sustainability' workshop organised with the Science Council. Its main new project has been to work with Swansea University, supported by the Welsh Assembly Government's Knowledge Exploitation Fund, to bring the PP4SD approach to small and medium-sized enterprises in Wales.

The current partners on the UK PP4SD project management group are:

- The Environment Agency
- The Institution of Environmental Sciences
- Society for the Environment
- The Royal Society for the Protection of Birds

### What is Sustainable Development all about?

Most of us have an intuitive understanding of what is meant by 'sustainable development'. Trying to put that into words in the form of a definition is much more difficult. Most people accept the definition stated in *Our Common Future*<sup>1</sup>: development that "meets the needs of the present without compromising the ability of future generations to meet their own needs". The passage continues "the concept does imply limits, not absolute limits but ones imposed by the present state of technology and social organisation on environmental resources and by the ability of the biosphere to absorb the effects of human activities". The fact that the term is difficult to define does not make sustainable development any less important. Consider 'democracy'. That is another big idea that is similarly hard to define, but it is still recognised as a goal that is worth achieving.

You will come across two terms related to the idea; 'sustainable development' and 'sustainability'. Sustainability is the goal to be achieved, sustainable development is what is done to get there. Then there are different terms applied to education about the topic including 'education for sustainability', 'education for sustainable development' and 'sustainable development education'. These all refer to what education agencies

<sup>1</sup> *Our Common Future* The World Commission on Environment and Development, Oxford University Press 1987

(formal and otherwise) do to prepare students for a world in which working towards sustainability will be increasingly important.

Other discussions about sustainable development and sustainability provide helpful insights into what constitutes sustainable development. They all recognise that for development to be sustainable in the long term it must take account of its impact on the environment, people and the economy.

The PowerPoint slides include some diagrammatic ways of trying to describe the relationship between the different aspects of sustainable development.

## Securing the Future

The British Government produced this diagrammatic set of principles in its document *Securing the Future*<sup>2</sup>.

Once principles are agreed, then indicators are established to allow progress to be monitored.

The Government has also published a set of indicators and publicises the progress being made<sup>3</sup>.

*Securing the Future* placed the concept of environmental limits at its heart. For the first time since the landmark *Our Common Future* (1987), sustainable development is no longer understood to be about balancing the conflicting demands of the environment, economy and society.

Instead, the new strategy makes clear that the economy, science and governance are the means by which we achieve our broader sustainable development goals – living within the planet’s environmental limits while also creating a just and fair society.

## Excerpts from ‘Starting to Live Differently’, the Sustainable Development Scheme of the Welsh Assembly Government

- 2.1 The Welsh Assembly Government will promote development that meets the needs of the present without compromising the ability of future generations to meet their own needs. By this we mean the needs of all human life, within the carrying capacity of supporting ecosystems, without compromising the ability of future generations to meet their own social, economic, environmental and cultural needs. Our interpretation of what this means for Wales is set out in the vision in Section 3.
- 2.2 This means that the principles and vision of the sustainable development scheme will drive everything we do. We will integrate these into our work and actively require or influence others, for example local authorities, public bodies, business, the voluntary sector and communities, to do the same to deliver change. We will seek to enable them to do so.
- 2.3 The Assembly’s vision of sustainable development remains a broad one, embracing commitments to improving quality of life, promoting equality and tackling disadvantage and poverty. This is because sustainable development in one place is often different to sustainable development in another place although the principles remain the same wherever. The Wales Spatial Plan will seek to capture this.
- 3.1 The Assembly will pursue, on an effective partnership basis, a sustainable future for Wales based on:

- promoting a diverse, competitive, high added-value economy, with high-level skills and education, that responds to sustainable development opportunities, minimises demands on the environment and maximises the distribution of the benefits;
- action on social justice that tackles poverty, poor health, and consequences of disadvantage and provides people and their communities with the means to help themselves break out of the poverty trap;

**Sustainable Development UK Government 2005**

**Living within Environmental Limits**  
Respecting the limits of the planet's environment, resources and biodiversity – to improve our environment and ensure that the natural resources needed for life are unimpaired and remain so for future generations.

**Ensuring a Strong, Healthy & Just Society**  
Meeting the diverse needs of all people in existing and future communities, promoting personal well-being, social cohesion and inclusion, and creating equal opportunity for all.

**Achieving a Sustainable Economy**  
Building a strong, stable and sustainable economy which provides prosperity and opportunities for all, and in which environmental and social costs fall on those who impose them (Polluter Pays), and efficient resource use is incentivised.

**Using Sound Science Responsibility**  
Ensuring policy is developed and implemented on the basis of strong scientific evidence, whilst taking into account scientific uncertainty (through the Precautionary Principle) as well as public attitudes and values.

**Promoting Good Governance**  
Actively promoting effective, participative systems of governance in all levels of society – engaging people's creativity, energy and diversity.

<sup>2</sup> Securing the future: delivering the UK sustainable development strategy The Stationery Office March 2005

<sup>3</sup> <http://www.sustainable-development.gov.uk>

- action in our built and natural environment that enhances pride in the community, promotes biodiversity, promotes local employment and minimises waste generation, energy, water and transport demands;
- strengthening Wales' cultural identity and helping to create a bilingual country, while looking confidently outwards and welcoming new cultural influences;
- creating a place which values its children and where young people want to live, work and enjoy a high quality of life, and where future generations enjoy better prospects in life and are not landed with a legacy of problems bequeathed by us;
- supporting people to live healthy and independent lives, irrespective of income, location or disability;
- valuing everyone in society and promoting equality of opportunity;
- promoting openness, partnership and participation, so that people can play a part in taking decisions that affect them;
- contributing to sustainable development at a global level as well as locally and taking account of the global impacts of decisions made in Wales.

## Eight Principles of Sustainability

PP4SD UK has agreed the following, in discussion with businesses and other organisations, as a framework for sustainable development.

In a sustainable society:

- 1 Any materials extracted from the earth should not exceed the environment's capacity to disperse, absorb, recycle or otherwise neutralise their harmful effects to humans and the environment.
- 2 Synthetic substances in their manufacture and use should not exceed the environment's capacity to disperse, absorb, recycle or otherwise neutralise their harmful effects to humans or the environment.
- 3 The biological diversity and productivity of ecosystems should not be endangered.
- 4 A healthy economy should be maintained, which accurately represents the value of natural, human, social and manufactured capital.
- 5 Individual human skills, knowledge and health should be developed and deployed to optimum effect.
- 6 Social progress and justice should recognise the needs of everyone.
- 7 There must be equity for future generations.
- 8 Structures and institutions should promote stewardship of natural resources and the development of people.

## Conclusion

These principles illustrate that sustainable development has moral elements as well as physical ones. These need to be raised in any teaching about sustainable development.

There is no agreed definition of sustainable development and it may be that there is no need for one. Sustainable development can be viewed as a process of change that is heavily reliant upon local contexts, needs and interests. Sustainable development is then seen as an 'emerging concept', first because it is relatively new and evolves as we learn to grasp its wide implications for all aspects of our lives, and, second, because its meaning emerges and evolves according to local contexts.

## Global Challenges and the Business Case for Sustainable Development

### Challenges in the Aquaculture sector

#### *Climate change*<sup>4</sup>

The Intergovernmental Panel on Climate Change (IPCC) was set up in 1988 to assess information on climate change and its impact. Its Third Assessment Report predicts global temperature rises by the end of the century of between 1.4°C and 5.8°C. Temperature rises are expected to affect countries throughout the world and have a knock-on effect with precipitation and sea level rises. Scientists have argued about whether temperature rises are due to human activities or due to natural changes in our environment. The IPCC announced in 2001, *"most of the warming observed over the last 50 years is likely to be attributable to human activities"*.

Projections for climate change globally:

- By the second half of the 21st century, wintertime precipitation in the northern mid-to-high latitudes and Antarctica will rise.
- By the same time, Australasia, Central America and Southern Africa are likely to see decreases in winter precipitation.
- In the tropics, it's thought some land areas will see more rainfall and others will see less.
- It is thought the West Antarctic ice sheet is unlikely to collapse this century. If it does fall apart, sea level rises would be enormous.
- Global average temperatures are predicted to rise by between 1.4°C and 5.8°C by 2100.
- Maximum and minimum temperatures are expected to rise.
- More hot days over land areas and fewer cold days and frost.
- More intense precipitation events.

#### *Biodiversity*<sup>5</sup>

From the dawn of time, extinction has usually progressed at what scientists call a natural or background rate. Today the tempo is far faster. In 2003 the World Conservation Union's Red List stated that more than 12,000 species (out of 40,000 assessed) faced some extinction risk, including:

- One bird in eight
- Thirteen percent of the world's flowering plants
- One quarter of all mammals.

Many species keep us alive, purifying water, fixing nitrogen, recycling nutrients and waste, and pollinating crops. Plants and bacteria carry out photosynthesis, which produces the oxygen we breathe. Trees absorb carbon dioxide, the main greenhouse gas given off by human activities. Some years ago, when the global annual gross product was about \$18 trillion, US researchers calculated the value of the goods and services provided by the earth to the world economy was \$33 trillion.

#### *Peak oil*

Peak oil is the point or timeframe at which the maximum global petroleum production rate is reached. After this timeframe, the rate of production will enter terminal decline. *"Peaking is at hand, not years away... If I'm right, the unforeseen consequences are devastating"* (Matthew Simmons, former US government adviser).

At a rate of 3% increase in demand per year and annual finds of 10 billion barrels, a French Ministry report states 2013 as "the time of maximum production or 'peak oil'"<sup>6</sup>.

<sup>4</sup> [http://www.bbc.co.uk/climate/evidence/global\\_change.shtml](http://www.bbc.co.uk/climate/evidence/global_change.shtml)

<sup>5</sup> <http://news.bbc.co.uk/1/hi/sci/tech/3667300.stm>

<sup>6</sup> <http://news.bbc.co.uk/1/hi/business/4077802.stm>

## The Business Case

### *Sustainable development in various guises*

The key concepts of sustainability are found in a number of areas of business management. One of the commonest places to find these principles is in the Corporate Social Responsibility (CSR) programme. It is important not to get so hung up on the names that managers fail to recognise the opportunities provided by other programmes.

The BSDGlobal website discusses the following ideas.

Corporate Social Responsibility promotes a vision of business accountability to a wide range of stakeholders, as well as shareholders and investors. Key areas of concern are environmental protection and the well-being of employees, the community, and civil society in general, both now and in the future. Bringing these factors together under this heading seems very much what sustainable development is all about.

The concept of CSR is underpinned by the idea that corporations can no longer act as isolated economic entities operating in detachment from broader society. Traditional views about competitiveness, survival and profitability are being swept away.

Some of the drivers pushing business towards CSR include:

#### **1 The shrinking role of government**

In the past, governments have relied on legislation and regulation to deliver social and environmental objectives in the business sector. Shrinking government resources, coupled with a distrust of regulations, has led to the increase of voluntary and non-regulatory initiatives as well.

#### **2 Demands for greater disclosure**

There is a growing demand for corporate disclosure from stakeholders, including customers, suppliers, employees, communities, investors, and activist organisations.

#### **3 Increased customer interest**

There is evidence that the ethical conduct of companies exerts a growing influence on the purchasing decisions of customers. In a recent survey by Environics International, more than one in five consumers reported having either rewarded or punished companies based on their perceived social performance.

#### **4 Growing investor pressure**

Investors are changing the way they assess companies' performance, and are making decisions based on criteria that include ethical concerns. The Social Investment Forum reports that in the US in 1999, there was more than \$2 trillion worth of assets invested in portfolios that used screens linked to the environment and social responsibility. A separate survey by Environics International revealed that more than a quarter of share-owning Americans took into account ethical considerations when buying and selling stocks.

#### **5 Competitive labour markets**

Employees are increasingly looking beyond pay-cheques and benefits, and seeking out employers whose philosophies and operating practices match their own principles. In order to hire and retain skilled employees, companies are being driven to improve working conditions.

#### **6 Supplier relations**

As stakeholders are becoming increasingly interested in business affairs, many companies are taking steps to ensure that their partners conduct themselves in a socially responsible manner. Some are introducing codes of conduct for their suppliers, to ensure that other companies' policies or practices do not tarnish their reputation.

### *Benefits of CSR*

Some of the positive outcomes that can arise when businesses adopt a policy of social responsibility include:

#### **1 Company benefits:**

- Improved financial performance
- Lower operating costs
- Enhanced brand image and reputation
- Increased sales and customer loyalty
- Greater productivity and quality
- More ability to attract and retain employees
- Reduced regulatory oversight
- Access to capital
- Workforce diversity
- Product safety and decreased liability.

## 2 Benefits to the community and the general public:

- Charitable contributions
- Employee volunteer programmes
- Corporate involvement in community education, employment and homelessness programmes
- Product safety and quality.

## 3 Environmental benefits:

- Greater material recyclability
- Better product durability and functionality
- Greater use of renewable resources
- Integration of environmental management tools into business plans, including life-cycle assessment and costing, environmental management standards, and eco-labelling.

### *The Sigma Project*

The UK Sigma Project<sup>7</sup> has also explored the business benefits of implementing sustainable development and it echoes much of what is said above. They list the following business benefits:

- Improved operational efficiency
- Enhanced brand value and reputation
- Customer attraction and retention
- Enhanced human and intellectual capital
- Improved management of risk
- Preservation of licence to operate
- Promoting and increasing innovation
- Improved access to capital
- Building and sustaining shareholder value
- Generating increased revenues
- Identification of new opportunities.

Sustainable businesses are often well run businesses and will deliver traditional business benefits. However, adopting sustainable development principles to business practice often goes further. Sustainable development is used to help businesses become architects of a better future. Sustainable development is therefore becoming established as a business ethic as well. This opens the way to progress in sustainable development in ways that may not be, at least in the short term, economically beneficial to the company.

### *The journey to sustainability*

Industry is on a three-stage journey from environmental compliance, through environmental risk management, to long-term sustainable development strategies.

In the initial phase of the journey, the need to comply with environmental regulations drives improvements in environmental performance. Businesses adopt a more proactive approach in the next phase. Environmental risk management is introduced, to reduce environmental liabilities and to minimise the costs of regulatory compliance. A substantial number of companies recognise that the implementation of sustainable business strategies can lead to new opportunities and improved results - the business and sustainable development phase.

### *References and contacts*

**BSDglobal.com** is maintained by the International Institute for Sustainable Development, in alliance with Global Responsibility International AB (an independent subsidiary of Skandia, a Swedish financial services and insurance group). The site's six sections cover:

- Current issues: briefings on specific sustainable development topics from a business perspective
- Strategies and tools: how to incorporate the principle of sustainability into everyday business activities, illustrated by real-life examples
- Markets: business opportunities arising from sustainable development
- Banking and investment: spotlight on how sustainable development is being approached by the financial services industry
- Working with NGOs: how businesses are forging working partnerships with lobby groups
- Training opportunities: how universities and professional training providers can help industry leaders incorporate sustainability into their business strategies.

The **Green Dragon Standard** is a stepped award available in Wales recognising effective environmental management. The Standard offers an environmental management system relevant to the specific needs of your company and rewards actions taken to achieve environmental improvements. See [http://www.arenanetwork.org/EMS/Green\\_Dragon.aspx](http://www.arenanetwork.org/EMS/Green_Dragon.aspx)

<sup>7</sup> SIGMA is a partnership of three organisations: British Standards Institution, AccountAbility and Forum for the Future.

**ARENA Network** is an organisation providing practical support to business and other organisations, primarily in Wales, on environmental management and training-related issues. See <http://www.arenanetwork.org/>

**The World Business Council for Sustainable Development** provides information on the business case for sustainable development. The Globescan Survey of Sustainability experts stated, "By far the best website for information on sustainable development". See <http://www.wbcsd.org/>

## Pressures for Change in the Aquaculture Sector

### News headlines

#### *Freedom Food work with industry to improve welfare*

Freedom Food is a farm assurance and food labelling scheme set up by the RSPCA<sup>8</sup> in 1994 to improve farm animal welfare and to address growing consumer demand for higher welfare produce. It is the only farm assurance scheme in the UK with improved welfare as its primary goal, and is completely independent from the food industry.



The Freedom Food label enables shoppers to recognise higher welfare products - products that come from animals reared on farms inspected to strict RSPCA welfare standards, with assured traceability from farm to fork.

The Freedom Food certification mark gives consumers the assurance that the scheme is backed by the RSPCA, one of the most respected animal charities in the world. In addition, the government has recognised Freedom Food as a 'higher level' assurance scheme.

Freedom Food currently has salmon standards for hatcheries, freshwater salmon, marine salmon, well boat transfer to slaughter, slaughter, processing and packing.

We are delighted that Freedom Food sponsor Aquaculture Today, demonstrating their ongoing commitment to working with the fish farming industry to achieve improvements in fish welfare.

<http://www.aquaculturetoday.co.uk>

<sup>8</sup> Royal Society for the Prevention of Cruelty to Animals, a UK voluntary organisation.

## ***Towards Sustainable Development in Aquaculture***

By Chris Harris, TheFishSite Senior Editor. At the recent FAO conference on the Role of Aquaculture in Sustainable Development in Rome, the United Nation's FAO Fisheries and Aquaculture Department, Ichiro Nomura, spelt out the need for growth to meet the rising demand for aquatic food.

<http://www.fao.org/>

Aquaculture is currently the world's fastest growing food producing sector.

However, the world is going to need an extra 37 million tonnes of fish and aquatic food by 2030, if the same levels of consumption are to be maintained.

Ichiro Nomura, ADG of the United Nation's FAO Fisheries and Aquaculture Department told a special conference on The Role of Aquaculture in Sustainable Development in Rome last month, that the major challenge facing the industry was how to meet this growth in demand with a sustainable and expanding industry.

"Today, aquaculture provides nearly half of the world's food fish. What's more, aquaculture is perceived as having the greatest potential to meet the growing demand for aquatic food," said Mr Nomura.

In 2005, the total production of aquatic animals amounted to 48.1 million tonnes with a farm-gate value of about US\$ 70 billion. "Considering the projected population growth over the next decades, estimates show that an additional 37 million tonnes of aquatic food will be needed by 2030 just to maintain current consumption levels," he said.

"Aquaculture plays a vital role in global efforts to reduce hunger and malnutrition. It supplies fish and other aquatic foods which are rich in protein, essential fatty acids, vitamins and minerals.

"Aquaculture also significantly contributes to development: it improves incomes, provides employment and increases the returns on resource use."

Mr Nomura said that given the present natural resources and technological advances, aquaculture is going to expand and in a more sustainable way in future, but he said this would only be possible if the benefits of aquaculture are acknowledged around the world.

<http://www.thefishsite.com/articles/372/towards-sustainable-development-in-aquaculture>

## ***Will the minimum wage affect your business?***

By Decision Finance

February 14 2005

The minimum wage is rarely out of the news but just how much do you know about the facts?

About two million workers will have received a pay rise as the minimum wage has recently risen by £0.35 an hour.

The hourly rate has increased from £4.50 to £4.85 for adults, and from £3.80 to £4.10 for workers aged between 18 and 21. A rate of £3 an hour will be introduced for 16- and 17-year-olds as the government aims to "eradicate poverty".

<http://money.uk.msn.com/business/article.aspx?cp-documentid=4752896>

## Joining-up the thinking and planning

Failure to consider all the consequences of an action is responsible for many of the unsustainable activities we recognise today. For example, allowing air traffic to expand at the current rate, by providing for the predicted increase in demand with new runways, undermines other efforts to curb emissions of greenhouse gases. Simple cause-and-effect answers are no longer adequate to find solutions to sustainable development issues. All the activities we carry out have consequences on the many physical, biological and social systems that have evolved. We need methods of being able to think about issues in a much wider context than we have been accustomed to. This is what is known as 'systems thinking'.

### Systems thinking<sup>9</sup>

The essence of systems thinking and practice is in 'seeing' the world in a particular way, because how you 'see' things affects the way you approach a situation or undertake specific tasks. And how you 'see' things is influenced heavily by the culture of the society in which you live and work, and by your education and training.

This simple story illustrates the different ways people 'see' the world. Each of the professionals in this story was given a barometer and asked to find the height of a church tower.

The physicist took the difference in air pressures at the top and bottom of the tower to calculate the height.

The engineer dropped the barometer and timed its descent to calculate height. The architect lowered the barometer on a piece of string until it touched the ground and measured the string. The surveyor ignored the barometer. He/she measured the shadow cast by the tower and used the angle of the sun to calculate the tower's height. The accountant went to the sexton and offered the barometer as a tax-deductible expense if the sexton told him the height of the tower!

The story illustrates two important points. First, that people and their viewpoints are part of the situations we normally deal with and, second, there is more than one way to handle any situation.

Systems thinking can help resolve complex situations involving people and things, where it is important to focus on the relationships between people and things as well as the structure of a particular situation.

By setting the sustainability agenda in an 'earth as a system' context, it is much easier to engage with what needs to be done, rather than merely focusing on measuring, managing and mitigating environmental impacts downstream.

### The Natural Step

The Natural Step has developed a framework consisting of a short set of principles which are conditions that must be met in order to have a sustainable society. The framework is grounded in natural science and serves as a guide for businesses, communities, educators, government entities, and individuals on the path toward sustainable development.

The principles illustrate that sustainable development has moral elements as well as physical ones.

See [www.naturalstep.org](http://www.naturalstep.org)

<sup>9</sup> Based on an article by Professor Stephen Martin for Professional Practice for Sustainable Development. The article can be downloaded from [www.pp4sd.org.uk](http://www.pp4sd.org.uk)

## The Five Capitals model<sup>10</sup>

The Five Capitals model is one way of helping people to think about issues from different points of view and find solutions that are truly sustainable. Capital is traditionally understood as accumulated wealth in the form of investments, factories and equipment. In reality, our economy and every company need five types of capital to function properly:

**Natural Capital** (also referred to as environmental or ecological capital) is any stock or flow of energy and matter that yields valuable goods and services. It includes *resources*, some of which are renewable (timber, grain, fish and water), whilst others are not (fossil fuels); *sinks* which absorb, neutralise or recycle wastes; and *processes*, such as climate regulation. Natural capital is the basis not only of production but also of life itself.

**Human Capital** consists of our health, knowledge, skills and motivation, all of which are required for productive work. Enhancing human capital - for instance, through investing in education and training - is vital for a flourishing economy. Poverty is both morally indefensible and socially inefficient in that it prevents millions of people from fulfilling their potential and becoming engaged in the creation of wealth.

**Social Capital** is the value added to any activity or economic process by human relationships and co-operation. Social capital takes the form of structures or institutions which enable individuals to maintain and develop their human capital in partnership with others and includes families, communities, businesses, trades unions, schools, and voluntary organisations.

**Manufactured Capital** comprises material goods - tools, machines, buildings and other forms of infrastructure - which contribute to the production process, but are not used up in it.

**Financial Capital** plays an important role in our economy by reflecting the productive power of the other types of capital, and enables them to be owned and traded. However, unlike the other types, it has no *intrinsic* value; whether in shares, bonds or banknotes, its value is purely representative of natural, human, social or manufactured capital.

Our wealth depends on maintaining an adequate stock of each of these types of capital. If we consume more than we invest, then our opportunities to generate wealth in the future will inevitably be reduced. Sustainability can only be achieved if the stocks of capital are kept intact or increased over time.

At the heart of the current environmental crisis is the way in which present patterns of consumption and production are unsustainably depleting natural capital. The earth's ability to support the projected levels of human population in the next century at *any* level, let alone at the standard of living we in the industrialised world enjoy, is seriously brought into question. As Paul Hawken and Amory Lovins argue in their book *Natural Capitalism* (1999):

*"What might be called 'industrial capitalism' does not fully conform to its own accounting principles. It liquidates its capital and calls it income. It neglects to assign any value to the largest stocks of capital it employs – the natural resources and living systems, as well as the social and cultural systems that are the basis of human capital."*

Many people now advocate a model of sustainable capitalism, based around maintaining and where possible increasing our stocks of these different capital assets, so that we succeed in living off the income without depleting the capital. They are the capital stocks from which we have to derive all our goods and services, and produce improvements in human welfare and quality of life. If consumption is at the expense of investments, then such consumption is not sustainable and will inevitably be reduced in the future.

However, it is worth bearing in mind that all such categorisations are more than a little arbitrary. In reality, there are only two sources of wealth in the world today. The wealth that flows from our use of the earth's resources and ecosystems, all powered by incoming solar radiation (our natural capital); and the wealth that flows from the use of our hands, brains and spirits (our human capital). All else – money, machines, institutions, etc – is derivative of these two primary sources of wealth.

<sup>10</sup> From <http://www.forumforthefuture.org.uk/our-approach/tools-and-methodologies/5capitals>