



Fostering Sustainable Development and Environmental Education Programmes: Role of Teacher Training Institutions and Colleges of Teacher Education

KEYWORDS

Environmental education, Teachers Training, Prospective teachers, Sustainable Development, Pedagogic Strategies, Ethics.

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ABSTRACT *In the present scenario, due to anthropogenic activities, environmental degradation is occurring at an alarming and rapid rate and is resulting in various environmental issues one of them being global warming. Science and technology, on the one hand, has brought immense benefits but on the other hand we are paying a heavy price for it. There is a wrong notion that economic development is based only in industrialization. However, science and technology can help in the process of global sustainable environment, but only in a limited way. In India environmental education has been introduced at various school levels. But the teaching of subject is not satisfactory due to lack of proper training of teachers in the field of environmental education. Bearing this fact in mind, an attempt has been made through this paper to highlight the necessity of making effective training programmes of prospective teachers in environmental education and sustainable development. The present generation is mindlessly pursuing its needs without thinking for the future generations. Therefore, in order to achieve the acceptable level of global environmental sustainability, the citizens must be empowered with essential knowledge and information especially in developing countries like India. Thus, the present paper concludes that it is the responsibility of teachers and prospective teachers to be able to sensitize their students and the public at large on the important issues related to environment and Sustainable Development.*

Introduction

For the past few decades there has been a growing concern both at the global level as well as at the national level among the intelligentsia at achieving sustainable development and dealing with everyday environmental problems. Today, we find a continuous depletion of natural resources, deforestation, extinction of many plant and animal species, rise in global temperature, environmental pollution, a shrinking of life saving ozone layer, etc. The situation has become quite grave with population explosion, food crisis, hunger, malnutrition, poverty, insanitation and excessive consumerism which have placed serious strains on the essential life-support systems of our planet.

Threats to peace and security of nations from environmental breakdown are today greater than any other foreseeable military threat from conventional arms (Rao, 1999)²⁶ and these are gathering frightening pace. Local and regional conflicts, based on environmental disruption, water and other natural resources scarcity, energy consumption, have already assumed alarming proportions in the world. These environmental threats now staring us in the face could have so much momentum that unless concrete steps are taken to reverse them, they may soon overwhelm our ability to respond to them (Baliga, 1996)⁵, even threatening all living beings including man himself with disaster or extinction (Parashar, 1996)²⁵. The recent Tsunami disaster because of relentless destruction of mangroves and coral reefs bear testimony to this. (Shiva, 2005)³⁵. The environment and natural resources directly affect the standard of living or quality of life of the people. The welfare of the individuals ultimately depends upon a viable life supporting system (Das, 1980)⁹, which can be provided only by a clean and vibrant ecosystem.

Education in general and the teacher education in particular have a special role to play in Sustainable development. Teacher's knowledge and understanding of environment and developmental issue and level of commitment, attitude and devotion would determine the future of the society and its development. World Commission on Environment and Development (WCED, 1987)⁴², in its report "Our Commission Future", defines Sustainable Development, as the "Development which meets the needs of the present generation without compromising the ability of the future generations to meet their own needs".

The objective of Sustainable Development is to ensure the well-being of the present and the future generations and to maintain a healthy environment and life-support system. The sustainable development framework entails thinking far into future and taking into account of how our present actions might affect our ability to live a wholesome and fulfilling life. One can look at Sustainable Development on a global, regional, national, state, local and even individual scale. The World Watch Institute (WWI) in its annual publication 'State of the World', 2006, specially focuses on the dramatic rise of the two Asian power houses, namely; India and China, with about 40 percent of world population and says that "The choice of development they make in the next few years would lead the world either towards a future—a path of development or of acceleration towards a collusion course with world's ecosystems and resources". Sustainable development does not imply absolute limits on economic growth (CEE, 1994)⁶, but takes into account the limitations imposed by the availability of resources, present state of technology, the ability of the biosphere to absorb the effects of human activities and social values. It is said (Schuyler, 1983)³², that, "We have reached a stage when we must shape our actions throughout the world with a more prudent care for our environment. Through ignorance or indifference we can do massive and irreversible damage to our environment."

Education in its traditional form is not sufficient to meet the immense challenges posed by the phenomenon of unsustainable living. People are becoming increasingly aware of the dangers they face and of the need for an informed action. New educational approaches are required to achieve necessary changes in the life styles and to be successful in combating waste in developing a new ecological vision and in fostering a sense of global solidarity (Mayor, 1997)¹⁸. Herculean efforts are needed to educate people and to solve environmental problems. Environmentalists have taken up environmental protection aspects in a serious way. They have taken a very strong position after the United Nations Conference on Human Environment at Stockholm in 1972, which was a major event for those concerned with the quality of world's environment. One of the major recommendations of the Conference resulted in the creation of United Nations Environmental Programme (UNEP) while other recommendations specially constituted the foundation of framework for cooperative efforts on International level which states that

environmental awareness may be adopted by:

1. Identifying analysing and understanding the needs and problems of personal life including healthy vocation etc.
2. Social life at different levels, viz; family, caste, community, religion, town or village life, state and country.
3. National life including civic, economic etc.

Environmental Education is a way of implementing the goals of environmental protection. Environmental Education is not a separate branch of science or subject of study. It should be carried out according to principle of lifelong integrated education. National Environmental Awareness Campaign (NEAC, 2000-2001), started in 1986 for creating Environmental awareness at all levels of society, was continued during the year with the main theme, as, "Keep our Environment Clean and Green". The Ministry (2000-2001)¹⁹ interacted actively with the University Grants Commission (UGC), National Council of Educational Research and Training (NCERT) and the Ministry of Human Resource Development (MHRD) for introducing and expanding environmental concepts, themes, issues etc., in the curriculum of schools and colleges". The present problem can be best tackled if proper awareness and attitude towards environment is developed both among individuals and society. Systematic, organized and awakened social mind can be developed only through right type of education and it is through right type of education that appropriate awareness can be created to make life and its environment creative, constructive and progressive. To develop such a state of mind, fostering a scientific attitude among individuals for the growth and the development of environmental awareness is essential.

Importance of Environmental Education in Teacher's Training Programme

Although, we have studied about the environment since long yet, it is only in the past few decades that the scientists and educationists have started to take keen interest and pay attention to the subject of Environmental Education (EE). Over million years, all forms of life in our biosphere have undergone evolutionary changes, consistent with the changing environment. The environmental change caused by the unchecked growth of industries in the west and by the unchecked growth of human population in the east have already reached such proportions that it can be literally seen, tasted and smelled. We are also realizing that air, water and land are becoming more polluted due to technological advancement. Education has a major role in implementing environmental protection and conservation. Nature conservation and environmental protection are extremely important for primary health care of the individual. Environmental Education programme should be introduced at every level of schooling. Neither people nor their surroundings can be treated separately for educational purposes. There must be a coordinated and comprehensive approach to Environmental Education as a whole. One cannot ignore the position of teacher and teacher training programmes in environmental perspectives, when we talk about environmental education. If we want to implement the programme of Environmental Education successfully in secondary schools, it is essential that teacher must be trained with all required skills, attitudes and values essential to teach environmental concepts. Therefore, introduction of Environmental Education in teacher training colleges should get due importance. National level workshops are also organized by National Council for Teacher Education, (NCTE)²³ in different states of India. Thus, we can say that continuous efforts are being made by NCTE²³ to make the prospective teachers environmentally literate.

Fostering Environmental Education and Education for Sustainable Development

There is mention of environment and its importance in many ancient literatures. However, the beginning of Environmental Education can be traced back to educational thinkers such as Froebel, Montessori, Steiner and Dewey who had put emphasis on the learner and learning environment, on learning

by doing and participation and on different learning needs and styles (Kirk,John,1992).

With increase in the knowledge of science and technology and initiation of industrial activities in the last few decades of the 19th century, there has been increasing awareness to protect air, water, land, forests and aquatic resources. In true sense of the term, the origin of environmental education concept goes back to 1899 when Scottish Professor of Botany Patrick Geddes, known as the 'Father of modern Environmental Education', founded in Edinburgh (England) a unique establishment, the 'Outlook Tower', to improve upon the existing environment and education. He was the first to make the vital link, fundamental to environmental education, that the quality of environment and education were closely interdependent and a child brought into the realities of his environment would not only learn better but would also develop a creative attitude towards the environment (Saxena,A.B,1993). Such beginning was strengthened by subsequent global catastrophic events such as London smog of 1952, Mina Mata tragedy of 1953 and the Torrey Canyon Disaster of 1967, etc., that forced people to become conscious about the state of global environment and how to preserve it.

The first UN sponsored conference on Human Environment was held at Stockholm (1972) in order to assess the damage done to environment and find ways and means of preventing it. In its principle 19, it laid emphasis on the need of Environmental Education. Subsequently UNEP in collaboration with UNESCO launched UNESCO-UNEP International Environmental Education programme which stressed on the environmental awareness among general public including teachers, planners, administrators, politicians and educationists (Srivastava, 2005)³⁶. The framework for Environmental Education was formulated in October, 1975 in the International Environmental Education workshop held at Belgrade popularly known as "Belgrade Charter". Subsequently in October, 1977, the Intergovernmental Conference on Environmental Education held at Tbilisi, USSR, outlined the structure of Environmental Education that formed the prototype for environmental education programmes world wide (UNESCO, 1978)⁴¹.

Environmental education (EE) has two intimately linked goals (Chopra and Kadekoli, 2001; Reddy, 2002)^{8, 28} -education towards protection and improvement of the environment, and education as an instrument of development and improving the quality of life of human beings. Further EE is considered as education about environment, education for environment and education in the environment (Palmer, 1993)²⁴. As such EE (NCERT, 2004)²¹ is a process aimed at developing a world population that is aware of and concerned about the total environment and its associated problems and which has a knowledge, attitude, motivation, commitments and skills to work individually and collectively towards the solutions of current problems as well as the prevention of new ones. Realising the increased magnitude of human impact on the environment and the consequent deterioration of the latter, United Nations General Assembly set up the World Commission on Environment and Development (WCED)⁴² in 1987, headed by Dr.Gro Harlem Brundtland, the then Prime Minister of Norway, to examine critically the environmental and developmental progress on the planet and to ensure that human progress is sustained by development which does not deplete the environmental resources of future generations. The report clearly states that there is a need to change present practices if people are to ensure their long term survival. Sustainable Development stresses the need to view environmental protection and economic growth as mutually compatible (Balgot, 1990)⁴ and not necessarily conflicting objectives. Interestingly WCED (1987)⁴² suggested that "Human survival and well being could depend on the success in elevating Sustainable Development to a global level". United Nations Conference on Environment and Development

(UNCED, 1992) popularly known as "Earth Summit" held at Rio-de-Janeiro in 1992 endorsed the concept of Sustainable Development (Koshoo, 1998)¹⁵ and the global environmental concerns came into sharp focus in this conference. It stressed, "Reorienting education towards Sustainable Development". Education is critical for promoting Sustainable Development and improving the capacity of people to address environment and developmental issues. In its agenda 21, it considered "Education, awareness and training" as the critical; factors of public understanding –fundamental to any progress to be made.

In 1997, UN Commission on Sustainable Development (CSD) Earth Summit plus 5 stressed on the importance of Education and drafted a work plan with 21 tasks for education for sustainable development. The second task requires to, "Clarify, promote and communicate the concept and key message of education for Sustained Development to all". Interestingly to send the message of Sustainable Development to every nook and corner, UNO has declared (2004-15) as the Decade on Education for Sustainable Development (DESD). Hence, Environmental Education for the 1990 has become Sustainable Development Education (Atchia, 1990)³. The Education for Sustainable Development is not the same as Environmental Education. The Environmental Education has not been traditionally concerned with the quality of environment and less concerned with social, economic and political aspects of change. But ESD besides ecological (environmental) dimension looks into economic and social issues (Disinger, 1990)¹⁰ with ultimate objective of improving the quality of life of people living on the planet. As such there is shift from awareness and understanding to involvement, participation and problem solving. It is interesting to note that the Millennium Declaration (2000) by heads of state of 189 countries in the form of Millennium Development Goals stressed on eight dimensions, all of which have implications for environmental sustainability (Sweetman, 2005)³⁸. Further the declaration in its target 9 stressed countries to integrate the principles of Sustainable Development into their national policies and programmes. The core themes of Education for Sustainability (EFS) include life-long education, Education for All, interdisciplinary education, value education, partnership, multicultural education, health education, women education and empowerment (Yodmani, 1997)⁴³. After Rio Earth Summit, besides EE various terminologies such as Education for a Sustainable Development (ESD), Education for Sustainability (EFS), Education for a Sustainable Future (ESF) and Sustainability Education (SE) have emerged (Sterling, 2005)³⁷. However, ESD is regarded as the new generation EE (Hesselink et al., 2000)¹².

Strategies for Promoting Effective Environmental Education

The following strategies are needed to promote Environmental Education effectively:

1. For a growing child, experiences related to Environmental Education need to occur continuously over a period of time from pre-school into adulthood so that understanding and motivation gained at each stage of life becomes an integral part at each stage of formal education right from pre-primary to university stage.
2. Environmental Education is a lifelong process and should not remain confined to formal system of education. It should form a part of non-formal education and adult education as well. We need more concerted efforts for success of Environmental Education.
3. In formal education, at all levels, curriculum should be prepared on interdisciplinary basis. It should include science, humanities and cultural contents and subjects such as history, geography, sociology, ecology, economics, biology, chemistry etc, to make the students understand various aspects of environment and its problems. The content of the curriculum should be rigorous. It should be based on well-researched facts and data. It should lay

emphasis on three C's Connection, Concern and Care. The topics covered should be specific to learning stages and ages.

4. Environmental Education during early years should be based on the sense of wonder and joy of discovery. Children should be given an opportunity to bond with nature and feel it. They should develop a sense of kinship with the natural world.
5. At the secondary stage curriculum should lay emphasis on awareness, life experiences, conservation and action skills. Since major aspect of Environmental Education is experience and relationship, experimental learning should be a major teaching strategy are secondary stage. Emphasis should be on hands-on grounded in directing experiences, applied learning, learning by doing etc. Students should be given opportunities to get involved and contribute to improving the environment. It should lead to sense of responsibility. Moreover, there should be relevant connection between the subject matter presented and students' day to day lives. Students are likely to find learning experiences more valuable if it is connected to their own lives. Innovative teaching learning strategies like role playing, simulation exercises can be used by the teacher.
6. At the university stage much emphasis should be laid on knowledge regarding sustainable development based on experiences with conservation. Content must be based on science and technology, environmental engineering, health and social ecology. Practical and action-oriented research should be stressed upon such as sustainable use of energy, water and other natural resources (firewood), air, water pollution, soil erosion and their prevention and above all projecting future threats to a sustained development by human activities.
7. At the secondary and higher education stage co-curricular activities can be effectively organized for action with participation of students in environment related activities. The following co-curricular activities can be organized under NSS and SUPW programmes. (i) cleaning environment (ii) digging pits for the waste in the village. (iii) Growing plants (iv) Organizing camps of population education. Besides, educational institutions, NGOs and government bodies can collaborate in organization of activities related to environment awareness like essay competitions, on the spot panting competitions, modelling and poster deigning etc. The voluntary organizations like WWF-India, Green Ray Foundation, Goa can set up Eco-Clubs in schools, colleges and university.
8. Under non-formal education system the department of Adult, Continuing and Extension Education in collaboration with NGOs can launch environmental awareness campaigns. Group discussions, lectures, print and electronic media, film, documentaries can be utilized for making general public aware on the need of maintaining balance and harmony between economic growth and environmental protection at local, regional and global level;.
9. An environment-friendly teacher can transform the school, can transform the society. In order to help students grow in knowledge, skills and values, attitudes and awareness relevant to environment, teacher should not be only dispenser of information and knowledge but should also be manager to teaching-learning situations. Teacher should make suggestions to students to hear/watch news with regard to environment, watch T.V. programmes on environmental concerns, read newspaper and prepare learning aids such as charts, models showing environmental pollution and degradation.
10. In order to equip our students with necessary knowledge, skills and attitudes for environmental protection and Sustainable Development, we need not only pre-service training of teachers and teacher educators but we also need to focus on in-service training of teachers, teacher educators and professional groups in environmental education. Refresher courses, workshops and training

programmes can be organized to equip in-service teachers and teacher educators with knowledge and skills required to teach this newly introduced subject in schools.

11. Community can make contribution in preserving the local quality of life for current and future generations. Environmental Education can be strengthened through the mobilization of public services, local communities, local religious and tribal leaders.
12. The media could also play a vital role in the effective implementation of Environmental Education programmes. Radio talks, television programmes, information packs, posters, slides and audio-visual material should be generated. Media can be very effective in non-formal environmental education programmes.

Education for Sustainable Development: Towards Developing a Curriculum for It

Education is an effective means of social reconstruction and to a great extent it offers solutions to the problems a society is faced with (Sathe, 1997)³⁰. These problems could be economic, social, cultural, ecological and educational. As teachers are the torch bearers in creating social cohesion, national integration and a lean ring society, the quality of education is a direct consequence and outcome of the quality of teachers and teacher education system.

IUCN (1980)¹³ observes that three objectives that are paramount to the future well-being of the species and the planet are needed to be taught to the teachers. These are:

- a) Maintaining ecological process and life support system.
- b) Preserving genetic diversity and
- c) Ensuring sustainable utilization of species and ecosystems.

To realize this, the curriculum of teacher education needs to provide the basic knowledge and conceptual understanding of ESD in order to develop relevant skills and attitudes in student teachers and the existing cadre of teachers. This calls for proper development of skills for competency based teaching, continuous and comprehensive evaluation, organizing and conducting projects and activities related to local specific conditions and the daily life learners.

Further, a comprehensive, dynamic and responsive system of teacher education programme needs to be continually evolved. The Education Commission (1964-66) stressed that in a world based on science and technology, it is education that determines the level of possible welfare and security of the people and that a sound programme of professional education of teachers is essential for the qualitative improvement of education. Some quality dimensions for developing Sustainable Development Education curriculum for teachers is as following:

1. Consider the environment related issues in totality, natural and man-made, economic, ecological, social, political and cultural aspects.
2. Build a sense of global connectedness. Emphasize on conservation of life support system on land, forest and water.
3. Be interdisciplinary in approach, drawing specific content of each discipline in making possible holistic and balanced perspective.
4. Stress on continuous lifelong process from pre-service level and continue that in all formal and non-formal areas.
5. Emphasize the improvement of quality of life of people irrespective of their socio- economic status.
6. Developing skills to establish closer school.-community contacts and promote interrelationship among people, economic development and ecological consequences. What is good for environment is also good for economy and environmental protection cannot be considered in isolation.
7. Promote values such as respect for nature, sharing of re-

sources, reduction in the use of natural resources, recycle of resources, reuse of wastes, living together, etc with local examples.

8. Stress on renewable and ensure wise use of non-renewable resources, appropriate use of alternate technology.
9. Orienting teachers and student teachers with planning, designing and conducting of projects, activities and case studies in local contexts. Protect endangered species and wilderness for the sake of survival, aesthetics and recreation. Consider the natural resources as components to conserve in order to realize that they will return more in the long run if we do not over exploit them now.
10. Ensure that environmental assets are appropriately valued. Introduce the concept of environmental accounting (Chidambaram, 2005)⁷ in terms of what one takes from earth in all forms of human activity.

Methods and Approaches to Teaching of Environmental Education and Education for Sustainable Development

Education for Sustainable Development is not a simple transfer of knowledge about environment education. Teachers have to understand the content and contexts of what needs to be taught and how to facilitate the teaching-learning process. Teacher's decisions about teaching-learning strategies determine the real curriculum (Sharma, 2005)³⁴. It is the teacher who becomes the real constructor of curriculum while translating the guidelines into curricular activities. Education for sustainable development believes in a shift from content and predetermined learning outcomes towards the nature of the learning experience (Sterling, 2005)³⁷. It stresses on action oriented approach with emphasis on learning by doing, critical thinking, problem-solving etc. While preparing a prospective teacher, socio-economic and cultural background of the community constituting the catchments area is to be realized. Teaching about the environment is most effective if it incorporates projects/activities (NCERT, 2005)²⁰ that seek to produce tangible results. Looking into the needs and activities such as water harvesting, vermi-composting, tree plantation, recycling of wastes, plantation of useful plants can be organized. Transactional modalities have to be essentially activity oriented, project based and participatory in nature. "Practise what you preach and teaching by example" are after all, just elements of good teaching practice.

Environmental problems being social problems, social approach/community service (Ediger, 2005)¹¹ should be used in order to solve those. In teacher education programme, social work is imperative both to help educate those creating the problems and those affected by the problems. For teaching Sustainable Development issues, Information Communication Technology (ICT) should be exploited so as to bring the environmental crisis, issues, developments and possible control measurers into kinds of prospective teachers. Approaches such as visit to actual site and its study, project method, experiments and surveys are more suitable methods. As such the current teaching strategy is to be modified (Jackson, 2007)¹⁴ to begin with the local and concrete and then, as children grow older, more remote and abstract subjects should be taught. Schaefer (1989)³¹ and Atchia (1990)³ observed that science and science education, in particular biology, provide the conceptual framework for practically managing the biosphere and as well as the techno-sphere (human habitat, industry, transportation, etc.) for sustainable and environmentally sound development. As a pre-requisite of quality improvement of teacher education, it is essential to provide opportunities to teachers and teacher educators to acquaint themselves with the changes that have been acquired due to scientific and technological developments which has a unique role (Arora & Panda, 2000)² in promoting Sustainable Development. Science education in USA has undergone reform providing an excellent opportunity to use sustainable agriculture as the basic theme in teaching science. For effective orientation of teachers in the area of Sustainable Development it is necessary to have coordination among university departments, Department of Science and Technology, Pollu-

tion Control Board (PCB), Department of Environment and Forest, etc. Ministry of Environment and Forest (MoEF, 1998) observed that for in-service training, support from Centre for Environmental Education, Ahmedabad and Chennai may be sought as they are generating resource materials and educational packages on nature and natural resource conservation.

It is highly necessary to have effective networking among resource institutions, schools and teacher training colleges to promote sustainable development message. In such education programmes, in-built mechanism should be there like identification of support material, skills in preparation of indigenous and low cost materials, judicious choice and utilisation of material for enhancing the learning and use of community resources for education. Interestingly some attempt has been made by NCERT (2001)²² in the form of training module to promote learning looking into the local needs. Further Environmental Education resource centres need to be built around each teacher training institute involving local NGO and couple of schools in the locality.

Role of Teacher Training Institutions and Colleges of Teacher Education in Promoting Sustainable Development and Environmental Education

Education provides the instrument for liberation from ignorance and oppression. Besides sharpening the eye of knowledge, it develops awareness (Alam, 1998)¹ and makes mind logical. Further it is a very important input in human resource development (UNDP, 1993)⁴⁰. The new concept of Education for Environmentally Sustainable Development (EESD) could be introduced (Prashar, 1996)²⁵ in the education system, which paves way for the protection of the environment keeping in view the developmental needs of the society through science and technology, considering the long term future of economy, ecology and equity of all communities. This would mean educating people to awareness, decision making and at a later stage implementing it. Building the capacity for such future oriented thinking is a key task of education. However, it should no longer be limited to environmental concepts alone. It is the complex interactions among environment, society and economy that have brought us to this unsustainable state in the world and we must work form an understanding of these interactions to learn how to live in a sustainable way.

It is observed that Teacher Educational Institutions (TEIs) have to take lead in stimulating and guiding the sustainable use of natural resources. Environmental Education for Sustainable

Development need to be introduced (Ray, 1997)²⁷ at all levels of education, school, colleges, universities as well as in all forms of informal education. It is suggested that Environmental Education curriculum for Sustainable Development should include skills, concepts and facts as already exists in the school curriculum but in the context of local specific environment. Issue based- curriculum with emphasis on learning the skills of gathering, recording and analysing information (NCERT, 2005)²⁰ for the purpose of decision-making and social action shall go a long way in solving problems. It will help children equipped to make decisions and participate in community action on issues relevant to their lives when they leave schools. While in the past much of the emphasis was on education related to cognitive understanding and development, now there is a need to also address the social and other dimensions of learning. So there is a shift from content and learning outcome to the nature of learning experience and environment.

A teacher is the most important person in teaching who sees that educational programmes are successfully implemented by organizing and managing the learning experiences and environments (Schiundu & Omulando, 1992)³³. To educate others, therefore one needs to be educated and have a broad background of general cultural training that provides a broad liberal education. Teacher education is an impor-

tant component of education. Through it school teachers who are considered mentors of society are prepared and produced. Loughran (2006)¹⁶ looks at teacher education as the pre-service and in-service teacher preparation where students of teaching seek to develop knowledge and skills of teaching and to learn how to competently apply these in practice. Teachers are the most important agents of change responsible for growth, development and progress of societies and communities (Mangal, 2002)¹⁷. Enlightened, emancipated and empowered teachers lead communities and nations in their march towards better and higher quality of life (NCTE, 1998)²³. As such their role as teachers is very crucial to achieve the objectives of Sustainable Development. Since teachers play a major role in the education of children, their own education on these sensitive issues must therefore create necessary understanding among teachers about their new roles and responsibilities. Recently following the Hon'ble Supreme court's directive, NCTE²³ has observed that Environmental Education as a compulsory curriculum for Teachers' education will be implemented so as to stress development of critical awareness about pressing problem of life especially, environmental degradation, its consequences and methods to curtail it.

To realize the objectives of teacher education curriculum and to develop relevant skills and attitudes in student teachers and the existing cadre of teachers, calls for proper and comprehensive evaluation.

The basic strategies required to strengthen both pre-service and in-service teacher education programmes in tune with ESD include:

1. Reviewing and modifying the existing pre-service and in-service education programmes in order to make ESD an integral part and provide both theoretical and practical inputs.
2. Orienting teachers and students teachers with planning, designing and conducting of projects, activities, and case studies in local contexts.
3. Exposing student-teachers to different kinds of community projects already in operation in the locality.
4. Developing skills to establish closer school-community contacts and
5. Installing in learners the ability and will to integrate sustainable living practices, for themselves and others in their daily lives.
5. Using co-scholastic activities in other subjects as a medium of teaching ESD

Education for Sustainable Development (ESD) is a complex interaction of economic, social, political, cultural and ecological forces. In addition global policy statements and principles have placed a heavy responsibility on Environmental Education to facilitate the transformations needed for sustainable living. As such ESD believes in a shift from content and pre-determined learning outcomes towards (Sterling, 2005)³⁷ the nature of the learning experience. Sustainable Development is not simply a subject, but an area of focus with goals to produce a responsible and environmentally conscious people. In the context of teacher training, it stresses on action oriented approach with emphasis on active, hands-on discovery method with emphasis on learning by doing, exploring, problem-solving etc. Teaching about the environment is more effective if it incorporates projects/activities (NCERT, 2005)²⁰ that seek to produce tangible results. Looking into the needs, activities such as water harvesting, vermin composting, tree plantation, recycling of wastes, cleaning and maintenance of water bodies, installation of bio-gas, organic farming, plantation of useful plants can be organized. It is not simply only about principles and concepts. It should be more from real life experiences and practice. "Practice what you preach and teaching by example" are after all, just elements of good teaching practice.

The National Policy of Education (NPE, 1986) calls for an overhaul of the teacher education system in India. A few centrally sponsored schemes of restructuring and reorganization of teacher education launched in 1987-88 primarily envisaged establishment of DIETs to provide pre-service and in-service training to elementary school teachers. In addition, up gradation of Secondary Teacher Education institutions into Colleges of Teacher Education (CTEs), establishment of Institutes of Advanced Studies in Education (IASE), strengthening of SCERTs and University Department of Education through University Grants Commission (UGC) were components of this restructuring which had the basic objective of providing training and resource support to elementary and secondary education at the grass root level (Sharma, 2005)³⁴.

Currently there are more than 14.7 lakhs and 17.7 lakhs elementary and secondary/higher secondary school teachers, respectively (Sharma, 2005)³⁴ in India. If these teachers are trained through in-service training programmes (Roux and Ferreira, 2005)²⁹, not only they can infuse Environmental Education in their teaching but can help to participate in solving environmental problems in their communities. Further the environmental conservation message can reach to the parents through their children. In the long run students trained in social and environmental problems can bring about substantial change in environmental conservation.

In United States, both at school and college level, students get involved in community-based education by getting engaged in the public domain and forming partnership to meet community need. In ideal partnership, students function as community members to create a product, service or process of value for the community that result in many meaningful learning experiences. They work on a project having local concern, conduct authentic investigations, analyse the results and propose to implement a plan of action for improvement or process to benefit that particular community. Throughout the year, students document their efforts by writing letters to the local new papers and producing video, posters and scrap book filled with photos and newspapers stories of their work. Environmental problems being social problems, social work/community service is considered to be the suitable mode to solve those. In teacher education programme, social/community work often forms a component of the curriculum but it is hardly organized in the true spirit. Often it is not linked to, local problems and concerns. As such it needs revolutionary changes. This calls for an active learning process which empowers learners and communities to resolve environmental issues and risks, to prevent environmental degradation and to support sustainable living. Teachers can play active role but to be able to do so they need the necessary skills to raise environmental awareness among learners and the boarder community. So there is need for in-service training as well as pre-service training programmes for teachers in community linked environmental issues to promote sustainability and Sustainable Development.

Suggestions

The implementation of environment education as a course subject in teacher's training institution requires efforts in many arenas and from local to national scales. Following are the main suggestions to reorient teacher training institutions for the same:

1. Community resources (NGOs, clubs, religious organizations etc. should be a part of teacher education programmes within and outside their classroom, to teach environment.
2. Prospective teachers and teacher educators should work on projects related to environment concerning skill, cross-curricular approaches and action based learning models relevant to local community.
3. It is necessary to introduce environment related course work for prospective teachers and make resource material for prospective teachers on local and global environ-

mental issues.

4. Short-term courses on environment education may be introduced for in-service teachers.
5. Activities like speech competition, writing in newspapers and lecture of eminent environmentalists, conferences and seminars on environment education may also be organized.
6. Teacher training institutions can organize workshops for prospective teachers to have an environmental education experience regardless of their discipline..
7. Practices related to environment education may be given to prospective teachers. Main focus should be given to environmental practicals like saving paper, conserving energy and conserving water which will help prospective teachers think about environmental activities and that will contribute to more interactive classrooms.
8. There should be encouragement and deep commitment by involving prospective teachers in all aspects of teacher training course and programme. They should be guided by teacher educators specifically for environmental oriented activities.
9. Teacher's training institutions should produce teachers having positive environmental oriented attitude. Teacher a re role model for school students. They must be willing to produce environment in the schools.
10. Mini-courses on environmental education should be developed that can be transmitted to other countries via satellite.
11. With the help of instructional technology environment learning activity package in the form of module can be developed. These modules should have behavioural objectives along with content and activities to achieve these objectives. Environmental games, songs, stories and drama can also be developed with the help of various technological resources.

Conclusion

In the 21st century we are witnessing systems of industrial and technological growth which not only destroying and depleting much of nature and natural resources but also endangering human and non-human species. These modern systems of industrial and technological development must be re-designed and recreated in ways that no longer rely on non-renewable natural resources, use of natural resources at non-sustainable rates, or cause harm to people or the natural world, at present or in future. It is recognized that environmental problems cannot be resolved by looking at only technological solution. To meet these challenges and solve the problems we need to have a re-look at our educational systems and the various curricula and understanding of our action to the environment. It also plays a significant role in changing the behaviour of people towards the environment. To accomplish this task, it should be related with the environment.

The International community is not serious enough about achieving any significant degree of global environmental sustainability and Sustainable Development. Effective policies must also include steps to curb consumption by the affluent in the society everywhere. We need moral education to instil genuine environmental values in the young budding teacher trainees and other specialised area students who, in their professional carriers as planners, designers, administrators, builders, and decision makers who would considerably contribute to mankind's impact on nature and the natural environment. Following interventions based on observation, discussion, research, writing and reflection, young children would realize that pollution can be hazardous to their health. Every possible effort must be made to include Environmental Education as an integral part of the curriculum from primary to higher educational level. Environmental education awareness also has to be raised among the general public, administrators, planners and workers. There should be coordination among various departments engaged in developmental activities and every scheme/plan has to be scrutinized by the

department of environment or by a cell looking after 'environmental worthiness' of developmental plans in the respective departments. Teachers need to be prepared to become EE facilitators, who will proactively adopt the activity oriented approach to teaching and learning through, about and for the environment. This will require in addition to teacher training, ongoing support that will reach into schools/colleges and influence the EE programme. This support could be perhaps from an external resource agency that closely interacts with the educational system on an ongoing basis.

It has also been said and emphasized in the Millennium Development Goals (MDGs) that it is necessary to integrate the principles of Sustainable Development into the national policies and programmes and reverse the loss of environmental resources, but still many countries are dithering in this regard. As teachers are the key to the whole education system, it is only through the initiative and innovativeness of the teachers that such programmes can succeed. Teachers only look into the needs of future generation through children to

whom they teach and mould their character. As such their academic needs in terms of training and in-service programme are to be looked into on priority basis.

To conclude, it could be said, that it is the responsibility of teachers and prospective teachers to sensitize their students and the public at large about important issues related to environment and Sustainable Development. It should be emphasized that man is an integral part of nature and must find ways and means to live in harmony with nature and must be educated about the importance of interdependence of man and nature. It is observed (Uhl and Anderson, 2001)³⁹ that teachers should be taught to understand a set of five core principles like respecting life and natural process, living within limits, valuing the local issues, considering the costs in the process of development and sharing of power. Such ecological literacy is fundamental to living fully and wisely. The curriculum should guarantee ecological literacy reducing alienation from natural world and strengthening the bond with it.

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