

POSITION PAPER
ON
ENVIRONMENTAL EDUCATION
STATE OF KARNATAKA

Final Draft

05-04-2022

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1.2. Executive summary:-

- Environmental Education is nothing but life education.
- Environmental Education has been the part parcel of the traditional life style. Everyone was exposed to their environment.
- Environmental education is a process that allows individuals to explore environmental issues, engage in problem solving, and take action to improve the environment.
- Environmental educations results in, individuals developing a deeper understanding of environmental issues and have the skills to make informed and responsible decisions.
- Environmental education is concerned with those aspects of human behavior that are more directly related to man's interaction with biophysical environment and his ability to understand this interaction. Still this culture is alive in the tribal communities across the country.
- Environmental education constitutes a comprehensive life-long education that is responsive to changes in a rapidly changing world.
- Environmental education prepares the individual and communities for life through an understanding of the major problems of the contemporary complex world, the problems resulting from the interaction of the biological, physical, social, economic and cultural aspects of the individual and the communities.
- Environmental education recreates an overall perspective which acknowledges the fact that natural environment and man-made environment are profoundly interdependent and links the acts of today to the consequences of tomorrow.
- Environmental Education must build character, enable learners to be ethical, rational, compassionate, and caring, while at the same time preparing them for gainful, fulfilling employment at local & global level. This is the need of the hour in 21st century.

1.3. List of members of the focus group:-

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1.4. Acknowledgement:

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2. Introduction to Environmental education

Environmental education is concerned with those aspects of human behavior that are more directly related to man's interaction with biophysical environment and his ability to understand this interaction. Environmental education is a process that allows individuals to explore environmental issues, engage in problem solving, and take action to improve the environment. As a result, individuals develop a deeper understanding of environmental issues and have the skills to make informed and responsible decisions.

Environmental education constitutes a comprehensive life-long education, one responsive to changes in a rapidly changing world. It prepares the individual and communities for life through an understanding of the major problems of the contemporary complex world, the problems resulting from the interaction of the biological, physical, social, economic and cultural aspects of the individual and the communities. Environmental education recreates an overall perspective which acknowledges the fact that natural environment and man-made environment are profoundly interdependent; and links the acts of today to the consequences of tomorrow.

One of the most glaring problems which the world faces today is environmental pollution. Man has exploited nature excessively at the cost of the environment. There is an immediate need to make people aware about environmental degradation. Education and public participation may change and improve the quality of the environment. According to UNESCO, "Environmental education is a way of implementing the goals of environmental protection. It is not a separate branch of science but lifelong interdisciplinary field of study." It means education towards protection and enhancement of the environment and education as an instrument of development for improving the quality of life of human communities.

India is a highly diverse country in terms of its climate, geography, geology, ethnicity, flora and fauna, society and economy. Therefore, environmental education in the country has to be location specific. An environment that is conducive to learning is critical for an efficient Education System. The environment must be safe, neat & clean, peaceful, caring, tolerant, impartial, steady, corrective but not punishing, accountable, warm, responsive and inclusive. All these properties assume greater importance when it comes to School Education (from the pre-school stage to the pre-university stage) because that's when the System either makes or breaks young minds.

In the light of the recommendations of NEP 2020, the committee deliberated and proposed the position paper by considering the following.

Reduce curriculum content to enhance essential learning and critical thinking

Curriculum content will be reduced in each subject to its core essentials, to make space for critical thinking and more holistic, inquiry-based, discovery-based, discussion-based, and analysis-based learning. The mandated content will focus on key concepts, ideas, applications, and problem-solving. Teaching and learning will be conducted in a more interactive manner;

questions will be encouraged, and classroom sessions will regularly contain more fun, creative, collaborative, and exploratory activities for students for deeper and more experiential learning.

Experiential learning

In all stages, experiential learning will be adopted, including hands-on learning, arts-integrated and sports-integrated education, story-telling-based pedagogy, among others with as standard pedagogy within each subject, and with explorations of relations among different subjects. To close the gap in the achievement of learning outcomes, classroom transactions will shift, towards competency-based learning and education. The assessment tools (including assessment “as”, “of”, and “for” learning) will also be aligned with the learning outcomes, capabilities, and dispositions as specified for each subject of a given class.

Respect and recognition for local skills and traditions.

The numerous rich local practices /traditions of India developed over millennia involving art, stories, poetry, games, songs and more, will be suitably incorporated.

Art Integration

Art-integration is a cross-curricular pedagogical approach that utilizes various aspects and forms of art and culture as the basis for learning of concepts across subjects. As a part of the thrust on experiential learning, art-integrated education will be embedded in classroom transactions not only for creating joyful classrooms, but also for imbibing the Indian ethos through the integration of Indian local art forms and culture in the teaching and learning process at every level. This art-integrated approach will strengthen the linkages between education and culture.

3. The vision, Perspectives, and Implementation

3.1. Historical perspectives in Environmental Education

Environmental Education in India is neither a new idea nor of recent origin. It dates back to the prehistory period. Every religion and every culture in India expressed concerns about the environment while reflecting the traditions and social perspectives, with a clear warning on the impact of environmental degradation and the need for conservation for human survival. In Indian culture, Nature is perceived as an all-encompassing entity. The age-old Hindu scriptures such as the Vedas, Puranas, and Upanishads and the great epics Mahabharata and Ramayana have strongly laid down the rationale for the protection of the environment and religious practices and sanctions, as code of conduct, against excessive use of natural resources. For example, the PrithviSukta of Atharva Veda is replete with references to Man-Earth relationships. Still, this culture is alive in the tribal community across the country.

The education system in India had incorporated some aspects of Environmental Education in school curricula as early as 1930. The roots of the present status of Environmental Education informal education can be traced back to the Report of the Education Commission (Kothari Commission-1964-66). This Report also incorporated the best that basic education had to offer so as to relate it to the life, needs, and aspirations of the nation. For the primary stage, the Report

recommended that “the aim of teaching science in the primary school should be to develop a proper understanding of the main facts, concepts, principles, and processes in the physical and biological environment”.

This recommendation could be implemented only in 1977 when the curriculum for the 10+2+3 pattern of education was evolved at the national level by NCERT and presented in the document 'The Curriculum for the Ten-year School: A Framework' (1975). The National Policy on Education (NPE, 1988) and subsequent curriculum frameworks brought out by NCERT in 1988 and 2000 reiterated the importance of Environmental Education in school education. Thus, Environmental Education has been one of the priority areas of concern in all curriculum development programs.

The syllabi and instructional material for science and the social sciences, and, to some extent, those for languages and mathematics, included enough content related to the environment essential for the fulfilment of the desired objectives. The textbooks of biology, chemistry, physics, geography, sociology, and mathematics at the senior secondary stage, too, provided enough content on the environment to further strengthen the knowledge, understanding, and skills acquired up to the secondary stage.

3.2. Rationale of Environmental education at different stages

The relevance of Environmental Education, as per *NEP-2020*, the new syllabi being proposed here aims at generating among young learners awareness and sensitivity to the total environment in a holistic manner and the problems associated with it. It would also equip the future custodians of the earth with the requisite knowledge of the total environment. The natural and social problems associated with it and the necessary skills for solving these in a positive and sustainable manner. The processes and strategies suggested would help develop positive attitudes, social values, and a strong concern for sustainable development and further improvement of the environment. While learners would appreciate local wisdom through traditions and customs, they would also discover their linkages with both national and global concerns. In effect, the courses would prepare them to initiate and carry on the practical initiatives at the individual, the group, and the community level for solving environmental - related problems and moving toward a life of perfect harmony with their social and natural environment.

In the changing global ecosystem employment landscape and environmental education is becoming increasingly important that children not only learn but more importantly *learn how to learn*. Environmental education must thus move towards less content, and more towards learning about how to think critically and solve problems, how to be creative and multidisciplinary, and how to innovate, adapt, and absorb new material in novel and changing fields. While learning by rote may be beneficial in specific contexts, pedagogy must evolve to make environmental education more experiential, holistic, integrated, inquiry-driven, discovery-oriented, learner-centered, discussion-based, flexible, and, of course, enjoyable. The curriculum must include basic environmental concerns in arts, crafts, humanities, games, sports and fitness, languages,

literature, culture, and values, in addition to science and mathematics, to develop all aspects of learners' capabilities and make education more well-rounded, useful, and fulfilling to the learner. Environmental Education must build character, enable learners to be ethical, rational, compassionate, and caring, while at the same time preparing them for gainful, fulfilling employment at local & global level.

The rationality of the Environmental Education NEP-2020:-

3.2.1 Foundational stage

- Children between 3 and 6 so far have been outside the ambit of formal education. It is for the first time that a plan from the perspective of education is being created. It is evident that nutrition and care form important aspects of a child in this stage as 85% of a child's cumulative brain development occurs prior to the age of 6 and care should be taken to not formalise learning for children at this stage.
- Environmental education during ECCE, the child should find itself in during this phase should be home-like so that the child is deprived of happiness and a feeling of safety.
- Learning should be through play-way or activity-based using the surrounding environment as a learning tool. The activities of the surrounding community can also be used as a tool to equip children to understand the environment.
- This is the phase where children naturally explore their surroundings - material, people, behaviour and practices and the natural world around them. Adequate opportunity for the child to learn through exploration should be provided.

3.2.2 Preparatory stage

- Children between classes 3 and 5 are generally expected to be very curious about everything around them and can explore the world around them without any prejudice.
- Opportunities to explore things around them, where they use their capabilities of observation and simple conclusions. It is important to acknowledge the knowledge they have gained through their experiences.
- Learning should be activity-based like exposure visit to water bodies, Park/Forests, farmer's field to explore the environmental relationships.

3.2.3 Middle stage

- Students between classes 6 and 8 should be capable of understanding abstract ideas. Experiential learning in the previous stages would have provided the right experiences to appreciate abstract ideas like water bodies, Park/Forest, Farmers field. Here they allow to rationality among the issues of the nature.
- The ability to establish associations amongst the environmental issues around them using new knowledge, and prior experiences and knowledge, needs to be encouraged.
- Learning should predominantly happen through experiential learning, with relevant, newer, and additional knowledge that can be made available in a reasonably formal manner compared to the earlier stages. Allow and help them to do small projects like, observing

and identifying trees, fruits, vegetables, greens, crops and surrounding issues in the environment.

- Functional abilities of language used for understanding and expression would have developed in students. Allow children to create a dictionary of the words used in their day to day life in their local language.

3.2.4 Secondary stage Classes 9 to 12

- Students between classes 9 and 12 become capable of understanding abstract ideas in-depth. Experiential learning in the previous stages would have provided the right experiences to appreciate abstract ideas. Allow them to do projects on local environmental issues like crop production, rainfall pattern, observing animals, sacred groves, water bodies, Rivers, forests, etc...
- Their ability to establish associations amongst things using new knowledge, and prior experiences and knowledge, needs to be encouraged. Expose children to local traditional skills to explore the possibilities of introducing new ideas. The ideas can be use local to global.
- Functional abilities of language used for understanding and expression would have developed in students. Allow children to create a words dictionary of their environment.

3.3 Objectives of Environmental Education:

Environmental Education is the process of recognizing values and clarifying concepts in order to develop skills and attitudes. These are necessary to understand and appreciate the Inter-relatedness among human culture and biophysical surroundings. Environmental Education also entails practice in decision-making and self-formulating of a code of behaviour about issues concerning environmental quality. Environmental Education should simultaneously attempt to create awareness, transmit information, teach knowledge, develop habits and skills, promote values, and provide criteria, problem-solving and decision making. It, therefore aims at both cognitive and affective behaviour modification. This is an action-oriented, project entered and the participatory process leading to self-confidence, positive attitudes, and personal commitment to environmental protection. Furthermore, the process should be implemented through an interdisciplinary process.

It is also a fact that India is the only country which had put Environment and its protection in its constitution. The Indian constitution endorses the concept of sustainability in its concern for the preservation of natural resources, wildlife, and forests. The constitution enjoins the state and the citizens to protect bio-diversity. Article 48-A states “The state shall endeavour to protect and improve the environment and to safeguard the forests and wildlife of the country” Article 51-A (g) expects every citizen to “protect and improve the natural environment including forests, lakes, rivers, and wildlife and to have compassion for living creatures” Article 21 entitles every citizen of India to safe and clean air and water”.

The movement of Basic Education launched by Mahatma Gandhi in 1937 was perhaps the first serious attempt at relating education in schools to local environmental needs. The essential elements of Basic Education were (a) productive activity in education, (b) correlation of

curriculum with the productive activity and the physical and social environment, and (c) intimate contact between the school and the local community.

At the global level as humanity endeavours towards sustainable development, educating each individual on earth to take good care of the environment that nurtures us is the most significant concern, of the new millennium. In view of this global concern the United Nations launched the Decade of Education for Sustainable Development (DESD) in 2005 which required the concerns on sustainable development to be inculcated through education. As per the National Policy on Education-1986 and the Programme of Action 1992, environmental education has been a priority area in all the curriculum development programs at the National level, as well as State levels and various initiatives were taken up to address its concerns through curricular and co-curricular interventions. The landmark judgment of the Supreme Court of India (2002) made it obligatory for the States and the Union Territories (UTs) to inculcate environmental concerns among children through education, wherein, the strategies of infusion, integration, or making it as a separate subject area are to be adopted by the States. The Eco-club concept was initiated in all the schools of Karnataka. This awareness program is in progress. They need very specific guidelines to function properly.

At the national level, the ESD (Education for Sustainable Development) was initiated. and it was not treated as a separate activity, but it dealt with holistically, being integral to the school curriculum, teaching-learning practices, and school and home environments of each learner. Being a joint responsibility of one and all, it aims to involve the entire school community (children, teachers, head-teachers, and support staff) and the neighborhood to work together through participatory, practical and collaborative approaches. It will also help all stakeholders of school education to realise that it does not require additional physical or human resources to understand and practice the principles of sustainable development within the available resources. To achieve this goal the Adult and Teacher education should focus on Eco-Literacy. The insight of ESD, 'Greening' and 'whole school' approach right from the classroom to school corridors and other open spaces, includes examples of learning opportunities provided by common school activities in and beyond school to build child-friendly and environmentally meaningful ethos with a physically safe, psychologically enabling and emotionally secure environment for children.

The National Curriculum Framework–2005 was in consonance with the principles of DESD–2005 and it recommended adopting a 'whole school' approach where the students' experiences are not confined to the classroom but are part of the learning in the school and the community. Learning is linked to real-life and activities require the application of knowledge and skills in real situations. Such an education places issues and concerns on sustainability at the heart of the 'whole school' policy planning and practice.

The new paradigm of education as proposed by the National Focus Group's *Position Paper on Habitat and Learning* (2006), NCERT, advises to expose children to the real world to enable them to analyse, evaluate and draw inferences about problems and concerns related to the environment and take suitable action to facilitate and participate in the pursuit of sustainable

development. The Whole School Development Plan (WSDP) under SSA envisions child-friendly schools, responsive towards the needs of all children by ensuring a safe, secure, clean, and hygienic environment for all children with optimum resource utilization through environmentally sustainable practices.

The global education development agenda is reflected in the sustainable development goal 4 (SDG4) of the 2030 Agenda for Sustainable Development. SDG4 seeks to “ensure inclusive and equitable quality education and promote lifelong learning opportunities for all” by 2030. An overarching aspect of SDG4 is that of inclusion and fostering quality education. Educational opportunity requires an effective system to support learning, including supportive organizations, resources, and sound policies. Such a lofty goal will require the entire education system to be reconfigured to support learning; else none of the goals of the SDGs can be achieved.

Aims of Environmental Education

The aim of environmental education is clearly to show the economic, social, political, and ecological interdependence of the modern world, in which decisions and actions by different countries can have international repercussions. Environmental education should, in this regard, help to develop a sense of responsibility and solidarity among countries and regions as the foundation for a new international order which will guarantee the conservation and improvement of the environment.

The main aim of environmental education at the grass-root level is to succeed in making individuals and communities understand the complex nature of the natural and the built environments. Further, to acquire the knowledge, values, attitudes, and practical skills to participate in a responsible and effective way in anticipating and solving social problems, and in the management of the quality of the environment.

3.3 Specific objectives for Environmental education at different stages of school education

3.3.1 Foundational stage

- To help children become familiar with the world in general and their immediate surroundings in particular.
- To help them establish a bonding with the natural world around them
- To develop an ability to know and explore things that are natural as a result of exploration through sensorial experiences
- To help perceive *beyond-the-obvious* patterns and aesthetics in the natural world.

3.3.2 Preparatory stage

- To help children enhance their familiarity with the world in general and their immediate surroundings in particular.
- To enhance the bonding, children have with the natural world
- To develop an ability to know and explore things that is natural as a result of exploration in their immediate surroundings and region.

- To help perceive *beyond-the-obvious* patterns and aesthetics in the natural world.
- To help perceive the very high level of interconnectedness of everything in the world.
- To help establish a connection with regional traditional practices and festivals that connect with region, natural events/seasons etc.

3.3.3 Middle stage

- To help students enhance their understanding of the world in general and their immediate surroundings in particular.
- To enhance the bonding children have with the natural world and appreciate the need for sustainability of natural resources.
- To develop an ability to know and explore things and identify underlying ideas and patterns in their immediate surroundings and region.
- To help perceive the very high level of interconnectedness and interdependence of things in the natural world and recognize important associations.
- To help establish a connection with regional traditional practices and festivals that connect with region, natural events/seasons etc.

3.3.4 Secondary stage

- To help students enhance their understanding of the natural world from the perspectives of historical relevance, natural changes and current situation. Scientific and anthropological views of the changes to the natural world should be provided.
- To enhance the bonding students have with the natural world and instil the ideas of sustainability and solution finding to current environmental challenges.
- To help perceive the very high level of interconnectedness and interdependence of things in the natural world and recognise important associations.
- To help understand regional traditional practices and festivals and understand their role in the sustainability of environment, culture, and knowledge.

3.4:- Implementation of NEP 2020 recommendations relating to Environmental education:-

3.4.1 Principles of NEP-2020 Policy:

The climate change, global warming, increasing pollution, and depleting natural resources, there will be a sizable shift in how we meet the world's energy, water, food, and sanitation needs, again resulting in the need for new skilled human power, particularly in environmental science, biology, chemistry, physics, agriculture, climate science, and social science. There will be a growing demand for Environmental education, humanities and art, as India moves towards. Indeed, with the quickly-changing employment landscape, realized the importance to the environment and global ecosystem, environmental education is becoming increasingly important that children not only learn but more importantly learn how to learn. Environmental education must thus move towards less content, and more towards learning about how to think critically and solve problems, how to be creative and multidisciplinary, and how to innovate, adapt, and absorb new material in novel and changing fields. While learning by rote may be beneficial in

specific contexts, pedagogy must evolve to make environmental education more experiential, holistic, integrated, inquiry-driven, discovery-oriented, learner-centred, discussion-based, flexible, and, of course, enjoyable. The curriculum must include basic environmental concerns in arts, crafts, humanities, games, sports and fitness, languages, literature, culture, and values, in addition to science and mathematics, to develop all aspects of learners' capabilities and make environmental education more well-rounded, useful, and fulfilling to the learner. Environmental education must build character, enable learners to be ethical, rational, compassionate, and caring, while at the same time preparing them for gainful, fulfilling employment.

NEP 2020 emphasizes to introducing Environmental Education as one of the contemporary subjects along with others such as Artificial Intelligence, Design Thinking, Holistic Health, Organic Living, Global Citizenship Education (GCED), etc. at relevant stages to develop these various important skills in students at all levels.

NEP 2020 emphasizes to include practices from Indian culture in which nature is revered, importance to natural resources, knowledge from ancient India and its contributions to modern India and its successes and challenges and a clear sense of India's future aspirations with regard to the environment. Specific courses in tribal ethno medicinal practices, forest management, traditional (organic) crop cultivation, natural farming, etc..., should be introduced at appropriate levels.

The policy also emphasizes that students will be taught at a young age the importance of "doing what's right" - basic ethical reasoning, traditional Indian values and all basic human and Constitutional values (such as seva, ahimsa, swachchhata, satya, nishkam-karma, shanti, sacrifice, tolerance, diversity, pluralism, righteous conduct, respect for elders, respect for all people and their inherent capabilities regardless of background, respect for environment, helpfulness, courtesy, patience, forgiveness, empathy, compassion, patriotism, democratic outlook, integrity, responsibility, justice, liberty, equality, and fraternity) will be developed in all students

3.4.2 Implementation strategy for implementation of NEP 2020

Foundational Stage:

The school environment should be an extended part of the family. Teachers should behave like a part of the family member. It will help the students to acclimatize with the surrounding environment fearlessly and confidently. It will allow children to explore the curiosities happening in the surrounding. Allow children to use their sensory organs effectively.

The children will be able to identify similarities, comparison and Categorising. Create an environment to understand the relationship with the surrounding family members & their community members, objects, plants, animals, Insects & birds, food & its taste& its ingredients

To understand the relationship between self and the surrounding environment and to live harmoniously. The motor skills, auditory and tactile skills are to be developed in this stage.

Primary Stage:

The school environment should be an extended part of the family. Teachers should behave like a part of the family member. It will help the students to acclimatize with the surrounding environment fearlessly and confidently. It will allow children to explore the curiosities happening in the surrounding. Allow children to use their sensory organs effectively. This environment should be continued.

The children will be able to identify similarities, compressions, Categorising. Create an environment to understand the relationship with the surrounding family members & their community members, objectives, plants, animals, Insects & birds, food sources & their components, Materials in daily use, Relationships with the surrounding environment, to live harmoniously with the surrounding environment. Now the children can be able to understand the cause & effects of the things happening in their surroundings. Allow children to understand the different varieties of the shelters among human beings & animals. Mapping of neighborhood is one of the activities to understand the geography. The mode of travel also explores.

Middle stage:

Allow children to the analytical observation of water, Air, Soil, Sky, Light & Energy, Plants, Animals, Birds & insects, Food and its availability, Shelter, Garbage, Disease, Travel, natural phenomena like rain, thunder, etc, Natural resources, Birth & death.

Allow and facilitate the children to explore the reason behind the cause of obstructive ideas. Create an environment to understand the surrounding more abstract relationship among the family members & their community members, objects, plants, animals, Insects & birds, food test & its ingredients, Relationship with the surrounding environment, Cold and Hot, Light & Dark, Day & night, Soil, Water, Air, Hygiene & Health, Food & Health to live harmoniously with the surrounding environment. The children will be able to identify similarities, compressions, Categorising & cause & effect. The children use their sensory organs of the body all the panchendriyas to expose to explore the curiosities of Nature. Conduct activities in eco-clubs frequently.

Secondary Stage:

Create an environment to understand the surrounding/issues with critical/analytical among the family members & their community members, objectives, plants, animals, Insects & birds, food test & its ingredients, Relationship with the surrounding environment, Soil, Water, Air, Hygiene & Health, Food & Health to live harmoniously with the surrounding environment. Allow children to explore the different skills that the community is having with critical thinking. Allow students to explore and study the local environmental Events/aspects and comparative study with the global phenomenon's. Encourage the students to explore the socio-economic aspects of the current scenario with the environmental impacts. Allow students to understand the impacts of Global warming & Climate change on the local socio-economic and local environment. Allow to studying the variations of Rainfall & Temperature impacts on the local

agriculture and forest ecosystem. Allow students to understand the local food & cloth diversity relating to the climate change scenario. Allow students to study Environmental study as a separate core subject like science & Maths. They will get in-depth knowledge of the environment. Conduct activities in eco-clubs frequently.

3.5 Natural and other disasters: Impact on teaching-learning in schools:

The geography of Karnataka, it is located on the peninsular plateau popularly known as Deccan Plateau. It is most unlikely to come by natural disasters like earthquakes. But in recent years the state is frequently experiencing extremities of drought and flood the last two decades (according to the studies conducted by the KSNDMC). This indeed affects the health and overall wellbeing of the children. According to a study, children of rural India are getting affected to an extent where children are underweight, less immunized, and prone to respiratory disease, diarrhoea, fever etc. Water-related disasters have affects the livelihood of the people, which further substantially affects the socio-emotional levels and literacy of the children.

Apart from the hasty and instantaneous natural disasters, the planet is awaiting many long -term anthropogenically caused disasters like deforestation, unsustainable agriculture, exploitative use of natural resources etc. These activities not only manifest everlasting effects on nature also consequences on human behaviour as well. Uncontrolled, unsustainable activities also cause natural disasters. These should be discussed in the classrooms. Many opportunities should be created to do small studies by the children locally to understand the local environmental issues. This will also help students to have a solution-orientated approach and orient them towards sustainability.

The uncontrolled, unsustainable, and anthropogenic activities also cause changes locally. And few incidents like the Bhopal gas disasters have impacted lives and the environment around. Our curriculum should be designed to make children aware of such events. From 2020 entire population is affected by the COVID pandemic. During which the children are kept away from the schools and formal learning. There are various studies conducted which indicate that the children have lost many of the competencies. Along with the academic void, the pandemic also affected the socio-emotional abilities of the children. This learning gap will not only have an adverse effects on children in the coming academic years also impels the socio-emotional and personalities of the children in adulthood.

3.6. Strategies adopted for teaching-learning in schools during situations of disaster

EE curriculum across schooling shall meaningfully incorporate elements of Education for Sustainable Development (ESD) to equip learners with relevant knowledge, attitude, and skills for achieving abilities to tackle emerging environmental conflicts and situations at the interface of local communities and the world as leaders of tomorrow.

To understand that, it takes a toll on children learning process when children go through emotionally exasperating events such as natural disasters. Many children may keep away from the schools. Thus, the learning environment should be brought near children. The school

environment should be prepared for any kind of emergencies. The children should be taught or given courses on disaster management. Mock drills should be performed at schools every month. Helpline numbers and safety kits should be readily available for kids.

During Pandemic huge effort has been put to continue the teaching-learning process although many couldn't sustain it.

- Preparedness of schools and teaching environment
- The involvement of the community in the learning and teaching process.
- Using technology-aided learning
- Developing materials for autonomous learning.
- Multigrade teaching

3.7 No hard separation in subject areas as per NEP 2020:-

The concepts of Environmental Education have been provided in the textbooks of science and social sciences, physical science, biological sciences and geography. The environmental concepts both are at concrete and abstract levels. The majority of the concepts are found in the textbooks of biology, chemistry and geography, which are optional subjects. Students opting for any one of these subjects would accordingly benefit in different aspects of Environmental Education.

The Secondary Stage will comprise of four years of multidisciplinary study, building on the subject-oriented pedagogical and curricular style of the Middle Stage, but with greater depth, greater critical thinking, greater attention to life aspirations, and greater flexibility and student choice of subjects. Allow students to observe things in an abstract & Critical way. Allow children to do activities freely. Allow them to do projects as per their will & wishes. The activities in all the subjects contain high civic sense, socio-emotional skills, environmental values, and ethical values.

The competencies that need to be developed through activities are as follows: data gathering, literature survey, data analysis, experimental skills, analytical reasoning and formal communication. Projects directed at finding solutions to problems of the environment involving field activities, relevant data gathering and lab work should be provided. There is no hard separation in the subject areas.

3.8 Basis for identifying core competencies:

Proposed core competencies at different stages: Environmental Education, more specifically at school, plays a leading role in the implementation of sustainable development. At this stage, the teachers need specific content knowledge as well as pedagogical content knowledge for the implementation of Education for Sustainable Development.

Foundational stage:-

The teacher should have the ability to nurture, guide and mentor students by creating a family atmosphere in which all students feel safe and can excel. It is pertinent to mention that the ability

of the teacher to transfer knowledge in a manner that all students can understand with joy is more vital for success. At this stage, the teacher must know to inculcate the children to observe the natural materials and learn themselves such that the learning capacities of the students at this stage would be observed and emulate leaning.

Preparatory stage:-

The teacher should have the ability to foster, lead and guide students by creating a family atmosphere in which all students feel safe and can excel. It is pertinent to mention that the ability of the teacher to transfer knowledge in a manner that all students can understand with joy is more vital for success. At this stage the teacher must know to train the children to observe the materials or natural processes around them confidently and permit them to express without restrictions. The teacher should have the ability to facilitate the learning process with active involvement such that a learning process is a pleasant event for the children.

Middle stage:-

The learning capacities of the children at the Middle stage are also observing things abstract way. The capability of the teacher to foster, counsel and mentor students by making the atmosphere in which all students experience the delight of learning and can excel in the subject is vital. At this stage the teacher must know to guide the children to observe and understand the materials or natural processes around them with confidence under a solid scientific frame.

Secondary stage:

Classes 9 & 10:-

A teacher who is a facilitator of students' learning needs to be aware of various pedagogies and also the progress in the child's learning from early stages to higher stages. The teacher needs to recognize students' capacity to construct knowledge as a natural learner and the knowledge as an outcome of engagement with the atmosphere around when the learner explores, responds, invents and makes meaning of it. The focus must be on the process of learning in place of product of learning emphasizing competency-based processes. At this stage the teacher must have adequate competency in the subject in imparting knowledge to the students.

Classes 11 & 12:-

A teacher who is an architect of students' learning, needs to be cognizant about various teachings and also the progress in the child's learning from early stages to higher stages. A teacher needs to recognize students' capacity to construct knowledge as a natural learner and the knowledge as an outcome of engagement with the atmosphere around when the learner explores, responds, invents and makes meaning of it. It is important to mention that the teacher should have the ability to use knowledge or apply knowledge, as implied in the syllabus. It includes application, analysis, innovation or creativity, and evaluation.

Teacher's competency includes cognitive and practical skills as well as attitudinal and other personality characteristics. Teachers are expected to motivate students to perform tasks by using relevant knowledge, skills, and tools to achieve specified targets within specified times.

The case study approach in teaching and learning is particularly suitable in providing students with situations that they could emulate to reach high levels of professional practice. It is prudent to explore the possibility of collaboration with others perhaps through membership of a workgroup or team to deliver hands-on training. A teacher's capability for analysis, diagnosis, design, planning, execution and evaluation of tasks may also be required as an important aspect of competency.

3.9 The present status of environmental education in the state of Karnataka:

Environmental education is a process that aims at the development of environmentally literate citizens who can compete in global economy, who have the skills and knowledge and inclinations to make well-informed choices.

Environmental education must become a vehicle for engaging young minds in the excitement of first-hand observation of nature and understanding the patterns and processes in the natural and social worlds in order to take care of the habitat and its surroundings which becomes a major part of Environmental Education in both primary and upper primary stages of school education. In the secondary and senior secondary stages also some of the major issues such as environmental protection, management and conservation are to be dealt with, in more detail.

Primary stage:-

Environmental Education is imparted as environmental studies (EVS), which forms a common component of the syllabus, prescribed by the States and CBSE. In Karnataka textbooks and workbooks from classes I to IV, environmental studies are in use. The textbooks for environmental studies which are prepared by N.C.E.R.T have taken cross-curricular approach to teach environmental concepts through language, mathematics about the environment. In classes I and II there is no separate EVS book. For classes III and IV, EVS textbooks are available. Environmental Education has been further reinforced under the art of healthy and productive living (AHPL) for which a single teacher's handbook has been developed for classes I to V.

Upper Primary stage:-

The contents of textbooks present an extension and elaboration of the concepts introduced at the primary stage. The textbooks in Rajasthan and Madhya Pradesh (Classes VI-VIII) and in Karnataka (Classes V-VII) contain environmental concepts by and large in the textbooks of science and social science. The textbooks of Karnataka for class V in the subjects of science, social science and language have environmental ideas infused with these subjects. The

State of Orissa, deals with the environmental concepts and concerns, in its textbooks for science and geography. These are also included in a single textbook of history and civics. The NCERT textbooks of 'Science' and 'Social Science' have incorporated such concepts in the textbooks.

Secondary stage:-

The concepts of Environmental Education have been provided in the textbooks of science and social sciences in the states of Rajasthan and Madhya Pradesh. In Orissa, there are textbooks, namely science part-I (physical science), Science Part-II (biological sciences), and geography. The environmental concepts both are at concrete and abstract levels.

Higher Secondary stage:-

This is the stage of diversification. Students opt for either the academic stream or the vocational stream. The treatment of concepts becomes deeper and more discipline-oriented since the content caters to the demands of the concerned subject, as an independent discipline a comprehensive view about Environmental Education is not available in the textbooks. The majority of the concepts are found in the textbooks of biology, chemistry, and geography, which are optional subjects. Students opting for any one of these subjects would accordingly benefit in different aspects of Environmental Education.

3.10 Pedagogy of Environmental education NEP-2020:-

3.10.1 ECCE stage:

Play-way and activities should be the predominant pedagogy. The use of materials, games involving movement, toys, art and craft, etc...Should be used predominantly and usage of books should be minimal. Water, Sky - Sun and Stars, Soil, Plants & Trees, Animals, Food, Forests, Seasons, Festivals can be themes for ECCE and Primary levels. Songs, stories and other children's literature, that are a part of the rich cultural tradition of the region should be introduced to children. People, practices and all things, particularly natural ones, should be introduced to children starting with those at home, community, village, town, district, state and nation. Names of all things in the child's environment (for example plants, food items like pulses, vegetables, fruits, spices) should be introduced in local language/mother language mandatorily in addition to other languages, as and when necessary.

The focus should be to encourage oral and visual expression (speaking, narration, singing, drawing, gestures, etc...) with an emphasis on the expressions of their original ideas, opinions, feelings and thoughts. Books children use should not be more formal than a picture and simple *activity* books. The competencies that need to be developed through activities are as follows: observation, comparison - leading to identifying similarities and differences, grouping and classification, empathy, oral & visual expression and demonstration working with materials. Emphasis should **not** be on written expression.

3.10.2 Primary Stage:

Experiential learning, including activities, should be the predominant pedagogy. The use of materials, games involving movement, art etc... should be used predominantly and usage of textbooks should be limited and appropriate. Water, Sky - Sun and Stars, Soil, Plants & Trees, Animals, Food, Forests, Seasons, Festivals can be themes this level. Songs, stories and other children's literature, that are a part of the rich cultural tradition of the region, should be introduced to children. People, practices and all things, particularly natural ones, should be introduced to children starting with those at home, community, village, town, district, state and nation.

Names of all things in the child's environment should be introduced in the local language/mother language mandatorily. They can be introduced in other languages, as and when necessary. Stories and songs from the classical and folk traditions of the region should be taught to children. Natural resources in the village/town and district should be introduced: lakes and water bodies, mountains/hills, forests, flora and fauna, agricultural and horticultural crops of the region. Short visits to such locations and also those of historical importance of the district/region should be organized with an emphasis on appreciation of the natural environment. Opportunities to see and experience the art and craft of local artisans should be provided.

Natural resources, their processing, and their utility, on the basis of sustainability, should be introduced to children. The focus should be to provide opportunities for oral and visual expression (speaking, narration, singing, drawing etc...) and minimal writing. Children should be allowed to express their original ideas, opinions, feelings and thoughts.

Textbooks children use should not be more formal and should promote experiential learning. They should not be information-centric or information-loaded. The competencies that need to be developed through activities are as follows: observation, comparison, leading to identifying similarities and differences, grouping and classification, identifying cause and effect association, sequencing, identifying phenomenon, empathy, oral & visual expression and demonstrating working with materials.

Small projects based on outdoor activities for enhancing the competencies should be provided. Projects involving mere compilation of information should be avoided.

3.10.3 Middle Stage:

Experiential learning, including projects and activities, should be the predominant pedagogy. Water, Sky - Sun and Stars, Plants & Trees, Animals, Food, Forests, Seasons, Festivals, Sustainability of Natural Resources can be themed for the Middle Stage. People, practices and all things, particularly natural ones, should be introduced to children starting with those at home, community, village, town, district, state and nation. Stories and songs from the classical and folk traditions of the region should be taught to children. Natural resources in the state and the nation should be introduced: lakes and water bodies, mountains/hills, forests, flora and fauna, agricultural and horticultural crops etc. Short trips to such locations and also those of

historical importance of the region should be organized. The opportunity to see and experience the art and craft of local artisans should be provided. The focus should be to provide opportunities for expression (speaking, narration, singing and writing etc). Students should be allowed to express their original ideas, opinions, feelings and thoughts. Textbooks children use should not be totally formal and should promote experiential learning. They should not be information-centric and information-heavy. The competencies that need to be developed through activities are as follows: grouping and classification, data gathering, analytical reasoning, empathy, oral, written & visual expression and demonstrating working with materials. Projects involving field activities should be provided. Projects involving mere compilation of information should be avoided.

3.10.4 Secondary Stage:

The opportunity to see and experience the art and craft of local artisans should be provided. The idea of economic and natural sustenance of these should be studied. Learning can be based on formal textbooks, but not limited to the information in the textbook. Textbooks should be designed to provide a context to learning and not be designed to limit knowledge. Students should be encouraged to gather new information from other sources as and when relevant. Projects, working in laboratories and field activities should be encouraged and overdependence on bookish information should be discouraged. The competencies that need to be developed through activities are as follows: data gathering, literature survey, data analysis, experimental skills, analytical reasoning and formal communication. Projects directed at finding solutions to problems of the environment involving field activities, relevant data gathering and lab work should be provided. The involvement of research organizations, NGOs working in the domain can be considered. Projects involving mere compilation of information should be avoided.

3.11 Strategy for holistic assessment

3.12.1 Foundational stage

The assessments at this stage, where learning is not formal have to be based on a qualitative perception of children's competencies. The focus should be on formative assessments only. Assessment should be for learning and as learning but not of learning. The assessments should assess the competencies demonstrated by the child and not on the information acquired by the child. Written tests should not be a form of evaluation during the ECCE stage.

3.12.2 Preparatory Stage:

The assessments at this stage, where learning is not formal have to be based on a qualitative perception of children's competencies. The focus should be on formative assessments and less on summative assessments. Assessment should be for learning and as learning but not of learning. The assessments should assess the competencies demonstrated by the child and not on the information acquired by the child.

3.12.3 Middle Stage:

The assessments at this stage have to be based on a qualitative perception of as well and formal expression of student's competencies. The focus should be on formative assessments and less on summative assessments. The assessments should assess the competencies demonstrated by the student and not on the information acquired by the student.

3.12.4 Secondary Stage:

The assessments should assess the competencies demonstrated by the student and not on the information acquired by the student. Projects directed at finding solutions to environmental situations and problems should be made a substantial part of the overall assessment. Formal project reports, thesis, viva-voce should be included as part of the submissions for assessment.

3.13 Plan for bagless days

Bag less day Programme in the state of Karnataka

As per NEP 2020 recommendations, bag-less days will be encouraged throughout the year for various types of enrichment activities involving arts, quizzes, sports, and vocational crafts for classes 6 to 12. But in the state of Karnataka, bag less day was introduced in the year 2019-20 for classes 1 to 12, but not implemented due to closure of schools due to covid-19.

The bag-less day was introduced for classes 1 to 8 on one Saturday in the state of Karnataka in each month spanning the whole academic year. But the policy suggests the need of bag-less day activities for classes 6 to 12 for the holistic development of our children. It also ensures that every student shall participate in 10-day bag-less day activities during Grades 6-8 where they shall intern with local vocational skill experts such as carpenters, gardeners, potters, artists, farmers, etc... and other local vocations skills and other environmental initiatives like visiting to water bodies, Parks, Forests, Rivers, sacred grows, Innovative farmers' fields, etc... DIETs/BRCs/CRCs should be given the responsibility to survey the local specific vocations and related experts and guide schools in organizing intern courses for children.

As per the policy, similar internship opportunities to learn vocational subjects are made available to students throughout Grades 9-12, including holiday periods. DIETs/BRCs/CRCs will prepare course modules and facilitate school complexes and schools in providing required resources. School complexes should be used as resource centres to provide master instructors to all schools in offline or online mode. Based on the local skilling needs, students are allowed to select arts, crafts or different vocations of their choice to undergo the fun course which includes exposure activities, fun and enrichment activities throughout the year. Students should be given opportunities to visit historical places, monuments and places of scientific, cultural and tourist importance in and around their village/town/city.

3.14 Indian Traditional Knowledge on Environmental Conservation

India is a land of knowledge and traditions and students should be made aware of our ancient land and culture which brings pride and self-esteem. UN declaration also explains “that respect for indigenous knowledge, cultures and traditional practices contributes to sustainable and equitable development and proper management of the environment”. So, it is imperative to develop respect for nature among children from an early age. The comprehensive knowledge of connection to ancient and modern traditional beliefs and protection of natural resources absolutely creates logic and is treated as a sustainable approach for resource conservation.

These are some of the examples to be included in the environmental education curriculum across all stages of school education to create awareness about our traditional practices.

Water - In ancient times, Indian rivers were not only considered as flowing mass of water but it was a symbol of life bestowing, life nurturing and life protecting divine mothers. While Bathing ceremony chanting of “Ganga Yamuna chaiva.....” hymn has been one of the most traditional expressions of duty.

Forest-Trees worship - Each household keeps sacred plants and worships them every morning as a duty, Tulsi plant leaves are used as a manifestation of Gods. Leaves of the mango tree and Ashoka tree are used in performing religious rituals and other social occasions like Havan. Without these being offered the worship is considered partial. Offering water to Pipal tree for the wellbeing of relatives and ancestors.

While sowing and harvesting crops, Enjoy the period when rain starts, do prayers for getting the maximum yield and celebrate harvesting time in the form of festivals (like Sankranti, Onam, Baisakhi etc), organize folk songs and in the moonlight for protecting crops from animals.

Animals – many animals are allowed to breed in the temples and the tiger and the cobra, though greatly feared, are afforded protection on religious grounds.

In Buddhist mythology, the Jatakas or the stories of the Buddha's previous life are replete with several incarnations of the Bodhisattvas as an animal. In Hitopadesha, jataka tales and Panchatantra stories animals have been endowed with ennobling qualities which provide lessons in morals relevant even to human beings.

Sacred texts recognized the sun as the ultimate provider of energy. As we know, the food we eat comes from plants that utilize solar radiation through photosynthesis. Power from the sun is ultimately responsible for each form of energy — fossil fuels such as coal, oil and natural gas, as well as renewable sources such as hydropower, wind power and biomass power. So Sun is worshipped as God by our ancestors.

Thus, the students should be made aware that cultural practices were intrinsically associated with the natural environment and correspond to each other in their own way, which brings a sense of pride among children.

3.15 Guidelines for curriculum developers:

3.15.1 Fundamental Stage:

The overall aim of environmental education in ECCE level will be to attain optimal outcomes in the domains of physical and motor development, cognitive development, socio-emotional-ethical development, cultural/artistic development, and the development of communication and early language, literacy, and numeracy. The numerous rich local practices/traditions of India developed over millennia involving art, stories, poetry, games, songs and more, will be suitably incorporated. Create the school environment as the extended part of the family as the children comes from. Allow them to be play freely without any hesitation/fear. Behave like a family member. Use the community as a learning area for children. Too many activities were taking place in the community throughout the year. School can use local community as resource persons. Effective life education can be transferred.

3.15.2 Preparatory Stage:

The Preparatory Stage will comprise three years of education building on the play, discovery, and activity-based pedagogical and curricular style of the Foundational Stage. Create the school environment as the extended part of the family as the children come from. Allow them to play freely without any hesitation/fear. Teacher should behave like a family member. Make the community and the surrounding environment as a tool for learning. Make use of life skill activities from the surrounding environment as a learning tool for getting local knowledge. Children should understand the surrounding environment and acclimating to that environment.

3.15.3 Middle Stage:

The Middle Stage will comprise three years of education, building on the pedagogical and curricular style of the Preparatory Stage, but with the introduction of subject teachers for learning and discussion of the more abstract concepts in each subject that students will be ready for at this stage across the sciences, mathematics, arts, social sciences, and humanities relating to the environmental relationship. Experiential learning within each subject, and explorations of relations among environmental education, will be encouraged and emphasized despite the introduction of more specialized subjects and subject teachers. Allow students to observe surrounding things in the environment an abstract way. Allow children to do activities freely. Allow them to do projects as per their will & wishes. Projects like crops, food, shelter, animals, dress, animals, water bodies, rivers, forests, sacred grows, vegetables, fruits, greens, rain fall, etc...

3.15.4 Secondary Stage:

The Secondary Stage will allow students to understand the surrounding environment with greater depth, greater critical thinking, and greater attention to life's aspirations. Environmental education courses should be introduced in Grades 11-12. Also try to include this at a more specialized school on environmental education in local or global level. Allow students to study the environmental impacts on climate change, global warming, rain fall and its impacts in a local

environment in abstract & Critical way. Allow them to do local or global level projects as per their will & wishes.

3.16 Implementation of the recommendations on Environmental education by Stakeholders:

Environmental education assumes various kinds of importance during the four stages of schooling. During Foundation and Preparatory stage, it aims to introduce children to the world we live in and appreciate the beauty, value and integrated view of the entire universe while building those basic and essential competencies required for formal learning in the later stages. In the middle and secondary stages, the current issues facing mankind with respect to environment and orientation to find solutions are introduced.

The fact that subject of environmental studies is all about things happening around us, the students have to appreciate and understand through making keen observations of both observable and inferable aspects in a person. Learning, therefore, has to happen through interactions with the natural world, people and community. Bookish knowledge, quite irrelevant especially in this subject, therefore necessitates experiential learning. The same subject at higher levels can be understood through scientific analysis while empathizing with all beings, people, communities and the natural environment that are getting affected in modern times. To understand the environmental movements in their surrounding & across the world small studies can be conduct. . The following are the role of stakeholders with respect to Environmental Studies education in implementing the recommendations of this committee.

3.16.1 Teachers:-

The teachers have traditionally been providing information in the textbooks to students. A significant change from that orientation to helping children make their conclusions using their competencies has to happen. Teachers, therefore, have to become familiar with and gain strength in the pedagogy of experiential learning. They also have to acquire the ability to distinguish between the competence to assess, competencies in children and information acquired by children through rote learning, and effectively asses competencies. Teachers also strengthen their ability to link the topics in the textbooks to experiences children can be provided through projects, field trips and other experiential learning modes.

3.16.2 Parents:-

Parents should be able to sensitize their children towards the environment they live in and its surroundings. Parents should place importance on the knowledge acquired by children through their own personal experiences and not be obsessed with booking knowledge, which unfortunately has been the norm. Parents should encourage their children to acquire knowledge and competencies through exploration.

3.16.3 School heads:-

The change desired in teachers and parents has been discussed in the preceding sub-sections. The role of school leaders is to bring about the change in parents' perception and skills amongst the teachers and community. In addition, school leaders have to work with the

community to identify people, places and activities that provide the right experiences necessary for environmental studies. Helping children connect their learning with the local community and the local region, makes learning seem meaningful and relevant and school leaders should force this change to happen.

3.16.4 Teacher Educators:-

Experiential learning as pedagogy, competency-centric learning and assessment of competencies are paradigm shifts. Bringing about these changes and enabling the right teaching manpower, is imperative, yet not easy. The role of teacher educators, for both in-service teachers and new teachers, is, therefore, extremely critical for the success of this initiative.

3.16.5 Community members and volunteers:-

In most schools, the transaction of teaching-learning is restricted to interactions between teachers and students. However, with the recommendations in the document, children's learning needs to be enriched with the involvement of members of the community. Local artists - classical and folk, agriculturists, people involved with environment and forests every service provider for the community can enrich the students' knowledge about the community and the environment he lives in and the problems thereof. Multifaceted understanding of the environment one lives in is essential to comprehensively understand, empathize, be objective and find solutions in the long run. Schools and community members, therefore, have to proactively work together to enrich the students.

3.17 Collaboration of various agencies in the implementation of Environmental education:

According to the NEP 2020, the stakeholders should be involved in the academic process. The community from which the children come from is a major part of education. The involvement of the stakeholders will improve and support the education system. The teachers and the school should involve these stakeholders and the community not just in the administrative process but the academic process.

Apart from the stakeholders such as SDMC and the community, other organizations can involve in various stages of education. There are many organizations working for children health that can be involved at the ECCE level in terms of developing the content as well as the health and wellbeing of the children. These organizations also can work bridging between Anganwadis and the schools in the beginning level.

Many organizations are working at various levels of education like education research, teacher education, and content development. These organizations should be recognized at the district, state and at the national level and collaborated. DIET and DSERT work for also recognizing the organizations at various levels of education.

Various departments should be involved in education. Department of agriculture research education, Department of Forestry, department of tourism, etc., can be involved locally in the education process. Various universities around the country can be beneficially used for school

education. Seamless integration and a holistic approach can be used for the benefit of education. Various research spaces and opportunities can be utilized.

3.18 Requisites for the implementation:

Successful learning in environmental education (EE) is closely related to methods used by the teacher and the learners.

3.18.1 School complex:

The concept of the school complex was originated from the report of the Kothari Commission, 1964-66. It was mooted as an innovation in school education. The Commission realized that modern education is a process of learning from real life and from the pulsating, dynamic society around us. Learning should be at the choice and pace of the learner. The school complex is organized by taking a group of elementary schools, high schools, a training school, a technical school etc. together. These institutions function cooperatively for the improvement of the educational standards. It will facilitate to providing equal educational facilities and experiences to all the schools.

Needs and Importance of School complex in Environmental education are as follows:

1. Sharing Instructional Works:

The school complex provides scope for the sharing of instructional work among the different constituent schools. The expert teachers of the complex may visit other schools, teach and plan new educational experiments regarding Environmental education. It will help to follow improved methods of teaching.

2. Sharing material facilities:

The school complex can provide new teaching aids like a projector, a good library, a good laboratory in each secondary school as a unit and make them functionally available to all the schools in one area.

3. Co-operative efforts for improvement:

The different schools work in close coordination for mutual benefit. It will help for educational reforms and the development of the country. It will mobilize both human and material resources for the progress of environmental education. It helps the schools to function in small, face-to-face Co-operative groups.

4. In-service Training:

The complex is able to facilitate to providing in-service training to teachers and upgrading of the less qualified teachers. The group of schools and teachers of one complex can get maximum freedom to develop their own programs. Under this program, the school will get much stronger and will be able to make the system more elastic and dynamic. The school complex can coordinate its works with the local communities and can derive as much help from this source as possible.

5. No isolation of schools:

The school complex brings the schools of an area together. It will help to break the terrible isolation under which each school functions at present and like with other schools in a particular area for raising the quality of education and to organize similar units throughout the country. It will enable a similar group of schools working in a neighborhood to make a cooperative effort to improve standards.

3.18.2 Human resources:

Teachers are the human resource across the school complex. The skill-based human resource in the surrounding community itself is a big resource. Local NGO's & other community organizations is another human resource for the school. Nearby colleges & research institutes are also big resources. Old students associations are one of the best human resources for the school.

3.18.3 Teaching-learning materials:-

Teaching-learning material is a very important and powerful tool for the process of learning. Teaching-learning material (TLM) also known as Instructional materials is any collection of materials including animate and inanimate objects and human and non-human resources that a teacher may use in teaching and learning situations to help achieve desired learning objectives. Selecting effective, TLM's can help in capturing the attention of learner in the classroom. TLM's provide a variety of stimuli, which helps in making classroom teaching most effective. TLM's facilitate the formation and attainment of concepts among children. They concretize the abstract concepts, thus children are able to understand them and not resort to rote learning.

Teaching-learning materials, environmental educators must carefully consider three primary issues:

- (a) Organization of environmental education topics and content with standards, state curriculum Frame work, and existing courses of study.
- (b) Professionally accepted criteria for judging the quality of materials.
- (c) The needs, interests, and environmental circumstances of local students.

While selecting teaching-learning materials for school environmental education programs, schools should consider the following issues:

Fairness and Accuracy:

Environmental education materials should be fair and accurate in describing environmental problems, issues, and conditions, and in reflecting the diversity of perspectives on them.

2. Balanced presentation of different viewpoints and theories:

Environmental Education as a process that should be continuously subject to rethinking, critical, re-examination and actualization at every step of its implementation in correspondence with the

development of environmental situation and pedagogy. In order to enrich the situations learning material would be of higher order.

3. Openness to inquiry:

Creating a fearless environment in the learning place is the first and foremost thing to be the priority. Allow the students to question fearlessly. Allow the students to exchange their ideas among the group members. Allow the students to make mistakes.

4. Depth:

Environmental education materials should foster awareness of the natural and built environments, an understanding of environmental concepts, conditions and issues; and an awareness of the feelings, values, attitudes, and perceptions at the heart of environmental issues, as appropriate for different developmental levels.

5. Critical and creative thinking material:

Environmental education materials should promote civic responsibility, encouraging learners to use their knowledge, applying skills to issues, personal skills, and assessments of environmental issues as a basis for environmental problem solving and action.

6. Teaching-learning material should be Précised and logical, Easy to use, long-lived, Adaptable, Accompanied by instruction and support, Fit with national, state, or local requirements.

3.18.4 Technology Related material:

Technology provides students with easy-to-access information, accelerated learning, and fun opportunities to practice what they learn. It enables students to explore new subjects and deepen their understanding of difficult concepts. By integrating technology into existing environmental education curricula, teachers can harness online learning as a powerful educational tool. The effective use of digital learning tools in classrooms can increase student engagement, help teachers improve their lesson plans, and facilitate personalized learning. It also helps students build essential 21st-century skills.

Virtual classrooms, videos, robots, and other technology tools can not only make the class more lively, but they can also create more inclusive learning environments that foster collaboration and inquisitiveness among the students. Technology in environmental education enables children to adjust to their own pace of learning. Students who need extra time can spend more time going over exercises until they understand, whilst students who need less support can continue ahead. It also frees up the teacher to help kids who need more support on an individual level. A wide variety of information and communication technologies (ICT) and digital tools have been introduced into environmental education, both inside and outside of the classroom.

Measures to be taken while using Technology Effectively In environmental education classroom:

Select, use, integrate, and evaluate technology and interactive media tools in intentional and developmentally appropriate ways, giving careful attention to the appropriateness and the quality

of the content. Provide a balance of activities in programs for young children, recognizing that technology and interactive media can be valuable tools when used intentionally with children.

Tools for Teachers - The following are the technology-based interactive tools and resources for Environmental education.

Audio aids: TLM's primarily stimulate the hearing sense of learners. It includes human voice, telephonic conversation, audio discs/tapes, records, etc.

Audio visual aids: These are the projected aids, which use both auditory and visual senses to enhance learning. The greatest advantages of these are – they closely represent reality. These include- motion picture film, Television, video discs/cassettes, slides-tape presentations, multimedia computer

Advantages of the use of technology in the classroom:

- ✓ It helps to make the learning process more effective and conceptual.
- ✓ It helps to grab the attention of students.
- ✓ It builds interest and motivation among teaching students learning process.
- ✓ It enhances the energy level of teachers and students.
- ✓ It is even better for overburden of classrooms.
- ✓ It provides students with a realistic approach and experience.

3.19 Specific recommendation for NCF/SCF:

3.19.1 Specific recommendations for NCF/SCF-ECCE:

- The school environment should be created, as an extended part of the family.
- Involve citizens and citizen action groups in the development of ECCE content, implementation and assessment.
- Curriculum should be activity-oriented which should be based on arts, stories, poems, games, toys and other playing materials. Area- specific.
- Emphasis should **not** be on written expression and written tests should not be a form of evaluation during the ECCE stage.
- The ECCE system should run and be managed by the local community/Parents.
- The teacher should be a member of that locality/community, preferably female.
- The communication language for learning, to be the local/native language.
- Infrastructure should be provided with community collaboration.

3.19.2 Specific recommendations for NCF/SCF school education:

- The school environment should be created, as an extended part of the family.
- Involve citizens and citizen's action groups in the development of school education content, implementation and assessment.
- The school education system should run and be managed by the local community/Parents.
- In school education, the teacher should be a member of that locality/community.
- The communication language of learning to be the local/native language.
- Infrastructure should be provided with community collaboration.
- Curriculum design and, subsequently, textbook designers should ensure that Experiential Learning as pedagogy is incorporated to the maximum extent possible. Environmental Education, in particular, is of no consequence if the knowledge acquired by the students is simply bookish. The textbooks and other learning resources made available so far have been content-centric. Conscious thoughts and ideas have to go into the creation of learning resources that provide the right experiences, which then will become the source of knowledge and competency in students.
- Environmental Studies should be introduced as one of the core subjects for classes 9 – 12. The content should include,
 - Forestry – Bio-Diversity, Ecology, Wildlife, Nursery Management, Plantation forestry
 - Sustainable Agriculture
 - Natural Resource Management
 - Climate Change
 - Green Energy/Renewable Energy
 - Waste Management
 - Urban Landscapes and their Management
 - Tribal ethnomedicinal practices
- The following subjects may be introduced as part of skill education at the secondary level which enables students to cater to the local demand and aspirations
 - Agriculture & Horticulture
 - Nursery Management
 - Food Processing
 - Dairy/Animal husbandry.
 - Fisheries (ornamental & edible)
 - Value addition, processing, and marketing non-timber forest products (NTFP)
 - Value addition, processing, and marketing of Agriculture & Horticulture crops.
 - Tribal ethnomedicinal practices
 - Vermi-compost/Organic manure production.

- Apiculture as a Home industry.
- Sericulture and its value addition.
- Bamboo crafts and wood crafts.

3.19.3 Specific recommendations for NC F/SCF Teacher education:

- ECCE and Primary teachers should be selected within the locality.
- ECCE and Primary teachers to be trained with respect to the very specific tasks which will help children to acquire environmental values.
- The teacher training should be at the Middle and Secondary stages, which should focus on the holistic development of the students and life skills to be one of the main objectives.
- Eco-Literacy to be introduced in the teacher’s training.

3.19.4 Specific recommendations for NCF/NCF Adult Education:

- Adult education is to be given on parental care for the ECCE and Primary student’s parents.
- Adult education to be given to the community, which shall focus on taking care of the “School education” by the community itself.
- Eco-Literacy to be introduced in the adult training.
- Tribal ethnomedicinal practices
- Traditional local skills should recognize & involved in skill training.
- Cultural art group & individuals identified & involve in skill training.

3.20 The development of Environmental education textbooks and other material bilingually

Development of syllabi and instructional material in a given subject of study, primarily textbooks, is the most logical step to be followed after the identification of specific objectives both stage-wise and class-wise. However, the scope and purpose of this exercise is likely to be quite different in the case of EE due to its inherent nature and specific needs to contextualize learning experiences extending from local to global environmental issues and concerns. The syllabi of EE and related instructional material are, therefore, expected to be as locale-specific as possible. There has to be sufficient scope and direction to translate broad guidelines at state level into teaching-learning situations in the context of locale-specific environmental problems and issues. NEP 2020 gives due importance to sustainable development goals which are further concerned with environmental benefit. The policy also emphasizes on the spread of indigenous knowledge which is also very beneficial for the betterment of present environmental challenges. The syllabus of Environmental Education at the state level is, therefore, not expected to be in the form of statements but opportunities should be created for children to go outdoors to learn about plants, trees, rivers, birds and insects, and also about environmental problems such as pollution, gas emissions, energy consumption, recycling, good use of water and other important aspects.

The institutions that could be involved at this stage of development of Environmental Education materials may be SCERTs, DIETs, NGOs, and experts from universities/colleges/research institutions.

The syllabus committee will have to review the proportion and relevancy of the science content in environmental studies taught at the lower primary stage.

- Emphases have to be given on first-hand experiences through practical activities.
- Provision for development of process skills – observation, classification, recording, etc...
- Create opportunities to link content with the immediate environment of the child
- Health and physical education must be integrated with concepts of Environmental education
- The comprehensive knowledge of traditional beliefs on protection of natural resources and scientific perspective of such practices should be included in textbooks.
- Instructional methodology should be according to the age group, nature of the content and available local resources.
- Flexibility in teaching for the teachers to be incorporated in the curriculum as per the nature of target groups.
- Avoid unnecessary content overloading

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