CHAPTER – I
THEORETICAL BACKGROUND OF THE STUDY

1.1 INTRODUCTION

“Earth provides enough to satisfy every man’s need, but not every man’s greed”

— Mahatma Gandhi

The above quote by Mahatma Gandhi rightly points the nature of earth which has sufficient resources to meet the human needs, but not to satisfy the greed. It has a great relevance in the modern world where people are exploiting the natural resources in an uncontrollable manner. Environment which is a combination of living and non living things is very important for life to exist on the earth.

Man has started the exploitation of the environment since he came into existence on earth. The exploitation of nature can be seen when he started to live in caves, nomadic life and settled and practiced agriculture. For the satisfaction of his basic needs and greed, he started to exploit the environment by cutting trees, destroying forests, destroying patches of land, constructing buildings, depleting of resources, using various modes of transportation, development in technology etc. This exploitation reached its zenith when the population increased drastically.

The consequence of this devastation can be seen in many places in the form of deforestation, different types of pollution, ozone depletion, Green house effect, Acid rain, various natural calamities etc. Number of plants and animal species has started to become extinct, large number of incurable diseases both for plants and animals have started to rule the earth and even man fails to find suitable preventive measures to fight diseases.

Pollution, deforestation, loss of biodiversity, ozone hole, global warming are some of the environmental problems that are faced by the world today. Where did they come from? All the basic resources required for living come from the environment. It is the environment that provides raw materials to industries, food
for people, fuel for transport etc. The environment also absorbs the waste that developmental activity creates, which means that the environment is both a source and a sink for developmental activity. The ways people interact with the environment influence its health and well being. Overuse of environmental resources causes environmental degradation.

India has made considerable strides in slowing down its population growth rate. But with all the efforts, the current estimate is that our population will only stabilize somewhere in the middle of the century, by that time India will have become the most populous country of the world. Till then India adds a population of approximately one Australia to India every year. With about 16% of the world’s population and a little over 2% of its land, there is already enormous pressure on the resources. But while the population increase puts pressure on the resources, the pressure of “development” is perhaps even greater. Unless development needs and those of poverty in particular, are dealt with simultaneously, there could be neither protection of the environment nor success in the programmes to achieve development (Kartikeya, 2000). Development is an important facet of the present world, which is essential for the societal well being. But these developments should not exert much pressure on the resources which can deteriorate the environment. The environmental, social and economic wellness is the need of the hour, which amalgamates together in the concept of sustainable development.

Solving these environmental problems and preventing new ones will require an understanding and appreciation of the linkages between environmental well being and human well being. However, many of these linkages are not apparent. To bring environment and development concerns to people’s notice, to enable them to understand the linkages between the two, to encourage them to take appropriate action, and to equip them with the skills necessary for taking the required action, education is necessary for all this (CEE, Ahmedabad, 1999).

The awareness of these prevailing dangerous situations of earth has led many scientists and eminent persons to predict about what could happen to the earth if it goes the same way. This is how the concept of protection and conservation of earth came into existence. Various measures were planned and adopted to some extent, though not successfully to control the environmental
devastation at the international level. In order to bring about awareness and to maintain the balance of the ecosystem, the developing countries had started to give more emphasis on the concept of Sustainable Development.

Few environmentalists have criticized the term “sustainable development”, claiming that economic policies based around concepts of growth and continued depletion of resources cannot be sustainable. Resources such as petroleum and coal are consumed much faster than they are created by natural processes, and are continually being depleted. Increasing population, accelerated resource exploitation and development based on careless application of technology are the chief cause of environmental crisis. Many fear that the world is quickly using up the vast but finite amount of fossil fuels whereas some fear that we may have already peaked in fossil fuel extraction and production.

1.2 NEED FOR SUSTAINABLE DEVELOPMENT AND EDUCATION FOR SUSTAINABLE DEVELOPMENT

The earth’s environment has been considered as a remarkably stable, self correcting machine, taking care of all human misadventures and assaults on fragile biosphere. But this misconception of nature cannot be taken for granted. Modern technology in industry and agriculture, as well as other developmental activities of modern society are highly exploitative in nature, which is enhancing pollution and causing enormous damage to the environment. Emission of smoke and gases from industry and automobiles leads to increased carbon dioxide content in the atmosphere. Effluents of the industry and mining are contaminating water bodies and are degrading the land. High dose of fertilizers are polluting lakes. Pesticide residues in the soil contaminate water bodies. The developmental activities including agriculture hasten the desertification and reduction of genetic diversity. Pollution of air and water is a great challenge which is intimately connected with the health of population and ecosystem. Inland water bodies and coastal areas have so far been treated as dumping grounds for wastes thus affecting aquatic and marine life. Environmental degradation refers to the diminishing of a local ecosystem or the biosphere as a whole, due to human activity. The long term final
result of environmental degradation may cause unsustainability of human population.

Sustaining human population is a part of sustainable development. Sustainable development demands ways of living, working and enabling people of the world to lead healthy, fulfilling, and economically secure lives without destroying the environment and without endangering the future welfare of people and the planet. One way of understanding this coexistence is the ‘egg of sustainability’ model developed by IUCN—the world conservation union. The ‘ egg of sustainability’ is a model that comprises people (human communities, economies etc.) within the ecosystem (ecological communities, processes and resources), together with their interactions. Interactions consist of flows from the ecosystem to people; both benefits (life support, economic resources etc.) and stresses (natural disaster) and conversely, from people to the ecosystem, both stresses (resource depletion, pollution etc.) and benefits (conservation). People depend on the ecosystem, which surrounds and supports them just as the white of an egg surrounds and supports the yolk. At the same time, a healthy ecosystem is no compensation if people are victims of poverty, misery, violence or oppression. Society can be well and sustainable only if both the people and the ecosystem are well, like an egg can be good only if both the yolk and the white are good. Human well being is a requirement of sustainability because no rational person would want to perpetuate a poor quality of life. Ecosystem well being is a requirement because it is the ecosystem that supports life and makes possible any standard of living. The well being of humans and the well being of the ecosystem are equally important, and a sustainable society needs to achieve both together (Chhokar et al, 2004).

Unsustainable development occurs when nature’s resources (such as trees, habitat, earth, water, air) are being consumed faster than that of nature can replenish them. Sustainability requires human activity that uses nature’s resources to the point where they can be replenished naturally. Unsustainable development ignores the fact that man managed systems degrade the natural resources by consuming non renewable resources, and reducing the capacity of natural systems to renew or recycle. The fast expanding green revolution unfortunately leads to the
unsustainable exploitation of natural resources. Excessive and unscientific use of chemical pesticides and mineral fertilizers also leads to environmental degradation. Thus tools for measuring sustainability will have to be enlarged in a manner that current attention could be paid to economic viability, environmental sustainability and social equity.

The intensified and unsustainable demand for land, water, marine and coastal resources resulting from the expansion of agriculture and uncontrolled urbanization lead to increased degradation of natural ecosystems and erode the life supporting systems that uphold human civilization. Caring for natural resources and promoting their sustainable use is an essential response of the world community to ensure its own survival and well being. The relationship between consumption behavior and sustainability is represented in table 1.1.

Table 1.1: Relationship between consumption behavior and sustainability

<table>
<thead>
<tr>
<th>Consumption of natural resources</th>
<th>State of environment</th>
<th>Sustainability</th>
</tr>
</thead>
<tbody>
<tr>
<td>More than nature’s ability to replenish</td>
<td>Environmental degradation</td>
<td>Not sustainable</td>
</tr>
<tr>
<td>Equal to nature’s ability to replenish</td>
<td>Environmental equilibrium</td>
<td>Sustainable growth</td>
</tr>
<tr>
<td>Less than nature’s ability to replenish</td>
<td>Environmental renewal</td>
<td>Sustainable growth</td>
</tr>
</tbody>
</table>

One should be aware of this relationship between consumption and sustainability. Education plays a crucial role in attaining such sustainability. Education encompasses teaching and learning specific skills, the imparting of knowledge, positive judgment and well developed wisdom which are less tangible but more profound. One of the fundamental aspects of education is imparting culture from generation to generation. The basic aim of the education system for sustainable development is ‘education of a new man’, ‘the man of a sustainable type of thinking’, a man of cosmo-planetary consciousness with a holistic world outlook who has a methodological culture and a culture of sustainability, who is
ready to a socially significant labour, to self organizing and self perfection, a man with high socio-cultural needs and deep moral ethical values, a man who is capable to solve global tasks facing by the mankind and to promote the forming of sustainable society.

Education in its contemporary development should be aimed at the future, should “foresee” and form in a certain way and satisfy needs of future generations of people. It means that education should be anticipatory to social, economic and cultural life; it should form a desirable sustainable future. A new educational paradigm will be a micro model of sustainable society. But such ideas could not be realized in old organizational forms of education system. There is a need for new organizational forms and educational institutions that are mobile, synergetic, creative, future-oriented which could provide the implementation of new objectives and new historical functions of education. For that it is necessary to incorporate possible principles of sustainable development into all spheres of life. These spheres of life should not only be considered at the individual level, but at the community level. There is a significant scope for regional and global cooperation in sustainable development. Education for sustainability is a new paradigm for a lifelong learning process that leads to an informed and involved citizenry having the creative problem-solving skills, scientific, technological, and social literacy, and commitment to engage in responsible actions that will help ensure an environmentally sound, socially just, and economically prosperous future for all (Fien & Maclean, 2000)

Some of the areas of common concern are marine and riparian issues, trans-boundary environmental impacts, management of bio-resources, technology sharing and sharing of sustainable development experiences. Efforts must be made especially by developing countries, to work towards synergizing experiences and raising shared regional concerns as a strong united front in international forums. Mechanisms must be put in place to facilitate such international exchange of domestic and global experiences in sustainable development. There must be mechanisms for monitoring the compliance of countries to their obligations under various environmental agreements. Currently there is a multiplicity of institutions with fragmented responsibilities. A better governance regime is required to ensure
cooperation and compliance. Sustainable development is achieved through optimizing gains from several variables, rather than maximizing those from a single one. This requires government departments, by convention sectorally organized, to work together, or in some cases as a single multi-disciplinary authority. For this joint planning, transparency and coordination in implementation are required. The richness of skills available in society must be harnessed through partnerships involving institutions in civil society, such as NGOs, CBOs, corporate (including private) bodies, academic and research institutions, trade unions, etc., which must be made an integral part of planning and implementation for sustainable development.

On the one hand there is a surfeit of laws, in which some of them are outmoded and irrelevant. On the other hand, effective enforcement is lacking in respect of laws relevant to contemporary concerns and conducive to governance. This calls for a thorough review of laws, elimination of those which are outmoded, and simplification of the procedures for implementing those which are relevant. Internal reviews as well as learning from international experience should be the basis of identifying and filling gaps in existing laws. It must, however, be recognized that laws in themselves do not provide solutions, unless there are mechanisms to effectively enforce them. There are many traditional systems and practices whose values and validity needs to be recognized and brought into the mainstream of government policies. Appropriate mechanisms for integrating them need to be created. Many policies were framed before sustainable development became a major concern. These need to be reviewed from the point of view of sustainable development. All future policies must be guided by considerations of sustainable development. Areas lacking policies should be identified and adequate policies compatible with the imperatives of sustainable development must be framed. It should be based on successful examples, of policies and initiatives in similar areas.

Effective management of resources requires participation by all stakeholders. At the local level, strengthening democratic institutions generally leads to better and more sustained management of natural resources. To enhance effectiveness of people’s participation in local governance, committees comprising
both elected and executive members of local bodies and representatives of community groups, must be formed. Appropriate capacity building would enable them to undertake local development activities according to community priorities, monitor project implementation and manage community assets. Where the conditions for such community empowerment have already been created, as in India through the 73rd and 74th amendments of its Constitution, effective implementation of the provisions should be ensured. All members of society are the stakeholders of sustainable development. Women make up half of this group. Affirmative action to ensure representation and power to women in local governance, and appropriate capacity building, are necessary to make them effective and equal partners in the development process.

Social groups which have been traditionally discriminated against must be represented in local governance and empowered to ensure that they become effective and mainstream partners in development. Children are a valuable asset of every society. It is the responsibility not only of the parents but of the community that children realize their potential fully, growing up in a healthy, enriching and fulfilling environment. Ensuring the provision of such an environment is a major challenge of governance at the local level. The occupational, cultural and economic heterogeneity of population is on the whole a major asset in making development sustainable; but there are times of crisis when the same heterogeneity can become the basis of conflict and social insecurity. It is imperative to evolve participatory mechanisms of governance involving citizen groups and local authorities which will provide effective means of conflict resolution.

1.3 CONCEPT OF SUSTAINABLE DEVELOPMENT

The rich and diverse religious and cultural traditions of India, including its tribal religions, include rich conglomeration of beliefs about nature and rules for the sustainable utilization of material resources. It also gives an idea of how nature’s different aspects should be kept clean and pleasant for a happy living on this earth. For example in Rigveda, which says,
“Madhuvata Rtaaye, Madhu ksharanti Sindhavah
Madhvirana Santosodhiih
Madhunaktamutososih Madhumat Parthivam rajah
Madhurdourastunah pita Madhuvan me vanaspathi
Madhvinam astusuryah, madhurgabobnabantu nah”
(Rigveda 1-90, 6-8)

The above mentioned scripture describes the five elements (air, water, fire, earth and space) that constitute this universe and provide the life support for man and animal and the base for all forms of human activity. According to E.P Odum, “The earth does not belong to man; man belongs to earth. Whatever befalls the earth befalls the sons of the earth. Man does not weave the web of life; he is merely a strand in it. Whatever he does to the web, he does to himself.” According to the Indian Philosophy, all that exists in the universe, whether organic or inorganic, have five constituent elements i.e. air, water, fire, earth and space. Everything comes from varying combinations of these five elements, and ultimately returns to these, which together create nature. Atharva Rishi explains this relationship by saying “Mata Bhumih Putrham Prithivyah” stating that “Earth is the mother and we are her children”.

Protection of environment in India is not a recent origin. It dates back to pre history period. Every religion and every culture in India expressed concerns about environment while reflecting the traditions and social perspectives, with a clear warning on the impact of environmental degradation and need for conservation for human survival. In Indian culture, nature is perceived as an all encompassing entity. The age old Hindu scriptures such as the Vedas, Puranas and Upanishads and the great epics Mahabharata and Ramayana have strongly laid down the rationale for the protection of environment and religious practices and sanctions, as code of conduct, against excessive use of natural resources. The Isopanishad emphasizes that: “This Universe is the creation of Supreme Power meant for the benefit of all his creation. Each individual life form must therefore learn to enjoy its benefit by forming a part of the system in close relation with other species. Let not any one species encroach upon the rights of the others”.

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Environmental conservation and protection were of major concerns in ancient India. As time proceeded, Industrial revolution has created a huge pressure on the environment. This was the main reason for including Environmental Education as a major subject in all education systems. Development is essential for the progress of any country. Hence, we started to think of both development and environmental protection, where it came out with a new concept of Sustainable development. Here the development is concerned with the economic and societal aspects, whereas the environmental protection is the environmental aspect in sustainable development.

The objectives formulated in the conference held at Tbilisi (1977) were; to develop awareness to the total environment and its allied problems, develop knowledge about the environment and its associated problems, develop attitudes including values and feelings of concern for the environment, to acquire skills for identifying and solving environmental problems, to actively participate at all levels towards resolution of environmental problems.

The principles that were identified in the Tbilisi conference (1977) stated that Environmental Education should consider the environment in its totality, be a continuous life-long process which begins at the pre-school level and continue through all formal and non-formal stages; be inter-disciplinary in approach; examine major environmental issues for local, national, regional and international points of view so that students receive insights into environmental conditions in other geographical areas, focus on current and potential environmental situations while taking into account the historical perspective; promote the value and necessity of local, national and international co-operation in prevention and solution of environmental problems; enable learners to have a role in planning their learning experiences and provide an opportunity for making decisions and accepting their consequences; relate environmental sensitivity, knowledge, problem-solving skills and value clarification to every age but with special emphasis on environmental sensitivity to the learner’s own community in early years; help learners discover the symptoms and real cause of environmental problems; emphasize the complexity of environmental problems and thus the need to develop critical thinking and problem-solving skills; utilize diverse learning
environments and a broad array of educational approaches to teaching/learning about and from the environment with due stress on practical activities and first hand experience.

The aims of ESD are to promote understanding of the interdependence of natural, socio-economic and political systems at local, national and global levels, to encourage critical reflection and decision making. It is reflected in personal lifestyles, to encourage the active participation of citizenry in building sustainable development, develop interactive and participatory skills, developing appropriate environmental understanding based on an understanding of the independence of nature and skills of problem-solving.

Beyond a simple one sentence definition, many governments and individuals have pondered what sustainable development means. The Rio declaration on environment and development fleshes out the definition by listing the 27 principles among which 18 principles of sustainability are addressed below.

i) People are entitled to a healthy and productive life in harmony with nature

ii) Development today must not undermine the development and environment needs of present and future generations.

iii) Nations have the sovereign right to exploit their own resources, but without causing environmental damage beyond their borders.

iv) Nations shall develop international laws to provide compensation for damage that activities under their control cause to areas beyond their borders.

v) Nations shall use the precautionary approach to protect the environment. Where there are threats of serious or irreversible damage, scientific uncertainty shall not be used to postpone cost effective measures to prevent environmental degradation.

vi) In order to achieve sustainable development, environmental protection shall constitute an integral part of the development process and cannot be considered in isolation from it.

vii) Eradicating poverty and reducing disparities in living standards in different parts of the world are essential to achieve sustainable development and meet the needs of the majority of people.
viii) Nations shall cooperate to conserve, protect and restore the health and integrity of the earth’s ecosystem. The developed countries need to acknowledge the responsibility that they bear in the international pursuit of sustainable development in view of the pressures their societies place on the global environment and of the technologies and financial resources they command.

ix) Nations should reduce and eliminate unsustainable patterns of production and consumption, and promote appropriate demographic policies.

x) Environmental issues can best be handled with the participation of all concerned citizens. Nations shall facilitate and encourage public awareness and participation by making the environmental information widely available.

xi) Nations shall enact effective environmental laws, and develop national law regarding liability for the victims of pollution and other environmental damage. Where they have authority, nations shall assess the environmental impact of proposed activities that are likely to have a significant adverse impact.

xii) Nations should cooperate to promote an open international economic system that will lead to economic growth and sustainable development in all countries. Environmental policies should not be used as an unjustifiable means of restricting international trade.

xiii) The polluter should, in principle must bear the cost of pollution.

xiv) Nations shall warn one another of natural disasters or activities that may have harmful trans-boundary impacts.

xv) Sustainable development requires better scientific understanding of the problems. Nations should share knowledge and innovative technologies to achieve the goal of sustainability.

xvi) The full participation of women is essential to achieve sustainable development. The creativity, ideals and courage of youth and the knowledge of indigenous people are needed too. Nations should recognize and support the identity, culture and interests of indigenous people.
xvii) Warfare is inherently destructive of sustainable development, and nations shall respect international laws protecting the environment in times of armed conflict, and shall cooperate in their further establishment.

xviii) Peace, development and environmental protection are interdependent and indivisible.

ESD is based on ideals and principles that underlie sustainability such as intergenerational equity, gender equity, social tolerance, poverty alleviation, environmental preservation and restoration. This is stated in Rio Declaration which contains 27 principles of sustainability. These principles can help governments, communities and school systems identify knowledge, principles, skills and values on which they will create education for sustainable development or reorient existing education to address sustainability.

ESD increases the civic capacity by enhancing and improving the workforce, social tolerance, environmental stewardship, participation in community-based decision making which should be enhanced by combining formal, non-formal and informal education. An attitude of concern for the quality of the environment is important to motivate people to develop skills, willingness to take necessary decisions and actions for solving environmental problems. Thus education becomes an indispensable element for achieving sustainable development.

Some of the major milestones in the history of sustainable development and sustainability are as follows:

i) Rachel Carson published her book ‘Silent Spring’in 1962. It highlighted how agricultural pesticides were building up to hazardous level affecting animal species and human health. It shattered the assumption that the environment has an infinite capacity to absorb pollutants.

ii) Paul Ehrlich’s (1968) ‘The Population Bomb’ explained the connection between human population, resource exploitation and the environment. In the same year The Club of Rome established by 36 European economists and scientists, commissions conducted a study of global proportions to model and analyze the dynamic interactions between industrial production, population, environmental damage, food consumption and natural resource usage.
iii) The United Nations Conference on Human Environment was held in Stockholm in 1972. It provided the first international recognition of environmental issues. In the same year, the Club of Rome published ‘Limits to Growth’. The report was extremely controversial because it predicted dire consequence if economic growth was not slowed down. The developed countries criticized it because it does not include technological solutions. The developing countries also criticized it because it advocates abandoning economic development.

iv) ‘Our Common Future’ (also called the Brundtland Report) was published in 1987, which played a role in popularizing the term ‘Sustainable Development’.

v) UN Conference on Environment and Development (1992) was held in Rio de Janeiro. Some of the major outcomes of this conference are the Agenda 21, the Convention on Biological Diversity, the Framework Convention on Climate change, the Rio Declaration, and a Statement of Non-binding Forest Principles. (International Institute for Sustainable Development, 1997)

Sustainability is a well-articulated goal for management based on the explicit abandonment of the assumption that Natural resources are limitless (World Commission on Environment and Development, 1987; Lubchino et al 1991). Sustainable Development, which is a complex concept, has its origin in the Natural and Social Sciences that has been developed through international dialogue in response to the challenges facing the world today.

There are many views and definitions of Sustainable Development. Some of them are; Sustainable Development is “development which meets the needs of the present without compromising the ability of future generations to meet their own needs” (Brundtland Commission/ Our Common Future, 1987). A sustainable society is “one that… can be sustained indefinitely while giving optimum satisfaction to its members” (Blueprint for Survival, 1972). “Sustainable development is using, conserving and enhancing the community’s resources so that ecological processes, on which life depends, are maintained and the total quality of life, now and in the future can be increased. For development to be sustainable it must take account of social and ecological factors, as well as economic ones; of the living and non living resource base; and of the long term as
well as the short term advantages of alternative actions” (World Conservation Strategy, 1980). The main features either explicitly or implicitly in many definitions of sustainable development are a desirable human condition—a society that people want to sustain because it meets their needs; a durable ecosystem condition—an ecosystem that maintains its capacity to support human and other life; and equity between present and future generations, and within the present generations. Hence, the common elements it covers are the well-being of the human society, the well-being of the environment and sustainability over time.

. . . Sustainable development is not a fixed concept; rather it is a culturally-directed search for a dynamic balance in the relationships between social, economic and natural systems, a balance that seeks to promote equity between countries, races, social classes and genders. The interdependence of people and the environment requires that no single development or environmental objective be pursued to the detriment of others. (UNESCO-UNEVOC, 2004).

A core principle behind sustainable development is a combination of economic, social and environmental conditions. Without a proper ecosystem, it is impossible to maintain a better society and economic development for our own and future generation. Thus environmental dimension can be regarded as the ultimate boundary for sustainable development. The Social dimension is to meet the basic needs of all people without exceeding the boundaries of the ecosystem. The economic dimension is a means to realize the goal within the limits of a socially and environmentally sustainable manner. Education for Sustainable Development is intended to educate all the stakeholders including the students, community, corporate etc. about the importance and need for sustainable development in the present world. So Education for Sustainable Development (ESD) cannot be considered as having link only with environment but with development of social and economic aspects. The tripolar relationship of sustainable development is represented in figure 1.1.
These “three pillars” of Sustainable Development are called as ‘triple bottom line’ or ‘triad’ of sustainable development

1.4 EDUCATION FOR SUSTAINABLE DEVELOPMENT

A useful way of thinking about the constituent parts of sustainable development is the WEHAB Agenda adopted at WSSD (World Summit on Sustainable Development) in 2002. WEHAB stands for Water, Energy, Health, Agriculture and Biodiversity. While the DESD (Decade of Education for Sustainable Development) discourse clearly recognizes the importance and validity of various fields of transformative education as forerunners of ESD, it vacillates widely on its commentary about topics and themes to be addressed by ESD. Although the finalized DESD International Implementation Scheme (IIS) (UNESCO, 2005b) does not emphasize the topic or theme based approach to ESD, draft schemes (UNESCO, 2004, 2005a) listed 15 topics to be considered in promoting ESD. These 15 strategic perspectives categorized under socio-cultural, environmental and economic perspectives in the draft IIS of January 2005 (UNESCO, 2005a) were reorganized into ‘sustainability issues’ under ‘three spheres of sustainable development’ and the intersectional sphere in the final IIS (UNESCO, 2005b). The major topics to be addressed by ESD that are highlighted in draft and final DESD IIS (UNESCO, 2005a, 2005b), are given in table 1.2.
Table 1.2: Major topics to be addressed by ESD as identified by UNESCO

<table>
<thead>
<tr>
<th>“15 Strategic Perspectives” in Draft IIS</th>
<th>“Sustainability Issues” in Final IIS</th>
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</thead>
<tbody>
<tr>
<td>1. Socio-cultural perspective</td>
<td>1. Social Sphere</td>
</tr>
<tr>
<td>• Human rights</td>
<td>• Employment</td>
</tr>
<tr>
<td>• Peace and human security</td>
<td>• Human rights</td>
</tr>
<tr>
<td>• Gender equality</td>
<td>• Gender equity</td>
</tr>
<tr>
<td>• Cultural diversity and intercultural understanding</td>
<td>• Peace and human security</td>
</tr>
<tr>
<td>• Health</td>
<td></td>
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<tr>
<td>• HIV/ AIDS</td>
<td></td>
</tr>
<tr>
<td>• Governance</td>
<td></td>
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<tr>
<td>2. Environmental Perspective</td>
<td>2. Environmental Sphere</td>
</tr>
<tr>
<td>• Natural resources</td>
<td>• Water</td>
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<tr>
<td>(water, energy, agriculture, biodiversity)</td>
<td></td>
</tr>
<tr>
<td>• Climate change</td>
<td>• Waste</td>
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<tr>
<td>• Rural transformation</td>
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<tr>
<td>• Sustainable urbanization</td>
<td></td>
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<tr>
<td>• Disaster prevention and mitigation</td>
<td></td>
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<tr>
<td>3. Economic Perspective</td>
<td>3. Economic Sphere</td>
</tr>
<tr>
<td>• Poverty reduction</td>
<td>• Poverty reduction</td>
</tr>
<tr>
<td>• Corporate responsibility and accountability</td>
<td>• Corporate responsibility and accountability</td>
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<tr>
<td>• Market economy</td>
<td></td>
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<tr>
<td>• HIV/ AIDS</td>
<td>• Migration</td>
</tr>
<tr>
<td>• Migration</td>
<td>• Climate change</td>
</tr>
<tr>
<td>• Climate change</td>
<td>• Urbanization</td>
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</tbody>
</table>

Source: i) UNESCO, 2005a, pp.19-22
ii) UNESCO, 2005b, Annex I, pp.3, paragraph B

ESD aims at building up one’s knowledge, skills, attitudes and values towards sustainable development which are some of the objectives of ESD. The knowledge, skills and values to be addressed in sustainable development are given below;

1.4.1 Knowledge Building

The World Energy Council has estimated that energy demands would double between 1990 and 2020, a demand erupting most forcefully from the developing countries where per capita consumption levels have not peaked as a result of low income and lack of infrastructure. It is consequently expected that a
number of developing countries will make those critical moves towards committing themselves to major investments in infrastructure in the next couple of decades (Preethi, 1999).

The Factors responsible for development of awareness in sustainable development are broadly classified into individual subjective factors, individual objective factors and collective subjective factors. The Individual subjective factors include Emotions (Kollmuss and Agyeman (2002) identify fear as a significant block to developing awareness of the sustainability crisis. On the other hand, they quote evidence, supported by Maiteny (2002) that a strong felt connection to the natural world is often crucial in bringing people to act); Perceptions of agency (Without agency, the felt sense of being able to do something meaningful in response, people will not be prepared to carry the burden of awareness; a key policy objective must therefore be to provide it (Macnaghten, Grove-White, Jacobs & Wynne, 1995); Unexamined habits (Kollmuss and Agyeman (2002) identify ‘old behaviour patterns’ as among the most significant blocks to change); Values, beliefs, worldviews etc. (Both Stern (2000) and Kollmuss and Agyeman (2002) identify personality traits, value systems, specific values and attitudes to the environment as important factors); Level of personal development (Higher levels of personal development are more naturally moved to care for the global commons (Wilber, 2000, p. 137) and lower levels are more likely to focus exclusively on the self, the family or community or the organizational system. This provides a personal context for pro-environmental values and beliefs. Developmental theory also suggests that higher levels of personal development are more likely to be able to reflect on prevailing frames or assumptions and so facilitate resolution of the difficult challenges that are likely to arise in promoting environmental sustainability alongside other goals (Beck & Cowan, 1996; Cook-Greuter, 1999; Torbert et al., 2004).

The Individual objective factors include Role (while a role does not in itself give meaningful agency, it does provide a context within which agency can be discovered); Skills and knowledge (Although Kollmuss and Agyeman (2002) are clear that it does not determine behaviour, they do see environmental knowledge as important: there is no guarantee that actions will actually benefit the
environment without appropriate knowledge); *Socio-demographics* (A Norwegian study found that income, age and gender are correlated with pro-environmental behaviour (Olli, Grendstad & Wollebaek, 2001). There is substantial evidence that people are most likely to become involved in the sustainability ‘field’ through local projects that they regard as meaningful, which will very likely be linked to socio-demographic factors (Burningham & Thrush, 2001; Church & Elster, 2002).

*The Collective subjective factors include Cultural solidarities* (There is an influential sociological literature claiming that different ‘cultural solidarities’ construct reality and perceptions of risk very differently and so respond to environmental and other issues differently (Thompson, Ellis & Wildavsky, 1990); *Level of wider organizational and social development* (A recent study identified six stages of organizational response to sustainability issues. The wider sustainability agenda only begins to be recognized at the fifth stage, which few organizations have reached (Dunphy, Griffiths & Benn, 2003, pp. 22–26); *Regimes of denial and of acknowledgement* (Cohen (2001) considers how regimes of denial become established. If we accept that such regimes exist, he claims, it is also clear that regimes of acknowledgement may also become established. Consistent with this, Norwegian researchers have identified that the single most important factor in determining pro-environmental behaviour was participation in environmental groups (Olli et al., 2001).

In order to build knowledge on sustainable development, *The United Nations Division for Sustainable Development* has listed the areas or topics as coming within the scope of sustainable development. These areas to be addressed while addressing sustainable development are agriculture, atmosphere, biodiversity, biotechnology, capacity-building, climate change, consumption and production patterns, demographics, desertification and drought, disaster reduction and management, education and awareness, energy, finance, forests, fresh water, health, human settlements, indicators, industry, information for decision making and participation, integrated decision making, international law, international cooperation for enabling environment, institutional arrangements, land management, major groups, mountains, national sustainable development strategies, oceans and seas, poverty, sanitation, science, small island development
states (SIDS), sustainable tourism, technology, toxic chemicals, trade and environment, transport, waste (hazardous), waste (radioactive) and waste (solid) and water.

### 1.4.2 Skill Development

ESD must go beyond teaching the basic knowledge to all students which must give practical skills that will enable them to continue learning after they leave school. UNESCO has listed out the skills to be incorporated, which will fall in the three realms of SD i.e. Environmental, Social and Economic. Some of these skills are; ability to think critically about-value issues, the capacity to move from awareness to knowledge to action, to work cooperatively with other people, capacity to use processes like knowing, inquiring, acting, judging, imagining, connecting, valuing and choosing, the ability to think in time-to forecast, think ahead and to plan. Pupil will also need to learn skills which help them to manage and interact with the local environment.

Critical thinking on sustainable development is a reasonable, reflective, responsible and skillful thinking that is focused on deciding what to believe or do for attaining sustainability. A person who thinks critically can ask appropriate questions, gather relevant information, sort this information efficiently and creatively, reason out logically from this information and come to reliable and trustworthy conclusions about the world that enable one to live and act successfully in it.

### 1.4.3 Development of Values

The Earth Charter (1992) is a synthesis of values, principles, and aspirations that are shared by a growing number of women, men, and organizations around the world. Drafting the Earth Charter was part of the unfinished business of the Earth Summit. “We urgently need a shared vision of basic values to provide an ethical foundation for the emerging world community. Therefore, together in hope we affirm the following interdependent principles for a sustainable way of life as a common standard by which the conduct of all individuals, organizations, businesses governments, and transnational institutions is to be guided and assessed.” The values underlined in the Earth charter were;
i) Respect and care for the community of life which includes; respect Earth and life in all its diversity, care for the community of life with understanding, compassion, and love, build democratic societies that are just, participatory, sustainable, and peaceable, secure Earth’s bounty and beauty for present and future generations.

ii) Ecological integrity which includes; protect and restore the integrity of earth’s ecological systems, with special concern for biological diversity and the natural processes that sustain life, prevent harm as the best method of environmental protection and, when knowledge is limited, apply a precautionary approach, adopt patterns of production, consumption, and reproduction that safeguard earth’s regenerative capacities, human rights, and community well-being, advance the study of ecological sustainability and promote the open exchange and wide application of the knowledge acquired.

iii) Social and economic justice; eradicate poverty as an ethical, social, and environmental imperative, ensure that economic activities and institutions at all levels promote human development in an equitable and sustainable manner, affirm gender equality and equity as prerequisites to sustainable development and ensure universal access to education, health care, and economic opportunity, uphold the right of all, without discrimination, to a natural and social environment supportive of human dignity, bodily health, and spiritual well-being, with special attention to the rights of indigenous peoples and minorities,

iv) Democracy, non-violence, and peace which includes; strengthen democratic institutions at all levels, and provide transparency and accountability in governance, inclusive participation in decision making, and access to justice, integrate into formal education and life-long learning the knowledge, values, and skills needed for a sustainable way of life, treat all living beings with respect and consideration.

v) Promote a culture of tolerance, non-violence, and peace.

There are values underlined in the Millennium Declaration by UNESCO. The Millennium Declaration—which outlines 60 goals for peace; development; the environment; human rights; the vulnerable, hungry, and poor; Africa; and the
United Nations—is founded on a core set of values described as follows: The United Nations General Assembly consider certain fundamental values to be essential to international relations in the twenty-first century. These include:

i) **Freedom**: Men and women have the right to live their lives and raise their children in dignity, free from hunger and from the fear of violence, oppression or injustice. Democratic and participatory governance based on the will of the people best assures these rights.

ii) **Equality**: No individual and no nation must be denied the opportunity to benefit from development. The equal rights and opportunities of women and men must be assured.

iii) **Solidarity**: Global challenges must be managed in a way that distributes the costs and burdens fairly in accordance with basic principles of equity and social justice. Those who suffer or who benefit least deserve help from those who benefit most.

iv) **Tolerance**: Human beings must respect one another, in all their diversity of belief, culture and language. Differences within and between societies should be neither feared nor repressed, but cherished as a precious asset of humanity. A culture of peace and dialogue among all civilizations should be actively promoted.

v) **Respect for nature**: Prudence must be shown in the management of all living species and natural resources, in accordance with the precepts of sustainable development. Only in this way can the immeasurable riches provided to us by nature be preserved and passed on to our descendants. The current unsustainable patterns of production and consumption must be changed in the interest of our future welfare and that of our descendants.

vi) **Shared responsibility**: Responsibility for managing worldwide economic and social development, as well as threats to international peace and security, must be shared among the nations of the world and should be exercised multi-laterally. As the most universal and most representative organization in the world, the United Nations must play the central role (United Nations General Assembly, 2000).
1.5 EDUCATION FOR SUSTAINABLE DEVELOPMENT AS AN INTEGRATED PART OF SCHOOL CURRICULUM

The national system of education, as defined in the National Policy on Education, 1986, visualizes a national curricular framework which contains a common core including several elements having a direct bearing on the natural and social environment of the pupils. The National Policy on Education, 1986 (NPE) states that the “protection of the environment” is a value which along with certain other values must form an integral part of the curriculum at all stages of education. The policy states: “There is a paramount need to create a consciousness of the environment. It must permeate all ages and all sections of society, beginning with the child. Environmental consciousness should inform teaching in schools and colleges. This aspect will be integrated in entire educational process.” There has been special emphasis on need to give importance to Environmental Education, and this has been kept in view while designing curricula, framing the syllabi and developing text books. The philosophy behind the curricula is that Environmental Education could be infused into the curricula especially at the primary level.

It is accepted that Environmental Education (EE) should be a lifelong process beginning at the pre-school level and continuing through all formal and non-formal stages. Thus children become the first and most important target group, and a strategy of EE which addresses itself to this group becomes imperative in the overall scheme of things. Environmental Education is not just a subject to teach, rather is an opportunity to let children use their own environment, of which the school is a part, as a source of information, a ground for learning, and a storehouse of experience which will last a lifetime. Thus Environmental Education to be effective, should ideally utilize diverse learning situations and a broad array of approaches to teaching and learning about and from environment, with due stress on practical activities and first-hand experience. The institutional framework includes space, organization and special environment which can be used for effective transaction of Environmental Education in schools. The main actors that interact within framework are students, teachers, curriculum or instructional material and methods. Programmes and materials that attempt to address all these are essential to realization of goals of Environmental Education.
Today Environmental Education (EE) in the formal educational system in India is handled at three levels. It is a composite subject called Environment at the primary school level; it is infused into environment in regular school subjects at the middle and secondary school level, and is a separate subject at the college level (Pandya, 2000). Environmental studies aims at educating the young child to be better equipped to face the ever changing environment in his future life. The objective of environmental studies is the development of necessary attitudes, skills and concepts for the study of other environments (Nasrin, 2007).

Within the school system, it is the teachers who are communicators of knowledge as well as architects of attitudes, play the greatest role in ordering learning conditions and guiding or inspiring students’ thinking and action in a desired direction. Environmental Education is not merely passing out facts and rules to be memorized by the students. Teachers need appropriate curricula, and material for communicating ideas effectively. Above all, the teacher also needs to adopt innovative methodologies and approaches to this process.

In the existing educational system, teachers are beset by a number of problems related to lack of resources, physical or academic constraints. While the content for teaching is provided in the form of text books, the methodology, skills and support materials for the effective use of the instructional material are often not provided. Moreover, most teachers do not have time, resources and confidence to undertake the task of active teaching-learning which are the key to effective EE. Teacher’s role in Environmental Education should be to assist learners in acquiring positive attitudes, recognizing, analyzing, clarifying personal values concerning the environment, and developing skills to solve problems in order to live more harmoniously with the environment. Teachers need a great deal of support and encouragement towards an approach which promotes thinking, problem-solving and active participation of teachers and learners alike and this also helps teaching to move away from a dully repetition of facts. This support would need a two-fold approach – (a) the development of instructional and resource material, and methods that combine worthwhile content with an enjoyable process; and (b) the orientation and training of teachers in the optimum use of the same (Pandya, 2004).
Figure 1.2 shows the different aspects being given emphasis in the Environmental Education from 1960 to 2000. It was seen that in 1960’s nature studies were given emphasis. Later the emphasis was on Environmental studies, rural studies, outdoor education etc. It followed a transition from Environmental studies to Education for sustainable development.

**Figure 1.2: Map of the development of different aspects or emphases of Environmental Education**

In figure 1.2, nature studies, rural studies, fieldwork, environmental studies, outdoor education and adventure education are almost self-explanatory, being a group of approaches to education that share a focus on ‘in’ the environment experiences. In the early days of ‘nature’ and ‘rural’ studies, emphasis was very much on teacher-directed ‘show and tell’ techniques. In recent years, fieldwork and environmental studies have encompassed more of what might be described as participatory, problem-solving techniques, but with a strong emphasis on scientific approaches involving detailed observations, measurements, and the gaining of empirically derived knowledge. ‘Outdoor’ and ‘adventure’ education are broader in scope and encompass outdoor activities in which students engage with the environment, such as mountaineering, walking etc. They aim to provide opportunities that encourage enjoyment, appreciation and awareness of the environment. Those who work in the outdoor and adventure education fields strive to help change attitudes by exposing young people to new and relevant experiences which will lead to better understanding of themselves as well as their environment. Such activities often operate from centres or specialist bases, rather than schools.

Urban studies promote the understanding of the social, physical and natural characteristics of the urban environment and their interrelationships. Aims of urban studies includes fostering concern about the built environment, improving understanding of the conservation of nature in urban areas, developing wasteland as an education resource and providing city children with experiences of the ‘natural’ world. Urban studies are closely linked to heritage education, which focuses particular concern on the educational use of historic buildings and estates, and the study of our historic heritage. Both of these movements involve close links between educators and other professionals—architects, planners and other local government professionals.

Development education grew out of the increasing concern in the 1960s and 1970s of the United Nations, the churches and charitable organisations about ‘Third World’ poverty. Originally, development education focused on the plight of certain developing countries. In recent years it has concerned with, understanding the level of development in a particular country; necessitating a study of global
economic and political systems; understanding development processes within and between all countries, rich and poor; showing that what is appropriate development in one context is not necessarily appropriate in another; showing that the ‘West’ has much to learn from non-Western perspectives on development; and showing that the ‘Third World’ is not just a term to describe economically poor nations, but also encompasses areas and groups that have been marginalised by the workings of economic and political systems (e.g. women, the aged, the homeless, the unemployed, ethnic minorities, indigenous peoples, and poor, remote or un influential parts of wealthy countries).

**Peace education** originated in the post-Second World War era. It aims to help students to create positive attitudes towards people of other nations and foster international understanding. In more recent years its focus has broadened to include not only ‘negative peace’ (i.e. absence of war) but also ‘positive peace’ (i.e. ways of creating more just structures in and between societies). It concerns itself with questions of violence/non-violence, poverty/economic welfare and injustice/justice. It also embraces the study of conflict, conflict avoidance and resolution between individuals, groups and nations, and explores the question of humanity’s relationship with the environment.

**Human or human rights education** also had a fairly limited original focus—on civil and political rights (e.g. freedom of speech, freedom of movement of individuals). Recent approaches have broadened to include social and economic rights (e.g. those that ensure material and bodily well-being such as the right to food and shelter) and non-Western concepts of rights and ‘new rights’ issues such as racism, sexism, the right to development etc.

**Global education** developed out of the proliferation of ‘educations’ (i.e. development education, Environmental Education, human rights education, peace education) should attempt to cluster them all under an inclusive title. It was recognised that while these separate educations had their own distinctive features and starting points, their concerns are actually complementary and interdependent.

**Earth education** is an approach to Environmental Education that has been developed for the protection of Earth. The overall goal is ‘the process of helping...
people of all ages to live more harmoniously and joyously with the natural world’. A range of structured programmes aims to ‘break down barriers in the natural world, encourage an understanding of how ecosystems work, and develop positive caring attitudes to the Earth’.

**Humane education** is a broad field, ranging from the humane treatment of animals to world peace. It aims to ‘provide the basis for responsible planetary citizenship’ and to ‘achieve compassionate change which challenges the selfish and anthropocentric attitudes that have encouraged exploitation of each other, animals and the world to the point where we are now threatening our very survival on this planet’. Core concepts and attitudes addressed include a reverence for life, respect for animals as living creatures, and an understanding of and concern for keeping the environment safe and natural for all life.

**Futures education** aims to provide a more ‘future-orientated’ approach to the curriculum, and bridges the gap between Environmental Education and ‘future studies’. Two inter-linked questions relevant to this field are ‘what sort of images do people hold of a probable future?’ and ‘what are people’s ideas of preferable futures?’ In other words, it is concerned with individuals’ ideas about the future, how their ideas influence the way they act in the present, and how their present actions influence the future.

**Education for sustainable development or sustainability** aims to help people understand the inter-dependence of life on Earth, the effects of actions and decision relating to resource use, and factors which foster or impede sustainable development. It is concerned with developing people’s awareness, values and attitudes, thus enabling them to be involved effectively in sustainable development (Palmer, 1998)

ESD has five major components; knowledge, skills, perspectives, values and teaching issues which are to be addressed in a formal curriculum for sustainable development. The linkage of these five components is given in Figure 1.3.
Sustainable development encompasses the dimensions of environment, society and economy. But, Education for sustainable development includes the attainment of objectives such as knowledge, skills, perspectives, values and teaching issues towards sustainable development. People need basic knowledge from the natural sciences, social sciences, and humanities to understand, the principles of sustainable development, how these can be implemented, the values involved, and ramifications of their implementation. Knowledge about the different aspects of sustainable development should be given importance. It includes the knowledge or awareness about the different aspects of ESD such as agriculture, atmosphere, biodiversity etc. which are listed in the United Nations Division for Sustainable Development.

ESD focuses largely on the major social, economic, and environmental issues that threaten the sustainability of the planet. Understanding and addressing these issues are the heart of ESD, and locally relevant issues should be included in any program related to educating for sustainability. To be successful, ESD must go beyond teaching about these global issues. The issues involved in ESD include addressing locally relevant issues, which has to be considered in teaching.
Reflecting on these issues is very essential while addressing sustainability. The best way to adopt this is by preparing an issue based curriculum at all levels of education.

ESD must give people practical skills that will enable them to continue learning after they leave school and to have a sustainable livelihood. These skills will differ with community conditions which fall into one or more of the three realms of sustainable development – environmental, economic, and social. These skills include critical thinking, decision making, problem-solving or creative skills which are essential for solving global and local issues that hinder sustainable development.

ESD carries with it perspectives that are important for understanding global issues as well as local issues in a global context. Every issue has a history and a future. Looking at the roots of an issue and forecasting possible futures based on different scenarios are part of ESD. ESD should also help in finding out the origin of any local or global issues and help in finding out the cause and solution for solving the same.

Values are also an integral part of ESD. Understanding one’s own values, the values of the society one live in, and the values of others around the world are the central part of educating for a sustainable future. The values to be developed as a result of ESD has been described by UNESCO which include respect and care for the community of life, ecological integrity, social and economic justice, democracy, tolerance, non violence and peace. Two common techniques -value clarification and value analysis -are useful to the value component of ESD. Value clarification has three approaches-Choosing, Prizing and Acting. Choosing include choosing freely from alternatives after thoughtful consideration of the consequences of each alternative. Prizing include cherishing and being happy with the choice, willing to affirm the choice publicly. Acting includes doing something with a choice repeatedly in some pattern of life (Raths et al, 1930, p 30). Value analysis is a method based on a technique which makes possible to evaluate and measure customer/user satisfaction in order to explicit or implicit requirements of the entity under consideration with reference to the global costs.
Integrating the objectives, concepts and learning experiences of education for a sustainable development into syllabuses and teaching programmes are an important part of reform. “A basic premise of education for sustainability is that just as there is a wholeness and interdependence to life in all its forms, so must there be a unity and wholeness to efforts to understand it and ensure its continuation. This calls for both interdisciplinary inquiry and action. It does not, of course, imply an end to work within traditional disciplines. A disciplinary focus is often helpful, even necessary, in allowing the depth of inquiry needed for major breakthroughs and discoveries”


The Figures 1.4 and 1.5 designate the importance of integrating ESD into the whole school curriculum.

1.6 NATIONAL AND INTERNATIONAL EFFORTS ON EDUCATION FOR SUSTAINABLE DEVELOPMENT

There are a number of committees and commissions that have contributed towards the origin of sustainable development. In 1970, U.S Congress passed the National Environmental Act of 1970. The Act authorizes the creation of an office of EE in the U.S Department of Health, Education and Welfare,
establishment of a national advisory council for EE and establishment of a domestic grants program. The Western Regional Environmental Education Council (WREEC) (now the Council for Environmental Education) is created as a “… unique effort to create a partnership and network between education and natural resource professionals in support of EE.”

In 1972 The United Nations Conference on the Human environment in Stockholm, Sweden was held. In 1975, UNESCO sponsored conference in Belgrade, came out with Belgrade charter, which outlines the basic structure of Environmental Education. In 1976, the WREEC and the American Forest Institute (now the American Forest Foundation) developed Project Learning Tree (PLT). It helps K-12 students gain awareness and knowledge of the natural and built environment, their place within it, as well as their responsibility for it. In 1977, the UNESCO in cooperation with UNEP held a conference in Tbilisi. It laid down the goals, objectives and guiding principles of EE.

In 1983 WREEC and the Western Association of Fish and Wildlife Agencies developed Project WILD. It sponsors the conservation and Environmental Education programs with a focus on wildlife for grades K-12. In 1987, the World Commission on Environment and Development published the Brundtland Report which is also known as *Our Common future*, which introduced the idea of sustainable development in which environmental protection and economic growth are reviewed as independent concepts.

Some of the programs building for the future are, in 1990, the council for Environmental Education and the Watercourse initiated Project WET (Water Education for Teachers). It facilitates and promotes awareness, appreciation, knowledge and stewardship of water resources in students K-12.

In 1991, the University of Wisconsin Stevens Point founded the National Education Advancement Project. In 1992 the United States Environmental Educational Protection Agency awards its first Environmental Education Training Program to the National Consortium for Environmental Education and Training, a cooperative partnership led by the University of Michigan. The Rio Declaration of 1992 has laid down 27 principles, out of which 18 were purely towards sustainability. In 1993, the North American Association for Environmental
Education initiates the National Project for excellence in EE. The project works to create guidelines for Environmental Education. In 1994, the President’s Council on Sustainable Development held the national forum on Partnerships Supporting education about the Environment at California. The report, *Education for sustainability: An Agenda for action*, was produced as a result of this meeting. In 1996, the United States Environmental Protection Agency’s National Environmental Education Advisory Council released the report *Assessing Environmental Education in the United Nations and the Implementation of the National Environmental Education Act of 1990*.

In 2002, the United Nations Commission on sustainable development held the Johannesburg Summit in Johannesburg. “The Summit brought together thousands of participants to focus the world’s attention and direct action toward… conserving our natural resources in a world that is growing in population, with ever-increasing demands for food, water, shelter, sanitation, energy, health services and economic security.

The Johannesburg World Summit on Sustainable Development (WSSD, 2000), proposed the Decade of Education for sustainable Development (DESD), signaling that education and learning lie at the heart of approaches to sustainable development. It considers the year 2005-2014 as the United Nations Decade for Education for Sustainable Development (UNDESD). It is a powerful concept that could ignite the interests of people around the world to use education as a tool to shape a more sustainable future. In December 2002, resolution 57/254 on the United Nations Decade for Education for Sustainable Development (2005-2014) was adopted by the United Nations general assembly and UNESCO was designated as leading agency for the promotion of the decade. The basic vision of the DESD aims for a world where everyone has the opportunity to benefit from education and learn the values, behavior and life styles required for a sustainable future and for positive societal transformation. Some of the proposed DESD objectives are to facilitate links and networking, exchange and interaction among stakeholders in ESD; provide a space and opportunity for refining and promoting the vision of, and transition to sustainable development through all forms of learning and public awareness; foster increased quality of teaching and learning in
education for sustainable development; develop strategies at every level to strengthen capacity in ESD. The decade provides an opportunity for countries to define for themselves the kind of path they wish to follow. There is no universal model of education for sustainable development. While there will be overall agreement on the concept and nuance differences according to local contexts, priorities and approaches. Each country has to define its own priorities and actions.

Thus the history of Sustainable Development can be traced back to several years. “Education is critical for promoting sustainable development and improving the capacity of people to address environment and development issues…It is critical for achieving environmental and ethical awareness, values and attitudes, skills and behavior consistent with sustainable development and for effective public participation in decision making” (Chapter 36 of Agenda 21, Rio Declaration 1992).

The three day international conference on climate change and environment (ICCCE, 2010) at Cochin University for science and technology came out with the following recommendations.

i) Today climate change is not only a problem for scientists alone but also a problem for all. Therefore global intervention and strong political initiatives are required.

ii) There has to be close cooperation at various levels-starting from national level right down to the state and regional level with sharing of infrastructure and data, and integration of research outputs and networks at all levels.

iii) The need for multidisciplinary approach involving society at large, agriculturists, NGOs and health authorities is now warranted. The people’s role is critical and should now form part of every citizen’s agenda. A compulsory program on climate change should be introduced at all educational levels.

iv) An exclusive media line has to develop on climate change—that could serve as a platform to address our issues and look for solutions.

v) Emphasis has to be laid on researches to understand and quantify natural and national resources and develop alternate sources of energy.
The International forum for a Sustainable Asia and the Pacific (ISAP) was held in Hayama, Japan 26-27 June 2009, by the Institute for Global Environmental Strategies (IGES), an international strategic policy research institute based in Japan. Under the theme ‘Towards Copenhagen: A new Development pathway to a low carbon sustainable Asia and the Pacific, ISAP promoted dialogue on regional sustainable development and enhanced cooperation among initiatives in Asia and the Pacific region. Five areas of consensus identified by the panelists and audience were:

i) Specific environmental courses at Universities can swiftly respond to the urgent needs of actual demands for environmental competencies by government agencies, civil society organizations and private companies.

ii) Problem-solving and interdisciplinary approaches across environmental courses, as well as faculty partnerships across university departments are essential to train students for increasingly complex environmental careers especially at the decision making level, where social and scientific knowledge and skills are needed.

iii) Internship programmes enable students to gain practical experience and skills (collaboration between academia, industry and the government)

iv) A multi stakeholder consortium incorporating diverse universities, private companies and governmental agencies can be an effective way not only to identify common needs for environmental human resources but also to narrow the gap between different counterpart’s interests.

v) Inter university cooperation should encourage practical collaboration to provide students with opportunities to allow universities to share implementation of similar programmes. (Kartikeya, 2010).

India is the only country which had put environment and its protection in its constitution. The Indian constitution endorses the concept of sustainability in its concern for the preservation of wildlife and forests. The constitution enjoins the state and the citizens to protect bio diversity.

i) Article 48-A states “the state shall endeavor to protect and improve the environment and to safeguard the forests and wildlife of the country”.

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ii) Article 51-A (g) expects every citizen to “protect and improve the natural environment including forests, lakes, rivers and wildlife and to have compassion for living creatures”.

iii) Article 21 entitles every citizen of India to safe and clean air and water.

Launching the World Conservation Strategy in India, the then Prime Minister Indira Gandhi reminded the audience that “the interest in conservation is the rediscovery of a truth well known to our sages. The Indian tradition teaches us that all forms of life: animal and plant are so closely liked that disturbance in one gives rise to imbalance in the other” (Indira Gandhi, World Conservation Strategy for India, March 1988). The Indian Constitution laid down the responsibility of Government to protect and improve the environment (Constitution of India, Article 48-A), and made it a “fundamental duty of every citizen to protect and improve the natural environment including forests, lakes, rivers and wildlife” (Constitution of India, article 51-g).

1.7 NEED AND SIGNIFICANCE OF THE STUDY

The above mentioned themes like concept of sustainable development, Education for sustainable development, Need and Importance of Integrating ESD into the school curriculum, there is a felt need for educational reform. It extends beyond the boundaries of individual school subjects and requires the attention of teachers, educational administrators, planners and curriculum agencies. It is particularly important for National officials to be sensitive towards achieving a high standard of physical, social and cognitive development. In some circumstances these trends will call for intervention in what is seen as an emerging and widespread inability of students to achieve success in a specific part of the curriculum. In other circumstances, the focus will be on the curriculum itself because it may be seen as being in need of revision and restructuring in order to take account of recent research and/or new social and economic conditions. (Somerset & Eckholm, 1990)

It was observed that in the present situation, there is a lacuna where Environmental Education is introduced in school system. It gives emphasis only with environmental aspect but not with developmental aspect. If it is given
importance only to the environment, then it becomes unilateral. Hence there is a need to incorporate social, political and economic aspects which should be considered together within the existing curriculum. It is in the whims of teachers to develop a positive attitude towards ESD and also to integrate ESD meaningfully into the existing curriculum. The prevailing teaching methods are not appropriate for transmitting ESD in order to alter the knowledge on sustainable development. So, there is a need to integrate ESD along with appropriate pedagogical techniques for attaining knowledge, skills and values related to ESD.

Jackson (2001) opined that Environmental Education strategy in India should incorporate the infusion of environmental concerns into the existing curriculum. He assessed what the impact of this exercise may be on student learning by an analysis of the NCERT model textbooks (NCERT, 1987-89). It concludes that the infused material is creating incoherence in the curriculum, and that attempts to remove this incoherence are further creating confusion. To overcome this problem it suggests that changes may be required in the existing science syllabus. Thus there is a need to define the country’s environmental problems more realistically and rigorously in the syllabus.

The comprehensive, continuing and interdisciplinary nature of EE is well described in the UNESCO-UNEP Congress (1987) on EE and training. “Environmental Education should attempt to create awareness, transmit information, teach knowledge, develop habits and skills, promote values and provide criteria and standards, and present guidelines to problem-solving and decision making. It therefore aims at both cognitive and affective behavior modification. This is an action oriented, project centered and participatory process leading to self confidence, positive attitudes and personal commitment to environmental protection. Furthermore the process should be implemented through an interdisciplinary process”.

Education should be aimed at empowering learners with the ability and desire to work towards realizing sustainable development locally and globally, which includes, the awareness and knowledge about the environmental development (Cognitive); develop willingness, desirable attitude, feelings and values required (Affective); also to act with the essential competence and skills
(Action-oriented). This leads to the critical thinking, commitment, creative problem-solving skills and decision making ability including participatory decision making.

The initial step in launching an ESD program is to develop awareness within the educational community and the public. If government officials or school district administrators are unaware of the linkage between Education and Sustainable development, re-orienting education to attain sustainable development will not occur. Thus the importance of ESD must reach beyond the delegations and permeate the educational community and general public.

Education for Sustainable development (ESD) provides opportunities for learners to participate in democratic discussions about what is important to them personally, and for society in the future. It also develops and strengthens the capacity of individuals, groups, communities, organizations and countries to make judgments and choices thus aiming at making our world safer, healthier and more prosperous, thereby improving the quality of life. It includes processes such as critical reflection, greater awareness and empowerment so that new visions and concepts can be explored and new methods and tools developed. Hence, a fundamental principle in learning for sustainable development is the idea of each individual’s involvement, responsibility and commitment to local and global discussions on our common future, which gives democracy a central role.

Children should explore the learning situations and learn the meanings on their own by connecting their knowledge with background experiences and the local knowledge. In the process of learning they attempt to negotiate, share ideas and participate effectively in the group task and in turn develops the inquiry and critical thinking abilities. The scope is to develop the mental processes which will strengthen the capacity to transfer the knowledge to new situations. Thus knowledge would be discovered from their surroundings and not through textbooks.

Knowledge becomes significant to the extent that its pursuit conveys the spirit and method of inquiry. Therefore, the learning should involve an approach that will help the child to think critically and develop various skills like inquiry, problem-solving, participatory decision making ability etc. Inclusion of materials
and experiences to develop a conceptual understanding of the phenomenon of change and the problems related to sustainable development in order to develop minds that cope with change and reasonable techniques is the need of the hour. Content and outcomes needs to be in tune with the social and cultural realities of the times. Orientation to cultural and social realities also involves value bearing concepts and experiences which encourage examination of value and value conflicts.

Since ESD is a subject for creating awareness, necessary skills and values, so that the child can take his/her place responsibly in the society for sustainable development of the future, the pedagogical methods to be followed should be different. The pedagogical situations should be created in such a manner in order to make the child sensitive to the world around him and create meanings from the surroundings and from his own experiences.

Classroom teachers are finding the implementation of various investigatory and inquiry approaches far more difficult than the reform community acknowledges. Mark Windschitl (2002) in his article presents a theoretical analysis of constructivism in practice by building a framework of dilemmas that explicates the conceptual, pedagogical, cultural, and political planes of the constructivist teaching experience. In this context, “constructivism in practice” is a concept situated in the ambiguities, tensions, and compromises that arise among stakeholders in the educational enterprise as constructivism is used as a basis for teaching. In addition to providing a unique theoretical perspective for researchers, the framework is a heuristic for teachers, providing critical questions that allow them to interrogate their own beliefs, question institutional routines, and understand more deeply the forces that influence their classroom practice.

There is an urgent need on an overall review of the existing approach in the education system with a sharper focus on attaining ESD which can sensitize the knowledge, skills, critical thinking and value issues towards attaining sustainable development. ESD should be incorporated in the entire curriculum starting from pre-schooling to higher education, which should be transacted in a meaningful manner using appropriate pedagogical techniques. Looking into the researches’ conducted in the past, which were more concerned with creating environmental
awareness and studying environmental attitude, and the trend in the world’s concern which is focused on sustainable development, it was intended to research upon ESD. This study attempts to develop an intervention programme by integrating ESD in the Science and Social Science subjects of VII standard, which in turn measures the change in knowledge, skills, critical thinking and value issues towards sustainable development as a result of the programme.

1.8 STATEMENT OF THE PROBLEM

The study attempts to attain sustainable development by integrating the components of ESD with the contents of Science and Social Science of VII standard NCERT textbooks and to research upon its effectiveness on some of the variables such as knowledge, critical thinking, problem-solving, participatory and performance skill and value preference towards sustainable development. Hence, the study is entitled as;

“An integrated approach to Education for Sustainable Development and a study of its effectiveness”

1.9 OPERATIONAL DEFINITIONS

The terms used in the study are operationally defined as follows;

1.9.1 Integrated Approach to Education for Sustainable Development

Sustainable development is the development, which meets the needs of the present without compromising the needs of the future generations to meet their own needs (Brundtland Commission, 1987). Education for sustainable development is educating the various stakeholders about sustainable development.

The present study adopts the above meaning to sustainable development wherein the concepts of ESD will be integrated meaningfully with the appropriate pedagogical techniques in the content of Science and Social Science of class VII NCERT textbooks in order to develop the desirable understanding, skills and values in students towards sustainable development.
1.9.2 Effectiveness

Effectiveness in the present study is defined as the effect of integrated approach to ESD in terms of selected variables such as knowledge, critical thinking, problem-solving, values and participatory and performance skills towards sustainable development.

1.9.2.1 Knowledge on Sustainable Development

Knowledge on sustainable development is viewed as the ability to recall simple facts and figures, recognize, analyze, apply, interpret and predict the concepts related to sustainable development like; agriculture, consumption and production patterns; atmosphere and climatic change; biodiversity and forests; water, fresh water, oceans and seas; land management; energy; disaster reduction and management, desertification and drought; toxic chemicals, hazardous wastes, radioactive wastes and solid wastes; health and sanitation; demographics, human settlement and poverty, international law and international cooperation for enabling environment and decision making.

1.9.2.2 Critical Thinking on Sustainable Development

Critical thinking is recognized by Delphi report as “purposeful, self regulatory judgment which results in interpretation, analysis, evaluation, and inference, as well as explanation of the evidential, conceptual, methodological, criteriological, or contextual considerations upon which that judgment is based.” (Delphi Report, 1990).

The present study defines critical thinking as the ability of a person to further expand his/her knowledge about sustainable development on a situation through interpretation, analysis, evaluation, inference, explanation and self regulation to reach effective solutions and sound decisions on issues related to sustainable development.

1.9.2.3 Problem Solving on Sustainable Development

Problem-solving is a planned attack upon a difficulty or perplexity for the purpose of finding a satisfactory solution towards issues or problems (Risk, 1989),
related to sustainable development. In the present study, Problem-solving is viewed as the ability to solve problems that hinder sustainable development which include the processes such as identifying and defining the problem, formulating hypothesis, testing hypothesis by collecting and evaluating data, identifying results and drawing conclusions about issues related to sustainable development.

1.9.2.4 Value Preference on Sustainable Development

The ESD not only develops knowledge and cognitive skills, but also has an effect on the affective dimension such as attitude and value formation which are very important to play a responsible role in sustaining the environment.

In the present study, it is the value preferred by the individuals towards values like; maintaining solidarity towards environment for sustainable development, observing tolerance in order to attain sustainable development, developing respect and care for environment and community of life, maintaining a shared responsibility for sustaining our environment, attaining socio-economic justice for a sustainable society, developing ecological integrity for attaining sustainable development, attaining non violence and peace for a sustainable society.

1.9.2.5 Participatory and Performance Skill towards Sustainable Development

Participatory and performance skill is the ability of individuals to participate in programmes and activities related to sustainable development and their ability of perform in terms of maintaining equality towards sustaining environment and resources, maintaining solidarity towards environment for sustainable development, observing tolerance in order to attain sustainable development, developing respect and care for environment and community of life, maintaining a shared responsibility for sustaining our environment.
1.10 VARIABLES OF THE STUDY

In the present study which explores the effectiveness of an integrated approach to education for sustainable development, the independent variable, dependent variables related to sustainable development and intervening variables are as follows;

- **Independent variable:** Integrated approach to Education for Sustainable Development
- **Dependent variables:** Knowledge, Critical thinking, Problem-solving, Value preference, Participatory and performance skill
- **Intervening Variable:** Intelligence

1.11 OBJECTIVES OF THE STUDY

In order to study the effectiveness of the integrated approach to ESD on the above mentioned dependent variables, the following objectives were formulated.

1. To develop ESD integrated materials by identifying the content areas and using appropriate pedagogical approaches in Science and Social Science curriculum of VII standard.
2. To study the effectiveness of integrated approach to ESD on the knowledge, critical thinking, problem-solving and value preference towards sustainable development.
3. To study the gender difference in the experimental group on the knowledge, critical thinking, problem-solving and value preference towards sustainable development as a result of the integrated approach to ESD.
4. To study the difference in critical thinking and problem-solving towards sustainable development among students of high, average and low knowledge group of experimental group.
5. To study the value preference to sustainable development of experimental and control group with respect to their high and low value preference.
6. To observe the participatory and performance skills of students undergoing the integrated approach to education for sustainable development.

7. To study the relationship among knowledge, critical thinking, problem-solving and value preference towards sustainable development.

8. To study the predictor variable of knowledge, critical thinking, problem-solving and value preference towards sustainable development

1.12 HYPOTHESES

In order to study the above objectives, the following hypothesis and research questions were formulated

1. There is no difference between experimental and control group in the pre test performance on knowledge, critical thinking, problem-solving and value preference towards sustainable development

2. There is a difference between experimental and control group in the post test performance on knowledge, critical thinking, problem-solving and value preference towards sustainable development as a result of experimental treatment of ESD.

3. The experimental group performs better on the knowledge, critical thinking, problem-solving and value preference towards sustainable development as a result of integrated approach to ESD when compared to control group

4. There is a difference in critical thinking and problem-solving towards sustainable development among students of high, average and low knowledge group of experimental group as a result of integrated approach to ESD

5. There is no difference in knowledge, critical thinking, problem-solving and value preference towards sustainable development with respect to gender when exposed to integrated approach to ESD.

6. There is a relationship between knowledge and critical thinking; knowledge and problem-solving; knowledge and value preference; critical thinking and problem-solving; critical thinking and value preference; problem-solving and value preference towards sustainable development.
1.13 RESEARCH QUESTIONS

For some of the objectives, the following research questions were formulated;

1. What is the level of participation and performance skills of students exposed to the integrated approach to education for sustainable development?
2. What are the predictor variables of knowledge, critical thinking, problem-solving and value preference towards sustainable development?

1.14. DELIMITATIONS OF THE STUDY:

The study had the following delimitations;

1. The study is confined to the Elementary level students of VII standard.
2. ESD components are integrated only in Science and Social Science subjects.
3. The study was confined to NCERT syllabus
4. Only selected variables like knowledge, problem-solving, critical thinking, value and participatory and performance skills were considered in the study.

1.15 CONCLUSION

This chapter highlights the need of ESD with conceptual background of sustainable development and education for sustainable development along with need and significance, objectives, hypothesis, research questions and delimitations of the study. The review, methodology, analysis and conclusion of the study are in the proceeding chapters.