

# Introduction

## Sustainability versus Negativity

This introduction explains why sustainability requires that we expand future options through reversible, adaptable, net Positive Development. Positive Development refers to physical development that achieves net positive impacts during its life cycle over pre-development conditions by increasing economic, social *and* ecological capital. Positive Development would not only generate clean energy, air and water, it would leave the ecology better than before development. It would be ‘reversible’ as well as achieving net positive impacts over its life cycle. No one suggests that buildings should be structurally unsound, yet we still allow buildings that are ecologically unsound. From a whole systems perspective – and one grounded in real life – a building would not be considered ‘structurally sound’ if it falls down either socially or ecologically. So-called ‘green buildings’ have begun to address the human environment, but not the ecology. Given the Earth’s diminishing biodiversity and carrying capacity, development can only be considered sustainable where it increases natural capital and reduces overall resource flows – as well as meeting conventional sustainable development criteria [Boxes 15 and 22]. Some eco-solutions that improve environmental conditions and create positive multiplier effects through resource reduction and waste reuse already exist. However, they are not yet integrated into our designs and structures.<sup>1</sup> But first, it is important that we are clear about what is meant by ‘sustainability’ in the context of this book, as the term is often used in different ways in different circles.<sup>2</sup>

Perhaps the first statement of sustainability by a national government was in NEPA, the 1969 US National Environmental Protection Act. Almost four decades ago, the preamble contained the basic issues and ethical mandates that the term sustainability generally implies today. It implied intra-generational and inter-generational equity, resource limits, transborder flows, and the need for transdisciplinarity and participatory decision-making.<sup>3</sup> However, the term ‘sustainable development’ perhaps first came into common currency among sentient people with the World Conservation Strategy in 1980 (produced by the IUCN/UNEP/WWF, re-published as *Caring for the Earth* in 1991<sup>4</sup>). Like some other early definitions, sustainability was defined as ‘improving the quality of human life while living within the carrying capacity of supporting ecosystems’. This definition was a fairly positive one in suggesting we can improve life quality and asserting the importance of carrying capacity and ecosystem health to human survival and life quality. However, another implication contained in this and similar definitions was negative – the suggestion that we could not increase the Earth’s carrying capacity and ecological health. We cannot improve upon nature, but we can allow nature to expand.

### **But isn’t it important to emphasize the limits of resources and nature?**

Absolutely. It was important back then. The focus on the limits of nature was necessary to overcome the widespread ‘myth-perception’ that technological fixes could perpetuate industrial growth for ever, or at least beyond the horizon of current decision-makers’ life-spans. By emphasizing the existence of ecological thresholds, these early definitions attempted to *counteract* the false but widespread belief that development could continue ‘as usual’. It backfired, however. The soft notion of sustainable development as ‘living within limits’ was subsequently watered down by the seminal United Nations

*Brundtland Report* (1987).<sup>5</sup> This provided what is now the standard definition: ‘development that meets the needs of today without compromising the ability of future generations to meet their own needs’. The *Brundtland Report*, published as *Our Common Future*, presumed that negative impacts could be mitigated through more knowledge and technology, but assumed that the Earth’s carrying capacity had not been reached. The *Millennium Ecosystem Assessment Report*, published less than 20 years later (in 2005), made it clear that we have already degraded 60 per cent of the Earth’s ecosystems services – including farms, fisheries and forests, and significant biodiversity.<sup>6</sup> What was useful about the definition in *Our Common Future* was that it emphasized the links between the distribution of wealth and environmental problems.

### **So was the Brundtland definition an advance over earlier definitions?**

In some ways. The problem was that the *Brundtland Report* took for granted that negative impacts and tradeoffs were necessary as “economic growth and development obviously involve changes in the physical ecosystem”. “A forest may be depleted in one part of a watershed and extended elsewhere, which is not a bad thing if the exploitation has been planned and the effects on soil erosion rates, water regimes and genetic losses have been taken into account”.<sup>7</sup> In other words, the conventional view was that, as long as we ‘know what we are doing’, we can interfere in natural systems. In reality, we will never fully understand the infinite complexity of nature. Yet the *Brundtland Report* sanctioned the ideas of sustainable yield and ‘substitutability’ as long as we can assess the impacts. Substitutability is the notion that, if wealth-producing development and industrial infrastructure replaces nature with means of production, future generations can be compensated for the loss of environmental amenity and ‘luxuries’ like wilderness experiences.<sup>8</sup> The creation of an international document calling for sustainable development as well as social justice was a virtually unparalleled accomplishment. However, it framed the concept of sustainability as ‘industrial growth with less impacts’. Oddly, mainstream environmental management and planning has never really challenged the terminal process of offsetting ecological losses with social benefits.

### **But isn’t industrial growth necessary to meet basic human needs?**

Logically, industrial growth cannot meet basic human needs, over the long term, unless it has *net positive* ecological and democratic outcomes. Growth has instead relied on a fanciful ‘trickle-down’ effect. Not only did the *Brundtland Report* definition allow for substitution, ‘needs’ were not adequately differentiated from consumer ‘preferences’. Humans *need* a healthy natural support system that provides access to the ‘means of survival’ (land, air, water, soil, food and other ecosystem goods and services) – not just the ‘means of production’. While the *Brundtland Report* was an impressive milestone, it marginalized ecology from the mainstream sustainable development debate. It treated nature as only a resource, and framed the sustainability issue as one of resource efficiency and equitable distribution. In other words ‘how to divide things up’ more fairly. For example, it considered a 3 per cent growth in GDP (Gross Domestic Product) to be essential to achieving social equity and environmental quality. We will see that only design, not accounting, can de-couple economic growth from environmental impacts. According to the CSIRO (Australia’s government-supported research body), a 3 per cent growth in Australia’s GDP could easily be achieved by mere efficiencies in the construction industry, along with a 10 per cent reduction in construction costs. However, if we continue simply to produce more products more efficiently (sometimes called ‘green business’), a 3 per cent growth in GDP could mean a geometric escalation of total resource flows.<sup>9</sup> Our definition of

sustainability has therefore created problems by equating it with ‘sustainable consumption’. A positive approach to sustainable development would instead make the health, resilience and expansion of the life-support system central to development decisions and economic planning.

### **Can we base policy on sustainability goals without a shared definition?**

Shared definitions and explicit understandings are indeed important. After all, we should have waited for a definition of the petrochemical economy before rushing headlong into it. But while some researchers have counted over 400 different definitions of sustainability in the literature, there is nonetheless a certain consistency among them. Most definitions simply vary across a spectrum from anthropocentric (human-centred) to ecocentric (ecology-centred). However, they are ultimately compatible when people fully appreciate how human survival and wellbeing depend on the ecological integrity of the planet. The term sustainability has helped to convey the realization that everything we do affects everything else, and that nature is a complex system that is inseparable from society – another complex system. However, sustainability and equality in consumption would not mean much if future generations have nothing, or live in steel cages within concrete jungles that are not of their own making or choosing. True sustainability requires intra- and inter-generational justice and democracy. For future generations to enjoy substantive democracy, they would have to be ensured the same or a greater range of meaningful choices and environments as we have today. So we need a stronger conception of sustainability: *expanding* future options, or at least keeping options open.<sup>10</sup> This suggests that sustainability will require not only behaviour change, but fundamental changes in the way we design our institutions, infrastructure, buildings and decision-making systems – and ultimately even our cultures and religions.

### **Hasn’t the term ‘sustainability’ already been co-opted by industrial interests?**

Today, as in the 1980s, the complaint is frequently heard that sustainability has been co-opted by government and business to justify development. But sustainable development at the very least still encompasses the idea of the ‘triple bottom line’, which today often includes a fourth category of ‘governance’. That is to say, sustainability has become a shorthand term for expressing the interconnection of environmental, economic and social factors. Before the term sustainability became well-worn, many mistakenly thought environmentalists were only concerned with single issues, not whole systems. The popularization of the term sustainability, by any definition, has also raised the general level of awareness. We have, for instance, largely moved beyond the earlier notion of sustainability as the ‘sustainable yield’ of forests, rivers or soil resources.<sup>11</sup> Of course, any and every new concept will be captured and twisted to some extent. For example, the term ‘sustainable development’ has sometimes been interpreted literally to mean ‘permanence’. Thus it has been used by some to imply, ironically, that environmentalists fear change. This stereotype may in fact be a negative projection. It is, after all, the status quo that represents social, political and biophysical change at an exponential rate – in the wrong direction. The military-industrial complex anticipated by President Eisenhower in the 1950s, and the ‘corporatist’ state that took hold in the 1980s, have imposed one, largely irreversible, pathway.<sup>12</sup> Environmentalists are no more fearful or irrational than those who choose to live in a military industrial complex.

## **Wouldn't sustainability mean the imposition of 'green' values upon others?**

Positive Development does not prescribe a particular aesthetic or set of values. It is the current system that reduces choice and prescribes a narrow range of values. The lack of meaningful choice is manifested in, for example, the reduction of crop varieties and seeds to a fraction of what was available 100 years ago. While industrial farming has led to more products on the shelves, the number of varieties of fruit and vegetables has been greatly reduced. Many competing brands of foods are owned by the same companies and contain very similar ingredients.<sup>13</sup> Likewise, housing seems to be produced by a cookie cutter, where 'choice' pertains to superficial variations in the conspicuous consumption of materials and fixtures. The attempt to rationalize the lack of future choice has become pervasive. For example, some say that major changes have happened over geological time, so climate change and extinctions are 'natural'. In fact, some even argue that militarism is 'natural'. But even *if* these positions are correct, it would not absolve humans of responsibility for the loss of biodiversity, human cultures and ecosystems. This is because sustainability is a matter of ethics and equity (not sunspots, comets, Earth wobbles or communists). Sustainability has always been about fairness among all people in present and future generations. Thus the fact that major catastrophes occurred on the planet even before humans existed does not justify inaction in preventing mass extinction. Material addictions can arguably be satisfied by 'virtual realities' (assuming these realities can someday transcend pornography and violence).<sup>14</sup> But while virtual worlds might reduce the need for some forms of material consumption, high quality public environments may be necessary to reduce conspicuous consumption.

## **Isn't sustainability just a concept for the privileged – What about the poor?**

The poor are most affected. While non-sustainable or status quo development affects all people, it first impacts upon disadvantaged children, women and the poor generally. Each year, at least three million children under the age of five die due to environment-related diseases. For example:

- Over 200 million children are living in shantytowns
- Over 30 million children are homeless
- Over 500 million children live on less than \$1 a day
- Over 30 million children do not have safe drinking water
- Over 30 million children do not have toilets, or other sanitation services like waste collection
- Over 180 million children are in child labour, mostly in non-sustainable resource exploitation

While statistics vary, such shocking figures are widely available and compiled by international agencies such as the World Health Organization.<sup>15</sup> It would not be consistent with the theme of this book to repeat a litany of crises and injustices. However, one cannot dispute that there is a clear pattern. The current path is genocidal. Acts of 'omission' on this scale must be seen as consequences, not just coincidental by-products, of conventional models of economic growth. Inaction in addressing inequities is a deliberate form of action. The current 'solutions' – either to impose Western environmental standards on the developing nations or to lower standards in the developed nations – are not satisfactory.<sup>16</sup> We need design standards that favour higher life quality through low-impact natural systems in *both* sets of countries.

## How can inaction be considered deliberate, since people are not fully aware?

Because we *do* know better. It has long been appreciated that environmental destruction is subsidized.<sup>17</sup> Water is a good indicator of sustainability, for example, as we can only live a few days without it:

- Up to 12 million children under 5 die per year (roughly 33,000 per day) from disease and poor nutrition alone, much of this directly linked to water quality and quantity
- 5 million people a year die from disease caused by contaminated water
- Serious water shortages in 80 countries affect 40 per cent of the world's population<sup>18</sup>

Yet world water consumption is subsidized to the tune of \$50 billion a year.<sup>19</sup> Water shortages also involve economic costs for the wider population. For example, a third of the Earth's topsoil and cropland are already ruined, while we have continued to subsidize unsustainable agriculture.<sup>20</sup> These subsidies indirectly contribute to climate change, droughts and floods (which have cost Australia billions in recent years).<sup>21</sup> These systems are not substantively rational and, due to the wealth transfers involved, could be characterized as 'systemic corruption'. In other words public funds or resources are being diverted to serve special interests rather than whole systems change.<sup>22</sup> The public pays for everything in the end, in effect, so corporations, public agencies and politicians should be obliged to put the public interest over special interests. One reason that such systemic corruption continues is our Orwellian culture: positive thinking is (paradoxically) equated with 'see no evil, hear no evil, speak no evil'. An objective analysis of our environmental frameworks, methods and tools will reveal that they are inherently negative. To design better systems, we first need to understand why the old systems do not work. This monumental death and destruction is by design, yet design is still widely regarded as a trivial pursuit. Hence, good design requires critical thinking and self-reflexivity.

## Don't such dire statistics and critical views make environmentalists 'negative'?

Accepting reality is not negative as long as we take action to make things better. Interestingly, environmentalists have been labelled as 'pessimistic', although they invest their time and energy trying to create a better future. It could be argued that it is the dominant paradigm that is pessimistic and negative, because it assumes that we can do nothing about the degradation and diminution of the natural environment – at least not without sacrificing our creature comforts. We have a remarkably negative view of nature and a remarkably positive view of cities. Nature, our life-support system, is still seen as somehow in conflict with human interests and outside of, or even superfluous to, the economy. In contrast, cities are seen as exciting and even aesthetically captivating. Yet, on the whole, cities are dreary cages, set among grimy alleys and congested streets, that are unfit for even battery hens.<sup>23</sup> Urban areas are widely perceived as places where natural systems cannot survive or do not even belong.<sup>24</sup> But through urban 're-design' we could create more healthy, stimulating and beautiful urban living environments that reunite humans and nature. Cities can solve serious ecological and social problems at a net economic gain. Eco-retrofitting of buildings is a low-risk business investment that can be cheaper than doing nothing [Chapter 2]. Eco-retrofitting, here, means modifying (and 'greening') urban areas to improve environmental and human health while reducing resource depletion, degradation and pollution. The aim would be to achieve a 'sustainability standard' – net positive improvements over existing conditions, not just resource efficiency [Chapter 5]. However, financial, environmental and health gains from improving our cities cannot achieve sustainability if total resource flows continue to increase beyond the Earth's carrying capacity. If we are to sustain the economy, then urban development must also restore and expand the ecological base of the surrounding region.

## **But is this really ‘affordable’, even given net resource and financial savings?**

The sometimes explicit but largely unconscious view that sustainability is impossible or unaffordable needs to be challenged head on. If biophysical sustainability can be shown to be possible through eco-innovation, there would be no excuse for ‘survivalist’, zero-sum strategies at either the individual or collective level. Sustainable systems would logically cost far less than our current systems of industrial production. After all, solar power is virtually infinite, many resources are renewable and microbial ‘employees’ work for free [Box 18]. Positive Development and eco-innovation do not imply more ‘technical fixes’. They entail institutional or physical design that improves human and environmental health and whole system efficiency. Eco-innovation often involves the use of natural systems and environments to replace ‘unnecessary’ machines or products. Models and sources of inspiration for eco-innovation are all around us [Box 3]. If corrective action were taken now, we could avoid cumulative, irreversible negative impacts of industrial (read fossil-fuel-based) systems, which are more costly to correct as time passes. In this context, the idea of the ‘limits’ to natural resources, paradoxically, can be counter-productive. There are, of course, biophysical limits – and we are certainly exceeding them. But the companion view that negative impacts are an inevitable consequence of development has blinded us to the obvious. We could design development to increase the size, health and resilience of natural systems, while improving human health and life quality. However, instead of ‘design’, we are still engaging in ‘accounting activity’: developing tools to mitigate the impacts of change upon development-as-usual. The ‘path’ to sustainability must therefore start from a new place.

## **Just what is sustainability supposed to be then – A ‘path’ or a ‘destination’?**

Both and neither. For those with a largely human-centred or ‘anthropocentric’ orientation, sustainability is seen as a path. Cultures and relationships evolve; hence we should not dictate how future societies will live. For those who take an ecological perspective, however, it is not enough to be on a path, as things they want to protect will soon be gone or extinct. The task for them is to get there, not just make progress.<sup>25</sup> Of course, if that end state were seen as fixed or permanent, it would not be consistent with a complex, evolving, natural world. It would also violate the principle of inter-generational equity. Citizens today and in the future must be able to determine their own lifestyles and habitats, within responsible parameters. To debate whether sustainability is either a path or a destination is ‘either-or’ thinking. Sustainability requires a complete change of direction, as our intellectual and institutional frameworks are incompatible with sustainability. To achieve sustainability, then, we need new, multiple pathways and destinations: different ideas about where to go and how to get there. Our environmental management processes, tools and methods are misguided and misleading. This is partly because, as we shall see, most of our planning and decision tools have borrowed concepts and constructs from reductions fields, where technocratic frameworks and methods dictate social values and choices. To reverse direction, then, we need to examine our negative development paradigm from the other side of the looking glass. In fact, we need to design our way out of a veritable hall of mirrors.

## **So how does design differ from our standard reductionist way of thinking?**

Design is an interactive, imaginative process for creating something that has never existed before, such as sustainability. Design provides a means of generating win-win-win solutions. In the dominant decision mode, decisions are made by choices assessed through various kinds of cost-benefit analyses.

These decision tools, infected by outdated politico-economic constructs, are designed to choose between competing interests and existing positions, or make tradeoffs between costs and benefits in a zero sum context. Design can help to reverse this systemic lobotomy. Instead of picking winners and losers, we can expand both social choice and biophysical sustainability by design. There have been many critiques of the dominant economic mode of thinking, so they are not repeated in this book [but see Boxes 42 and 43].<sup>26</sup> However, economic concepts and decision tools should be seen as subsidiary to design, because they cannot, in themselves, create eco-solutions. They can at best provide ‘incentives’ for better design. As recently as 2007, an Australian federal treasurer said the economy depended on population growth. If so, this means the Australian economy is fundamentally in conflict with sustainability.<sup>27</sup> The economic system is not pre-ordained. It is a designed system. When the design of an economic system militates against the ecology, we need to redesign the system.

### **Doesn’t sustainability mean balancing economic and environmental goals?**

No. Sustainability means the *integration* of social, economic and environmental goals, not interest balancing. In fact, economic ‘means’ have become the ‘ends.’ As we will see, the ongoing sacrifice of social and ecological ‘ends’ by culturally-specific and ecologically flawed ‘means’ creates vicious circles. So, to summarize:

- **Social sustainability** means future generations must inherit substantive democratic rights and effective control over the means of survival (eg soil, air and water). We can enhance the public estate to enable secure public access to the means of survival – which the preservation of democracy ultimately requires. Decision systems that transfer resources from the poor to the rich cannot remain substantively democratic because power differentials will increase over the long term. If we were serious about sustainability, then, we would design a future in which all people (and other species) have at least the same range of responsible life choices and environmental quality that the ‘privileged’ on Earth now enjoy. This requires the design of decision systems that can ensure that public resources and means of survival are ‘effectively’ in public control [Chapter 13].
- **Ecological sustainability** suggests we must create healthier living environments (both built and natural) for everyone – including future generations. Decision systems that encourage the substitution of social or manufactured capital for nature are not sustainable. Given increasing flows and diminishing carrying capacity, development must be designed to expand the ecological base.<sup>28</sup> Urban development can be designed to, in a real sense, *over-compensate* for the impacts of existing development, by increasing our ecological support systems beyond what was there before development occurred. This can be achieved by design that creates the conditions for ecosystems to function in urban development, through ‘design for eco-services’.
- **Economic sustainability** depends on social and environmental sustainability. Its reason for being should be to support the society and environment, not the reverse. Economics is not valid if it does not support sustainability. The economy is merely a social construct, while the ecology is the basis of all life. Economic theories and methods are only legitimate to the extent that they implement social and ecological sustainability [Boxes 42 and 43].

**So how do we design built environments that give back more than they take?**

To be truly sustainable, the artefacts and mechanisms for natural systems must be replaced by the task of ‘design *for* nature’. Where we lack the design capacity to expand the range of substantive life choices available to present and future generations (while preserving wilderness), we need to make development, land-use and resource decisions that are ‘reversible’. This can only be achieved by design. We increasingly hear a distinction made between circular (as opposed to linear) metabolisms, or closed loops, where wastes from one process become resources for other processes.<sup>29</sup> McDonough and Braungart have shown that instead of closing loops, we can create no loop designs, where no waste is generated in the first place. We might add to this a third variation: ‘direct action’ to correct past design failure. This means *physical* design solutions – as opposed to indirect incentive systems that can have unintended consequences.<sup>30</sup> Direct action could be described as a ‘reverse linear system’. This more proactive approach is exemplified by earthworms. Worms are linear systems, but they perform in the opposite direction to industrial factories: they turn wastes into resources. Arguably, therefore, worms have evolved to a higher level of ‘intelligent design’ than human societies, which continue to turn resources into waste. (They are also a good source of food in themselves, although ‘wormburgers’ have yet to take off.) Worms could thus be said to encapsulate a net Positive Development approach at the micro-level. The following chapters aim to show how this proactive approach could be up-scaled to urban and regional planning and design. A *direct* design approach is intended as an antidote to the ‘managerialism’ that now dominates environmental planning, management and design.