FORMAL ENVIRONMENTAL EDUCATION AT PRESCHOOL, PRIMARY, AND SECONDARY LEVELS

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Summary

Considering that as future adults today's children are more likely than not to make adverse impacts on the natural environment and earth's life-support systems through their behavior, life-styles and attitude, the importance of formal environmental education for children as well as of instilling in their consciousness awareness of the natural environment and respect for it cannot be over-stated. No doubt informal education has a significant role to play in this. However, this does not diminish the case for including environmental studies in formal curricula which pupils and students tend to take more seriously as experience clearly shows.

According to educational psychology and science of education, children, unlike adults

whose attitude and behavior have largely been formed and who tend to become set in their ways with age, have greater capacity for imbibing the basic notions of 'good' and 'bad' *vis-à-vis* nature and the natural environment (and anything else for that matter) in ways that endures significantly to shape their attitude and behavior in adulthood. It would be sensible, therefore, to concentrate limited educational resources for changing human behavior and attitude on the young. With mounting environmental problems on all fronts, some of which (e.g. global warming) are potentially catastrophic for life on earth, this needs to be taken on board by policy-makers and by educational professionals generally.

Important issues of children's formal environmental education are discussed in this chapter including: development of curricula up to the secondary level; development of curricula for children with learning disability; instilling environmental awareness in children; and some other issues closely related to children's education. A generic environmental syllabus is proposed in outline for the secondary level from which one or more teaching modules may be developed as deemed necessary or appropriate.

1. Introduction

1.1. The Problem in Context — The Background

It is an indisputable fact that all kinds of human activities for economic development have been degrading the natural environment (Porritt, 1991a; WCED, 1987). Phenomenal growth of industrial production since the Industrial Revolution has been relentlessly degrading the global environment and nature's life support systems without which life on earth cannot exist. The enormity of the problem can be gleaned from the fact that during 1950 and 1985 the world's manufacturing output grew by a factor of about seven (WCED, 1987), releasing a matching amount of environment-degrading pollutants. The trend is relentlessly upwards, and it is becoming increasingly hard to find a single human activity for economic development that does not adversely impact on the natural environment, or is benign to it.

For sometime now the informed have opined that if nothing is done effectively to reverse, or at least arrest, the growing pace of global environmental degradation, future generations are at serious risk of inheriting a polluted earth denuded of its resources and unable to provide an acceptable quality of life. Alarmed by this scenario, in 1983 the General Assembly of the United Nations constituted a special and independent commission, called the World Commission on Environment and Development (WCED) under the chairmanship of Dr. Gro Harlem Brundtland. Its remit was to explore, as a matter of urgency, ways in which this deeply disturbing scenario could be averted. After exhaustive consultation with people from all walks of life world-wide, in 1987 the Commission published its report entitled *Our Common Future* (WCED, 1987). In the report the Commission concluded that the above scenario could only be averted by adopting a new kind of economic development — Sustainable Development — which it defined as "development that meets the needs of the present generation without compromising the ability of future generations to meet their needs" (WCED, 1987).

Agenda-21 was a major document to emerge from the United Nations Conference on

Environment and Development (UNCED) held in Rio de Janeiro in 1992. This enormous document of 40 chapters is meant to be a blue-print of how global sustainable development could and should be achieved to secure both intra-generational and intergenerational equity.

However, there are several problems thwarting the practical implementation of sustainable development. We refer here to two of these that are relevant to the present context. First, the official definition of sustainable development given above is a political one, as is the document *Our Common Future* (also called the Brundtland Report). It sounds fine and points to a novel pathway for the sustainable development of societies everywhere. However, it is proving to be impossible to translate this political definition into a unique operational definition for the practical implementation of sustainable development. The OECD's effort to this end is revealing. In 1989 the organization assembled a group of leading economists and environmental experts to advise it on how to respond to the Brundtland Report. The group's advice, after considerable deliberation, was that the OECD should abandon trying to develop an operational definition, and that instead it should help its member countries to advance towards sustainable development by pursuing a series of strategic elements which look like critical pathways to anyone's concept of a sustainable future (Long, 1996).

The second problem is that in pluralistic democratic societies the time horizon of politicians does not extend beyond the next election, that is four or five years, whereas sustainable development is demonstrably an on-going, long-term process. Not surprisingly, therefore, all that the concept of sustainability seems to mean to most politicians is being able to go on subscribing to the literally unsustainable — namely, infinite growth on a finite planet. By a piece of linguistic manipulation worthy of 'doublethink' in George Orwell's (1984), sustainability can be interpreted as sustaining the patently unsustainable (Porritt, 1991b).

Like it or not, our world is rapidly evolving as two different worlds — the rich world and the poor world — each with its characteristic unsustainable patterns of development. In the poor world, comprising the developing nations, these patterns are characterized mainly by poverty, high population growth rate, and huge income disparity between the rich and the poor. Even though the poor may be genuinely aware of the need to protect the environment, it is not a priority for them however, and neither are the finer points of sustainable development. Securing the next meal is, and, for sheer survival they may and do resort to damaging or even destroying their environment. In the rich world of the developed nations, on the other hand, unsustainable patterns are increasingly characterized by highly consumptive, polluting and hedonistic lifestyles fuelled by a pervasive culture of greed. It is the rich world that creates much of the world's pollution. For example, with only about 4 percent of the world's population the USA creates an estimated 26 percent of the global pollution and consumes about 28 percent of the earth's resources. Yet, what it has been doing to protect the global environmental is far less than commensurate with the pollution it has been creating or the natural resources it has been depleting. Recent withdrawal of the George W Bush's US Administration from the Kyoto Agreement is an example of this. Instead, and perversely, the rich world expects the poor world to curb its pollution, knowing very well that this would thwart their developmental ambitions and so consign them to even

greater poverty.

The factors mentioned above, and others that are variously economic, political and socio-cultural (Nath and Talay, 1996), have been acting in concert to frustrate efforts at implementing sustainable development, especially in the vast poor world. And degradation of the global environment continues unabated as a result with potentially catastrophic consequences for life on earth (e.g. ISSC, 2005; Royal Society, 2005).

1.2. How Did We Get Here?

To an objective external observer human beings are the most intelligent, inventive and industrious in all of nature's earthly creation. Blessed with tremendous capacity for rational as well as abstract thought they have developed logic, mathematics, philosophy, poetry, music and so on, and even the concept of The Divine. And their outstanding achievements in science, medicine and technology are without parallel. Yet, they have been systematically degrading the very natural environment and its fragile life-support systems that provide all their needs and without which they will surely perish. It is hard to find an animal of a lower species that knowingly 'digs its own grave' in this way. Therefore, in order to develop a heuristic for improving matters, it would be helpful first to explore the origins of this bizarre and potentially self-destructive human behavior.

"*Man has wiped out a third of the natural world in the last thirty years and soon will have to start looking for a new planet to live on…..The scale of devastation is so great that man will have used up all the Earth's natural resources by 2075……If every human alive today continues to consume resources and produce carbon dioxide at the same rate as the average Briton, we will need to colonize at least two Earths to survive……Our current rate of consumption is eroding the very fabric of our planet and will ultimately threaten our long-term survival.*"

The Living Planet Report 2000, World Wildlife Fund

It is a demonstrable fact that how we treat and relate to nature and the natural environment is fundamentally determined by our attitude to them. And our attitude, in turn, is shaped by the moral and ethical values we hold (Gross, 2001).

In the Western context the philosophical world-view of Aristotle may be taken as the starting point of what eventually became the foundation of modern science and technology. According to Aristotle, nature has no intrinsic value. It is of value only if it benefits humans. Thus, for example, a rare plant in the tropical rain forest is valuable and worth preserving *only* if some useful drug could be made from it, or if it serves a useful purpose to benefit the humankind. Clearly, it is a highly utilitarian and exploitative attitude to nature. It is also profoundly anthropocentric and does not acknowledge nature's right to exist for its own sake. Historically this attitude, which is all too common in pervasive Western cultures, has driven the evolution of both science and technology and still continues to do so.

In the Seventeenth Century this utilitarian and highly exploitative attitude, which also pervades the Judaeo-Christian tradition, was reinforced by Francis Bacon (1561-1626)

and René Descartes (1596-1650) among others. Their thesis was that nature and everything within it was for the sole benefit, well-being and pleasure of man. In other words, man had the *carte blanche* to exploit nature as he pleased for his own benefit and pleasure. However, as it has now become clear, this attitude more than any other factor has been responsible for the continuing degradation of earth's natural environmental capital (ISSC, 2005; Royal Society, 2005), thus bringing us to the cross-roads of history where our long-term survival as a species is put at risk *vis-à-vis* the environment and nature's life-support systems (Nath, 2000, Nath, 2003).

"*In Western terms, one of the underlying factors which may have contributed (by being taken literally) to the desire to dominate nature, rather than live in harmony with it on a sustainable basis, is to be found in the Book of Genesis where it records that "God said unto man, be fruitful and multiply, and replenish the Earth and subdue it: and have dominion over the fish of the sea and over the fowl of the air and over every living thing that moveth upon the Earth." To me, that Old Testament story has provided Western man, accompanied by his Judaeo-Christian heritage, with an overbearing and domineering attitude to God's creation."*

HRH The Prince of Wales (Porritt, 1991)

The Platonic world-view, on the other hand, acknowledges the intrinsic value of nature for its own sake. That is, nature and all things within it have their own intrinsic values independently of humans and regardless of what humans thought those values might be. We humans may not know about or understand those values or their intrinsic quality because of our own limitations, ignorance or selfishness. Clearly, it is an eco-centric world-view which is benign to nature at the very least. It is tempting to speculate on how human societies will have evolved with the Platonic world-view as the foundation of economics, science and technology rather than the Aristotelian world-view which prevailed.

Historically, the older civilizations based on the *Buddhist* and *Daoist* (Taoist) world-views among others, and the ancient *Vedic* philosophy of India, which is still constitutes that country's culture, taught man to regard planet earth with respect and consideration as the provider of all his needs and sustainer of all life on earth. Even today in India planet earth is usually referred to as *Dharitri Mata* in Sanskrit, meaning Mother Earth. Then, much later, came Western science and technology with their characteristic arrogance firmly based on the Aristotelian world-view which despised any notion of respecting earth as 'mother' as sheer sentimentality. The earth, it was proclaimed, was there for man to exploit with science and technology for his own benefit and pleasure. If ever there were to be a global environmental catastrophe — and heavens forbid it — this must surely be its most fitting epitaph. Indeed, this exploitative mentality, and the self-serving greed which fosters it, together with arrogance and ignorance which promote both, has in the main been responsible for the increasingly serious environmental predicament in which the humankind now finds itself (Nath and Talay, 1996; Nath, 2003).

1.3. A Heuristic for Addressing the Problem in Hand

In the light of what was said in Sections 1.1 and 1.2, it is clear that if we are at all

serious about achieving even a modest degree of global sustainability, the all-pervasive Western exploitative attitude to the environment must change to one of *genuine* concern, care and respect for nature and the natural environment. It is encouraging to note that the need to respect the environment is beginning to be officially acknowledged, as in Article 2 of the Treaty of the European Union (TEU), for example, which states that EU's environmental policy objective shall include the goals of "sustainable and non-inflationary growth respecting the environment" (Lee, 1995). It is, however, curiously reticent (hopefully for the time being) about what "respecting the environment" is actually supposed to mean in practice. The strategic rationale of respecting the environment is obvious to see. For if societies everywhere could be persuaded to respect the earth *truly* as *Mother Earth*, as had been the case in some of the older civilizations, and to accept from her bountiful benediction only that which they needed, then, since people do not normally abuse of exploit their mothers, all human societies would live in harmony with nature, thus paving the way to global sustainability.

Unfortunately, an adult's attitude, which is fundamentally shaped by the ethical and moral values he or she holds and had imbibed in childhood, is one of the hardest things to change, and no amount of science or technology, however clever, can be helpful in this regard. This is mainly because with age a person becomes increasingly set in his or her ways, unlike children whose minds are much more receptive and pliable. *The strategy must therefore be to instill and nurture appropriate moral values, especially in children, effectively from early childhood so that by the time they take their places in society as adults, they will have imbibed a robust and genuinely environment-respecting attitude.*

A very important 'bonus' of teaching children such moral values stems from the fact that these values are exclusively concerned with 'before-the-pipe' strategies for pollution prevention. That is, they teach children, directly or indirectly, *how not to create pollution in the first place.* This strategy of waste prevention or minimization is much to be recommended. Not surprisingly, it is at the top of the EU hierarchy of waste management options (Powrie & Robinson, 2000). By contrast, environmental science and technology are almost exclusively concerned with 'end-of-the-pipe' methods and strategies. That is, dealing *with the consequences of pollution after it has been created.*

We concede, however, that in the real world of today (especially in the Western developed nations that are profoundly materialistic) this prescription of genuine respect for the environment is likely to be seen as being far too idealistic to be realistic, and possibly even surreal. But then, what alternative is there, given that science and technology for pollution prevention or alleviation is almost exclusively for the rich world, and that despite tremendous advances in science and technology the global environment continues to be degraded relentlessly?

1.4. Reliance on Clean Technology, Market Forces and Economic and Regulatory Instruments — the Reality

There is the counter argument that clean or cleaner technologies, market forces and economic and regulatory instruments can be relied upon to alleviate or even solve

environmental problems. Even the Brundtland Commission Report (WCED, 1987) tends to support this argument, and understandably so given that it is first and foremost a political document.

We take the view, however, that in reality this argument is intellectually deficient as it is uninformed as well as naïve about human nature. Because, to put it crudely, if environmental problems could be alleviated or solved using science and technology, why is the deterioration of the global environment continuing to accelerate? Why, despite its abundant endowment of skilled manpower and financial resources the USA continues to be the biggest polluter in the world with grossly unsustainable life-style (Nath, 2003; Nath and Kazashka-Hristozova, 2005)? Certainly clean technologies can bring environmental benefits to a nation, but only if it can afford them. Most of the poor nations cannot, and neither can even the mighty USA as it would appear from that country's withdrawal from the Kyoto Agreement.

As for market forces and economic and regulatory instruments, we note that driven by greed both individuals and corporations will always find ways and means to circumvent prevailing laws and regulations for greater profit. For example, in the USA there is a plethora of laws and regulations, as well as well-funded enforcing authorities (e.g. the powerful Securities and Exchange Commission), to monitor and ensure the financial probity of business corporations. And yet, in the first half of 2002 there have been a number of spectacular financial scandals involving some of the largest US corporations such as ENRON, WorldCom, TYCO and Anderson Consulting, while two of the largest finance houses, Merrill Lynch and CSFB, have been penalized with enormous fines for deceiving the public for making greater profit (Nath, 2003). Such selfish behavior is symptomatic of the pervasive and apparently insatiable 'greed culture', and one may be forgiven for thinking that the above list merely represents the tip of the proverbial 'iceberg'. The enormity of the implications of such behavior for corporate America, and by implication the rest of the world, is summed up by a recent comment of the Chairman and Chief Executive of Goldman Sachs, which is one of the world's largest investment banks. He said that America faced the biggest crisis of confidence in its capitalist system in his working lifetime (As reported in the London *Daily Mirror* of 12 June 2002, page 6).

We submit, once again, that such behavior is fundamentally a product of attitude which, in turn, is shaped by one's moral values imbibed in childhood. And so an attitude can *only* be changed by changing the moral values that engender and underpin it. With this in mind, we propose in what follows strategies for instilling and nurturing environment-respecting moral values in children that would hopefully endure throughout their lives.

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Biographical Sketch

Professor Bhaskar Nath received his Bachelor's degree in Civil Engineering from the Indian Institute of Technology, Kharagpur, India, in 1960, followed by the Ph.D. degree from the University of Wales, UK, in 1964. In 1983 he was awarded the D.Sc. degree by the University of London for his outstanding original research (according to citation) in numerical mathematics. In 2001 he was awarded the Doctor Honoris Causa (Dr.H.C.) by the University of Chemical Technology and Metallurgy, Sofia, Bulgaria, for his contribution to environmental education.

After having taught at the University of London for more than 27 years, currently Professor Nath is Director of the European Centre for Pollution Research, London; Executive Director of International Centre for Technical Research, London; Editor of Environment, Development and Sustainability published by Springer; visiting professor to several European universities, and consultant to a number of international companies and organizations. Professor Nath's research interests include Numerical

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