Introduction...
1. INTRODUCTION

1.1 GENERAL INTRODUCTION

Education, one of the major and important human endeavours has been going through seminal changes. For sure, it is no longer a process of systematic acquisition of knowledge of natural and cultural worlds for character building of the citizens and the nation. It is now being pursued largely as a means of livelihood- business for an individual as well as for the institutions. Knowledge and skill acquired, and sometimes purchased, are used for a sophisticated living as far removed from nature as possible. Towards this objective, science education is even more useful because science has indeed helped in the production of goods, services and technology. Together with technology, science has certainly helped in the growth of population, urbanization, meeting the greed of population and in economic growth. The same science especially that of environment tells us that the blooming growth factors have adversely and irreversibly degraded the critical resources of life sustenance such as air, water, land/soil, climate and bio diversity. Therefore, there is a growing concern the world over as to how to maintain the mother Earth as a sustainable habitat. The only way this concern can be translated into action is to educate the citizens about the realities of the mother Earth in terms of its materials and processes, and how they work to sustain life. A conscious participation to save life on earth calls for a conviction arising out of an understanding of the term nature (Earth). This can come from religion or science, or more practically from Environmental Education.

The ongoing environmental degradation has a positive contribution to our knowledge of natural environment with its four component parts such as
solid earth (lithosphere), the hydrosphere, the atmosphere and the biosphere. We have not learnt to some extent as to how the component parts are complexly and interdependently inter-connected with the fluxes of materials and energy to sustain life and to evolve together. The complex and interesting interconnections are illustrated by taking water as an example as water is life on earth. The technological evolution, act of evolving brains is a need of hour to meet out our demands and therefore, will continue to evolve. The evolution is primarily all about changing raw material or one from of product to the other more useful product. This can never happen with 100% efficiency and bound to produce/generate some by-products (not needed by us) that are harmful to our environment. Therefore, only making people aware about their action and developing attitude of “to act” in them can provide large scale solution for sustainable development on this living planet.

Our planet “Earth” is unique in the entire solar planetary system in terms of the presence of Biosphere/life forms since 4.6 billion years. The habitable aspect of Earth’s Environment, to allow the presence of diverse life forms to flourish and evolve, can be traced in geological time scales i.e. billions of years to the evolved life forms of the present day. Natural processes/Nature has maintained the physical attributes of our environment crucial for sustenance of life on planet Earth for example, 1) Average Temperature of the planet has not changed much (17.5 ± 5 °C) over last millions of years, 2) atmospheric composition of the Earth (21 % Oxygen and 78% Nitrogen) has stayed almost invariant, 3) presence of naturally driven food chains and 4) stratospheric Ozone layer for protection from incoming solar Ultraviolet radiations. These entire phenomenons are vital for the
survival of life on the Earth. Any change in these natural interactions between Biosphere and Physical Environment, e.g. its absence, will decrease atmospheric Oxygen (thousand time less) and substantial increase in Carbon dioxide (hundred times more). The survival of the life on Earth under such conditions will be unattainable or even unthinkable. Change in the environmental conditions is an inherent feature on geological time scale. But with the concoction of industrialization and large scale human centric developmental activities, the magnitude of change has increased and time span has been shifted from geological to human scale. Fuelled by fossil fuel energy, these perturbations, classified as anthropogenic, have become more frequent and they extend over much shorter time span. Inability of the Natural environment to absorb these anthropogenic perturbations have unfolded multitude of local, regional and global environmental challenges to the forefront: (i) Environmental Pollution of air, soil and water (ii) threat to biodiversity and ecology (iii) Global warming, glacier melting, depletion of ozone layer. These manifestations have local, regional and global dimensions which arise on varied temporal scale, depending on the physical environment linked factors of the location. Therefore, it becomes imperative that we protect the vital traits of the Natural Environment for the survival of life.

Earliest records that can be traced, tell that in India, it was realized even by pre-Vedic man, who identified at-least four major components, the Mittra- the Sun, Agni- the Fire, Prithvi- the Earth and Dyu- the Sky, that sustained life and therefore, worshiped them as deities. As the culture advanced to the Vedic age, man expressed importance of environment by singing hymns in its praise and a deep sense of communication with nature.
Nature is to be understood as a friend, revered as mother, obeyed as father and nurtured as a beloved child. 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 everything ultimately returns to these. These together create nature. Mahatma Gandhi has rightly said, “I need no inspiration other than nature. She has never failed me as yet. She mystifies me, bewilders me, sends me to ecstasy”. Our environment is a set of natural and social systems in which man and other organisms live and from which they derive their sustenance. The environment though invisible has no geographical and ideological frontiers and it is common to all living organisms-man, animals and plants.

Superfast degradation of environment is the most dangerous problem of the present day. Basically, we are here because there is an environment. Every mortal totally depends upon it. From birth to death all our deeds are influenced by nature. It is time to think, how much we take care of it. It’s a threatening factor to human being. Ever growing population is one of the basic causes behind this problem. Needs are growing, caring tendency has vanished. Environment provides resources to us, but many are limited and possibly near to cease off. Excessive use of pesticides and fertilizers, fossil fuel burning, biomass burning, destruction of biodiversity, decline in the forest areas, water pollution, water scarcity, air pollution, waste disposal, coastal zone depletion, ground water contamination, human health, wild life conservation as well as melting of glaciers are some of serious issues ahead of nation in the current
times. *Lack of environment awareness seems to be a major causal factor behind it.*

It is felt that no single step solution exists for such problems rather there can be collective way to first understand these problems and to address them so as life continues on the planet Earth. People have felt the need of such initiatives and the concept of environmental literacy followed by formal environmental education programme were proposed during last century. The potential of environmental literacy as a vehicle to realize the concept of sustainable development cannot be over emphasized. Environmental literacy is essential pre-requisite for maintaining and improving the quality of natural environment and life as such (Disinger and Roth, 1992). The development and fostering of environmental literacy need, therefore, to be a key in any general education programme. Since its inception these terms have been or is being rethought, redefined and evolved to a considerable extent.

Teachers - more than any other professional group - can probably promote environmental literacy, by virtue of their interaction with society (more specifically learners, parents and colleagues). Teachers at all levels and subject areas have a role to play in this regard i.e. contribute to the development of citizens who possess the basic understanding and skills to make informed decisions in matters affecting the environment and whose personal lifestyle supports sustainable development. Teachers can, however, hardly assist learners to become environmentally literate if they themselves lack environmental literacy. Despite the important role, teachers play in educating students, research into teachers' level of environmental literacy has
been extremely limited. The few studies conducted in this aspect have indicated a relatively low level of environmental literacy. An example is a study by Buethe and Smallwood (1987) which stated that the environmental literacy of Indiana teachers is far from optimal. In addition several researchers, for example, Schreuder (1995), Braus (1995) and Papadimitriou (1995), mentioned that most teachers are not trained to do justice to environmental education. Now the question is; “do our teachers in India have been trained for such teachings”? Very limited research information is available to address this question. Previous studies (Sundarajan and Rajashekar, 1993; Patel and Patel, 1994 and 1995; Patel 1999; Pradhan 1995; Nagra, 2010 or many more) on the environmental literacy of teachers in India indicated that environmental literacy level of teachers is not good and vary widely depending upon their level of teaching (elementary or secondary), level of their education (graduate, post graduate), living (urban or rural), sex (male or female) and same is true for the young children. Incorporating EE in teacher education involves deliberating several issues relating to content, learning and teaching methodologies, materials development and capacity building requirements for its effective implementation. Efforts have been made to develop curriculum and other support materials for introducing EE at all four levels of teacher education in the country but results are yet to come.

1.2 ENVIRONMENTAL LITERACY

Actually, the concept of environmental literacy (EL) came before the concept of formal environmental education. It was first used by Roth in 1969 (Roth, 1992) in USA in which he posed the question, “How shall we know the environmentally literate citizens?” Later the US president Richard Nixon used
the term in his speech on first National Environmental Education Act (Task Force, 1972). The term Environmental literacy does not mean same to everyone. Various researchers have made efforts to define, redefine and refine the concept of EL (Clacherty, 1992; Roth 1992; Subbarni, 1998 and more references in Swanepoel et al., 2002). EL, as stated by Swanepoel et al., (2002), is “the ability to be aware of one’s environment. It enriches one with the knowledge to realize the imbalances and threats the environment faces and enables one to form positive attitude towards it with the aim of developing skills to resolve and prevent environmental problems and urge to protect and improve the environment for the present and future generations by active participation”. Munson, (1994), Odum, (1992) and Roth, (1992) studied various models comprising concepts and researchers regard important to environmental education and environmental literacy. They identified ten concepts mainly from major environmental area such as ecology and interactions in the environment, participation in identification and prevention of environmental problems, decision making on environmental issues and ethics. The ten concepts were biosphere, ecological perspectives, inter-relationships in an ecosystem, environmental changes, basic human needs, resources, maintaining environmental quality, the ability to make choices, decision making on environmental issues as well as environmental ethics. Environmental literacy is considered as a continuum of competencies ranging from zero to very high competency. Also there exist a broad spectrum of environmental literacy, from complete unawareness to deep, thorough understanding and concern.
1.3 ENVIRONMENT EDUCATION (EE)

The two words in EE i.e. Environment and education carry their own meaning, therefore, before understanding EE, it imperative to know them. Education is a continuous and creative process aimed to develop the capacities latent in human nature and to coordinate their expression for the enrichment and progress of society, by equipping children with spiritual, moral and material knowledge. Education imparts knowledge, qualities, skills, attitudes, and capacities that enable individuals to become conscious subjects of their growth and active responsible participants in a systematic process of building a new world order. Education plays a vital role in life of human beings. It makes a human being who can think, analyze and act judiciously. Many philosophers and educationalists have defined education in many ways. One can sum up by defining education as “that process which brings changes in the behaviour of human beings in the desired manner”.

Environment etymologically means surroundings which could be anything e.g. society, politics, economics, agriculture, culture or the physical environment i.e. atmosphere, hydrosphere, lithosphere, biosphere. Environment is the complete range of external conditions, physical and biological, in which an organism (human, animal, or plant) lives or operates (Oxford dictionary.com). Thus, it could be political, social or economic environment but in the present study, only physical form of natural environment is considered. Word "environment" is most commonly used for describing "natural" environment and means the sum of all living and non-living things that surround an organism or a group of organisms. Environment includes all elements, factors and conditions that have impact on growth and
development of living organism (animals and plants). Environment includes both biotic and abiotic factors that have influence on organisms. Abiotic factors such as light, temperature, water, atmospheric gases combine with biotic factors (all surrounding living species). Environment often changes after some time and therefore, many organisms have ability to adapt to these changes. However, tolerance range is not the same with all species and exposure to environmental conditions at the limit of certain organism's tolerance range represents environmental stress. Environment is sum total of all conditions that influences life.

"Environment is not only the sum of all the material things that constantly interacts with each other and which makeup the mosaic of the country side landscape, it is much more than this. It also includes the economic structures and the outlook and habits of the people in different parts of the world" (UNESCO, 1990).

"Environment includes a complex of natural, built and social components in the life of humanity and that the social components constitute a set of cultural, moral, personal values and interrelations" (Tbilisi, 1977).

"Environment means all those external forces, effects and situations which affect life, nature, behaviour, aptitude, development and maturation of an organism" Duglus and Holland.

In the present study environment means our physical natural environment.

Many definitions do exist for EE as it has come a long way forward since its inception in early seventies. It is a process of making people to understand the basic knowledge and delicate nature of our environment, making them aware of the harm caused to environment by human activities in
particular, and developing attitude, commitments and skills towards protection of our environment in its totality to meet out the goal of sustainable development. "Environmental Education is the process of recognizing values and clarifying concepts in order to develop skills and attitude necessary to understand and appreciate the inter-relatedness among man, his culture and his biophysical surroundings. Environmental Education also entails practice in decision-making and self-formulation of a code of behaviour about issues concerning environmental quality (Nevada Conference, 1970). The objective of the environmental education (EE) is to make people, society and nation and globe environmentally literate.

The basic guidelines of EE were first laid in first inter-governmental Conference on environmental education held at Tbilisi in 1977 and later modified from time to time. The main points are listed here below:

- Examine major environmental issues from local, national, regional and international points of view.

- Promote the value and necessity of local, national and interpersonal co-operation in the prevention and solution of environmental problems.

- Relate environmental sensitivity, knowledge, problem solving skills and values clarifications to every age and the learner’s own community in early years.

- Emphasize the complexity of environmental problems (develop critical thinking and problem solving skills).

- Utilize diverse learning environments and a broad array of educational approaches to teaching/learning with the stress on practical activities and firsthand experience.
> Environmental education should be integrated into the whole system of formal education at all levels.

> Environmental education should be interdisciplinary and a continuous life long process.

> Environmental education about the environment, for the environment and in the environment.

> Environment education should adopt a holistic perspective for both natural and manmade, which will examine the ecological, social, cultural, economic, technological and other aspects of particular problems.

> Environmental education should be centred on practical problems related to real life.

> Environmental education should aim at building up sense of values.

**The main objectives of environmental education are stated as follows:**

- To create environmental awareness.

- To help understand the basic components of environment.

- To help view environment as an integral component.

- To develop sensibility to and appreciation of the tremendous diversity existing in the nature.

- To help acquire social values and strong feeling of concern.

- To help motivate for active participation in the promotion of environment.

- To help acquire the skills for solving environmental problems.
There has been sudden increase in the activities for environmental education during the last two decades. This has resulted in the development of different kinds of curriculum out of school activities and literature. The purpose is to regenerate man’s interest in preservation, conservation and improvement of the environment before it is too late and reaches the point of no return. Environmental education is a process to promote the awareness and understanding of environment and its relationship with man and his activities. It is also aimed at developing responsible acts necessary for preservation, conservation and improvement of the environment and its components. For this, three concepts of environmental education flow: “about” the environment, “from” the environment and “for” the environment. Education about the environment is acquiring an understanding of the total environment. When the environment is used as a vehicle for gathering concepts, knowledge and skills related to specific academic disciplines, it is learning from the environment. And finally, the development of attitudes, skills and evaluation abilities for the proper use and the development of the environment is education for the environment.

Basic Philosophy of Environmental Education is 1) to be in harmony with nature, 2) live together/allow others to live and 3) care and share. In order to do justice with the aims and objectives of environmental education, we need a paradigm shift from knowledge to action in our present formal education system. Thus, it can be concluded that broad objective of EE is to make people environmentally literate and improve on their environmental attitude.
1.4 WHEN EE SHOULD BEGIN?

It is very important and apparent question "as to when environmental education should begin in formal education system?" The EE should start at an early stage of life, could be at kindergarten stage of formal education system or even earlier but should be based on experiences. Such experience based teaching and learning module is expected to play a critical role in shaping life-long attitudes, values and patterns of behaviour toward natural environments (Tilbury, 1994; Wilson, 1994). Children residing in urban area tend to develop unfounded fears and feelings of disgust in relation to natural objects (Bixler et al., 1994). In general children, regardless of where they live (urban or rural) spend most of their time in settings and activities that keep them essentially isolated from direct contact with the natural world. The indoor recreational activities e.g. watching TV, transportation by car or other motor vehicle versus walking and day-care centres, which are much more oriented towards the classroom than outdoors, further increases the gap between child and nature.
As a result of which, children are at risk of never developing positive attitudes and feelings towards the natural environment or achieving a healthy degree of competency on the environmental literacy continuum (as outlined by Disinger and Roth, 1992). Therefore, attention to environmental education at the early childhood level is proposed as a partial antidote to this concern.

The early life of a man (~20 years) is spent in getting education. The time from the age of 6 years onwards is crucial for planning of desired changes and executing them through successive stages of formal education system i.e. primary, high school, pre-university or 10+2 level and university level. The most interactive and receptive time is during first two stages i.e. primary and high school/secondary level when the desired changes can be inculcated effectively.

Broadly there could be two important rationales for start of EE during the early childhood years; 1) children must develop a sense of respect and caring for the natural environment during their first few years of life or be at risk for never developing such attitudes (Stapp, 1978; Tilbury, 1994; Wilson, 1994) and 2) positive interactions with the natural environment is an important part of healthy child development (Carson, 1956; Cobb, 1977; Crompton and Sellar, 1981; Miles, 1986/87; Patridge, 1984; Sebba, 1991; Wilson, 1994) and that such interactions enhance learning and quality of life over the span of one's lifetime (Wilson, 1994). Children who are close to nature tend to relate to it as a source of wonder, joy and awe. Their spirits are nurtured by nature and they discover through it "sources of human sensibility" (Wilson, 1992).
The newly-emerging field of early childhood environmental education reflects an increasing awareness that "environmental experience in the critical phase of the early learning years can determine subsequent development in environmental education" (Tilbury, 1994) and that the preschool years may "prove to be critical for the environmental education of the child" (Tilbury, 1994). Nature-related experiences tend to foster a child's emerging sense of wonder - referred to by Plato as the source of knowledge and by Cobb (1977) as our source of imagination. According to Cobb, it is through wonder that we come to know the world. It's wonder - rather than books, words, or learning all the facts--that provides the direction and impetus for environmental education in early childhood.

1.5 WHO WILL IMPART EE?

The apparent question now comes to mind, when it has been argued and understood that environmental education should start from early childhood age, is who will impart the environmental education? Because young children learn about the environment by interacting with it, educators and other adults must attend to the frequency, nature, and quality of child-environment interactions during the early years. Teachers, particularly school level who shape the future generations at early ages of childhood, could contribute significantly in this process of environmental education. It becomes imperative that these teachers must carry a high sense of environmental knowledge so as they can deliver better.

Though, EE has now become a part of school curriculum in India and elsewhere also, but its learning should not remain as only a subject to attempt
in examination. The teacher should create awareness and positive attitude among students. Co-curricular activities are the best medium to provide factual knowledge to students. In his own day-to-day teaching, the teacher can use various methods like dramatization, observation method, story-telling, excursions, project method etc. Apart from bookish interaction, teacher should give more importance to practical awareness about environment. To create environmentally aware citizens with pro environmental behaviour, technology can play a vital role. There could be many ways and means of imparting environmental education as shown below in the schematic diagram (Figure 1.2; adopted from Satapathy, 2007).

**Figure 1.2** Figure showing ways and means of imparting environmental education (adopted from Satapathy, 2007).
Distance education has emerged as a non formal, learner friendly, cost effective alternative method of teaching and learning across the world. The instructional gaps can be bridged between teacher and learner, who do not have direct face o face contact. Distance education (non formal) uses a multimedia (both print and non print media) approach to instruct the learners. Research studies revealed that technology has a positive impact on teaching learning system and has brought positive attitudinal changes in the learners. Open and distance education can be used for promoting environmental education too (Pant, 2005)

On the whole, survival of all mortals depends upon nature. Care of nature is not only necessary for us, but for coming generation too. When teacher is called a pillar stone of nation, it is his prime duty to save it. Teachers play key role in advancing environmental education and environmental literacy of future generations as well as society (World commission on Environment and Development, 1987). But, not very healthy to accept, insufficient teacher preparation is one factor in the weakness of propagating environmental education efforts and curriculum (UNESCO, 1997; Knapp, 2000). This is also due to the fact environmental education carry an inherent element of multi-disciplinarily in it. It will be difficult as well as unethical to expect that a teacher of social science or science can deliver the relevant education on environment. It requires special training for the teachers who themselves have never read environmental science/education as a subject. It is very recent that masters programme has started in India and that too at very limited places. The manpower, which is capable, never joins the teaching profession at junior or secondary level. Therefore, the need is to train the in-
service teachers for environmental education and to teach environmental education in pr-service teacher training curriculum to do justice with EE at junior and secondary level.

![Multi-disciplinary model to teach Environmental Sciences](adapted from Satyapathy 2007)

**Figure 1.3** Multi-disciplinary model to teach Environmental Sciences (adapted from Satyapathy 2007)

It is suggested that in service environmental education program must have the following characteristics:

1. The program should deal with basic science as needed but it should not be science dominated.
2. It should be appropriate for teachers with a wide variety of backgrounds and interests.
3. It should have a strong motivation impact on the participants.
4. It should encourage teachers to environmentalize their teaching.
5. It should bring teachers into direct involvement with the particular environments under consideration.

6. It should make a serious effort to envisage teachers in exploring their personal assumptions, values and feelings about society and self and the relationship of these to the world.

In a developing country like India, there is an urgent need for capacity building of teachers, in environmental education, in both pre-service and in-service teacher training programme. However, in-service teacher training programme has to face the challenges like paucity of time, resources and relevance of the program to teacher and educator.

1.6 NEED OF THE STUDY

As the environmental problems are growing in number and nature (quantity and quality) and becoming more difficult to manage and control, there is growing need for improvement in the public understanding of our natural environment. Comprehensive, meaningful and promising environmental education programme could be a potential tool for making the society aware of environment related problems and preparing them to act for their solutions. Environmental education can produce environmentally literate citizens, able to actively address environmental problems and challenges (Hungford and Peyton, 1976; UNESCO, 1980; Roth, 1992; Tuncer et al., 2009). Comprehensive environmental education from the early age may serve as an important means for society as a whole to meet the increasing need of improved understanding of environment, its problems and solutions. It was felt a decade after Tbilisi conference (1977) that efforts should be made in
providing holistic, simplistic information and move towards providing: knowledge of complex environmental issues, specific knowledge about approaches for addressing such issues and decision making skills (Hines et al., 1986/87). They called for efforts to change certain effective qualities (attitude) that result in people’s caring and paying attention to environmental conditions.

Realising the level of threat our environment has, government of India has introduced the Environmental education as compulsory part in the formal education system of the country. This education is not only targeted to educate the population about conservation of natural environment but also aims at developing in them the knowledge, attitudes and skills which is important to save nature. This is also very important to realise that developing environmental literacy is a major challenge for our school system. School textbooks, in all subjects and at all levels, have been revised to integrate environmental concepts. It is also noted that there is no uniform syllabi for EE in our country. The effects of these curricular revisions will not be sustained unless they are coupled with appropriate changes in teacher education curricula. It is the disposition of teachers towards the environment and environmental education which determines to a large extent whether learners are educated to become adults who take the responsibility to maintain the environment and improve quality of life.

In order that teachers impart proper knowledge and share relevant information about our natural environment, its related problems and an attitude to care for environment, it is mandatory and pre-requisite that teachers must be trained with the subject content. The existing information on teachers,
particularly primary and secondary school teachers, perception about environmental discipline, environmental awareness and attitude is very scarce. The scanty information that is available indicates that there is an urgent need to work on the improvement on environmental literacy of school teachers (Nagra, 2010). It seems, therefore, imperative to be able to determine the state of affairs regarding the environmental literacy of the teachers in the country which can guide us for its improvement. In the present study a few distinguishable, but not separable, disposition levels on the continuum of environmental education were identified, namely awareness and attitude towards environment.

1.7 ORIGIN OF THE RESEARCH PROBLEM

The natural environment has been undergoing large scale degradation due to rapidly increasing urbanisation and industrialisation and some of it is irreversible in nature. It is being felt that environmental education through improving environmental awareness and developing environmental friendly attitude among society could be a possible way out to stop further degradation and improve on the existing conditions. Teachers play a vital role in such large scale initiatives as they train the young students in the class room as well as disseminate knowledge to the society. Though Environmental Education has been made as compulsory part of the curriculum at almost each stage of education from Primary to the degree level in the state of Haryana and whole country but it has not been made a compulsory part of Teacher Education curriculum in Haryana. It is required that to impart quality and proper information to the students, teachers should have the desired knowledge through proper training. This has, therefore, become the concern of the
researcher to study Environmental Awareness and Environmental attitude of Pre-service and In-service elementary and secondary school teachers in the state.

1.8 STATEMENT OF THE PROBLEM

The study entitled “A study of Environmental Awareness and Attitude of Pre-service and In-service Elementary and Secondary School Teachers” was undertaken during this work.

1.9 OPERATIONAL DEFINITIONS OF THE KEY TERMS

Environmental Awareness

"Environmental Awareness means to help social groups and individuals to acquire an awareness of and sensitivity to the total environment and its allied problems."

Environmental Attitude

Environmental attitude mean attitude of an individual towards our natural physical environment and may be defined as “the collection of belief, affect and behavioural intentions a person holds regarding environment related activities or issues” (Schultz, et al., 2004). The individual’s opinion about preservation and utilization makes the basis for his/her environmental attitudes. These are a set of social values, strong feelings of concern for the environment and the motivation for active participation in its protection and improvement.

Pre-service Elementary Teachers

Pre-service Elementary Teachers included those subjects who are being trained for teaching of class 1 to VIII from self or government owned
recognised institutions. There educational background is not considered in defining pre-service elementary teachers; the minimum qualification they should carry is 10+2 but may possess higher degrees like bachelor in science, social science or education.

**In-service Elementary Teachers**

Teachers who are involved in regular class room teaching of class I to VIII in any approved school whether owned by self or by any society or by government after passing the required diploma like Junior Basic Training (JBT) or Diploma in Education (D. Ed.) etc. Their educational background is not considered in defining in-service teachers; the minimum qualification they should carry is 10+2 and the diploma but might have possessed higher degrees like bachelor in science, social science or education.

**Pre-service Secondary School Teachers**

Those individuals who are undergoing the bachelor degree in education in any institution (self owned or government owned) recognised by the competent body like National Council for Teacher Education (NCTE) and are affiliated to any university. There educational background is not considered in defining pre-service teachers; the minimum qualification they should carry is bachelor degree in social science or science or equivalent but may possess higher degrees like masters in any discipline or even Master of Philosophy or Doctorate.

**In-service Secondary School Teachers**

Those individuals who are teaching class IX to XII in school (self owned or government owned) recognised by the competent body like CBSE or state education boards. There educational background is not considered in
defining in-service teachers; the minimum qualification they carry is bachelor degree in any discipline and education but might have possessed higher degrees like masters in any discipline or even Master of Philosophy or doctorate.

1.10 OBJECTIVES OF THE STUDY

Following objectives were set for the present study on “Environmental Awareness and attitude of Pre-service and In-service Elementary and Secondary School Teachers”.

1.1 To study and compare the pre-service elementary and secondary school teachers on their environmental awareness.

1.2 To study and compare the in-service elementary and secondary school teachers on their environmental awareness.

1.3 To study and compare the pre-service and in-service elementary school teachers on their environmental awareness.

1.4 To study and compare the pre-service and in-service secondary school teachers on their environmental awareness.

2.1 To study and compare the pre-service elementary and secondary school teachers on their attitude towards environment.

2.2 To study and compare the in-service elementary and secondary school teachers on their attitude towards environment.

2.3 To study and compare the pre-service and in-service elementary school teachers on their attitude towards environment.

2.4 To study and compare the pre-service and in-service secondary school teachers on their attitude towards environment.
3.1 To study the relationship of environmental awareness with attitude towards environment of pre-service elementary school teachers.

3.2 To study the relationship of environmental awareness with attitude towards environment of in-service elementary school teachers.

3.3 To study the relationship of environmental awareness with attitude towards environment of pre-service secondary school teachers.

3.4 To study the relationship of environmental awareness with attitude towards environment of in-service secondary school teachers.

1.11 HYPOTHESES OF THE STUDY

Following null hypotheses have been formulated to meet the above cited objectives of the present study:

1. Pre-service elementary and secondary school teachers do not differ significantly on their environmental awareness.

2. In-service elementary and secondary school teachers do not differ significantly on their environmental awareness.

3. Pre-service and in-service elementary school teachers do not differ significantly on their environmental awareness.

4. Pre-service and in-service secondary school teachers do not differ significantly on their environmental awareness.

5. Pre-service elementary and secondary school teachers do not differ significantly on their attitude towards environment.

6. In-service elementary and secondary school teachers do not differ significantly on their attitude towards environment.

7. Pre-service and in-service elementary school teachers do not differ significantly on their attitude towards environment.
8. Pre-service and in-service secondary school teachers do not differ significantly on their attitude towards environment.

9. There is no significant difference between the Environmental Awareness and Attitude towards environment of pre-service elementary school teachers.

10. There is no significant difference between the Environmental Awareness and Attitudes towards environment of in-service elementary school teachers.

11. There is no significant difference between the Environmental Awareness and Attitudes towards environment of pre-service secondary school teachers.

12. There is no significant difference between the Environmental Awareness and Attitudes towards environment of in-service secondary school teachers.

1.12 RESEARCH INSTRUMENTS USED IN THE STUDY

After doing the sufficient market survey for the availability of research instrument in environmental education area, the two research instruments entitled "Environmental Awareness Ability Measure Test – (EAAM)" prepared by Dr. Praveen Kumar Jha and "Environmental Pollution Attitude Scale (EPAS)" by Dr. M. Rajamnaikam published by Rakhi Prakashan, Agra (India) were finalised for assessing environmental awareness and attitude towards environment respectively of the pre-service and in-service elementary and secondary school teachers. The statistical reliability and validity was the major criteria for selecting the above cited instruments among the available ones in the market. Details of the tests are provided in chapter 3.
1.13 STATISTICAL TOOLS USED IN THE STUDY

The descriptive statistical tools such as mean, mode, median, standard deviation, coefficient of variance, skewness, box and whisker plot, frequency distribution and two tailed t test at 95% and 99% percent confidence limit were used for the data analysis and testing of hypothesis to meet the objectives. Details of the statistical tools used in the study are discussed in chapter 3.

1.14 DELIMITATION OF THE STUDY

Environmental education need to be imparted to all sections of society like poor and rich, rural and urban, children, young and old to safeguard the natural environment. Present study was planned to assess the environmental awareness and attitude of pre-service and in-service elementary and secondary school teachers considering the fact that teachers are main vehicles for imparting knowledge to the children, the future torch bearers of the society. Teachers also play vital role in dissemination of knowledge to the society around them. To achieve significant information in a timely manner, present study has been delimited to the pre-service teachers, preparing themselves to be a elementary or secondary school teacher in District Institute of Educational Training (DIETs) and Colleges of Education respectively located in three districts, Gurgaon, Rewari and Mohindergarh of Haryana, and in-service teachers involved in regular class room teaching at elementary (I to VIII) and secondary level (IX to XII) in the government of self owned school in these three districts of Haryana. The rationale for such delimitation was that these districts represent different geographic, social and economic settings.
Gurgaon district shares the boundary with national capital of Delhi and is representative of fairly rich urban whereas Mohindergarh district, located in deep southern part of Haryana can be taken as rural dominated area with middle class population. Rewari being located between these two districts represent a transitional setup. In case of pre service elementary and secondary school teachers pursuing their courses in District Institutes of Educational Training and Colleges of Education, whether private or state owned, a significant number of institutions in both categories have been covered in the present work. In case of in-service teachers of both levels due care was given while choosing the school to cover a true representative picture.

1.15 SIGNIFICANCE OF THE PRESENT STUDY

In the light of the present physical state of natural environment in India, issues related to sustainable development, failure of technological innovations in meeting the need of mankind without disturbing the nature, the environmental education seems to be the only solution for finding suitable path for sustainable development. With the thrust given to Environmental Education in the new policy of education (1986) and the direction of Supreme Court (2003), efforts have been made to include EE in the school curriculum as a separate subject and recognize the content and methodologies of teaching at the school level for its effective implementation. EE focuses on two important parameters namely environmental awareness and attitude.

The introduction of the Environmental Education programme requires the involvement and participation of teachers, students and administrators. It offers teachers a rich and diverse array of activities and opportunities to enrich
their classroom teaching and help children develop positive attitudes and
behaviour towards environment. The EE at training colleges should not only
create Environmental Awareness but should develop basic knowledge and
skills required to impart these among the pupils. EE can become most
relevant, effective and functional when its goals and objectives as well as its
implementation are based on recognized needs of its target groups at
international, national, regional and local levels. It proves actually to be a new
kind of integrative teaching, which is characterized by a training of inclusive
thinking, by a continuous training of habits in small steps and by the
development of a general attitude of openness to new aspects.

For the effective programme of EE, our teachers themselves should
possess enough environmental awareness, positive environmental attitude and
skill of achieving objectives in relation to their students. For this purpose, it is
also needed to have adequate EE programme for pupil teacher in their training
course. In order to impart effective teacher training in this field, an
understanding of the aims and objectives of EE, its contents and approaches,
efforts made in the field and the skills required for imparting the
environmental values to the students, future builders of the nation, became a
fundamental prerequisite. This study will provide the current status of
environmental awareness and environmental attitudes of teachers of two
selected categories. This information will further guide the institutions, policy
makers and government to take necessary steps to train the in-service teachers
and to incorporate environmental education in the teachers training
curriculum.
1.16 TIME LINE OF EE AT GLOBAL LEVEL

Based on the concerns shown by world community about the degradation of natural environment, the United Nations Conference on the Human Environment was held in Stockholm in 1972. The term “environmental education” became popular in the 1970’s and began to encompass the ethical, political and urban issues that had been previously left to other fields. Recommendations of the conference emphasized introduction of formal and mass environmental education programme. Later in UNESCO-UNEP launched the international environmental education programme (IEEP) in 1975 whose objective was to promote the exchange of information, experience, research, curriculum in the area of environmental education. As a follow up to this an international workshop was held in Belgrade in 1975, which further emphasized that environmental education should be life long, interdisciplinary and involve global cooperation (UNESCO-UNEP: 1985 a and b ). An inter-governmental conference on environmental education was organized at Tbilisi, USSR in 1977 by UNESCO and UNEP which resulted in famous Tbilisi declaration (UNESCO UNEP: 1977). The declaration read the development of necessary skills, knowledge, values, attitude and understanding among individual and social groups about environment and related issues/problems. The 1980’s wrapped global issues into the field while the 1990’s allowed “environmental education” to be grouped with other movements looking to education for change, such as social equality. In 1987, the World Commission on Environment and Development published The Brundtland Report, more commonly known as “Our Common Future,” which helped to fuel change in the education world by creating a unified world view

30
and a unified global problem (http://www.brundtlandnet.com/29). In the process the issue of environmental education and its successful implementation to meet the challenges to sustainable development has been debated at various international forums at different times. At present United Nations Decade of Education for Sustainable Development (2005-2014), for which UNESCO is the lead agency, seeks to integrate the principles, values, and practices of sustainable development into all aspects of education and learning in order to address the social, economic, cultural and environmental problems we face in the 21st century. The various meetings, conferences and declaration meetings held since 1977 on environmental education directly or which incorporated environmental education indirectly in their agenda are listed here below in chronological sequence.

**Table 1.1** List of Major World Summits and Meetings Taken Place Globally Regarding Environment and its Protection as well as Sustainable Development

<table>
<thead>
<tr>
<th>Year</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>1972</td>
<td>UN STOCKHOLM CONFERENCE ON HUMAN ENVIRONMENT</td>
</tr>
<tr>
<td></td>
<td>- UNEP ESTABLISHED</td>
</tr>
<tr>
<td>1975</td>
<td>UNESCO – UNEP LAUNCHED INTERNATIONAL ENVIRONMENT PROGRAMME (IEEP)</td>
</tr>
<tr>
<td>1975</td>
<td>BELGRADE CHARTER ON ENVIRONMENTAL EDUCATION</td>
</tr>
<tr>
<td>1977</td>
<td>TBILISI INTER-GOVT CONFERENCE ON ENV EDUCATION</td>
</tr>
<tr>
<td>1979</td>
<td>FIRST WORLD CLIMATE CONFERENCE</td>
</tr>
<tr>
<td>1982</td>
<td>TEN YEAR ANNIVERSARY OF STOCKHOLM CALL FOR A COMMISSION ON ENVIRONMENT AND DEVELOPMENT</td>
</tr>
<tr>
<td>Year</td>
<td>Event</td>
</tr>
<tr>
<td>------</td>
<td>-------</td>
</tr>
<tr>
<td>1983</td>
<td>UN General Assembly created UN Commission on Environment and Development (Brundtland Commission)</td>
</tr>
<tr>
<td>1985</td>
<td>Vienna Convention on Ozone Depleting Chemicals (came into force in 1988)</td>
</tr>
<tr>
<td>1987</td>
<td>Brundtland Report</td>
</tr>
<tr>
<td>1987</td>
<td>World Commission on Environment and Development (WCED) &quot;Our Common Future&quot;</td>
</tr>
<tr>
<td>1988</td>
<td>Setting up of Inter-Governmental Panel on Climate Change (IPCC)</td>
</tr>
<tr>
<td>1989</td>
<td>Green Summit in Paris of G-7 countries</td>
</tr>
<tr>
<td>1989</td>
<td>UN General Assembly agrees to a New Earth Summit</td>
</tr>
<tr>
<td>1991</td>
<td>Creation of Global Environmental Facility</td>
</tr>
<tr>
<td>1992</td>
<td>UNCED - Earth Summit - Publication of Agenda 21</td>
</tr>
<tr>
<td>1994</td>
<td>UN Convention of Desertification</td>
</tr>
<tr>
<td>1995</td>
<td>Second IPCC Report</td>
</tr>
<tr>
<td>1997</td>
<td>Kyoto Conference on Global Warming (came into force in 2005)</td>
</tr>
<tr>
<td>2000</td>
<td>Millennium Declaration. Goal 7 (Ensure Environmental Sustainabilities)</td>
</tr>
<tr>
<td>2001</td>
<td>Third IPCC Report</td>
</tr>
<tr>
<td>2002</td>
<td>World Summit on Sustainable Development (WSSD)</td>
</tr>
</tbody>
</table>
2005 - UN DECADE ON EDUCATION FOR SUSTAINABLE DEVELOPMENT LAUNCHED

2007 - INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE (IPCC)
   (FEB-2007, PARIS)

2007 - UN FRAMEWORK CONVENTION ON CLIMATE CHANGE
   (UNFCCC) (DEC-2007, BALI)

2009 - THIRD WORLD CLIMATE CHANGE CONFERENCE

1.17 BUILDING OF ENVIRONMENTAL EDUCATION IN INDIA

In India, learning from Stockholm summit 1972, environmental concern was incorporated in the constitution through 42nd Amendment in 1976. Thus, the Indian Constitution has further strengthened and captured much of environmental concerns in giving responsibility to its citizens to protect this environment. The constitution enjoins the "State to take measures to protect and improve the environment and to safeguard the forests and wildlife of the Country" (Directive Principles of State Policy Article 48-A).

It also makes it as "Fundamental duty of every citizen to protect and improve the natural environment including forests, lakes, rivers and wildlife and to have ecological compassion for the living creatures" (Fundamental Duty Article 51-G). Environment became a priority in policy statements, plans and strategies especially after 1980 with the establishment of a full-fledged Ministry of Environment and forests. Increasing concern on Environmental Education (EE) in India gained its momentum while its importance was recognized by the Government and policy was planned to introduce EE in
schools. Environmental education in one or the other form was existed in school curriculum prior to the Honourable Supreme Court of India’s directive on 18th December, 2003 to impart EE in educational institutes as a compulsory subject. The direction No. 4 of the Honourable Supreme Court reads thus: 

"We accept on principle that through the medium of education awareness of the environment and its problems related to pollution should be taught as a compulsory subject. So far as education up to the college level is concerned, we would require every State Government and every Education Board connected with education up to the matriculation stage or even intermediate colleges to immediately take steps to enforce compulsory education on environment in a graded way. This should be so done that in the next academic year there would be compliance with this requirement"

In 1986, when NCERT took upon itself the responsibility of conducting what was called a “massive teacher training programme”, it recognized that good EE was not merely a transfer of information and knowledge, but required students to engage themselves in activities, in observations, in going out in nature and that these needed to be integrated into the classroom environment. Centre for Environmental Education (CEE), along with its sister institutions, to developed first manual “Joy of Learning” as a response to this, for the NCERT and is today available in over 20 languages. Besides India, our neighbouring countries are using this material as well.

So the whole approach of dealing with EE not just as content transfer or information transfer, but as activity oriented, started almost two decades ago. Later it was felt that at least at the primary level (Standards I to V), an
attempt must be made to use the environment as a binding, over-arching subject. And so science and social studies in these standards were integrated into “Environmental Studies”. Over the years, through the efforts of Ministry of Human Resources Development (MHRD) and NCERT and the Ministry of Environment and Forests (MoEF) and through the institutions set up by it and with its support, including the Centre of Excellence (CEE and C.P.R. Environmental Education Centre), other centres like Bharati Vidyapith Environmental Education and Research Institute (BVEERI) and the Uttarakhand Sewa Nidhi, key experiments at bringing locale-specificity into EE have been carried out.

In 1998, CEE was asked to prepare a paper by Ministry of Environment and Forests, Government of India on greening formal education. The paper, “Greening Formal Education: Concerns, Efforts and Future Directions”, came out with the recommendation that there should be much better infusion of environmental concerns in all subjects. Infusion, as on that date, often meant that certain chapters in a science or a social studies book were “green”. But this did not go into the very greening of thinking. And therefore the paper stressed that a major effort was needed towards infusion of environmental concerns, perspectives, environmental skills and understanding into the existing textbooks. In 2001, the MoEF undertook a massive exercise in eight states of this country under the same project called “Environmental Education in School System (EESS)”.

The Supreme Court directive is really something which opened up an opportunity to do something and bring about a change in the School Syllabus
on lines which have been thought about for a fairly long time but needed that extra push, that extra imperative to really take it forward. If one sees the Supreme Court directive in terms of that opportunity, then it can have far-reaching and fundamental impacts on school education in India.

It will be appropriate to record that in India, the issue of environmental education has evolved through various stages since the Tbilisi meet in 1972. Indian peoples have taken it very seriously and discussion started form the preparation of curriculum for TEN years of School – A Framework (NCERT, 1975). Later it was formally discussed in National Policy on Education (NPE, 1986) which states that “There is a paramount need to create consciousness in the Environment ...... Environmental consciousness should be there in the form of teaching in schools and colleges. This aspect will be integrated in the entire educational processes”. The National Curriculum for Elementary and Secondary Education (NCERT, 1988), National Curriculum framework for school education (NCERT, 2000) also subsequently given due consideration and weightage to the effective implementation of environmental education India.

The need, implementation and monitoring of EE in India has been discussed at different levels; to name a few are National Curriculum framework (NCERT 2005, Habitat and Learning) and Environmental Orientations to school education (MHRD 1988), Environmental Orientation to School Education - A Training Module for Eastern Region (NCERT, 2001), The Honourable Supreme Court of India Judgment (Dec. 2003), Environmental Education in Schools, (NCERT, 2004; CEE, Ahmedabad;
CSE, New Delhi, Ministry of Environment and Forest (MoEF) (Non Formal Environmental Education), MoEF environmental information centres across the country.

But the way of imparting EE in school is still not similar throughout the country and there are no definite standards too. So far no agreement had been arrived at as how to impart EE in regular school curriculum. Except for the schools in Uttarakhand where EE was included as one of the regular subjects up to class VIII, no other schools in the country had found a suitable place for regular EE course. Question still persisted whether EE could be introduced as a separate subject or be infused in curricula through certain chapters in other relevant subjects.

A serious thought about EE in schools started after the National Council of Education Research and Training (NCERT) circulated its Discussion Document (2000) inviting comments from concerned agencies. It was revealed that the document was miserably lacking environmental concern at school curricula. Towards the end of the last century four major reviews of EE in the country were published by centre for Environment Education (CEE 1998), C.P.R. Environmental Education Centre (CPREEC 1999), Prativesh (1999) and Gill and Lahiry (1999). The national curriculum for elementary and secondary education - A Framework formulated in 1988 (NCERT; 1988) marked the first concerted and systematic effort to bring EE into the school syllabi. This was an major infusion of environmental concerns and a whole range of environmental concerns were infused into the NCERT model test books published between 1987 and 1989 (NCERT 1987-89). But still we have not achieved what has been planned to achieve.
1.18 EE IN MAKING DIFFERENCES

EE can make big differences through peoples small step initiatives in protecting the planet and change the world. The following short list of the things (adopted from [http://www.unfoundation.org/global-issues/climate-and-energy/green.html](http://www.unfoundation.org/global-issues/climate-and-energy/green.html)) that can be executed in day-to-day life at no cost rather would save money too in addition to protecting the environment.

| **Seal the deal.** | We waste a lot of energy inadvertently heating and cooling the outdoors. Fully close windows, weather strip, caulk gaps and holes and upgrade your insulation and windows when you renovate—you can save up to 20 percent on your annual heating and cooling costs. |
| **Recruit the best.** | Upgrade to high efficiency (ENERGY STAR) water heaters, AC units, lighting and appliances when it is time to replace old units—many of these upgrades even are available with substantial tax breaks! |
| **Surf.** | Many states, cities and utilities have programs that make up the cost difference between high-efficiency appliances and the average. Do a quick Internet search on your local utility Web site to see if there are such programs in your area. Energy saved is money saved. |
| **Set and forget it.** | A programmable thermostat reduces energy use by adjusting temperatures while you sleep or when you’re not home—just a few degrees can save you more than 10 percent on your heating bill. |
| **Put the bottle down.** | Bottled water and other highly packaged items contribute to landfills and emissions. Filter systems are cleaner and cheaper. Ninety percent of the cost of bottled water goes to the cap and bottle, making it 240 to 10,000 times more expensive than that of tap water! |
| **Designate a driver.** | Where possible, use public transportation or carpool. Better yet, walk or bike instead and enjoy the fresh air—studies show that getting out of your car makes you healthier and happier. |
| **Talk it up.** | Share what you do with your friends and co-workers. Let your public officials know that you care about climate issues and remember them in the voting booth. |
In addition to above listed activities, simple individual and community approach for doing the following activity can address the present day issue of climate change (reduction in carbon footprint) and protect environment.

- Plant trees, which absorb carbon dioxide
- Use rechargeable batteries
- Wash your clothes in cold or warm water
- Turn off the heated dry function on your dishwasher
- Change your light bulbs to compact fluorescent light bulbs (CFLs)

The all above need one common thing i.e. environmental awareness and attitude towards our environment which can be imparted through environmental education at various levels in the society (individual, school, colleges, teachers, social groups). By doing so “we might even make a little green by being green”.

I hope to bring out with such examples as to how the knowledge of environmental science is absolutely essential for holistic management of the environment and why every citizen should realize the basic terms of the earth, if not details. Every effort should be made to impart environmental education to every citizen at all levels to inculcate environmental education in them. The ultimate goals of EE is to protect the mother “EARTH” (atmosphere, lithosphere and hydrosphere) and the life forms (biosphere) existing on it so as to all continue to survive without creating any imbalance and harming each other. This can be achieved through creating awareness about the environment and environmental problems and finally changing this awareness in attitude to act through a process of environmental education at all levels of schooling.
CHAPTER 2

Review of Literature...