India is grappling with serious environmental issues that have been largely sparked by its galloping economy. As a measure of its seriousness to reduce the environmental impacts it has spearheaded numerous policy initiatives. One of the major thrusts of the proposed initiatives to curb environmental degradation has been to create an informed and well-educated citizenry. The federal mandates have triggered new curriculum policies and the compulsory teaching of environmental and sustainability education at all levels in all education institutions.

This volume examines the policy practice conundrum. It looks at how national and international policy reforms reach practitioners – in this case teacher educators. Furthermore, it unravels how teacher educators understand environmental education, the ways in which they negotiate its demands on their busy schedules, what helps them in determining relevant issues within this and finally how they implement these policies in their everyday practices.

It is evident from this book that while there have been some really well meaning development of policies, their impact on teacher educators’ practice, and therefore student teachers’ learning about Environmental Education is limited. The study showed that while these teacher educators had a clear understanding of the environment and saw the need/importance of incorporating Environmental Education in their daily practices they had very little scope to do so. There were numerous factors that constrained implementation.

The book provides inputs on global policy practice gaps. It offers valuable insights to a global audience grappling with understanding the ways in which environmental education policies are put into practice in emerging economies like India. The final argument is thesis that while policy reforms are a step in the right direction they need to be backed up with strong implementation systems in order to be successful.
Environmental Education in a Climate of Reform
Environmental Education in a Climate of Reform

Understanding Teacher Educators’ Perspectives

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Monash University, Australia
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SECTION 1
BUILDING THE STORIES
CHAPTER 1

INTRODUCTION

We are responsible for whatever we are, and whatever we wish ourselves to be, we have the power to make ourselves. If what we are now has been the result of our own past actions, it certainly follows that whatever we wish to be in the future can be produced by our present actions; so know how to act.

Swami Vivekananda

As we work our way on this earth there are numerous experiences that we go through. What sense we make of these journeys, how we imbibe the various experiences ultimately lies with us and our perceptions. My own life experiences have shaped this book, which I see as a ‘taking stock of my journey so far’ point on this travel. In writing about environmental education and teacher education particularly in the Indian context there will be different colours thrown in, many of which will lie slightly to the left or right of the actual plot of this book but all of them will add together to help tell my story and through me the story of the teacher educators who have participated in the study that frames this book. This is as much my story as it is theirs.

It is important to document some background information on what prompted me to tell this story? Why did I want to tell this story or this book? And what were some of the triggers that put me on this path.

BACKGROUND

In December 2003, the Supreme Court of India mandated the teaching of environmental education across all years of formal schooling (Supreme Court of India, 2003). At the time, this appeared to provide a much needed impetus in raising the awareness of environmental issues in India; a phenomenon that has been growing significantly alongside the rapid growth of the Indian economy (Rangarajan, 2009; Ravindranath, 2007).

While the education community welcomed the mandate, the mode of implementation raised many concerns. As a teacher at the time, I too was concerned about the modalities of implementation, such as how the government would support teachers in implementing the mandate and how it would be translated into everyday teaching practice. On a more fundamental level, the question as to whether or not teachers were comfortable with the mandate and shared the same environmental concerns in India is ever present.
CHAPTER 1

This significant national policy development reignited my longstanding interest in environmental education (EE) and particularly my thinking about the role of EE in teacher education. My Research interests in EE originated when I was a student for my Master’s degree in Education, in the United States. My scholarship was funded by GLOBE (Global Learning and Observation to Benefit the Environment), which is a NASA initiative designed to build student/scientist partnerships. As part of that project I was involved in assessing biodiversity (loss of species) in a chain of Metro Parks in the city of Cleveland, Ohio. My project was aimed at involving school children in the program, developing long-term student-scientist partnerships, and encouraging teachers/school districts to include such initiatives as part of their school curriculum.

The Personal Connection

I have lived outside India for almost fifteen years. However, each yearly visit back to India has left me with a gnawing realisation that a lot needs to be done towards stemming the environmental concerns that have been growing disproportionately to the colossal economic strides that India has been taking in recent times. The changes have come with dizzying speed and as Kamdar (2007, p. 3) notes, it feels like “watching time-lapse photography”.

Two incidents in particular stand out as main sparks that jumpstarted the thought process. One of them was a visit to Juhu beach after a break of almost 10 years. The degradation on the beach, the amount of rubbish strewn on its once beautiful sand and the almost blackish coloured water moved me to tears. The place was especially dirty as I had visited after a festival when numerous idols are immersed into the sea. The second event was the devastating floods of 2005 that brought the entire city to a halt. Numerous lives were lost and there was extensive damage to property. Most of my family members that travel to work were trapped – in fact we did not have any news from my niece for two days. While Mumbai did receive unprecedented rainfall in the 24 hours leading up to the flood this was not necessarily the main cause for the floods. The city’s main natural drainage systems – namely the Mithi River and its extensive mangrove systems had been completely clogged leaving very little room for the water to leave the city thereby causing the floods.

While I had been thinking and reading about research in EE these two events provided the necessary impetus to take some action towards making a difference. There seems to be a growing acknowledgement that education – both formal and informal- in so many ways is key to societal change. However any attempt to reform the formal education system is futile unless it is accompanied by widespread support to teachers and teacher educators. Conversations with colleagues and eminent personalities in the field of teacher education have led me to believe that EE in formal teacher education institutions is still in a nascent stage and that there is a perceived gap in research about EE in teacher education. This study has been an
attempt in understanding the ground realities and with the intention to help towards bridging this gap.

RATIONALE

In the course of history, there comes a time when humanity is called to shift to a new level of consciousness, to reach a higher moral ground. At a time when we have to shed our fear and give hope to each other. That time is now. Those of us who have been privileged to receive education, skills and experiences and even power must be role models for the next generation of leadership. (Maathai, 2009, p. 16)

There has been no other time in history where environmental issues have been so prevalent (Cuff & Goudie, 2009; Diamond, 2005; Earth Summit, 2012; Krapivin & Varotsos, 2007; Nielsen, 2005; Pretty et al., 2007). Nielson (2005) identified seven broad issues – population explosion, diminishing land resources, diminishing water resources, destruction of the atmosphere, the approaching energy crisis (climate change), social decline, and conflicts and increased killing power. The explosion in world population has placed inordinate stress on the limited and finite resources of the earth, which have led to serious consequences such as destruction of natural habitats (Cuff & Goudie, 2009), increased levels of pollution and colossal losses in biodiversity.

Correcting these environmental imbalances requires a complete change in the general attitude towards treatment of the environment. Quoting a proverb by Chinese poet Kuan Tzu, 500 BC, Swaminathan outlines the impact that education can have in changing the future: ‘If you are planning one year ahead – plant rice, if you are planning ten years ahead – plant trees, if you are planning a hundred years ahead – educate the people’ (Swaminathan, 1987, p. 23).

Education is an important tool of change because it has the ability to bring about a shift in attitude. The 2007 International Conference on Environmental Education in Ahmedabad declared that, ‘Through education, human lifestyles can be achieved that support ecological integrity’ (K. Sarabhai, 2008, p. 2). The importance of education in bringing about a change in attitudes towards the environment that is sustainable was also emphasized in UNESCO’s (United Nations Educational, Scientific and Cultural Organization) Guidelines and Recommendations for Reorienting Teacher Education to Address Sustainability – ‘Education is essential for moving toward a more sustainable future. We cannot imagine how the people of all nations could move toward a more sustainable world without the contribution of educators from around the globe’ (UNESCO, 2007, p. 10).

Despite the fact that the concept of EE has been in existence for some time, there is no single agreed upon definition. Stapp coined the first formal definition in 1968 however the most commonly used definition was created by the International Union
for Conservation of Nature and Natural Resources in 1971. According to the IUCN, EE is:

… the process of recognizing values and clarifying concepts in order to develop skills and attitudes necessary to understand and appreciate the inter-relatedness among man, his culture, and his biophysical surroundings. Environmental education also entails practice in decision-making and self-formulation of a code of behaviour about issues concerning environmental quality. (IUCN, 1971, p. 7)

UNESCO has been central to the development of EE. The Belgrade Charter in 1975 and the Tbilisi conference in 1977 (which was the first UNESCO conference involving different governments) provided the most commonly used aims, objectives, and guiding principles for EE used to this day in international and national policy documents (UNESCO, 1975; UNESCO & UNEP, 1977). In recent years there has been extensive debate surrounding EE. There has been a dramatic shift toward education for sustainable development since the World Summit on Sustainable Development held in Johannesburg in South Africa. The general reason for this shift is the perception that EE lacked a holistic approach – one that also takes into account the developmental needs of society (Tilbury, 2004). Further to this, there has been a call to find a balance between the conservation of resources and meeting human needs in a sustainable manner. The World Conservation Strategy launched in 1980 first highlighted the need for sustainable development (International Union for Conservation of Nature and Natural Resources (IUCN), 1980). The Bruntland Commission devised the most commonly used definition for sustainable development that meets the needs of the present without compromising the ability of future generations to meet their needs. (World Commission on Environment and Development, 1987, p. 43)

The advent of the concept of sustainable development in some respects has pushed EE to the background. Major conferences and international literature appears to increasingly focus on education for sustainable development. Often sustainable development is considered an end purpose of EE. This can be problematic especially as the term is still fluid in its meaning and a universally accepted definition as yet, does not hold sway. Another cause for concern is that the notion of sustainable development has tended to push environment, nature and its study way from the centre of the issue and blur the focus somewhat. However, there can be no education for sustainable development without the environment being an integral part of it (Lotz-Sistika, 2009). Despite this situation, EE policy tends to adopt characteristics of ecological sustainability, thus further highlighting the lines of difference and concern that exist in the field (Cutter-Mackenzie, 2010).

It has been argued that the practice of EE in schools has been seriously lacking. In Australian schools, a growing culture of sustainability is prevalent (Cutter-Mackenzie, 2010). The depth and breadth of practice varies markedly, although even
ten years ago EE was considered to be a failing in school systems. While progress in teacher education has been slow, this area is now increasingly becoming an area of focus in some teacher education faculties (McKeown-Ice, 2012). Globally, education for sustainable development in the higher education sector is becoming increasingly important (Cotton, Warren, Maiboroda, & Bailey, 2007). In Australia EE is integrated across the curriculum and is beginning to be taught in more systematic ways in some teacher education institutions (Cutter-Mackenzie & Tilbury, 2002). In India, although teaching EE has been mandated across all schools, it does not appear to be mandatory in teacher education.

In 1991 UNESCO labelled teacher education as the ‘priority of priorities’ in relation to environmental education. This has been further emphasised through an international effort to reorient teacher education to EE (McKeown-Ice, 2005; Tilbury, 1992). The rationale for this approach is multifaceted.

In 1996 (Oulton, 1996, p. 1) argued that ‘only limited progress has been made at the school and teacher education levels’ to incorporate EE into the formal education system. An earlier study undertaken by the Organization for Economic Cooperation and Development (OECD) in five countries saw teacher education as the weakest aspect of EE programs in all these five countries (Organisation for Economic Co-operation and Development, 1995). Additionally the study also found that very few teachers thought that teacher education institutions are doing enough to prepare teacher for teaching environmental issues. The main impediments for this seem to be the traditional disciplinary structure and pedagogical practice of higher education. An Australian study (Miles & Cutter-Mackenzie, 2006, p. 148) also found that:

… despite national and international policy rhetoric about the importance of pre-service teacher preparation in environmental education, the present study has shown that there are still inadequate levels of environmental education provision at the teacher education level and that pre-service teachers’ preparedness for teaching environmental education is overwhelmingly low.

It has now been 15 years since the OECD study. Research undertaken since that time (Cutter-Mackenzie, 2009; McKeown-Ice, 2000, 2012; Oulton, 1996; Tilbury, 2004) has significantly aided in explaining existing patterns of EE provision and identified reasons as to why teacher education programs have typically failed to adequately prepare teachers in EE. Major impediments/barriers to this include: inadequate provision for EE in teacher education programs; inadequate preparation of teachers such that they do not have the requisite knowledge, skills and experience to teach EE (Cutter, 1998; Cutter-Mackenzie & Tilbury, 2002; Ferreira, Ryan, & Tilbury, 2006; Miles, Cutter-Mackenzie, & Harrison, 2006);

- lack of commitment from teacher education institutes;
- lack of awareness about the environment;
- lack of motivation; and,
- lack of disposition of the individual student teachers and teacher educators.
Miles, Cutter-Mackenzie and Harrison (2006) contend that ‘little has changed in the adequate provision of environmental education in pre-service teacher education over the last twenty years.’ They challenge teacher education providers to consider ‘new ways and approaches to better prepare future teachers in the area of environmental education’ (p. 57). Such conclusions have tended to be based upon pre-service teachers’ (student teachers’) course experiences (McKeown-Ice, 2000; Plevyak, Bendixen-Noe, Henderson, & Wilke, 2001; Tilbury, 1992, 1994). Teacher educators themselves have seldom featured in such studies, which makes this thesis particularly significant in advancing the field of EE from a teacher education perspective.

**Significance of the Study**

If education has to be an effective tool of change, in the general attitude towards the treatment of environment, teacher education will have to respond to this effectively at all levels. The content and processes of teacher education will have to equip teachers with a proper understanding of and love for the nature around and the skill of inculcating these among their students. This may result not only in a healthier society, both physically and mentally, but also the much needed replenishment and sustenance of natural resources notwithstanding all the material and industrial development. (National Council of Teacher Educators, 2005, p. 57)

While there are a growing number of research studies investigating pre-service teachers’ thinking and experiences in EE, teacher educators themselves and the culture and organisation in which they operate have tended to be overlooked. There is a lack of research concerning teacher educators’ understandings of, and attitudes in, the field of EE (Cotton et al., 2007). UNESCO’s key Reorientation Policy emphasised that:

Institutions of teacher education fulfil vital roles in the global education community; they have the potential to bring changes within educational systems that will shape the knowledge and skills of future generations. Often, education is described as the great hope for creating a more sustainable future; teacher-education institutions serve as key change agents in transforming education and society, so such a future is possible. Not only do teacher-education institutions educate new teachers, they update the knowledge and skills of in-service teachers, create teacher-education curriculum, provide professional development for practicing teachers, contribute to textbooks, consult with local schools, and often provide expert opinion to regional and national ministries of education. Institutions of teacher education also perform similar services for school principals who have significant impact on what occurs in schools. Because of this broad influence in curriculum design and implementation, as well as policy setting within educational institutions, faculty members
INTRODUCTION

of teacher-education institutions are perfectly poised to promote education for sustainable development (ESD). By working with the administrations and faculties of teacher education institutions, governments can bring about systematic, economically effective change. For these reasons, nations should include teacher education institutions in their national sustainability plans. (UNESCO, 2005b, pp. 11–12)

Fien and Maclean (2000) identify a special commitment from teacher education institutions as a necessity for reorienting teacher education towards sustainability. It is important to note that UNESCO-UNEP made an urgent request two decades ago for the preparation of teachers to be considered as ‘the priority of priorities’, yet little seems to have changed in practice.

As Ravindranath (2007) pointed out, there is need for the development of an integrated approach towards teacher education, which brings together modern and traditional approaches and retains the basic Indian philosophy of respect for the environment and all creatures that live within it. The National Council for Teacher Education (NCTE, 2005) India’s top governing body for teacher education clearly recognised the crucial role of teachers and teacher educators in creating environmental consciousness amongst all sections of society. While it recognised the importance of EE in teacher education it also acknowledged the lack of work in the sector. The NCTE also highlighted the need for EE to be made compulsory and taught as an integral component of teacher education (National Council of Teacher Educators, 2005). However, there appears to be little evidence that this recommendation is being implemented and, that is where the significance of this study lies; in understanding teacher educators’ experiences in implementing EE.
CHAPTER 2

ENVIRONMENTAL EDUCATION & TEACHER EDUCATION

A Review of Literature Review

INTRODUCTION

Satellite pictures in the sky show a denuded landscape where mangroves, wetlands and forests are vanishing. Negative trends seem to overwhelm positive ones. Yet, the signs of hope, the spirit of enquiry beckons equally strongly. In our capacity to master the means, ignorance is a luxury nobody can afford. (Rangarajan, 2009, p. xxii)

While a complete comprehensive review of research is beyond the scope of this chapter it does aim to provide a snapshot existing literature pertaining to major concepts pertaining to this study. It starts by looking at research spanning global and local environments and contexts highlighting some of the key environmental concerns. I first begin by discussing the major global and national (Indian) environmental issues and challenges. It is important the threats and concerns for the environment serve as a background towards laying down the importance of this book. Overtime there has been a push towards education as a means to bring about change. The next section therefore provides a historical analysis of these global and national trends in Environmental Education especially with an emphasis on policy. Any change in the education sector needs to be supported by sound understanding of the role of teachers and teacher educators in implementing Environmental Education. Current trends in this field are presented in the third section. The final section of this chapter focuses on existing literature that helps understand the teacher preparation and environment education in India.

GLOBAL – LOCAL: ENVIRONMENTAL CONCERNS AND CHALLENGES

Global Issues

Latest reports from the biannual Living Planet (2014) reveal that our demands on the planet are 50 per cent more than what it can sustain. There has been a rapid loss in biodiversity with sharp declines in the representative populations of all species. In particular the Indo-Pacific region shows a dramatic decline in freshwater species – about 76 per cent.
CHAPTER 2

It can well be argued that the planet is facing an environmental crisis. Lester Brown, President of the Earth Policy Institute aptly describes the situations as follows:

We are liquidating the earth’s natural assets to fuel our consumption. Half of us live in countries where water tables are falling and wells are going dry. Soil erosion exceeds soil formation on one third of the world’s cropland, draining the land of its fertility. The world’s ever-growing herds of cattle, sheep, and goats are converting vast stretches of grassland to desert. Forests are shrinking by 13 million acres per year as we clear land for agriculture and cut trees for lumber and paper. Four fifths of oceanic fisheries are being fished at capacity or overfished and headed for collapse. In system after system, demand is overshooting supply. (Brown, 2011, pp. 3–4)

Humans have caused more changes to the ecosystems in the past 50 years than any comparable period in history mainly to meet rapidly growing demands for food, fresh water, timber, fibre and fuel leading to large and irreversible loss to diversity of life on Earth (Millenium Ecosystem Assessment Board, 2005). Environmental concerns are currently at unprecedented levels worldwide and continue to escalate and are presently one of the most important issues facing humanity today. Global ecosystems have undergone massive changes, especially over the past 50 years (Matthews et al., 2012). India and China have been growing at an unprecedented rate since 2001 – China at a nine-year doubling time and India at a seven-year doubling time. Consequently environmental pressures have also been growing at the same rate. If these two economic giants fail to improve their environmental footprint they will be responsible for the 37% of the increase in global environmental footprint by 2015 (UNEP, 2012b). If the entire world adopted U.S.’s current resource consumption and waste production patterns (Bryner, 2011) points out that it would amount to having the worlds population suddenly grow to 72 billion.

Diamond (2005), Krapivin and Varotsos (2007), Nielsen (2005), Palmer (1998) and the most recent GEO 5 report (UNEP, 2012a) amongst others have described and categorized the global environmental problems in detail. For the purpose of this review, global environmental problems will be discussed by placing them in the following categories.

a. Population and Unsustainable development: The world’s population has increased from 2.8 billion in 1950 to around 7 billion in the year 2011 (Rajagopalan, 2011). In this century, the world has experienced the highest rate of population growth (averaging 2.04% per year) in the 60s, and the largest increment to the world population (86 million people every year) in the 80s (U.S. Bureau of Census, 2009). Neilsen (2005) termed this explosive growth- growth that is sudden and very fast. Naturally, this sudden and fast increase placed a tremendous burden on the limited and finite resources of the Earth particularly food, freshwater, wood, fibre and fuel (Palmer, 1998; Pretty et al., 2007).
The increasing population has led to a 2.5-fold increase in food production from 1980–2000, more than doubled the freshwater consumption, tripled the use of wood for paper and doubled the power of hydroelectric stations’ (Krapivin & Varotsos, 2007, p. 46). These needs are met by intensifying activities using modern technology to harvest resources. It is suggested that in the next 50 years the need for food will grow by 70–85% and the need for water will increase by 30–85%, and this will lead to further ecosystem degradation. Such intensified usage often leads to the outbreak of diseases, decrease in water quality especially coastal waters – leading to collapse of fisheries and climate change amongst other changes. In short, as continuing rapid population growth leads to scarce cropland, dry wells, disappearing forests, increased soil erosion, rising unemployment and spreading hunger (Brown, 2011).

b. Loss of forests: Three issues, namely – loss of biodiversity, scarcity of fresh water, and disruptive climate change have been identified as particularly difficult and emblematic of the environmental problems facing humanity (Bryner, 2011). Loss of forests at the rate of 15–20% since pre-agricultural times has led to a rapid loss of biodiversity (Cuff & Goudie, 2009). Most deforestation is happening in the tropics with countries like Indonesia losing large tracts of forests for farming (Gornall, Wiltshire, & Betts, 2012). Globally forest cover declined at the rate of 200 kms² per day between 2000–2005 (Gornall et al., 2012). An estimated 45 million hectares of forests is lost annually and foreshadows the loss of all biologically productive land in 200 years (Nielsen, 2005). In India the forest cover has declined from 40% a century ago to 19% – in other words it lost more than half its forests (Rajagopalan, 2011). In the past 30 years, larger amounts of land were transformed into agricultural lands, 20% of global coral reefs have been lost and 20% have been damaged, 35% of mangroves have been destroyed. About 50% of the worlds wetlands have disappeared since 1900 (Bryner, 2011). It is estimated that about one species every 20 minutes or approximately 30,000 species every year are lost on Earth which is about 1000 times higher than normal (Edwards, 2010). In an interview Vandana Shiva points to the expedited loss of genetic diversity particularly of cultivated species due to genetic manipulation/engineering (Mazur & Miles, 2009). Overall it is estimated that at this rate half of the existing species in the world will be wiped out in the next 70 years (Krapivin & Varotsos, 2007).

c. Desertification and drought: Desertification impacts approximately one-sixth of the worlds population, about 70% of all dry lands and about a quarter of the entire land area of our planet (Bryner, 2011). This is caused by natural processes like soil erosion but accelerated due to human activities. Removal of forests or grazing pastures for agriculture, large-scale logging and clearing for timber or fuel wood along with agricultural mismanagement, land conversion, industry and urbanization (including roads and highways) are causes for rapid desertification (Kemp, 2004). While drought and famine have been long standing issues these seem to have exacerbated in recent times. Additional desertification, which is mainly man-made,
has emphasised human contribution to the problem. Land management is also a serious issue that impacts the environment with a plateau reached in nitrogen use efficiency. This translates to farmers having to use increasing levels of fertilisers which adds to the problem of runoff of nitrogen into the biosphere creating hazardous water and atmospheric pollution (Gornall et al., 2012).

d. Fresh Water: Growing demand for fresh water and declining water quality due to increasing pollution. As described earlier the increasing population has placed a tremendous burden on the water systems of the Earth. Only 0.3% of the Earth’s water resources are found in renewable resources like lakes, rivers, marshes, and wetlands – which are becoming increasingly polluted and affecting water quality. Global water withdrawals have increased 7 fold in the past 100 years. Water availability has decreased by 40% in industrialized nations and 70% in developing countries, it is estimated to decline further to only 80–90% of the 1950s level (Nielsen, 2005). According to the World Bank (World Bank, 2003) there will be a 50% increase in water consumption over the next thirty years and about half the world’s population will live under conditions of severe water stress by 2025.

e. Oceans: Degradation of oceans, coast and marine resources due to pollution and over exploitation. The number of large predatory fish in the oceans has decreased by ninety per cent the beginning of industrial fishery (Orr, 2007). Excessive pollution and oil spills from shipping accidents lead to the formation of ‘dead zones’ – parts of the oceans that cannot support any form of life (Nielsen, 2005).

f. Atmosphere: Atmospheric pollution, climate change, ozone layer depletion and acid deposition are pressing environmental issues directly influenced by human contributions. Air pollution mainly causes by the use of fossil fuels has harmful effects on human health. It kills about 1.9 million people each year in developing countries. India and China have the highest levels of air pollution in the world – cities like Delhi, Calcutta and Mumbai are amongst the most polluted (Nielsen, 2005). These pollutants have thinned and caused holes in the ozone layer and along with increased amounts of greenhouse gases are adding to the global warming process. Bryner (2011, p. 25) summarises the evidence that clearly documents the effects of global warming like the almost two fold increase in average Arctic temperatures over the past hundred years or the widespread changes in extreme temperatures over the past fifty years. ‘Climate change threatens, among other things, food security and biodiversity’ and people in ‘developing regions are especially vulnerable to the effects of climate change’ (UNEP, 2012a, p. 33). It is expected that by the end of the century warming could be up to 5°C compared to pre-industrial times and this would lead to a world with ‘more extreme weather events, most ecosystems stressed and changing, many species doomed to extinction, and whole nations threatened by inundation’ (World Bank, 2010).

g. Energy: Growing demands for energy coupled with unsustainable use and pollution of the environment are pressing problems. Energy consumption has increased nearly 70% since 1971 and is projected to increase by approximately 2%
annually over the next fifteen years (Bryner, 2011). The approaching energy crisis is caused mainly by the exhaustion of fossil fuel supplies, which have already fallen to half and are expected to fall further. As demands for these fuels continues to rise there is an ever widening gap between supply and demand (Nielsen, 2005).

h. Waste: Population growth, new lifestyles and rapidly changing technology create serious waste disposal problems (Kemp, 2004). Managing exceeding levels of solid waste and use of non-biodegradable products particularly plastics. Disposal of hazardous substances including nuclear waste is also a serious point of contention.

i. Global Security: Global security is threatened due to increasing conflicts over sharing (or lack thereof) of resources. The World Commission on Sustainable Development points out that historic responses to the above mentioned scarcity of resources has often been the source of conflict (Barrow, 2012; World Commission on Environment and Development, 2004).

Apart from the challenges briefly noted above, other issues such as decreasing levels of photosynthetic ceiling – the amount of sunlight fixed by plants to produce food, the introduction of ‘alien species’ or non-native species, and the production of greenhouse gases by the burgeoning human population are also cause for concern (Diamond, 2005). Orr (2007) predicts that these issues bode a trouble future for the signature accomplishments of the fourth ‘design revolution’ namely the creation of an homogenised industrial civilisation through science and technology.

The World Wildlife Fund (WWF) cites the loss of a third of the planet’s wildlife in the past 35 years and argues that humans will need the equivalent of two planets if current lifestyles continue unabated (World Wide Fund (WWF), 2008). Neilsen (2005) affirms that the increasing population is putting enormous stress on the environment, and human needs are now reaching or exceeding the planet’s ecological limits. If current consumption levels continue there will be a surplus of 3 billion people on the planet by 2020, and six Earth-like planets will be needed to accommodate the surplus population.

Neilsen (2005) also categorizes social decline as key environmental issue and lists the gap between the “haves and the have-nots” and the disparity in their GDP’s as a leading cause for concern. China and India for example account for 76 per of the world’s population but for only 29 per cent of its income. Krapivin & Varatsos (2007) point out that about 1.1 billion people live on daily income of less than a dollar a day. This poverty is particularly acute in Asia and Africa with 29 sub-Saharan African countries forming the bottom rung of the Human Development Index (HDI) – an index developed to rank 177 countries based on their level of socio-economic welfare, health and education (Human Development Report Office, 2011). In countries like Ethiopia 98 per cent of the population live on less than $2 a day. This disparity is evident even locally within countries, for example, on the one hand India is home to some of the richest billionaires in the world, but on the other hand 60 per cent of India’s poor live on Rupees 35 (approx. half a dollar) a day and
nearly as many in the cities who live on Rupees 66 (approximately one dollar) a day. Overall 30% of India’s population lives on less than $1 a day (National Survey Sample Organization, 2012; World Bank, 2012).

It is this poverty and disparity in wealth that triggers Nobel Peace prize winning Kenyan environmentalist Wangari Muta Maathai (see, World Commission on Environment and Development, 2004, p. 100) to say, ‘If you want to save the environment you should protect the people first, because human beings are part of the biological diversity. If we can’t protect our own species, what’s the point of protecting tree species?’ She points to the irony of the poor, who depend most on the environment, yet are also often the ones who are responsible for its destruction. She attributes that situation to the fact that the poor are often ‘so preoccupied with their survival that they are not concerned about the long-term damage they are doing to the environment simply to meet their most basic needs’ (p. 100). This contention, although credible in its own right, also raises the question of long-term vision – if the poor are the most dependent on a resource then that should also impel them to act to save it. However, the issue often goes beyond poverty to the distribution and unequal distribution and overconsumption of natural resources. Industrialized nations containing 20% of the global population shared 86% of global wealth while the 20% living in poor countries shared only 1% of the global wealth, by the end of the 20th century. China, India, Indonesia, Brazil and Russia accounted for 50% of the world’s population but shared only 9% of its wealth (Nielsen, 2005). Krapivin and Varotsos (2007, p. 49) highlighted the disparity between global consumption and population (see Table 2.1).

### Table 2.1. Shares of global consumption and population (%) in different regions

<table>
<thead>
<tr>
<th>Region</th>
<th>Consumption</th>
<th>Population</th>
</tr>
</thead>
<tbody>
<tr>
<td>USA and Canada</td>
<td>31.7</td>
<td>5.3</td>
</tr>
<tr>
<td>Western Europe</td>
<td>28.9</td>
<td>6.5</td>
</tr>
<tr>
<td>Eastern Asia and Pacific Ocean Region</td>
<td>21.6</td>
<td>32.9</td>
</tr>
<tr>
<td>Latin America and Caribbean Region</td>
<td>6.9</td>
<td>8.7</td>
</tr>
<tr>
<td>Eastern Europe and Central Asia</td>
<td>3.7</td>
<td>8.2</td>
</tr>
<tr>
<td>South Asia</td>
<td>2.2</td>
<td>22.5</td>
</tr>
<tr>
<td>Australia and New Zealand</td>
<td>1.8</td>
<td>0.6</td>
</tr>
<tr>
<td>Near East and North Africa</td>
<td>1.7</td>
<td>4.4</td>
</tr>
<tr>
<td>Sub-Saharan Africa</td>
<td>1.5</td>
<td>10.9</td>
</tr>
</tbody>
</table>

An average American consumes natural resources dozens of times greater than an average individual in developing countries. Despite a history and obvious evidence of over consumption, wealthy countries have not even begun to contemplate the concept of “consumption policy”. The Western countries, and the U.S.A. in
particular, have contributed to two-thirds of greenhouse gases, which are responsible for global warming; yet the brunt of this is being borne most by the developing countries (Cuff & Goudie, 2009). Paradoxically, developing countries are often unwilling to share any responsibility for the mistakes of the Western world yet would like to achieve industrialization and wealth despite the environmental cost. They do not want to sacrifice their right to development in order to protect the environment especially as they view the current environmental crisis as largely the doing of the economic growth patterns and ‘footprints’ of the Northern countries (Young, 2002).

In general, there is a greater emphasis on economy rather than environment and a lack of consensus between North and South over which environmental issues are of major global concern (Young, 2002). The developing countries also disagree with the hegemony of developed countries over solutions to environmental problems and their unwillingness to consider the significance of cultural aspects in seeking alternative solutions (Smyth, 2008).

In his speech at the Rio Earth Summit, then Malaysian President Mahathir Mohammed was quoted as saying:

> We know that 25% of the world’s populations who are rich consume 85% of its wealth and produce 90% of its waste. Mathematically speaking, if the rich reduce their wasteful consumption by 25%, worldwide pollution will be reduced by 22.5%. But, if the poor 75% reduce consumption totally and disappear from this earth altogether, the reduction in pollution will only be by 10%. It is what the rich do that counts, not what the poor do, however much they do it. The rich will not accept a progressive and meaningful cutback in their emissions of carbon dioxide and other greenhouse gases because it will be a cost to them and retard their progress. Yet they expect the poor people of the developing countries to stifle even their minute growth as if it will cost them nothing … Malaysia will do what can reasonably be expected of it for the environment. (Conca & Dabelko, 2004, p. 334)

There is no doubt about the fact that environmental change is a risk to human security. Global environmental change brings new and often unprecedented threats to human security raising important questions about equity and sustainability. However environmental change goes hand in hand with other social factors like poverty and discrimination in creating these insecurities (Barnett, Matthew, & O’Brien, 2010). This conflict of assets, attitude and interests between the haves and have-nots increases immigration pressures, breeds resentment against richer countries, encourages terrorism and is causing further delays in stemming the environmental decay (Nielsen, 2005). As Barnett (2010, p. 4) state global environmental change is ‘inherently a question about the capacity to respond to new challenges and to reconcile the growing disparities that undermine human security’. Young (2002) suggested there was real value in an equal and participatory approach in helping local people manage local environmental issues with the help of international expertise, without having this help imposed on them.
In the Asian context given the population densities and the rapid economic
development particularly of India and China, it is imperative that they take
environmental sustainability into account failing which they will export their
suffering to the rest of the world (Luce, 2006). The blurring between local and global
environmental problems and challenges has become omnipresent, increasingly with
governments referring to current issues in a ‘glocal’ sense. The tensions between
developed (rich) and developing (poor) countries are likewise omnipresent.
However, for the purpose of this review, each concept is considered individually
before identifying the tensions and relations between local and global (or glocal)
keeping in mind the arguments concerning developed and developing nations.

Nielsen (2005) conceded that one could argue about the unimportance of a small,
seemingly insignificant species and its extinction. But this response would then miss
the point, that even the smallest creature is a link in the web of life and regular loss
of such ‘small’ and ‘inconsequential’ species disturbs the natural equilibrium, which
humans cannot replace. The interactions between different ecosystems, species and
genes is absolutely critical in determining the overall health of the system and of
individual species – humans being one of those (Bryner, 2011)

Atmospheric pollution is of particular concern due to climate change, global
warming, ozone layer depletion and acid deposition to which it leads. Global
impacts of these changes are expected to have widespread effect on the populace
with estimates that natural disasters killed more than 120,000 people per year in the
past decade, which was almost double of the toll in the 1990s. 174 million people
were affected annually by natural disasters in the mid-1980s to the mid-1990s. This
number rose to 254 million a year in the decade from 1995–2004 and in 2007 just the
floods in Asia had affected 250 million people. These numbers show the exponential
increase of global impact by natural disasters driven in part by climate change
(Hunter Lovins & Cohen, 2011, p. 9). There are predictions that the environment
is reaching its threshold level and any further increase could lead to dramatic and
perhaps irreversible changes.

The disparity in GDP’s between developed and developing countries is a major
cause of concern; only 11% of countries containing 16% of the global population
are rich. It is estimated that the richest 20% of the world’s population accounts
for 86% of total private expenditure while the poorest 20% consume only 5% or
less of these resources (Khoshoo, 2010). China and India account for 76% of the
global population but for only 29% of its income. Approximately 1.1 billion of the
world’s population currently live on a daily income of less than $1/day (Krapivin
& Varotsos, 2007). This poverty is particularly acute in Asia and Africa with 35
sub-Saharan African countries forming the bottom rung of the Human Development
Index (HDI) – an index developed to rank 177 countries based on their level of
socio-economic welfare, health and education (Human Development Report Office,
2011). In countries like Ethiopia 98 per cent of the population lives on less than
$2/day. Often the most populated countries are also amongst the poorest and most
environmentally stressed.
While current environmental problems are due to the detailed physical and scientific issues noted above, these are also a result of deeper underlying issues around social change in society brought about by greater change in culture and personal lifestyles. According to Lacey (2011, p. 86) ‘our destiny and thriving are bound up with the land, in the city as well as in the countryside. We are learning too that equity and autonomy are vital in the human community and that these too are bound up with the health of the biosphere.’ As discussed earlier poverty and discrimination are often at the heart of our interactions with the environment.

As with other contemporary issues there are objections as to the seriousness of these environmental issues. The veracity of some of the environmental challenges have been challenged as myths that have been created by distorting facts and drawing biased conclusions about a few scientific facts (Bennett, 2012). Cutter-Mackenzie (2009) discusses some of these including claims that the environmental problems are getting smaller not bigger, and that environmentalists are basically anti-modernization in their attitudes. Commonly cited objections range from arguments such as: ‘Technology will solve our problems’ and, ‘If we exhaust one resource, we can always switch to some other resource meeting the same need’.

For some, there is also a sense of over simplification of the entire environmental issue, as reflected by statements such as:

There is no food problem; there is already enough food; we only need to solve the transportation problem of distributing that food to places that need it. Look at how many times in the past the gloom-and-doom predictions of fear mongering environmentalists have proved wrong. Why should we believe them this time? (Diamond, 2005, p. 169)

The above arguments are short sighted, simplistic and highly technocentric views of the world and the environment. For example while relying heavily on technology to solve our problems we overlook the fact that most of the current environmental problems have been caused by technology. In suggestion the transfer of food to so called Third world countries the logistics and politics of the matter is overlooked. Shiva (2005) further points out to the dangers of globalisation and biopiracy that developing nations face in dealing with food security/insecurity. There is a serious lack of studies and research articles that counter the arguments of these critics. Cutter-Mackenzie (Cutter-Mackenzie, 2003, p. 37) made an important observation that ‘to date the arguments of environmental critics have not been analysed in the environment literature’.

India faces several of the problems highlighted above so it comes as no surprise that many of these environmental concerns have a direct impact on the country. The next section considers the nature of environmental issues as applicable to India.

Local (India)

No other country matters more to the future of our planet than India. There is no challenge that we face, no opportunity we covet where India does not have critical
relevance (Kamdar, 2007, pp. 3–4). India is the second fastest growing economy in the world and with a population of 1.2 billion is also the second most populous nation. Between 2001–2011 the addition to India’s population is slightly less than population of Brazil – which is the fifth most populous nation in the world. At 1.2 billion people, India’s population is almost equal to that of six other populous nations put together – namely Brazil, Indonesia, Bangladesh, Pakistan and Japan. India has only 2.4% of the world’s surface area but accounts for 17.5% of the world’s population. In contrast a country like U.S.A. covers 7.2% of the world’s surface area but accounts for only 4.5% of the world’s population (Census of India, 2011).

India is hugely diverse both in terms of its population and ecosystems. Kamdar (2007, p. 4) describes it as a world in a microcosm, a nation that is ‘at once an ancient Asian civilisation, a modern nation grounded in Enlightenment values and democratic institutions, and a rising twenty-first century power’. This is where diversity is found in almost everything and centuries harmoniously coexist (Khoshoo, 1987). With approximately 1652 languages and numerous dialects spoken, a myriad mixture of religions and traditions exist in India (Ravindranath, 2000). Its land and population size, unprecedented growth and immense diversity make India’s environment and environmental management vital to the entire world. What happens in India will have deep, long-range consequences for the entire planet (Rangarajan, 2009, p. xx).

The rapid growth, both in terms of its population and development especially in the last two decades has simultaneously raised major environmental concerns. The Environmental Performance Index ranks India at a dismal 125 amongst all nations – it has the unhealthiest air quality in the world compared to the other 133 nations (Yale University, 2012). Unlike Western nations where industrialization was a comparatively slow process, India has seen tremendous growth in just three decades. Kamdar (2007) contends that the magnitude or velocity of India’s transformation has been unparalleled. This has led to an increase in population and rapid development, which in turn has placed tremendous demands on its resources (Joshi, 2005; Luce, 2006; Rangarajan, 2009; Ravindranath, 2002a; K. Sarabhai, 2008). For example India’s rivers, which were once symbols of purity and linked to deep spiritual beliefs have been reduced to mere receptacles of sewage and toxic waste (Sharma, 2010). India’s future; its possibilities and perils reflect globally for according to Kamdar (2007, p. 3) ‘as goes India, so goes the world’. It holds the key to the emerging new world, which has been recalibrated due to Asia’s phenomenal rise. This newfound power has serious environmental implications. One example is the rise in energy consumption in India – it is the ‘fifth largest consumer of energy in the world’ even though about ‘57% of its rural population have no access to electricity’ (Srivastava, 2009, p. 33). Given the economic growth that it has been witnessing, India is expecting to join the league of ‘developed’ nations by 2020. It is not hard to imagine the kind of energy usage India will reach if every Indian household is to access energy and electricity to the same level as those in ‘developed’ countries. If India
along with China does not stem rapid deterioration of their environment then they will export their suffering to the rest of the world (Luce, 2006).

Extreme poverty remains a significant concern in India. Nearly half of India’s urban population lives in slum-like conditions. About 10% of the global population (and half of India’s) live in the Ganges valley and is also the concentration of the world’s greatest poverty (Cuff & Goudie, 2009). The disparity of wealth between richer states/people and the economically underprivileged ones is great. This region is also prone to the most severe effects of climate change – the drying up of the rivers, soil erosion, frequent flooding, and earthquakes. Water shortages are also a growing area of concern. Brown (2011, p. 14) states that the ‘water bubble’ that India lives in – over pumping aquifers to grow grain to feed over 175 million Indians – could burst anytime leading to mass food shortages.

Cuff and Goudie (2009, p. 358) raise and consequently answer four major questions about environmental problems and challenges in India:

*Does the size of the population alone create damaging environmental pressures?*

Population size alone has “prompted major schemes with both negative and positive impacts, and a potentially damaging agrochemical form of agriculture” (Cuff & Goudie, 2009, p. 358). A large population places increasing demands for resources. This in turn stresses the environment especially since the demands are unsustainable. For example, huge dams have been built in India and China to meet fresh water and energy requirements of the increasing in population. These dams while solving some problems also create new social, political and ecological problems. They contribute to global warming, destroy productive land areas, disturb habitat of species, contribute to deforestation, and displace people creating ‘ecological refugees’. They also add to international disputes over water sharing treaties (Nielsen, 2005). The Narmada Dam in India is a glaring example of one such disaster.

*Does poverty of large areas create environmental pressures?*

Indian Prime Minister Indira Gandhi while addressing the first UN Conference on Environment in Stockholm in 1972 stipulated ‘poverty and need’ to be the greatest polluters of the environment:

> We do not wish to impoverish the environment any further and yet we cannot for a moment forget the grim poverty of large numbers of people. Are not poverty and need the greatest polluters? The environment cannot be improved in conditions of poverty. Nor can poverty be eradicated without the use of science and technology. (as cited in, Rangarajan, 2009, p. xviii)

Poor and dense rural/urban populations in India are often unable to maintain sustainable development. This could be due to inadequate training and lack of education in sustainable development and procurement of livelihoods (Cuff &
Do the new large cities have damaging ecological footprints?

25 of the 100 fastest growing urban cities in the world are in India. This is in contrast to China that has only 8 of them (Barta & Pokharel, 2009). 60% of India’s population lives in these cities (World Bank, 2012; World Bank, 2009) in slum-like conditions. These cities place a huge demand on natural resources like food, water and building materials which affects not only the immediate urban, but also the distant rural environments.

Is India’s unique environment particularly ‘difficult’ or ‘fragile’?

India’s environment is as diverse as the country and consists of different biomes. From windy, wet lengthy coastlines to the dry hinterlands of Central India that lack both wind and rain, from the snow-covered alpine regions in the Himalayan foothills to the desert of Rajasthan, different ecosystems and climates exist within the country. Each of these poses a different kind of challenge in terms of the environmental issues it raises (Joshi, 2005).

The next section considers the disparities and tensions between global and local.

Glocal

How the earth will fare may be a distant concern for a person who is unsure of the next meal. But how that meal and that person are made secure will have a lot to do with the fate of the earth. How poverty will be tackled may have little immediate relevance to anyone with a credit card. But riches cannot fully guard against contaminated water and air anymore than they can against the return of diseases once thought to have been eradicated. In contrast to ‘purely’ economic issues, those with an ecological edge or an environmental dimension can help trace the threads that bind us in a common future. (Rangarajan, 2009, p. xxi)

The Asian Development Bank has identified Asia as the world’s most polluted and degraded region with a range of potentially dangerous environmental problems and a high economic cost attached to these problems (Yencken, Fien, & Sykes, 2002). Environmental problems often transcend boundaries as water, air and nature as such does not honour manmade borders (Rangarajan, 2009). Issues concerning India are not confined locally and are most likely to have global repercussions.

As identified earlier, unlike Western nations where industrialization was a relatively slow process (in comparison to India and China), India has seen tremendous growth in just three decades. India’s booming growth, both in terms of its population and economy, has led to unprecedented demands on its resources
thereby adding to its environmental problems and challenges. These problems are transposed to neighbouring nations and to the planet. Luce (2006) identified India, China and the United States as the three most important obstacles to international consensus in tackling global warming. International agencies like the UNESCO, UNDP (United Nations Development Program) and World Bank are attempting to have a strong presence in India and are actively involved in improvement and creating awareness through education. The World Bank (2009) for example, stresses the need for long-term vision and urgent action in dealing with India’s environmental issues which have made it exceptionally vulnerable to effects of climate change – namely cyclones, floods and droughts. They believe that growth has led to a higher toll on India’s natural resources and emphasise the need for sustainable development and reduction of the burden that environmental degradation imposes on the most vulnerable population group.

On the other hand it can be observed that the World Bank is also the major funding agency for many of the development projects that have been environmentally unfriendly. A case in point is the Narmada Dam, which was labelled as the world’s greatest planned environmental disaster (Gadgil, 2007), which even according to conservative estimates directly displaced 100,000 people, a majority of which were landless tribes, and affected millions more. These double standards often send out mixed messages and further push developing countries such as India into struggles between environmental protection and economic development. The interests and policies of these international agencies can be in direct contrast to their actions and practices.

The path to projects that are environmentally conducive, and aim at long-term economic progress, can only be achieved through support of initiatives that are sustainable. The one essential tool towards sustainability of any sort is Education with public awareness, education and training as the key factors for moving society towards sustainability (McKeown, Hopkins, Rizzi, & Chrystalbridge, 2002).

The following sections examine the role of education in the environmental context, and begin to provide a background on the state of EE, both globally and in relation to India.

A HISTORICAL ANALYSIS OF EE (FROM GLOBAL TO LOCAL)

The origins of EE may be found in what started out as a Nature Study movement in the early 1900s. This was followed by a phase of the conservation movement in the mid-1900s (Palmer, 1998). The original emphasis was on getting students out into nature to be able to admire and consequently develop a desire to pursue preservation. Increasing environmental deterioration led to the development of an awareness of human impact on the environment and the need to reduce those affects. This increasing environmental consciousness was fuelled by scientists and authors like Carson (Carson, 1964) and Gough (Gough, 2006).
Table 2.2 offers a timeline of the landmark events and developments in the field of EE from the 1970s to the present. Although the term ‘EE’ was first used in 1965, the EE movement started gaining momentum around 1960. The ‘classic’ definition of the term was developed and adopted in 1970. According to the International Union for Conservation of Nature and Natural Resources EE is:

… the process of recognizing values and clarifying concepts in order to develop skills and attitudes necessary to understand and appreciate the inter-relatedness among man, his culture, and his biophysical surroundings. Environmental education also entails practice in decision-making and self-formulation of a code of behaviour about issues concerning environmental quality. (IUCN, 1971, p. 7)

<table>
<thead>
<tr>
<th>Year</th>
<th>Event</th>
<th>Development</th>
</tr>
</thead>
<tbody>
<tr>
<td>1977</td>
<td>The UNESCO Intergovernmental Conference on Environmental Education, Tbilisi, Former USSR.</td>
<td>‘Tbilisi Declaration’</td>
</tr>
<tr>
<td>1988</td>
<td>World Commission on the Environmental Development.</td>
<td>Our Common Future – most commonly used definition of Sustainable Development.</td>
</tr>
<tr>
<td>1997</td>
<td>The United Nations International Conference on Environment and Society, Thessaloniki, Greece.</td>
<td>‘Thessaloniki Declaration’</td>
</tr>
<tr>
<td>2002</td>
<td>World Summit on Sustainable Development, Johannesburg, South Africa.</td>
<td>‘Plan of Implementation’ and the ‘Key Outcomes Statement’</td>
</tr>
<tr>
<td>2007</td>
<td>4th International Conference on Environmental Education, Ahmedabad, India.</td>
<td>‘The Ahmedabad Declaration 2007’</td>
</tr>
</tbody>
</table>
The first Conference on the Human Environment was held in 1972 at Stockholm and was the first attempt at bringing together higher-level government officials and discussing ways to deal with the environmental situation and raise the issue at an international level (Tilbury, 1994). It was a significant achievement as it marked the first attempt towards international cooperation and commitment to environmental conservation. It was also vital in highlighting the importance of education and training in environmental problems as the means of creating awareness and practical action (Gough, 2006, p. 23). This conference also led to the formation of the United Nations Environment Program (UNEP) which plays an important role in negotiating global environmental treaties by bringing all concerned parties together (Cuff & Goudie, 2009).

The establishment of the UNESCO-UNEP International Environment Programme (IEEP) with the goal of furthering EE through a cooperative international programme was in 1975 (Gough, 2006). In that year, IEEP organised the Belgrade International Workshop on EE, which formulated The Belgrade Charter – A Global Framework for EE, a strong policy statement that was endorsed by 64 countries. It has been hailed as the greatest landmark in EE history where there was a call for the establishing a harmonious relationship between humanity and the environment, as well as a call for the eradication of poverty, illiteracy, pollution and exploitation (UNESCO, 1975).

The 1977 the Tbilisi Conference (UNESCO & UNEP, 1977) that followed provided goals and objectives that went on to be the basis of EE globally. These included amongst others the provision of ‘opportunities to every individual to acquire knowledge, values, attitudes, commitment and skills to protect the environment’ (Gough, 2006, p. 73).

The World Conservation Strategy was published in 1980 by the IUCN in collaboration with the UNEP and the World Wildlife Fund (WWF) and was the first to discuss the interdependence of conservation and development and was the first to call for the need for ‘sustainable development’ (International Union for Conservation of Nature and Natural Resources (IUCN), 1980).

The 1982 Nairobi conference – a decade after the landmark Stockholm conference- called for the setting up of United Nation’s World Commission on Environment and Development. The WCED came up with its report ‘Our Common Future’ also known as the Bruntland Report (World Commission on Environment and Development, 1987) which placed the concept of sustainable development in the realm of international environmental policy. It also provided the most commonly used (although still not universally accepted) definition for sustainable development namely:

development that meets the needs of the present without compromising the ability of future generations to meet their needs. (p. 43)

In 1992, the United Nations Conference on Environment and Development (UNCED) called the ‘Earth Summit’ was held in Rio de Janeiro and led to a ‘tremendous surge’
in environmental consciousness among the general public (UNESCO-UNEP, 1992). It resulted in the following actions:

- Agenda 21, a plan for action into the twenty-first century;
- the Rio Declaration on the Environment and Development;
- the 1992 United Nations Framework Convention of Climate Change, which was to provide a framework for the negotiation of detailed protocols on further issues such as controls on the emissions of greenhouse gases—particularly carbon dioxide—and deforestation;
- the 1992 Convention on Biological Diversity, which was aimed at arresting the alarming rate at which species were disappearing through pollution and habitat destruction; and,
- a legally nonbinding Declaration on Forests (Cuff & Goudie, 2009; Gough, 2006).

As noted earlier, Agenda 21 highlighted education as a priority and as being significant in promoting sustainable development. It stressed participation from everyone involved in education—teachers, teacher educators, curriculum developers, education policy makers and authors of educational materials (UNESCO, 1992).

Since 1980 sustainable development has infiltrated the field of EE. The Earth Summit in Johannesburg (UNESCO-UNEP, 1992) was crucial in furthering the idea of education for sustainable development:

Education is critical for promoting sustainable development and improving the capacity of the people to address environment and development issues. It is critical for achieving environmental and ethical awareness, values and attitudes, skills and behaviour consistent with sustainable development and for effective public participation in decision-making. (Cutter-Mackenzie, 2009, p. 44)

The 1997 Thessaloniki (International Conference Environment and Society: Education and Public Awareness, 1997) conference was held to celebrate the 20th anniversary of the Tbilisi conference with an underlying aim of reorienting education for sustainability for the 20th century. It was also considered to be the beginning of the end for EE with even a call to rename EE as education for sustainability. The World Summit on Sustainable Development forwarded the cause of education for sustainable development and sought to rename EE with education for sustainable development. It also proposed a Decade of Education for Sustainable Development from 2005–2014 (UNDESD, 2007). None of the key indicators that were listed by the summit mentioned the term EE; instead it was replaced with education for sustainable development.

Although education for sustainable development and education for sustainability have permeated the field of EE, there are those that see this change as problematic. Cutter-Mackenzie (2009) identified some of these issues and highlighted their importance in shaping the debate. For example, heavily resource dependent economies

26
can look at environmental protection as an antithesis to development. In this case without a universally accepted definition, terms like ‘need’ and ‘development’ are subject to multiple meanings. In countries like India, it may be difficult to justify how much ‘development’ is sufficient to satisfy the ‘needs’ of the people. It is a profoundly moral question to then ask ‘How much should a person consume’ (Guha, 2006). Since there is no real agreement on what sustainable development really constitutes, there is no real agreement on how it should be taught. Jickling and Spork (1998) suggested that students of EE needed to study and critique the ideologies pertinent to their societies rather than be indoctrinated into one particular ideology. In other words, ideologies should be accepted or rejected based on their relevance to the context rather than on origin. (This idea is discussed further in the Chapter Three: Conceptual Framework.)

The Bruntland Commission Report (World Commission on Environment and Development, 1987) places emphasis on the need to link environment and development. This is more readily accepted by many developing countries, which are often of the view that industrialisation can help alleviate poverty and lead to economic growth and that environment and development are not pitted against each other (Rangarajan, 2009). However the underlying message that comes across seems to be that development will lead to economic growth and prosperity. The major criticism here is that economic growth by itself may or may not be successful in alleviating poverty or increase sustainability (Goueli, 2003). Again, although the Commission’s definition of Education for Sustainable Development has been more widely accepted – there is no consensus and hence no universal accepted definition for sustainable development. Since there is no agreement on what sustainable development really constitutes there is no real agreement on how it should be taught. For example countries like India may find it difficult to define what ‘development’ is and how much of it is ‘sustainable’, as also the ability to quantify or justify the ‘needs’ of the country. It could therefore be very easy to fall into the trap of mass consumption as a sign of growth and development.

There is also the danger of the environment being considered as a mere resource to meet human needs. Putting a monetary or economic value on the environment and the services it provides undermines the role that these resources play in society, history and culture. However the disposition to put an economic value to the environment is on the rise mainly because it fits into most capitalist approaches. For example Hunter-Lovins and Cohen (2011) define the current era as an era of ‘climate’ and ‘capitalism’ both intertwined as the cause and the cure for each other. Valuation of environmental resources continues to be common for three main reasons:

- It provides a mechanism to help maintain a record of society’s management of environmental resources often providing a sense of accomplishment to otherwise poorly managed stewardship of these resources.
- Economic development and human interventions are now central to policy debates with a need to provide direct effects and opportunity costs of development.
Issues of sustainability have gained more prominence in terms of being mindful of needs of future generations in decisions made today about resource use. This means the trade-off between current and future demands on the environment and the economic valuation that permit these intertemporal comparisons have become increasingly important (Pretty et al., 2007, p. 5).

Laying emphasis on the environment as a resource reeks of apathy and a lack of engagement with the environment. Khoshoo (2010, p. 152) for example echoes this sentiment while comprehending sustainability as ‘the rate of harvest from a renewable system which must not exceed the rate of annual increment’. EE is considered to merely reflect on the quality of the environment and raising awareness and understanding. In contrast sustainable education is considered to deal with the ecological (environmental) dimension and also look into economic and social issues such as the social, economic and political aspects of change. The ultimate objective of sustainable development is then to improve the quality of life of people living on the planet (Khoshoo & Moolakkattu, 2009). This “self-centric” view completely overlooks the well-being of the environment and the quality of life for anything other than humans. Orr (2002) sees sustainable growth as an unachievable oxymoron while terming sustainable development as much more achievable. He argues for a change that transcends mere superficial levels if genuine sustainability is to be attained.

There are benefits and constraints attributed to both pathways. Fien and Trainer (1993) believe that often EE and education for sustainable development are intertwined and there are many times, particularly in science and social science fields, EE is also education for sustainable development. Another advantage as Selby (2006, p. 354) recounts is the opportunity to ‘loosen the clutches of natural science’ on the field paving the way for greater cross disciplinary influences from ethical, political, social and economic lenses. In India though there has not been a clear demarcation between the two and both EE and education for sustainable development have often (not necessarily appropriately) been interchangeably used. As Chhokar and Chandrasekharan (2006) suggest, in India it is often EE for Sustainability – a mixture of both terminologies and ideologies.

The United Nations World Summit on Sustainable Development (UNWSSD) held in 2002, in Johannesburg also emphasized the role of education, but it broadened the vision to include not just respect and nurture for the environment but also social justice and the fight against poverty. UNWSSD urged all nations to unite and work towards increasing access to basic requirements and to use modern technology in training and education to banish underdevelopment (UNESCO, 2002).

The 2007 International Conference on EE in Ahmedabad declared, ‘Through education, human lifestyles can be achieved that support ecological integrity, economic and social justice, sustainable livelihoods and respect for all life. Through education we can learn to prevent and resolve conflicts, respect cultural diversity, create a caring society and live in peace’ (K. Sarabhai, 2008, p. 1). It encouraged
a shift from viewing education as a delivery mechanism to a lifelong, holistic and inclusive process.

As mentioned earlier, 2005–2014 has been declared as the Decade of Education for Sustainable Development (UNESCO, 2005c) in recognition of the need for commitment and skills to strengthen education systems across the world and to integrate ESD (Education for Sustainable Development) in national education plans across all sectors (J. Fien, 2006). The UNDESD’s main aim is to increase and encourage initiatives that raise the importance of education in achieving sustainable development (UNESCO, 2005c).

Gough (2006) made an interesting comparison between the Belgrade Charter-1975 and current policies framing the UNDESD, and found that the same spirit underlies both the documents. She commented that maybe the path travelled over the past 40 years remains the same, but for a few curves, detours and potholes. Reading Gandhi’s thoughts on ‘Education for life; through life; throughout life’ his perceptions of ‘education as a life-long process which involves harmony of the head, heart and hands’ (Sarabhai, 2007, pp. 2 & 109) and his Basic Education Framework, it is safe to assume that the path has not changed in over 60 years.

**History of EE in India**

O Earth, whenever I am compelled to create cavities on you they may be filled again soon. May I not inflict any injury on your bosom and cause Nammyn in your heart. (Atharvaveda XII- I, as cited in Sharma, 2010, p. 48)

EE is not new to India. Protection and improvement of the natural environment including forests, lakes, rivers and wildlife; and living harmoniously with the environment is embedded in the Constitution of India in Articles 48A and 51G. It is in fact deeply rooted in the religious and cultural traditions of India where nature is perceived as an all-encompassing entity that needs to be protected and revered (Baez, 1987; Bussey, Inayatullah, & Milojevic, 2008; Ravindranath, 2000, 2002a, 2007; K. Sarabhai, 1995). Scriptures ranging from the Vedas, Upanishads, Smritis, Puranas and the Bhagavadgita, which describe the Hindu-way of life uniformly sanction the environment as an integral and inseparable part of humans. The Rigveda for example considers the entire creation as one and indivisible; and the entire universe constitutes a life unto which every aspect of creation, including the human, is integrated (Sharma, 2010). This is echoed by Tagore who said, ‘the same stream of life that runs through my veins … runs through the world’ and ‘the world is a living thing, intimately close to my life, permeated by the subtle touch of kinship, which enhances the value of my own being’ (Haigh, 2008, p. 49).

Unlike Europe where the past is the past, in India not only does the past continue to be visible in the present, it is in many ways also the future (Luce, 2006). India’s esoteric traditions continue to survive despite the onslaught of modern consumerism. Sacredness of living things has been a basic tenet of Hindu philosophy for thousands


of years with ‘ahimsa permo dharma’ – ‘non-cruelty to animals the supreme religion’ advocated by sages centuries ago (Wali, 1987, p. 28). Many Indians inherit nature awareness, as part of their culture; worship of trees, tigers, elephants, snakes, monkeys and other creatures is considered part of religious/social observations with an ecological meaning. For example a tree is called ‘Dasputra’ or ‘ten sons’ because it provides for ten important needs, namely food, fodder, fertilizer, fibre, fuel, air, water, soil, shade and beauty (Parthasarthy, 1987). Strict instructions on the need to preserve the environment and protect it from degradation are part of this ethos and have been laid down in ancient Hindu scriptures like the Vedas, Puranas, and the Upanishads (Baez, 1987; Khoshoo, 1987; Ravindranath, 2000, 2007; Wali, 1987). Protection of the environment and its connections with daily communal life has always been an integral part of the social fabric of Indian society (Ravindranath, 2002b). It has been laid down as one of the five Yagnas or daily duties that a man has to perform and is on par with duties to the Gods, teachers, ancestors and fellow human beings (Sharma, 2010). This ethos has been very simplistically echoed by Gandhi’s words ‘Live simply so that others may simply live’ (Bussey et al., 2008, p. 243).

India’s first attempt at incorporating environment in education was initiated by Mahatma Gandhi in a movement called ‘Nai Taleem’ or Basic Education in 1937. The essential elements of Basic Education policy were productive activity in education, correlation of curriculum with the productive activity and the physical and social environment, and intimate contact between the school and the local community (Chhokar & Pandya, 2005). The aim was to create freethinking individuals with relevant skills to be able to act locally and aspire transcendentally for liberation (Haigh, 2008).

This movement ended once India achieved independence and Gandhi died. It has been replaced by the current conventional model based on colonial methodologies of thinking and limited to the learning by rote techniques, where ‘free thinking’ is neither sought nor encouraged. Local and regional issues are neglected and the main aim seems to be the production of ‘able’ individuals who could contribute ‘economically’, meet the needs of rapid ‘industrialization’ and ‘globalization’ of the country.

Landmark Policies/Developments that Shaped EE in India

Table 2.3 presents the influential landmark developments that shaped EE in India. As is outlined, the field of EE has recently received major impetuses in the form of the Federal Court mandate and development of curriculum policies.

In December 2003, the Supreme Court of India passed a ruling that was hoped would change the EE scenario in India. The direction No. 4 issued by the Court reads thus:

We accept on principle that through the medium of education awareness of the environment and its problems related to pollution should be taught as
a compulsory subject. Learned Attorney General pointed out to us that the
Central Government is associated with education at the higher levels and
University Grants Commission can monitor only the under graduate and post
graduate studies. The rest of it, according to him, is a state subject. He has
agreed that the University Grants Commission will take appropriate steps

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<td>1984</td>
<td>Establishment of the Centre of Environment Education (CEE) as a National Centre for Excellence in EE under Ministry of Environment and Forests.</td>
<td>CEE worked with different sectors – particularly education- to spread environmental awareness. First National policy indicated including EE in schools.</td>
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<td>1986</td>
<td>Adoption of the National Policy on Education. The National Environmental Awareness CamNammygn of the Ministry of Environment and Forests.</td>
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<td>1988–89</td>
<td>Environmental Orientation to School Education Scheme of the Ministry of Human Resources Development.</td>
<td>Called for orientating curriculum to include EE.</td>
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<td>1989</td>
<td>C.P. R. Chennai established as a second Centre of Excellence.</td>
<td>Works towards promoting EE in south India.</td>
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<td>1991</td>
<td>First Supreme Court of India mandate requiring the University Grants Commission to prescribe courses on the environment at all levels of higher education.</td>
<td>The judiciary steps in to help control environmental problems – a first of its kind step.</td>
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<td>2003</td>
<td>Second Supreme Court judgment mandating EE to be taught across all formal education institutions.</td>
<td>Requires every school in every state of India to teach EE.</td>
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<td>2005</td>
<td>National Council for Teacher Education provides the EE curriculum framework for teachers and teacher educators. National Curriculum Framework is drafted – clearly specifies the role of EE.</td>
<td>A major step providing national level impetus for the inclusion of EE in teacher education. School curriculum now includes EE and has to be mandatorily taught.</td>
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immediately to give effect to what we have said, i.e., requiring the Universities to prescribe a course on environment. They would consider the feasibility of making this a compulsory subject at every level in college education. So far as education up to the college level is concerned, we would require every State Government and every Education Board connected with education up to the matriculation stage or even intermediate college to immediately take steps to enforce compulsory education on environment in a graded way. This should be so done that in the next academic year there would be compliance with this requirement. (Supreme Court of India, 2003, p. 1)

This was a follow up to a 1991 ruling which had directed that ‘through the medium of education, awareness about the environment and its problems related to pollution should be taught in all schools and this should be implemented by the State authorities’ (Supreme Court of India, 2003, p. 1). The National Commission for Education, Research and Training (NCERT) was also directed to prepare the syllabus/curriculum for EE for all grades. This directive was not uniformly adhered to and hence was followed up by the 2003 directive that provided the government only one year to comply. In 2003 the Supreme Court also reviewed a curriculum framework prepared by the NCERT under its directions. The State governments were asked to develop textbooks using this framework and EE was made mandatory across all grades, in schools all over the country, from the year 2004–05. This directive, while giving a much-needed boost to the cause of EE concerns, also added to the strains of an already over-burdened educational system. While the mandate was of critical importance, it is still unclear whether or not it is being implemented and how effective the implementation has been.

The Supreme Court intervention seems to have provided a much-needed impetus to the cause of EE in India. The National Curriculum Framework drafted in 2005 attempted to bridge the gap in EE (National Commission for Education Research and Technology, 2005). Section 3.9 of the Framework is devoted entirely to Habitat and Learning, which in substance and spirit is equated to EE. In that Section it was acknowledged that formal education had largely become alienated from the students’ ‘habitats’, which in turn implies that the current education system is far removed from the current lifestyles of students. The section of the NCF goes on to assert that environmental degradation is happening at an unprecedented pace. It substantiates the role of education in helping to comprehend the roots and re-establish the links between education and habitat. Overall issues and concerns pertaining to the environment were designed to better inform the different school subjects and experiences. The main focus of the Section was based on the principle that children learn in relation to their encounters with nature and the environment (National Commission for Education Research and Technology, 2005).

While establishing the necessity of EE in India, the Supreme Court (2003) ruling however also placed large responsibility on the State Education boards to adapt the syllabi from NCERT to their respective education systems. How this was to be done
was not clearly spelt out, therefore the policy was open to numerous interpretations and loopholes. On paper India has done everything to ensure that EE is a major part of the school curriculum. However, as Weiner states, laws and policies in India are ‘often seen as a kind of modern talisman which will bring results by the magical power of words themselves unrelated to the action (Weiner, 1991). There is currently little information available on how the different agencies interpret and implement this policy. This study tackles this situation by investigation one teacher education institution and exploring how its teacher educators interpret this federal mandate.

This section of the chapter explored the evolution of EE and some landmark developments and policies that have influenced the field – both globally and locally. The next section reviews the relationship between teacher education and EE.

TEACHER EDUCATION AND ENVIRONMENTAL EDUCATION: A ROCKY MARRIAGE

Developments/initiatives in EE with respect to its reorientation to teacher education

Teacher Educators train new teachers, provide professional development for practicing teachers, consult with local schools, and provide expert opinion to regional and national ministries of education. Teacher educators write and teach not only pre-service teacher-education curriculum, but also contribute to committees that create teacher-education standards and officially mandated curriculum for primary and secondary education. They also write textbooks and sit on advisory committees from local to national levels. Because of this broad influence in curriculum design, implementation, and policy setting, faculty members of teacher-education institutions can bring about far-reaching educational reform – even beyond training the teachers in the world. (McKeown-Ice, 2005, p. 3)

The role of teachers and hence teacher education has been widely recognised by the international community. There have been numerous efforts to highlight the role of teacher education programs in developing EE. The first efforts were made at the European International Union for the Conservation of Nature and Natural Resources (IUCN) Conference in Switzerland in 1971, which raised international concerns for adequate teacher education. This conference recognised teacher education as one of the most important and significant aspects of EE programs and recommended that all teachers be taught the basic knowledge required to implement EE.

We recognize that teacher training forms one of the most important and significant aspects in the development of environmental education programmes and we recommend that:

the training of teachers provide them with essential basic knowledge of ecological facts and an adequate background of sociology and its relationship to human ecology; efforts should be made to develop in teachers a critical
CHAPTER 2

awareness of environmental problems to enable them to provoke responsible attitudes concerning environmental matters in their pupils;

environmental conservation is recognised as an essential part of the teacher training and that developments started in pre-service training should be continued by in-service training;

as teacher training in environmental education involves the use of many techniques and methods, all prospective teachers should be given training in the use and evaluation of pedagogic methods, including those relating to inter-disciplinary approaches to team teaching; media banks be established at the national and international level for exchange of information, training aids and teaching materials. (IUCN as cited in Tilbury, 1992, p. 270)

The 1972 Stockholm conference called for teacher education to move towards creating environmental awareness and practical action (UNEP, 1972). The Belgrade Charter in 1975 identified teachers as the principle audience of EE and recommended well-designed programs to educate teachers and set the stage for revamping the teacher education curriculum (UNESCO, 1975). The next major conference held at Tbilisi in 1977 clearly prioritized the need for in-service and pre-service teacher education. It provided the goals and objectives that went on to be the basis of EE globally. These included amongst others the provision of opportunities to every individual in order to acquire knowledge, values, attitudes, commitment and skills to protect the environment (UNESCO & UNEP, 1977).

The 1992 UNCED held at Rio de Janeiro played a pivotal role in bringing environmental consciousness to the forefront. 'Agenda 21' which was formulated at the this conference clearly lists education as a priority and called for involvement from everyone involved in the process – the teachers, teacher educators, curriculum developers, education policy makers and authors of educational materials (UNESCO, 1992).

The Thessaloniki Declaration as part of the International Conference on Environment and Society: Education and Public Awareness for Sustainability also sought to elevate education as a fourth pillar of sustainability in the 21st century. It stressed that educational messages for sustainability must also be emphasized in pre-service and in-service programmes for teacher training (International Conference Environment and Society: Education and Public Awareness, 1997). In 2002, the United Nations World Summit on Sustainable Development (UNWSSD) re-emphasised the role of teacher education to help nurture the environment. It urged nations to unite in improving access to basic requirements and training and education in order to banish underdevelopment (UNESCO, 2002).

In its Guidelines and Recommendations for Reorienting Teacher Education to Address Sustainability, UNESCO clearly highlights teacher educators as having a ‘broad influence in curriculum design and implementation, as well as policy setting
within educational institutions’ and ‘being perfectly poised to promote education for sustainable development’ (UNESCO, 2005b, pp. 10–11).

The 2007 Ahmedabad Declaration continued to stress the importance of education in achieving sustainable development goals and the need to focus on teacher education (Center for Environment Education, 2007–2008; UNESCO, 2007). As outlined above there has been a strong call for reform in teacher education at an international level with respect to EE. This focus was carried forward with the Earth Summit in 2012 in Rio de Janeiro which continued the emphasis on teacher education and putting education at the centre of any significant change (Earth Summit, 2012).

Research in Teacher Education: Teacher Educators’ Identities

While a lot of attention has been paid to what teachers ought to know and be able to do, there has been much less attention on teacher educators and the knowledge and subject matter appropriate for them (Cochran-Smith, 2003). Loughran (2011, p. 279) pointed to ‘superficial/simplistic views of teaching and learning’ and ‘learning as listening’ as one of the major problems with Teacher Education. ‘High stakes testing and approaches to teaching standards which, because of the implicit need for simple solutions to complex situations again reinforce ingrained views of practice as the delivery of information’ (p. 279) further worsen this. While discussing the situation in Australia he explains how economic imperatives undermine expectations of quality learning making it difficult to bridge the theory-practice gap and ‘creates binaries that mask the real issues associated with the complexity of teaching and learning about teaching’ (p. 282). This discussion could easily be extended to India given the larger economic imperatives at stake there where there is an appalling lack of qualified teachers and teacher education institutions (UNESCO, 2011). This creates pressures to shorten the length of Teacher Education courses (Currently most Bachelor of education courses are one year courses completed post Bachelors in any other discipline) and increase the student intakes. As a result class sizes can often swell to up to 100 students per class seriously impacting the quality of learning and teaching quality. Examinations – often conducted by external bodies – are the main form of assessment and teaching is often centred on how to help students perform well in these exams (Batra, 2005).

Darling-Hammond (2012, p. 3) refers to teaching quality as ‘strong instruction that enables a wide range of students to learn. Such instruction meets the demands of the discipline, the goals of instruction and the needs of students in a particular context.’ While strongly related to teacher quality, namely teacher’s knowledge, skills and dispositions, context of instruction plays a major role in determining teaching quality. ‘Curriculum and assessment systems that support teachers’ work and the “fit” between teachers’ qualifications and what they are asked to teach, and teaching conditions’ (p. 3) are key considerations to this context. No matter how high the teacher quality, flawed curriculum, poor teaching conditions, inappropriate
teaching materials and assessment, substandard space, lack of time and large classes all negate the effectiveness of a high-quality teacher. Developing teaching contexts that enable good practice is crucial in order to enable good practice. In short ‘if teaching is to be effective, the policies that construct the learning environment and the teaching context must be addressed along with the qualities of individual teachers’ (p. 4). Teacher quality is also vital particularly in the teaching of EE.

In an interview with Hungerford and Simmons (2003, p. 7) Paul Hart put forth the argument that ‘whether teachers' actions (and intentions) originate in significant early life experiences or not, they have a historical embeddedness in personal experiences as well as sociocultural practices in which the deeper values are implicated.’. Extending this to teacher educators it might be argued that their life experiences, the culture and societal influences play a large role in their enacting of environmental actions. According to Hart, EE happens in Canada mainly because teachers have made the ‘moral/ethical leap of consciousness from assuming traditional pedagogical responsibility for the construction of personal and social values to encorporate environmental values’ (p. 8). They have done this even in the absence of sophisticated content knowledge of environmental issues and environmental science. This provides hope in India where teachers/teacher educators could draw from rich knowledge based on local, cultural and traditional traditions irrespective of the access to sophisticated (content) knowledge about the environment.

Hart strongly recommends that we acknowledge and pay respect to teachers’ personal practical ideas as teachers’ thinking and practice are mutually informing processes; it is impossible to study either of them without considering the other. Cochran-Smith asserted that what makes a successful teacher depends heavily on who they are as individuals, what experiences they have had before they started to teach and the type of education – in particular the type of teacher education program they have had (Wilson, 2008). By extension, their personal stories and theories build teachers’ and teacher educators’ identities and influence teacher quality in education. Teacher Quality being ‘the bundle of traits, skills, and understandings an individual brings to teaching, including dispositions to behave in certain ways’ (Darling-Hammond, 2012, p. 2).

Developing an identity as a teacher (and teacher educator) is essential in ensuring commitment and adherence to professional norms of practice (Darling-Hammond et al., 2005, p. 382). Identity according to Payne (2001, p. 68) is an often neglected but crucial and relevant aspect of understanding EE practices. He defines identity as ‘how I view myself, how others portray me and how I perceive those others who understand me, the practices of identity relate to how I present myself in various circumstances and settings, make some sense of them, and how others relate to the various ways I present myself.’ Identities are complex, deeply grounded in and shaped by everyday experiences – how individuals act, interact and communicate in relation to ‘various social and environmental sensibilities’.

An individual’s embodiment in everyday experiences is integral to understanding his/her identification with the environment and the nature of its ‘crisis’ (p. 70). For
a teacher educator identity shapes his/her interactions and engagement with EE in their professional practice. While Payne discusses this in terms of pre-service teachers' ongoing struggles and predicaments 'in relation to forming or sustaining an identity as an environmental educator’ (p. 70), this can easily be extended to teacher educators and their struggles in finding their identity as Environmental Educators. It is important to understand the ‘local, historical, social, cultural and global ‘shapers’ of self, social and environmental consciousness and personal identity’ and the ‘politics of development’ of these identities as they significantly influence teacher educators and their work. Generating ‘local knowledge of practice’ by linking their work to larger social, cultural and political issues helps teacher educators to be better at their work. Teacher educators who regard teaching as ‘a political activity and embrace social change as part of the job’ are the ones who join other educators, parents, and communities in ushering major reforms and are agents of change – like the ones needed in India right now (Cochran-Smith, 2003; Cochran-Smith & Lytle, 1999). An important consideration in building Teacher Educator Quality would be providing opportunities to ‘articulate their principles of practice and see the value in so doing’, which would help, minimise the ‘discord associated with mixed messages so common when action and intent are at odds’ (Loughran, 2011, p. 288). Teacher educators need to be able to move beyond the tacit and make their pedagogical purposes explicit in order to be able to understand the ‘why’ – the ‘fundamental pedagogical underpinnings inherent in supporting meaningful learning’ (p. 287). Their identities are ‘entwined with the how and why of teaching about teaching (and that is what constitutes a pedagogy of teacher education’ (p. 290). Articulating this would mean reflecting on their approaches and conceptualisation of their own practice (Loughran, 2008a). (An issue that emerges as being at the heart of the learning inherent in the study of the teacher educators involved in this project.)

Teacher education and EE. Teacher Education has been claimed to be the ‘priority of priorities’ and there have been numerous recommendations seeking reorientation of teacher education toward EE (Cutter-Mackenzie, 2009; McKeown et al., 2002; McKeown-Ice, 2000; Nemerov & Agardy, 2005; Pepper & Wildy, 2008; Tilbury, 1992, 1994, 2004; Yencken et al., 2002). Such recommendations have come from UNESCO through various documents and directives chiefly the ‘Guidelines and Recommendation for Reorienting Education to Address Sustainability’ (UNESCO, 2005b). That document validates the influential role teacher education institutions and teacher educators’ play and highlights the need to address a number of themes. It recommends the need to reorient teacher education curricula, programs, practices and policies so that they match the environmental, social, and economic conditions and goals of their respective communities, regions, and nations. The report advocates greater participation by teacher educators in the intellectual lives of their respective faculties, institutions, and the broader community as necessary in bringing about change. It also lays some onus on individual faculty members urging them to work within their own sphere of influence and exert individual authority to bring
about change. The policy clearly spells out the crucial role of teacher educators recognising them as key change agents and the ones who bridge gaps between theory and practice (UNESCO, 2005b).

Although there has been an increasing emphasis on the role of teacher educators and teacher education in promoting EE and the need to implement EE, there seems to be a significant gap in actual practice. Ferreira, Ryan, Cavanagh, and Thomas (2009, p. 1) claim that ‘recent research indicates that pre-service teacher education institutions and programs are not doing all they can to prepare teachers for teaching education for sustainability or for working within sustainable schools’. They summarise a body of research to identify ‘teacher education as a key strategy that is yet to be effectively utilised to embed education for sustainability in schools’ (p. 2).

Due to this under-utilisation – namely inadequate training – pre-service teachers have problems teaching EE (Cutter-Mackenzie, 2009). One of the main reasons teachers are not teaching EE is because they are not being well-prepared to integrate it into their classrooms (Gabriel, 1996). Since there is a lack of EE embedded in the teacher education programs, very little is written about it (J. Fien & Maclean, 2000). When EE is embedded in teacher education programs the teachers are better placed to implement it in their classroom as advocated by Plevyak, Bendixen-Noe, Henderson, and Wilke (2001). They stressed the need for teacher preparation and development of positive teacher attitudes in order for successful implementation of EE. This lack of pre-service teacher preparation was also found in a nationwide study in the U.S. which concluded that ‘pre-service teacher education programs are not systematically preparing future teachers to effectively teach about the environment’ (McKeown-Ice, 2000, p. 10).

Including EE in pre-service education can be a challenging task (Powers, 2004). Amongst other factors, a lack of vision or awareness of the role education can play in achieving sustainability is seen as an impediment in EE. One of the main problems documented in doing any work on education and learning about sustainability in institutions ‘were lack of awareness and understanding of the concept of sustainable development among faculty members’ (UNESCO, 2005b, p. 29).

There has been very little research on the role/perceptions/preparedness of teacher educators to teach EE. McKeown-Ice (2000) found most institutions lacking in commitment with the EE program (which was often driven by one person) and recommended the hiring of more faculty specialized in teaching EE. A study interviewing 18 professors of education about their perspectives on EE revealed that:

- limited time was the biggest constraint to infusing EE;
- student disposition, in particular an aversion to science was a concern;
- there was infusion of EE into existing courses rather than EE being a separate course; and,
- the use of pre-packaged, nationally disseminated curricula was common rather than developing more locale-specific curricula (Powers, 2004)
Summers, Childs and Corney’s (2005) study on interdisciplinary collaborations points to the gaps in understanding of ESD. While extolling the virtues of whole-school approaches they suggest limiting collaborations to only a couple of subjects as being more reasonable to begin with rather than attempting whole school approaches. They also highly recommend professional development. Qablan (2009) uncovered a clear mismatch between teacher educators’ attitudes and practice and recommended special training courses to enhance their pedagogical knowledge, and to encourage them to build learning communities that would advance their awareness, attitudes, and pedagogical knowledge relating to EE.

UNESCO (2005b) made the following recommendations to encourage teacher educators to reorient their teaching to address EE:

• create awareness amongst administration and faculty leaders about the need for reorienting teacher education programs;
• provide education opportunities to faculty members so that they understand the need for EE, its relevance in improving educational standards and how they can contribute to the overall effort of reorientation;
• set up participatory and democratic process involving the entire faculty;
• move quickly to institutionalise EE so that it continues irrespective of faculty, administration or funding changes; and,
• recognise and reward efforts especially if they are voluntary.

As the above makes clear, teacher educators are viewed as having a clear role in EE. However, there is a significant gap in the research literature on how teacher educators may come to better understand this role. Few studies have delved into the perspectives of teacher educators and how they currently integrate EE or Education for Sustainability into their teaching of pre-service teachers as pointed out by Fien and Trainer about two decades ago (1993). The paucity continues to exist with limited empirical studies about teacher educators’ implementation of EE. There is also a need for studies that look into the organisational culture that influences teacher educators and their implementation of EE. UNESCO (2005b) spells out a need for concerted efforts and resources to institutionalise EE into programs, practices and policies of teacher education. Having reviewed international perspectives on teacher educators and their importance in furthering the cause of EE, the next section discusses the relationship between teacher educators and EE within teacher education in India.

THE CASE OF INDIA: TEACHER PREPARATION AND EE

While introducing the new ‘EE Curriculum Framework for Teachers and Teacher Educators’ Shardindu, Chairman of National Council for Teacher Education (NCTE) – India’s apex body for Teacher Education remarked:

Education, especially teacher education has obviously to play an increasingly vital role towards mitigation of continuing environmental degradation and the
complexities of pollution, which pose a great menace to the survival of human life and other species on this planet. (National Council of Teacher Educators, 2005, p. 1)

The National Council for Teacher Education – India’s central body and policy maker on teacher education clearly states:

Teachers occupy a crucial position in the system of education. Through them its message is conveyed to society, ideas are disseminated and behaviour is shape. (National Council of Teacher Educators, 2005, p. 1)

The NCTE maintains that the importance of EE is being widely recognised but ‘it is yet to get its rightful place in education, much more so, in teacher education’ (National Council of Teacher Educators, 2005, p. 1). The NCTE also asserts that unless EE is prescribed as a compulsory and integral component of education and teacher education its message will not be conveyed to all.

EE is taught as a compulsory core module on Environmental Studies in all undergraduate courses developed by the University Grants Commission which is a six-month course taught through both classroom and field activities. Evaluation of the course is through exams at the end of the semester with 25 out of the 100 marks allotted to fieldwork. India’s largest Open University – The Indira Gandhi National Open University – also has some awareness level courses and also a Post Graduate Diploma in Environment and Sustainable Development. The Centre for Science and Environment offers a two-day training program for teachers, educators and others interested in EE (Kaur & Bhati, 2012). These possibilities are indicative of the limited efforts being made towards educating/training teachers in EE.

There have been efforts towards introducing EE in schools; but they have been few and far in between (Chhokar & Pandya, 2005; Joshi, 2005; Pande, 2001; K. Sarabhai, 1995). Pandya (2000, 2004) claims that efforts towards preparing pre-service teachers to teach EE have been made. But these efforts have been few or are unreported and hence unnoticed. Khirwadkar and Pushpanadam (2007) maintain that most teacher education programs merely train teachers to adjust to the current system of education by transmission of information.

Organisations such as the Centre for EE (CEE) have played a pivotal role in preparing teachers to teach EE. Since its inception in 1984 it has worked tirelessly to promote EE through various programs some of which have involved teachers. It has established regional centres, which often act as resource centres for school students, teachers and teacher educators. It offers the Green Teacher – a one year diploma course in EE for practicing teachers and educators offered through both online and offline modes (Center for Environment Education, 2012). CEE has been working with teachers in conjunction with the government and other Non-Governmental Organisations (NGOs) to help implement EE in schools. However, there has been no research conducted to gauge the effectiveness of these programs or to help identify the core needs of those working in the field – so that future programs could
be tailored to meet those needs. CEE has been instrumental in publishing India’s first international journal in the field, The Journal of Education for Sustainable Development. However, its annual report does not feature any programs directly working with the teacher educators (Center for Environment Education, 2007–2008).

Research on EE in India is still in its nascent stages. Very little research is available into that which has been conducted and published in the field of EE and particularly in the field of Teacher Education in India.

Patil (2006) in a review of research studies undertaken between 1990 and 2004 contended that the themes for research until that period included environmental awareness, developments of teaching methodology and learning styles, and curricular aspects of EE. In separate studies, she noted a number of authors that had all tried to evaluate environmental awareness amongst students. Further to this, in separate studies she also found that video instruction, field trips and ‘conducive classroom environments’ influenced students’ learning styles. Finally, in another set of separate studies she looked at the curricular aspects of EE and found that multi-disciplinary approaches including activity based instruction helped improve student learning. Unfortunately, none of these studies involved the teachers or teacher educators. It has only been in recent times that endeavours have been made to study teacher educators and their role in EE; this study does so in India and offers insights into the field that sheds new light on the issues and concerns associated with such development.

Overall there is a well-established concern for the state of the environment, which is echoed at the global level as well as at the local level (India). Historically, the emphasis on EE was consistent with nature studies. Concurrent with the changing environment, EE has likewise changed particularly with the advent of sustainable development. This is especially true in India where the increase in environmental concerns has given rise to numerous calls for developing environmental consciousness. Education is widely seen as a means of responding to these calls.

Over the past decade in particular, efforts from national and state governments to implement EE have redoubled. The Supreme Court directives and the National Curriculum Framework have attempted to provide a jolt to the field. Policies and directives however, will only make a difference if matched by efforts to put them into practice.

EE in India as part of formal education is relatively new, although EE has been part of Indian culture for over 5000 years; it is only just becoming visible in education. It seems apt that any approach to EE in India should build on the cultural and traditional ethos so embedded in Indian culture. Varma (2005) echoes these sentiments by highlighting the antiquity of Indian culture and the need to dip into this culture – taking it to a global level. Immersing EE practices into Indian culture and using it to frame policies seems to be a logical move.

Recent developments and federal initiatives have managed to put the policies like the National Curriculum Framework and the National Curriculum for teachers and teacher educators into place. These policies are an attempt to provide direction and
address the future requirements of EE. What needs to be determined is whether or not these policies are being put into practice.

In India there is a danger of using words as magical talismans that are seen to do away all evil (Luce, 2006). For example despite numerous laws to deal with such things as child labour, dowry and child marriage, such practices are still quite widespread (and sometimes flourishing) across India. Unfortunately, it is quite evident that there is limited research into the practice of EE in teacher education in India. This study responds to that need and attempts to bridge the gap by establishing a beginning point in understanding teacher educators and their experiences in teaching EE in India.