INTRODUCTION

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This is not a book about the perils of global warming and its impact on children, although climate change provides an impetus. Nor is it a response to environmental issues that shifts responsibilities from adults to children, asking them to fix what we leave behind. Instead, it is a book of positive ideas and actions that shows what early childhood educational communities can do when children, teachers and parents work together to address, arguably, one of the most serious issues of our time. It is about what early childhood education – and specifically, early childhood teacher education – can and must do to play its part in helping societies move towards sustainable living. It is about the emerging field of early childhood education for sustainability (ECEfS).

WHAT URGENCY?

Life on Earth is at a critical time. While global warming has captured media headlines, the bigger issue is that humans are not living within the Earth's capacity to provide clean air, clean and adequate water supplies, fertile soils, productive oceans and ongoing resources for the world's human population – now over 6.6 billion – and for the millions of non-human species. As the health of global ecosystems and the health of human populations are inextricably linked, the need for fundamental changes in how humans live is becoming difficult to ignore. The crisis in the world's financial markets (made evident in August 2008) demonstrates what happens when we live on borrowed capital. 'The global financial crisis has drawn attention to the problem of borrowing from resources that do not exist' (University of Gothenburg & Chalmers University of Technology, 2008). The impacts are worldwide; the most economically vulnerable have become more vulnerable. Governments face new, deep and urgent challenges to maintain economic stability. Coming on top of mounting ecological crises, deep cracks are showing in the way humans 'do business' on this planet.

The next generations – our children and grandchildren – will be the recipients of the best and the worst that is passed on. There seem to be endless and exciting opportunities ahead for many children, particularly those born in the West. Nevertheless, even for rich nations (the over-developed

world?), there are increasing concerns about the state of the natural environment and the economic and social prospects for future generations if actions to reverse – or at least to ameliorate – what is happening are not taken. As Lester Brown (2000) of the Worldwatch Institute has said 'Nature has no reset button' (para. 25).

What is sustainability and why does it matter?

Sustainability is a confused and contentious topic that has no universally accepted terminology or definition. A popularised description from the World Commission on Environment and Development's (1987) *Bruntland Report* – also known as *Our Common Future* – describes sustainable development as that which 'meets the needs of the present without compromising the ability of future generations to meet their own needs' (p. 8). Perhaps a more poetic way to capture this complex concept is 'enough for all forever', a description used in the *Statement on Sustainability for All Queensland Schools* (Education Queensland, 2008).

In Australia, 'sustainable development' has been replaced by terms including 'sustainability' and 'sustainable living'. In this text, I use 'sustainability' – and therefore 'education for sustainability' – as the descriptor to capture this concept. This is preferred because of the implied assumption that development equates with economic growth, and that only after economic growth is achieved can environmental concerns be addressed. As many in the environment movement emphasise, supporting the growth and development of economies – especially through increasing mass consumption – in a world of finite resources and growing population is not a sustainable option.

As conceptualised by the authors in this book, sustainability is a broad concept that is about much more than addressing concerns with the natural environment, important though these are. The diagram below (Figure 0.1) illustrates this broad view.

In summary, sustainability emphasises the linkages and interdependencies of the social, political, environmental and economic dimensions of human capabilities. It is a view that acknowledges relationships between humans and between humans and other species, is underpinned by critique of the ways in which humans' use and share resources, and recognises intergenerational equity issues.

Sustainability is essentially an issue of social justice and fairness. The causes and effects of unsustainable living are disproportionate and unevenly

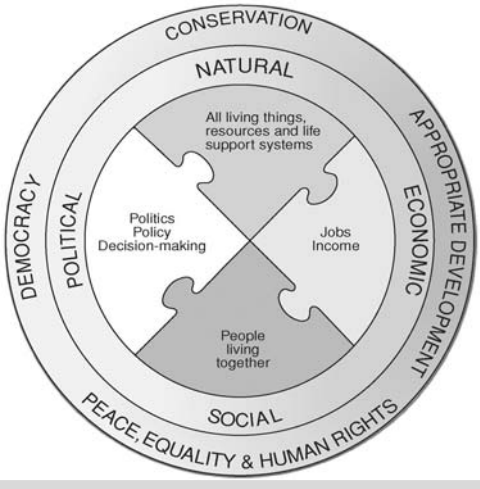

Figure 0.1. The four dimensions of sustainable development.
Source: United Nations Educational Scientific and Cultural Organization, 2002a.

distributed. Some humans enjoy the benefits of global economic development, industrialisation and new technologies; many other people and many other species bear the risks and costs. Among human populations, the poorest nations, and the poorest within nations, are most at risk (Lowe, 2006). As Nicholas Stern (2006), chief author of the British government's report on the economics of climate change commented in the Executive Summary, 'The poorest developing countries will be hit earliest and hardest by climate change, even though they have contributed little to causing the problem' (p. xxvi). Furthermore, while efforts are (slowly) getting underway to reduce or reverse future global warming, the unequal distribution of benefit and risk will be even greater for children who face the brunt of future consequences (a topic further explored in Chapter 1). Sustainability is concerned, therefore, not only with the state of the natural world but also with poverty, population, consumption, gender equity, indigenous issues, peace and reconciliation, community life and human health. It is about how we all live our lives now and into the future.

PROVOCATION 0.1

Write or illustrate your own definition of sustainability. Consider personal, local and global dimensions as well as current and future perspectives.

Another way to capture the ideas and ideals of sustainability is through the *Earth Charter*, a civil society initiative to guide the transition to sustainability (see www.earthcharterinaction.org). Like UNESCO's Four Dimensions of Sustainable Development, this document also integrates four dimensions, or pillars, of sustainability: social/cultural, economic, ecological and political. The development of the *Earth Charter* was influenced by ways of thinking and knowing as diverse as science, indigenous peoples' knowledge, international law, religious and philosophical traditions, United Nations' declarations and reports, and through examining good practices for building sustainable communities. In Chapter 4, Robert Pratt comments that the *Earth Charter* has had a strong influence in shaping his thinking and actions as an early childhood teacher for sustainability. There are versions of the *Earth Charter* adapted for younger children, written in more accessible language.

PROVOCATION 0.2

Look up a Children's Earth Charter at:
www.earthchartercitizens.org/Earth%20Charter%20Younger%20Children.htm
or
www.brinkx.org/SchoolRoom/pdf_module/Earth%20Charter%20for%20Children.pdf

What does the *Earth Charter* mean to you? Does it expand your thinking about how **you** live in the world? How?

In what practical ways might you use a Children's Earth Charter in an early childhood education context?

Regardless of the still-evolving terminology and definitions of sustainability, a clear message is that the natural world's life-supporting capabilities need to be sustained indefinitely, productively and equitably into the future. While the world has made some progress towards understanding sustainability issues in recent years, the overall condition of the global environment has not improved. The 2007 *Global Environment Outlook GEO4* report (United Nations Environment Programme, 2007), for example, states that 'increases in consumption and associated waste have contributed to the exponential growth in existing environmental problems, including deteriorating water and air quality. Land and ecosystems are being degraded, threatening to undermine food security' (p. 215). McMichael (2008, pp. 5–6) highlights the following indices showing exponential growth since 1900:

- Energy use has increased 16-fold.
- Industrial production has increased 40-fold.
- Water use has increased 9-fold.
- Fish catch has soared 35-fold.
- Carbon dioxide emissions have increased 17-fold.
- Sulphur emissions have increased 13-fold.
- Rates of deforestation and desertification continue to accelerate.

At a time when the human population has increased from around 1.6 billion to over 6.6 billion (more than a three-fold increase in just over 100 years) and is tipped to rise to 8 billion by around 2025, then to 9 billion by 2043 (United States Census Bureau, 2008), there is additional cause for concern. The human 'ecological footprint' is just too large in relation to the Earth's capacity to provide adequate resources for this expanding population.

Put simply, the human species is living beyond its means. Profound shifts in thinking and acting are necessary to overcome current challenges, and to prosper into the future. Governments and corporations are required to do more than kickstart economies so that they continue as before. New ways of building sustainable economies are necessary that stabilise the climate, protect habitats and environments, shift to renewable forms of energy, increase food production using less water and fewer chemicals, create jobs and generate prosperity while achieving greater income equality. As Vanada Shiva – physicist, environmental activist and eco-feminist – remarked in her 2000 Reith lectures for the British Broadcasting Corporation, 'sustainability demands that we move out of the economic trap that is leaving no space for other species and other people' (para. 71). The threats are great; the opportunities are greater.

HOW CAN WE GAUGE HOW UNSUSTAINABLY WE ARE LIVING?

The term 'ecological footprint' has entered the lexicon in recent years as a way of measuring the impacts of human lifestyles on the planet. This tool (Wackernagel & Yount, 1998) provides an index of the area of productive land and aquatic ecosystems required to produce the resources used, and to assimilate the wastes produced, by a defined population at a specified material standard of living, wherever on Earth that land may be located (United Nations Environment Programme, 2007). According to the *2005 Footprint of Nations* report (Venetoulis & Talberth, 2005), humanity's

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How can we gauge how unsustainably we are living? continued »

global footprint in 2005 was 17.5 billion global hectares (gha), or 2.7 gha per person (a global hectare is a hectare – approximately the size of a standard soccer field – of biologically productive space that has world-average ability to produce resources and absorb wastes). On the supply side, the total productive area, or biological capacity, was 13.6 billion gha, or 2.1 gha per person, calculated to be 20 per cent above what is available. The impact of this is net environmental degradation. In other words, the total world population is engaged in unsustainable ecological overshoot.

A country's footprint is the sum of all the cropland, grazing land, forest and fishing grounds required to produce the food, fibre and timber it consumes, to absorb the wastes emitted when it uses energy and to provide space for its infrastructure. Australia's ecological footprint has been calculated at 6.6 gha per person, three times the average global footprint (2.1 gha) and well beyond the level that the planet can regenerate on an annual basis. This is the sixth-largest (behind the United Arab Emirates, the United States, Finland, Canada and Kuwait) and is 3.5 times more than Australian environments have to offer.

While such figures are useful, the important message related by ecological footprint measurements is that humanity's demand on the planet's living resources exceeds the Earth's regenerative capacity by about 30 per cent (World Wide Fund For Nature, 2008). This is simply not sustainable, and is a fundamental issue for our children and future generations.

PROVOCATION 0.3

Calculate your own ecological footprint by going to:
www.footprintnetwork.org/en/index.php/GFN/page/calculators.
School children can calculate their footprint by going to:
www.kidsfootprint.org.

WHAT IS EDUCATION FOR SUSTAINABILITY?

It is important to emphasise that responsibility for solving the world's problems cannot rest on the shoulders of educators. Sustainability is everyone's

business – politicians, civil servants, the media, doctors, plumbers and parents. As mentioned, global warming concerns – in tandem with the Global Financial Crisis (GFC) – have ushered in new times and new opportunities. To change how we live, first, we should change how we think. Bonnett (2002) calls for the exploration of sustainability as a 'frame of mind' (p. 9), a metaphysical transformation that qualitatively shifts outlook and relationships where 'the attitude of sustainability is not a bolt on option but a necessity' (p. 19). Education and learning have clear roles in helping to create such shifts. Most education policymakers though are unaware of the scale of the changes required for education to play a significant and constructive role in achieving a more sustainable society (Sterling, 2006). Sterling is reported as stating that 'society's movement towards sustainability is a profound learning process involving everybody engaged in education, and one we are collectively still only in the early stages of' (University of Bath, 2005).

Such fundamental reframing necessitates significant shifts in education – from fragmentary, short-term, 'here and now' thinking (Sterling calls this 'mechanistic') towards systemic, long-term, futures-oriented thinking ('ecological' thinking). An important element of the latter is the transcendence of discipline-bound knowledge. Living sustainably requires not just scientific and technological solutions but also new social solutions and alternatives that blend science, sociology, psychology, health, economics, education, the arts and politics. Adopting interdisciplinary, indeed, transdisciplinary ways of thinking and problem solving that are more than simply joining disciplines together, is essential but represents a great challenge. Transdisciplinarity creates new knowledge, processes and perspectives that go 'beyond' the disciplines and offers new ways of looking at and responding to issues and problems.

A concept in evolution

Just as sustainability is a hard-to-define concept that is still being debated and clarified, so too is 'education for sustainability' a concept in transition. It has its history in environmental education. Now, though, as practitioners and researchers continue to think and work in the field, and as new players bring new tools and perspectives, this is being reconceptualised more broadly and widely into education for sustainability (EfS) as shown below.

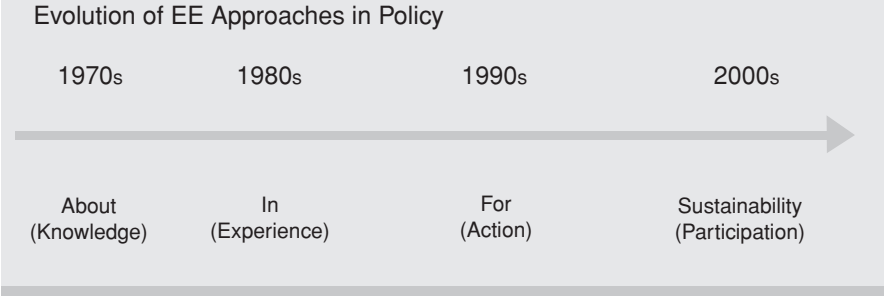

Figure 0.2. Evolution of EE approaches.
Source: Tilbury, Coleman & Garlick, 2005, p. 26.

FROM ENVIRONMENTAL EDUCATION TO EDUCATION FOR SUSTAINABILITY: A SHORT HISTORY

EfS can be traced back to its basis in environmental education (EE), developing from an outdoor, science-based education to education with greater emphasis on interactions between people and environments.

It is generally recognised that the first concerted international efforts to define EE, and to set out guiding principles and frameworks, was at the *Intergovernmental Conference on Environmental Education*, held in Tbilisi, Georgia, in 1977. The concepts and vision taken up at this conference saw a broadening of early EE into a spectrum encompassing environmental, social, ethical, economic and cultural dimensions. The *Tbilisi Declaration* became the foundation for EE, driving the call for environmentally educated teachers as the 'priority of priorities' (UNESCO–UNEP, 1990).

Later, the *Brundtland Report* recognised that 'the world's teachers . . . have a crucial role to play in helping to bring about the extensive changes needed for sustainable development' (World Commission on Environment and Development, 1987, p. xiv). Other pivotal documents that have contributed to the uptake and spread of EE/EfS include:

- the Agenda 21 report of the 1992 United Nations Conference on Environment and Development (the Rio Earth Summit)
- the 2002 World Summit on Sustainable Development, held in Johannesburg, South Africa

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From environmental education to education for sustainability: a short history continued »

- the *United Nations Decade of Education for Sustainable Development* (UNESCO, 2005).

An early assumption of EE was that adequate knowledge and concern for the environment would create an appropriate environmental ethic, leading to changes in behaviours that would be more 'environmentally friendly' (Davis & Macleod, 2006). Research into links between environmental knowledge and values indicated, though, that there was 'little correlation between acquired knowledge and concern and values' (UNESCO–UNEP, 1986, p. 2). Thus, in the 1990s, environmental educators began to refer to dimensions of EE that distinguished between:

- education *about* the environment (focused on understanding concepts and knowledge related to environmental processes and issues)
- education *in, through* or *from* the environment (direct environmental experiences and field knowledge and skills)
- education *for* the environment (development of values and action skills, as well as knowledge and processes, aimed at learners making informed judgements, participating in decision making and taking action on environment-related issues).

The latter form – education *for* the environment – is inclusive of the previous two forms but takes an overtly socio-political position to education. It is the form of environmental education closest to EfS.

PROVOCATION 0.4

Think back to your own experiences of environmental education. Can you identify examples of education *in, about* and *for* the environment? What were these experiences?

EfS . . . A socially transformative approach

As Lang (2007) comments, EfS 'focuses on the interactions between people and people, and how these interrelationships affect the integrity of the environment and its functioning'. This requires 'a deep understanding of ourselves, our neighbours, our societal and cultural processes, and how we are connected with the ecological systems for life' (p. 6). It is founded on principles of critical inquiry, empowerment, participation, democratic decision making and the taking of action that supports sustainable living and aims for social change – it is transformative education. As such, there is the recognition that

education that delivers 'more of the same' is not adequate in contributing to social transformation for sustainability. As David Orr (1994), a leading advocate of environmental education/education for sustainability has commented, 'the crisis [of sustainability] cannot be solved by the same kind of education that has helped create the problems' (p. 83).

This orientation requires EfS to be implemented in such a way that it develops systemic curriculum, pedagogy and policy responses that go deep and wide (a topic returned to in Chapter 9), aimed at overcoming the fragmented, shallow and inconsistent approaches that are too often implemented in educational settings. As growing international evidence indicates, an important element of a systemic approach is for EfS to be enacted through 'whole settings' approaches (Henderson & Tilbury, 2004) that aim to transform current, unsustainable ways of thinking and acting with embedded 'cultures of sustainability' (see Davis, Rowntree, Gibson, Pratt & Eglington, 2005 and also Chapters 3 and 4 of this text).

In summary, key qualities of EfS include those listed below.

EDUCATION FOR SUSTAINABILITY

EfS is . . .

positive, hopeful and affirming
futures focused
change oriented
learner centred
community connected
lifelong and long term
interdisciplinary and/or transdisciplinary

EfS focuses on . . .

the fragility and vulnerability of natural systems
sustainable living – 'living lightly'
human–environment interactions
Indigenous ways of knowing that offer alternative perspectives and options

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