Ethics in Sustainability Education

Arthur Lyon Dahl

Abstract Underlying many sustainability challenges are fundamental ethical issues of equity and responsibility concerning the behaviour of individuals, communities, businesses and nations. Resolving these challenges requires changes in human and institutional behaviour at all these levels. Using a systems perspective, it is possible to derive a set of ethical principles for sustainability. An increasing recognition of the importance of this ethical component is reflected in educational materials for responsible living and accompanying values-based indicators and activities. There are still significant obstacles to the incorporation of this dimension into educational systems that need to be addressed with care. Other partners, both religious and secular, can be involved constructively in this process. Given the urgency of responding to challenges such as climate change and the difficulty in motivating people to change their lifestyles, ethical approaches to sustainable living need to be strengthened and diffused widely in the years ahead.

Keywords Education · Ethics · Sustainability · Values

1 Introduction

No civilization has endured for more than a few centuries. The recent rapid expansion of the human population and technological progress has produced environmental impacts transcending planetary boundaries and threatening overshoot and collapse, suggesting that our own civilization is equally at risk. Sustainability has thus become a key issue on the agenda, and it is an open question whether we can avoid a traumatic collapse of civilization and make a more reasonable transition to sustainability. The scientific and technological solutions seem to be available; the problem is human, relating as it does to our behaviour and habits, vested interests,

A.L. Dahl (✉)
International Environment Forum, Geneva, Switzerland
e-mail: dahla@bluewin.ch

resistance to change, preference for least-cost short-term solutions, and lack of political will (Randers 2012). Scientific knowledge alone seems insufficient to lead to the necessary change, in what is often called the knowledge-action gap. Human decision-making operates at deeper levels of emotions, beliefs and values. Education for sustainability also needs to reach these deeper levels, which means directly addressing issues of ethics and values.

2 The Challenges of Sustainability and Their Ethical Implications

All the major challenges of sustainability have a significant ethical dimension, and this can be used to take education about these issues beyond the purely scientific to link them to moral principles and ethical challenges that address each person individually. This can help to overcome the feeling that such problems are so big as to be overwhelming and beyond what any one person can influence.

Climate change and the related problem of our addiction to fossil fuels as the primary energy source for our civilization is an excellent example. The release of greenhouse gases that has precipitated accelerating global warming has largely come from the use of fossil fuels (coal, oil, gas) in the industrialized countries, together with deforestation and land use changes driven largely to supply resources to those same countries. The rich can usually find ways to escape from or adapt to the impacts of climate change. It is the poor who have not caused the problem who suffer the most, which is unjust. Looking to the future, continued inaction to control greenhouse gas emissions is expected to trigger runaway global warming in this century with catastrophic impacts on society around the world (IPCC 2013; World Bank 2012). The remaining capacity of the atmosphere to absorb carbon dioxide without exceeding 2 °C of global warming is 565 gigatonnes of carbon, while the carbon content of conventional fossil fuel reserves already being exploited (not counting unconventional sources like shale gas or tar sands) is 2,795 gigatonnes (McKibbon 2012). To avoid catastrophic climate change, we need to leave 80 % of existing fossil fuel reserves in the ground, which means wiping off 80 % of the share value of fossil fuel companies and slashing the income of fossil-fuel producing countries. This is technically possible (Jacobson and Delucchi 2011) but seems politically impossible. Everyone with a reasonable standard of living is at least partly dependent on fossil fuels, so we are all responsible for climate change. This gap between scientific and political realities is another ethical challenge.

The rich biodiversity of our planet is a significant part of our natural capital and essential to maintain the health and productivity of the biosphere, providing essential ecosystem services. We are already driving species to extinction at a thousand times the nature rate (Pimm et al. 2014) and it is estimated that 2 °C of global warming will exterminate 20 %, and 4 °C up to half of all the species on the planet. Our generation may succeed in destroying all undisturbed natural areas, leaving a severely impoverished planet to our descendants. What will they think of us?

There are many other environmental challenges linked to our unsustainable exploitation of natural resources, accumulation of wastes and release of dangerous pollutants as consequences of our consumer society, where the lifestyle of the wealthy fifth of the world population is leading to crises in food, water, and other essential requirements for life in the coming decades (Beddington 2009). We are reaching our planet's carrying capacity and overshooting planetary boundaries (Rockstrom et al. 2009), raising fundamental issues of equity in the sharing of the limited ability of the biosphere to support human life, and condemning future generations to life on an impoverished and depleted planet.

This of course leads to the issue of social sustainability. Extremes of wealth and poverty are socially destabilizing and undermine the social cohesion upon which any society is built. Governments have long recognized the reduction of poverty in the world as an absolute priority (WCED 1987), but we are still far from achieving it, and with the increasing concentration of wealth in the super-rich, the gap is widening. This could lead to social chaos in the near future (Turchin 2010) if social inequality is not addressed.

Behind this are the values underlying the economy and financial system. By compartmentalizing our institutional structures and processes into separate functional systems where the economy is the dominant component separate from social and environmental issues, and is only responsible for creating wealth, we have produced a business world for which the ends justify any means, and social and environmental responsibility are externalities. This is combined with a dominant materialistic outlook, and the collapse of traditional moral standards and ethical principles, leading to a society in which selfishness has become a prized commercial resource; falsehood reinvents itself as public information; and greed, lust, indolence, pride, and violence are broadly accepted and have social and economic value. Adam Smith would be shocked. His invisible hand of self-interest was combined with a strong sense of moral purpose, but we have retained the former and forgotten the latter.

All this should make it clear that education for sustainability cannot ignore the ethical dimension, and can only succeed in its educational purpose if ethics are integral to the design of educational programs.

3 Ethical Needs for Individuals and Institutions

It will help to define more clearly what we mean when we refer to ethics, and how and where they should be applied. Moral values state what is good and of primary importance to human civilization. They are often articulated as ideals, and define right from wrong. A capability of moral reasoning starts from abstract general ethical principles to resolve conflicts that arise from moral dilemmas and ethical

problems. Ethical principles are the operational expression of moral values, and provide guidance to decision-making and action (Anello 2008).

A related concept is values, which are qualities on which worth, desirability, or utility depend. They are principles or rules generated by an ethical or spiritual framework. Values are what determine how humans relate to each other. They are the social equivalent of DNA, encoding the information through which society is structured and its relationships regulated. For our society to become more sustainable, its values must also evolve to become more just, equitable and responsible.

We usually consider that ethics and values are a personal matter for each individual. In society, they may be an innate part of culture or religion, where everyone knows what is "right" and "wrong". They usually find formal expression in the adoption of laws and their application through a system of justice. Both law and ethics are concerned with the application of justice. In a system of law, we have institutions for enforcement in a top-down regulation of society, with punishment and the use of force if necessary. This is a costly and negative way of achieving justice. With ethics, based on individual attachment to the principle of justice and its application, good behaviour is self-motivated and bottom-up, founded on reward more than punishment. The stronger the ethical framework and its application, the less need for law. It is a more cost-effective, process-based solution.

One problem with our compartmentalized society is that there is no integration of ethics and values into most institutional structures, so that the institutions themselves are held responsible. Everything now depends on the individuals in positions of responsibility, and enforcement is usually by outside laws, not internal systems of regulation and accountability. This fosters corruption and ethical failures, with politics and business particularly susceptible. More effort is needed to build the ethical needs of society into the very fabric of society and the economy and to add them to the corporate charters of businesses where they can influence management performance.

Different ethical principles come into play at each level of social organization. For example, where an individual might do best to forgive the fault of another, the community may need to apply justice. Justice is in fact the central foundation of sustainable social organization. "Justice is the first virtue of social institutions, as truth is of systems of thought. A theory however elegant and economical must be rejected or revised if it is untrue; likewise laws and institutions no matter how efficient and well-arranged must be reformed or abolished if they are unjust.... Therefore in a just society the liberties of equal citizens are taken as settled; the rights secured by justice are not subject to political bargaining or to the calculus of social interest.... Being first virtues of human activities, truth and justice are uncompromising" (Rawls 1999, pp. 3–4).

At the individual level, ethical principles are first communicated in the family by imitation, and then by education, both through formal education and sometimes through religious instruction. In communities, social pressure becomes an additional factor, as failure to respect social norms can result in criticism or exclusion.

The biggest problem lies at the higher levels of social organization, where the institutional structures are of recent origin and often reflect the values of our present materialist society but have not yet evolved to incorporate the dimensions of social and environmental responsibility necessary to achieve sustainability. Where those working within these structures have been educated in the ethics of sustainability, this may be sufficient, but too often highly-motivated individuals are trapped in institutional structures that prevent them from living their values in their workplace. We need a multi-level approach to values, from individual to international, incorporating the ethical principles relevant to the social functions of each institution (Dahl 2013b). Ideally, businesses should be designed so that managers are accountable for the ethical performance of the business, and politicians should be responsible for the ethical behaviour of governments. Internationally, there are some codes of conduct such as the Universal Declaration of Human Rights, the various declarations on environment and sustainable development, the many international conventions, and non-governmental initiatives like the Earth Charter, but these are largely voluntary, and mechanisms for enforcement are weak or non-existent.

4 Ethics and Behaviour Change

Achieving sustainability will require significant changes in lifestyle, particularly among the wealthier components of the population and participants in the present consumer society. This is the focus of education for responsible living. Much has been done to prepare educational materials on the scientific dimensions of the sustainability challenge, the environmental implications of lifestyle choices, and the threats to our own well-being and to future generations. Unfortunately it is well known that there is a knowledge-action gap. People know that they are doing something that may be bad for themselves and others, but if the effect is not immediate and only an uncertain probability in some future time, it is easy to ignore or rationalize. We are very good at self-deception, and at preferring immediate pleasure over possible future pain.

There is also the problem that the messages on the environment and our unsustainability are mostly negative. There is lots of bad news, the future looks grim, and we are all guilt of many forms of unsustainable behaviour. Negative messages are demotivating. We either deny the reality, become depressed, or give up, feeling that the problems are too big to do anything about anyway. While we must be realistic about the present, we need to provide some basis for optimism and hope for the future if we want to motivate action.

PERL has specifically focused on addressing the knowledge-action gap through education. To change behaviour, it is necessary to have an emotional as well as an intellectual commitment, so education must also operate at the level of values and the transmission of ethical principles necessary for sustainability. Recent EU-funded research by some PERL partners has explored values-based indicators of education for sustainable development (http://esdinds.eu) as expressed in the attitudes and behaviours of participants in the activities of relevant civil society organizations (Burford et al. 2012, 2013; Podger et al. 2013; Dahl 2013b). This

work has shown that values, which were previously invisible and considered too subjective to focus on through education, could be made visible, assessed, and developed through educational activities. A PERL project is now adapting these activities and indicators for use in secondary schools through a set of toolkits on activities and indicators for values-based education.

Furthermore, success in applying ethical values in one's own life is positively motivating. The satisfaction that comes from good actions for sustainability, individually or in a group, can show that progress is possible, that many small actions can have a cumulatively significant effect, and that hope for a better future is possible.

Of course, good values are necessary but not sufficient to permit a sustainable lifestyle. There are also institutional enabling factors that can facilitate or block what people can do. A desire to change from a private car to public transport is frustrated if no public transport is available. More sustainable options may simply not exist, or be too expensive for those most in need of them. Communities, businesses and governments must also play roles in facilitating transition to more sustainable living by providing necessary infrastructure, products and services.

5 Systems Approach to Ethical Principles

There is always the challenge of deciding on the appropriate content for values-based education. What moral standards and ethical principles should be included? Most cultures and communities already have some fundamental concepts such as the golden rule: do unto other as you would have them do unto you. They simply need to be placed in the context of more sustainable lifestyles. Others may be more specifically relevant, such as moderation.

From the point of view of systems science (Dahl 1996; Capra and Luisi 2014), we can identify those values that facilitate human relationships and make higher levels of social cohesion and integration possible. Trust and trustworthiness, for example, are essential to everything from governance to business relationships. Just as an individual is a complex system that is growing, building capacities, changing, maturing and acquiring wisdom throughout life, so do all social constructions have their own dynamics as complex and evolving entities, which can achieve higher levels of integration and effectiveness, and demonstrate emergent properties. Computer programmers, faced with a challenge beyond what a human mind can accomplish, can give instructions to many computers in a neural network and let them evolve and select an optimal solution. In the same way, individual people or human institutions, given a set of ethical principles to put into operation, can evolve solutions relevant to their own capacities, environment and situation, that are coherent in their diversity because they are all expressions of commonly-held values. Systems science also shows how efficiency comes from nested systems at multiple scales of integration, just as cells form tissues, organs and functional systems in the body. Sustainability values need to be built into all

the different components of society, each in their appropriate way for their specific functions.

Ultimately, everything should revolve around a common purpose, which can be considered both individually and collectively. For an individual human being, most would consider that human purpose should extend beyond the immediate satisfaction of basic material needs. People are capable of high social, cultural, scientific, artistic and spiritual accomplishments, so individual human purpose might best be defined as enabling each individual to fulfil his or her highest potential in all the domains of human consciousness. Unfortunately much current economic and psychological theory only depicts human beings as slaves to self-interest. "The faculties needed to construct a more just and sustainable social order—moderation, justice, love, reason, sacrifice and service to the common good—have too often been dismissed as naïve ideals. Yet, it is these, and related qualities that must be harnessed to overcome the traits of ego, greed, apathy and violence, which are often rewarded by the market and political forces driving current patterns of unsustainable consumption and production" (BIC 2010).

Human life inevitably involves a tension between the ego and self-interest that are an essential part of building self-identity in childhood, and the altruism and spirit of service that can be the dominant characteristic of a mature adult. Much of education and most cultures and spiritual traditions have emphasized the need to struggle against the former and to cultivate the latter. Pragmatically, most of the problems with our social and political systems today result from people failing to make that transition, and remaining driven by a desire for power and self-gratification. Societies will be much more sustainable if we can design educational processes that assist and accompany young people in this process of maturation. Values-based education can contribute to this.

It is important to acknowledge that religions have been a principal source of ethical guidance in the past, and can be important partners in educating the public for sustainability today. There is a coherence between the values derived from a systems approach and many of those emphasized in various religious traditions that can be a powerful support to the education of believers within those traditions to adopt more sustainable behaviour.

The highest collective human purpose would be that everyone can contribute within their capacity to an ever-advancing civilization. However this needs to look far beyond the narrow view of progress as growth in GDP that has driven present unsustainability (Stiglitz et al. 2009). We need to redefine prosperity in much more than material terms (BIC 2010) to include the many other dimensions of human development and well-being (Dahl 2013a). A sustainable civilization will probably be much more selective in the forms that material development takes in order to remain within planetary boundaries, while emphasizing growth in social capital, science, culture, beauty and spirituality which do not face the same limits (Capra and Luisi 2014).

There are many occupations that can be oriented to support the transition to sustainability, and a proper education should give each person the scientific, practical and ethical knowledge and skills to contribute some service to society while earning their living. A systems approach to the redesign of economic activities

and social functions should be able to identify many new possibilities for employment in activities that meet human needs while respecting environmental limits, in order to replace those sectors of the economy whose activities threaten our future. There are also critical social skills derived from an ethical perspective. "The moral dimensions of just and peaceful human relations include the generation of knowledge, the cultivation of trust and trustworthiness, eradication of racism and violence, promotion of art, beauty, science, and the capacity for collaboration and the peaceful resolution of conflicts" (BIC 2010).

Much recent research is demonstrating the validity and pertinence of values for sustainability from a systems perspective. Karlberg (2004) has explored how a world order characterized by competition, violence, conflict and insecurity can give way to one founded on unity in diversity. A number of lines of research are showing that cooperation rather than competition is the best foundation for social and economic progress (i.e. Nowak and Highfield 2011). Beinhocker (2006), summarizing a long tradition in ecological economics, as reconsidered economics from a systems perspective and defined a whole set of norms for individuals, collective behaviour and innovation in enterprises, accompanied by ethical principles for long-term sustainability.

Since no human being is sustainable as an individual (we are not going to live forever), social sustainability also requires the transmission of knowledge, culture and values from generation to generation, which is the essential purpose of education. With the emergence of modern information technologies, the youth of today are better informed and more effectively networked than any previous generation. If we can instil in them a culture of learning and the ethical principles necessary for sustainability, the youth can become the principal agents of change, and can transform society in a generation.

6 Ethics in Educational Approaches and Materials

It is not possible in a short review to cover all the materials that could support ethical instruction and values-based education. The educational materials produced by the Partnership for Education and research about Responsible Living (PERL, http://perlprojects.org) and its predecessor the Consumer Citizenship Network are all related in a general way to the values required for sustainable lifestyles and responsible living.

A PERL subproject is just completing a set of toolkits for values-based education building on the methodologies developed during the Values-based Indicators of Education for Sustainable Development (esdinds.eu) project. There are three toolkits:

- *Measuring What Matters—Values-based Indicators* This toolkit explains the background and approach to how values are expressed and can be measured, for those who want to create their own indicators adapted to their needs.

- *Discovering What Matters—A journey of thinking and feeling* This toolkit developed with and for students includes both a menu of indicators of values, skills, knowledge, attitudes and personal qualities, and examples of activities ready to use. It can be used directly by student groups.
- *Building a Shared Vision—A toolkit for schools* This toolkit provides tools to assess whether the educational environment a school creates for its students is a vibrant sustainable community with a supportive environment that facilitates acquiring responsible values.

Another initiative that has developed a range of materials for teaching values and virtues is The Virtues Project (http://www.virtuesproject.com/) producing virtues cards and other materials that can be used in families and in more formal educational settings. Materials are available in several languages and adapted to various faith traditions.

An important dimension often overlooked in education for sustainability is direct contact with nature. Being in, understanding and appreciating nature not only provides a foundation for a scientific understanding of the natural world, its contributions and requirements, but also creates an emotional and spiritual resonance that supports a strong environmental ethic. Many people who have chosen environmental careers or shown a strong environmental sensitivity as adults experienced nature as children, although others have been motivated as much by a strong feeling of justice and equity towards those less fortunate then themselves (Howell 2013). Unfortunately, in a world that is rapidly urbanizing, an increasing proportion of children have little or no contact with nature, leaving a vacuum in their life experience that may make it more difficult for them to be motivated towards environmental protection and responsible living in harmony with nature later on.

Where the formal educational system is unable or unwilling to provide ethical instruction, families and communities may need to organize in other ways to give their children a foundation of values and social skills that will orient them towards a more sustainable and fulfilling life. This could be with children's classes providing activities and instruction adapted to each age group. Perhaps the most important time for ethical empowerment is the pre-adolescent years from about 11 to 14 when children are leaving the parental fold and adopting their own values and directions in life. Groups of pre-adolescents can be accompanied as they read stories about the ethical challenges faced by those of their own age who have faced problem of poverty, civil war and lack of opportunities, and plan and implement their own service projects in their communities. If such young people experience the pleasure that comes from altruistic acts of service, and build confidence in their own abilities to communicate, take charge, and organize their own activities, they will be better prepared to face the challenges of life as they grow up in a positive, constructive way. Such activities are often best accompanied by youth not much older than themselves, whom they can relate to and communicate with more freely.

The local community is also an important educational setting. If children grow up in a community with strong social ties, where respect for diversity and solidarity are important values, this will also give them a good start in life. Such communities, like extended families, can compensate to some extent for failings in the immediate family. The more children grow up with models of ethical and responsible living around them, the easier it will be for them to follow this path.

7 Values in the Educational System

Educational systems are some of the most conservative institutions in society, and quite resistant to change. Each generation of teachers is most comfortable with the methods they have learned and practiced in the classroom. In one sense, this is a useful protection against fads and political pressures for change only for the sake of change. But it also means that new social needs such as adapting to a more diverse and globalized world, and learning responsible lifestyles can take a long time to introduce into the curriculum.

In some countries, religion is a regular part of the curriculum, or schools are run by religious institutions, which insures some ethical instruction at least within one doctrinal framework. In other countries, education is completely secular, and religion cannot even be mentioned in the classroom. Neither is ideal, as instruction limited to one faith tradition may exclude some important ethical principles for sustainability, and in a secular system, there may be no mention of ethics and religion at all, leaving young people ignorant of a major dimension of human experience and culture.

A scientific Symposium on Meaning, Values and Spirituality in the Development of Children and Young People, organized by the Centre for Social Paediatrics at the Cantonal Hospital of Winterthur, Switzerland, in collaboration with the Club of Rome on 5–6 December 2013, raised a number of important points about this challenging issue (http://iefworld.org/node/657). Many children today have parents who rejected religion in their youth and transmitted nothing to their offspring. Basic questions of life such as its meaning and purpose have never been addressed. Ignorance of religion is often accompanied by prejudice against people with a religious belief, reinforcing social fractures and violations of human rights. To prevent this, the cantonal government of Zurich has adopted weekly religious instruction for the first nine years of schooling, with a curriculum jointly developed by Catholics, Protestants, Jews, Hindus, Buddhists and Moslems, to present the objective reality of religion as a cultural phenomenon, without sectarian bias. Values and spirituality are important for children. Values are things that are part of a good life, that provide points of reference. Children should have examples of love, and practicing values, with the possibility to fail, stumble, and learn from it. The consumer society is a danger for children, with a globalized and commercialized world of brutal and erotic advertising, with profits for the few, and many losers. Naive inexperienced children cannot resist these pressures and suffer

badly. They become passive consumers, dependent financially and with their motivation undermined. The symposium also noted a decline in social commitment and interest in environmental issues among young people, which is of concern for motivating responsible living. It highlighted the need for an ethical component to education, and the damage that is done to young people when this is deficient.

In the diverse world of today, where schools have students from many faith traditions and no tradition, it is important that ethics and values be presented with neutrality, sensitivity, and respect for each perspective. There should be no pressure either to accept or reject any belief, but an open process of inquiry and independent investigation of truth. This can help to overcome conservatism, and to open each student to the possibility of adapting his or her beliefs to the new requirements of a unified and sustainable world. Some schools have open dialogues, where students can invite representatives of different faiths and ethical perspectives to share their understanding of ethical topics. There can even be partnerships with a range of local traditions and organizations to develop curriculum materials relevant to the local social, cultural and environmental context. At the level of university instruction and advanced studies, the ethics of sustainability has been one of the topics most appreciated (Dahl 2012). It should become a standard part of any curriculum.

8 Priorities for the Future

As the process of globalization continues, driven by new technologies, and the dangers inherent in overshooting planetary limits become increasingly apparent, two processes will be advancing simultaneously. Those institutions, attitudes and values associated with the consumer society and national sovereignty will push society towards repeated crises and collapse. At the same time, those still embryonic institutions and innovative approaches to building unity in diversity and sustainability in a planetary human system, and the ethical principles that must underlie them, will continue to develop. This is the logical next step in the evolution of human civilization towards higher levels of complexity and systems integration. The challenge is to advance the constructive processes fast enough to reduce the human suffering that the collapse of old maladapted structures necessarily entails. An ethical transformation must be at the heart of building a new society.

The United Nations is preparing a new vision beyond 2015, including adopting new Sustainable Development Goals, targets and indicators, and implementing the framework of action on Sustainable Consumption and Production approved at Rio+20 in 2012. This will provide a more specific near-term set of goals towards which action motivated by ethical principles can be directed. Education in ethics to meet concrete targets can be more relevant and effective than if there are only nebulous long-term aims, so educational approaches can build on this.

Climate change is emerging as the most challenging crisis of this century, threatening as it does on the one hand the energetic foundations of the present

economic system, and on the other the safety and well-being of billions of people and the natural systems upon which we all depend. The ethical imperative to respond rapidly to climate change necessitates a major focus in the years ahead.

It is obvious to all who understand the science behind the sustainability challenge and planetary limits that business as usual is leading us to disaster, and a fundamental transformation in the economic system is essential to make a transition towards a better future. It is not so much the mechanisms of the economic system that are at fault, as there will always be a need for industry, trade and commerce, but the values underlying the economy that need to be changed. Sustainability requires new values-based economic models that support a dynamic, just and thriving social order, are strongly altruistic and cooperative in nature, provide meaningful employment, and help to eradicate poverty in the world (BIC 1998).

Times of transition and change are necessarily risky and often painful. The best protection in periods of trouble is strong community solidarity and resilience. The ethical principles for sustainability find their full expression at the community level, and many neighbourhoods and communities are already going in this direction. The community provides the perfect environment for pre-adolescents to perform acts of service, for sustainable forms of transport and sources of energy to be organized, for more effective forms of production and consumption to be explored, for community agriculture to be developed, for culture, art and beauty to be nurtured, for different approaches to spirituality and faith to be shared and appreciated, and for participatory decision making to form the heart of community life.

Another coming challenge requiring an ethical response is the increasing flow of refugees and displaced persons all around the planet. Climate change is expected to displace hundreds of millions of people from low-lying coastal areas and from places where environmental resources such as water and agricultural land become insufficient. Unlike political refugees, these displaced populations may never be able to return to their homes. There are at present no international structures or mechanisms to manage population movements at this scale, and the issue of immigration is too sensitive politically to discuss this openly, not to mention to respond in an ethically appropriate way. Most human rights violations today are against immigrants and minorities. Will immigrants be forced to assimilate into the receiving countries, or can they retain their cultural roots and heritage? Can communities be allowed to migrate together, retaining their cultures and social capital? Since we have all contributed to climate change, we all have a responsibility towards those who have been impacted by our actions and lifestyles. The ethical principles of solidarity, hospitality to guests and strangers, and responsibility towards other members of our human family, must be cultivated in the receiving communities. We must anticipate and respond to this challenge before it becomes a global humanitarian crisis with great suffering (IEF 2010).

Finally, we can counter all the depressing if not overwhelming sustainability challenges facing us with an ethics of hope. The scientific solutions are there, but human stubbornness is preventing their application. We need to recognize our higher human purpose, and consult on collective visions for the society we want to build. We should understand the processes of change at work in society and the

opportunities that change provides for innovation and creative solutions. We can cultivate a culture of learning and adaptive management as we explore new directions together through action, reflection and consultation. Even if the global challenges seem immense, we can always develop our own capacities and improve our own character, and work together to improve our own community or neighbourhood. Together, with the power of ethical principles and conviction as well as science, we can contribute to the constructive forces at work in the world, and build momentum towards a just and sustainable society.

References

Anello, E., 2008. *A Framework for Good Governance in the Public Pharmaceutical Sector.* Working draft for field testing and revision. Geneva: World Health Organization. http://www.who.int/entity/medicines/areas/policy/goodgovernance/GGMFramework2008-04-18.pdf [Accessed 12 August 2014].

BIC (Bahá'í International Community), 1998. *Valuing Spirituality in Development: Initial Considerations Regarding the Creation of Spiritually Based Indicators for Development.* A concept paper written for the World Faiths and Development Dialogue, Lambeth Palace, London, 18-19 February 1998. London: Bahá'í Publishing Trust. https://www.bic.org/statements/valuing-spirituality-development [Accessed 12 August 2014].

BIC (Bahá'í International Community), 2010. *Rethinking Prosperity: Forging Alternatives to a Culture of Consumerism.* Bahá'í International Community's Contribution to the 18th Session of the United Nations Commission on Sustainable Development. https://www.bic.org/statements/rethinking-prosperity-forging-alternatives-culture-consumerism [Accessed 12 August 2014].

Beddington, J., 2009. speech at GovNet SDUK09. http://www.govnet.co.uk/news/govnet/professor-sir-john-beddingtons-speech-at-sduk-09 [Accessed 12 August 2014].

Beinhocker, E.D., 2006. *The Origin of Wealth: Evolution, Complexity, and the Radical Remaking of Economics.* Cambridge: Harvard Business School Press, and London: Random House Business Books.

Burford, G., Velasco, I., Janoušková, S., Zahradnik, M., Hak, T., Podger, D., Piggot, G. and Harder, M.K. 2012. Field trials of a novel toolkit for evaluating 'intangible' values-related dimensions of projects. *Evaluation and program planning* 36(1):1-14. May 2012. DOI: 10.1016/j.evalprogplan.2012.04.005

Burford, G., Hoover, E., Velasco, I., Janoušková, S., Jimenez, A., Piggot, G., Podger, D. and Harder, M.K. 2013. Bringing the "Missing Pillar" into Sustainable Development Goals: Towards Intersubjective Values-Based Indicators. *Sustainability* 5:3035-3059. doi:10.3390/su5073035

Capra, F. and Luisi, P.L., 2014. *The Systems View of Life: A Unifying Vision.* Cambridge: Cambridge University Press.

Dahl, A.L., 1996. *The ECO Principle: Ecology and Economics in Symbiosis.* London: Zed Books and Oxford: George Ronald.

Dahl, A.L., 2012. *Values Education for Sustainable Consumption and Production: From Knowledge to Action.* Paper presented at the Global Research Forum on Sustainable Consumption and Production, Rio de Janeiro, Brazil, 13-15 June 2012. http://iefworld.org/ddahl12i. [Accessed 12 August 2014]

Dahl, A.L., 2013a. *Putting the Individual at the Centre of Development: Indicators of Well-being for a New Social Contract.* Paper presented at the Third Rencontres Internationales de Reims on Sustainability Studies, "Post-2015 Sustainable Development Goals: Towards a New Social Contract", Reims, France, 18-20 June 2013. In press in François Mancebo (ed.), *Transitions to Sustainability.* Dordrecht: Springer.

Dahl, A.L., 2013b. "A Multi-Level Framework and Values-Based Indicators to Enable Responsible Living", pp. 63-77. In Ulf Schrader, Vera Fricke, Declan Doyle and Victoria W. Thoresen (eds), *Enabling Responsible Living*, Berlin/Heidelberg: Springer Verlag. DOI: 10.1007/978-3-642-22048-7_6 http://www.springer.com/environment/sustainable+development/book/978-3-642-22047-0 . [Accessed 12 August 2014].

Howell, R.A., 2013. It's not (just) "the environment, stupid!" Values, motivations, and routes to engagement of people adopting lower-carbon lifestyles. *Global Environmental Change* 23: 281-290.

IEF (International Environment Forum), 2010. Statement to the Human Rights Council Social Forum on Climate Change and Human Rights. http://iefworld.org/node/249#app2 [Accessed 12 August 2014].

IPCC. 2013. Climate Change 2013: *The Physical Science Basis. Summary for Policymakers*. Working Group I Contribution to the IPCC Fifth Assessment Report. Geneva: Intergovernmental Panel on Climate Change.

Jacobson, M.Z. and Delucchi, M.A., 2011. Providing all global energy with wind, water, and solar power, Part I: Technologies, energy resources, quantities and areas of infrastructure, and materials. *Energy Policy* 39: 1154–1169. doi:10.1016/j.enpol.2010.11.040

Karlberg, M., 2004. *Beyond the Culture of Contest: From Adversarialism to Mutualism in an Age of Interdependence*. Oxford: George Ronald.

McKibben, B., 2012. Global Warming's Terrifying New Math. *Rolling Stone*, 2 August 2012. http://www.rollingstone.com/politics/news/global-warmings-terrifying-new-math-20120719 [Accessed 12 August 2014].

Nowak, M.A. and Highfield, R., 2011. *Super Cooperators: Altruism, Evolution, and Why We Need Each Other to Succeed*. New York: Free Press.

Pimm, S.L., C.N. Jenkins, R. Abell, T.M. Brooks, J.L. Gittleman, IL.N. Joppa, P.H. Raven, C.M. Roberts, and J.O.Sexton. 2014. The biodiversity of species and their rates of extinction, distribution and protection. *Science* 344 (6187) 30 May 2014 http://www.sciencemag.org/content/344/6187/1246752.abstract [Accessed 12 August 2014].

Podger, D., Velasco, I., Luna, C.A., Burford, G. and Harder, M.K. 2013. Can values be measured? Significant contributions from a small civil society organisation through action research. *Action Research Journal* 11(1): 8-30. DOI: 10.1177/1476750312467833

Randers, J., 2012. *2052: A Global Forecast for the Next Forty Years*. A Report to the Club of Rome. Commemorating the 40th Anniversary of The Limits to Growth. White River Junction, Vermont: Chelsea Green Publishing.

Rawls, J., 1999. *A Theory of Justice*. Rev. Ed., Cambridge: Harvard University Press.

Rockström, J., W. Steffen, K. Noone, A. Persson, F. S. Chapin, III, E. Lambin, T. M. Lenton, M. Scheffer, C. Folke, H. Schellnhuber, B. Nykvist, C. A. De Wit, T. Hughes, S. van der Leeuw, H. Rodhe, S. Sörlin, P. K. Snyder, R. Costanza, U. Svedin, M. Falkenmark, L. Karlberg, R. W. Corell, V. J. Fabry, J. Hansen, B. Walker, D. Liverman, K. Richardson, P. Crutzen, and J. Foley. 2009. Planetary boundaries: exploring the safe operating space for humanity. *Ecology and Society* 14(2): 32. [online] URL: http://www.ecologyandsociety.org/vol14/iss2/art32/ [Accessed 12 August 2014].

Stiglitz, J.E., Sen, A. and Fitoussi, J-P., 2009. Report by the Commission on the Measurement of Economic Performance and Social Progress. http://www.stiglitz-sen-fitoussi.fr [Accessed 12 August 2014].

Turchin, P., 2010. Political instability may be a contributor in the coming decade. *Nature*, vol. 463, Issue 7281, p. 608. (4 February 2010). doi:10.1038/463608a

World Bank. 2012. *Turn Down the Heat: Why a 4°C Warmer World Must be Avoided*. Washington, D.C.: The World Bank. 84 p. http://documents.worldbank.org/curated/en/2012/11/17097815/turn-down-heat-4%C2%B0c-warmer-world-must-avoided [Accessed 12 August 2014].

World Commission on Environment and Development. 1987. *Our Common Future*. Oxford, Oxford University Press.