

## **Education for sustainable development**

### **Concept of Sustainable Development:**

The concept of sustainable development (SD) can be defined as maintenance and sustainable utilisation of the functions (goods and services) provided by natural ecosystems and biospheric processes. Conversely, in a situation of unsustainability, where the limits of the biosphere's carrying capacity (CC) are exceeded, not all of the environmental functions can be fully fulfilled anymore.

1. To maximise the biological system goals (genetic diversity, resilience, biological productivity), economic system goals (meeting basic minimum needs, equity etc.), and social system goals (social justice, people's participation, etc.) simultaneously;
2. Improving the quality of human life while living within the CC of supporting ecosystems (The World Conservation Union (IUCN), UNEP and Worldwide Fund for Nature, 1991). SD classically portrayed as the interface between environmental, economic and social sustainability, and the ideas inherent in SD are often presented in visual terms.

Indeed, a study of the visual devices used in the literature (SD art) and the ideas behind them could be a fascinating topic for analysis in itself. In Fig. 25.2, which is perhaps the most common type of presentation of SD, there are three interlocking circles, with SD representing the point where all three overlap. This diagram has had much appeal in the literature, perhaps because of its stress on circularity and nonlinear inter-linkage.



Fig. 25.2: The interactions between ecological, economic and social (community) development

### Need of Sustainable Development for Improving Quality of Life for the Present And Future:

Today the whole world, particularly the developing countries, face a near-crisis situation, both economic and environmental. Policy-makers find it difficult to formulate programmes that would work under the present situation of escalating population on the one hand diminishing that would work under the present situation of escalating population on the one hand and diminishing resources on the other.

The environmental decadence inevitably weakens economy, which, in turn leads to social disintegration. Human history is replete with such instances and the remains of past civilizations in the archaeological sites of the world bear testimony to this.

These civilizations were not able to cope with the pressures of the degraded environments. Kautilya, the wise minister in the court of Chandragupta Maurya, said that “stability on an empire depended on the stability of its environment”.

The link between environmental and socio-economic degradation cannot be overlooked particularly because, in the past, what took hundreds of years is now getting telescoped into a few decades. Today, very few have the comprehension and the capability to break this vicious circle successfully. In our own country, in the post-independence period, our attitude was dominated by developmental growth and we did not have a culture of pollution control.

**The following are the environmental problems facing the country where priority action is needed and if solved could as well lead to sustainable development:**

1. Population stabilisation;
2. Integrated land use planning;
3. Healthy cropland and grassland;
4. Woodland and re-vegetation of marginal lands;
5. Conservation of biological diversity;
6. Control of pollution in water and of air;
7. Development of non-polluting renewable energy systems;
8. Recycling of waste and residues;
9. Ecologically compatible human settlements including slum improvement;
10. Environmental education and awareness at all levels;
11. Upgrading environmental law; and

12. New dimensions to national security.

These are the very issues that are posing threat to our environment as a whole, and to sustainability, in particular. These require immediate attention; otherwise, gains from the developmental activities will be ephemeral. The threats to our long-term ecological security are real and are growing slowly and insensibly but surely.

**b) EDUCATION FOR SUSTAINABLE DEVELOPMENT APPROACHES AND STRATEGIES:**

A whole-school approach to ESD calls for sustainable development to be integrated throughout the formal sector curriculum in a holistic manner, rather than being taught on a stand alone basis. This philosophy supports the notion that ESD is education *for* sustainable development rather than education *about* sustainable development. In practice, this approach means that a school will incorporate teaching and learning for sustainable development not only through aspects of the curriculum, but also through sustainable school operations such as integrated governance, stakeholder and community involvement, long-term planning, and sustainability monitoring and evaluation. Whole-school approaches also advocate for active and participatory learning, a hallmark of ESD, and call for the entire school, including students, educators and administrators, to be actively engaged in working towards a sustainable school with ESD fully integrated into the curriculum as the driving factor.

Various documents and declarations at the international, regional and national levels support this whole-school approach to ESD implementation. United Nations Educational, Scientific and Cultural Organization (UNESCO's) International Implementation Scheme for the Decade of Education for Sustainable Development (2005) states that ESD should be interdisciplinary, holistic and

participatory, with 'learning for sustainable development embedded in the whole curriculum, not as a separate subject' (UNESCO, 2005:4).

Education for Sustainable Development and National Sustainable Development Strategies Education has been identified as an important social strategy for the realisation of a sustainable future. Education for Sustainable Development (ESD) recognises that it is impossible to achieve sustainable development without appropriate education, training and public awareness for all sectors of society. Thus, ESD needs to be a central focus within an NSDS;" ESD can build capacity and learning capabilities within an NSDS development process;" and Countries can also develop specific ESD strategies to strengthen the role of education," training and public awareness in achieving a sustainable future.

National Sustainable Development Strategies involve stakeholders from a range of different sectors. Major challenges in the NSDS process are: leadership, multi-sectoral thinking, integrated or cross-cutting management, new economic thinking and practice, and multi-stakeholder participation. Few countries have developed the learning capabilities necessary for: Analysing the inherent trade-offs and inter-linkages among the economic, social and environmental dimensions" of sustainable development, and adapting national strategy accordingly; Restructuring economic policy, national" budgeting and revenue generating processes through, for example, ecological taxes, subsidy reform, user fees, etc. for sustainable development; Co-ordinating sub-national and local" sustainable development action; and Visionary leadership for sustainable" development. Education for Sustainable Development programmes are needed to build these

learning capabilities in society. These learning capabilities are necessary if sustainable development is to move from the periphery of government decision-making to the centre.

ESD is multi-disciplinary and multi-sectoral. Learning for sustainability needs to take place in all sectors of society and all walks of life. ESD is a lifelong learning process and needs to be integrated into the entire education, training and public awareness system to build capacity for sustainable development. The UN Decade of Education for Sustainable Development is providing the impetus for countries to develop specific Education for Sustainable Development strategies or action plans. These are to strengthen the role of education, training and public awareness in building capacity for sustainable development. Such strategies can be regional, sub-regional and national. ESD strategies typically: Provide a situational analysis of key sustainable development issues and their relevance to education, training and public awareness; Identify key stakeholders involved in ESD; Develop country-based goals and strategies for ESD; Identify lead agents and an implementation mechanism (including roles and budgets); Establish a multi-stakeholder forum or committee to steer implementation; and Establish a monitoring and evaluation system to ensure continuous improvements.

Strategy as practice and learning National Sustainable Development Strategies, with their associated Education for Sustainable Development Strategies, are useful tools to guide decision making and set direction for re-orienting society towards sustainable development. Such strategies mean little unless they are used in practice. Thinking about strategy as something that people do, rather than something that organisations have, establishes strategy as a practical process that is learning centred. It helps to focus on how strategy actually works, and what

changing knowledge, skills and action competences are needed throughout the process. NSDS and ESD strategy should continuously maintain an effective balance of formal planning to guide practice, and informal learning that occurs through practice. This is necessary to respond to the complex and ever-changing sustainable development challenges they address.

“A fundamental change is needed in the way we think about education’s role in global development, because it has a catalytic impact on the well-being of individuals and the future of our planet. ... Now, more than ever, education has a responsibility to be in gear with 21st century challenges and aspirations, and foster the right types of values and skills that will lead to sustainable and inclusive growth, and peaceful living together. “ Irina Bokova, Director-General of UNESCO “Education can, and must, contribute to a new vision of sustainable global development.” (UNESCO, 2015)

### **Cognitive learning objectives**

1. The learner understands the concepts of extreme and relative poverty and is able to critically reflect on their underlying cultural and normative assumptions and practices.
2. . The learner knows about the local, national and global distribution of extreme poverty and extreme wealth.
3. 3. The learner knows about causes and impacts of poverty such as unequal distribution of resources and power, colonization, conflicts, disasters caused by natural hazards and other climate change-induced impacts, environmental degradation and technological disasters, and the lack of social protection systems and measures.

4. 4. The learner understands how extremes of poverty and extremes of wealth affect basic human rights and needs.
5. 5. The learner knows about poverty reduction strategies and measures and is able to distinguish between deficit-based and strength-based approaches to addressing poverty.

### **Socio-emotional learning objectives**

6. 1. The learner is able to collaborate with others to empower individuals and communities to affect change in the distribution of power and resources in the community and beyond.
7. 2. The learner is able to raise awareness about extremes of poverty and wealth and encourage dialogue about solutions.
3. The learner is able to show sensitivity to the issues of poverty as well as empathy and solidarity with poor people and those in vulnerable situations.
4. The learner is able to identify their personal experiences and biases with respect to poverty.
5. The learner is able to reflect critically on their own role in maintaining global structures of inequality.

### **Behavioural learning objectives**

1. The learner is able to plan, implement, evaluate and replicate activities that contribute to poverty reduction.



2. The learner is able to publicly demand and support the development and integration of policies that promote social and economic justice, risk reduction strategies and poverty eradication actions.
3. The learner is able to evaluate, participate in and influence decision-making related to management strategies of local, national and international enterprises concerning poverty generation and eradication.
4. The learner is able to include poverty reduction, social justice and anti-corruption considerations in their consumption activities.
5. The learner is able to propose solutions to address systemic problems related to poverty.

### **c) EDUCATION FOR GLOBAL PEACE**

#### 1 Education Boosts Confidence & Hope

Confucius said it as far back as 500 B.C.: “Education breeds confidence. Confidence breeds hope. Hope breeds peace.” Confidence has been defined as the belief that you can succeed at something and a sense of self assuredness. Knowledge is a key confidence builder; it allows one to feel a sense of accomplishment, to be more fearless, and to grow in unexpected ways. This confidence and self assuredness in turn sparks motivation and optimism—or hope as Confucius says— to work towards peace.

## **2 Education Promotes Independent Thinking**

Education encourages independent thinking, and it opens doors to new ideas. Independent thinkers tend to try to make sense of the world and draw their own conclusions instead of blindly following the beliefs of others. Independent thinkers may be less likely to join militant groups or be followers, and may instead be leaders towards positive change and action.

## **3 Education Inspires Problem Solving Skills**

Along with math skills that are learned in classrooms, students are often challenged to use logical thinking in order to analyze different pieces of literature, the significance of historical events, and scientific findings. Coupled with independent thinking, these critical thinking skills can lead to innovative solutions and alternatives to violence.

## **4 Education Builds Communication Skills**

In the classroom, students are often asked to speak or read in front of others, offer opinions, and break into small groups to work on projects together. This is how communication skills are honed, and communication is the key to solving conflict. Through quality education, students may be armed with the tools to work within their communities to solve problems, or to do so on a global scale.

## **5 Education Opens Doors**

There's no doubt that education for peace leads to career enhancement, employment opportunities, and chances of higher earnings. What was once out of reach for girls in the remote villages we work with—say becoming a doctor or a lawyer—are now possibilities. And with these careers in place, many come back to work within their communities and support their families, often promoting peace.

## 6 Education Reduces Poverty

Imagine always being uncomfortable, malnourished, and fearful, not knowing where your next meal will come from if it comes at all. This fear can often lead to anger, and anger to violence. Education, especially when it's combined with technical training (read more about [CAI's vocational training programs](#)), has been proven to reduce poverty. This is one driving force behind education for peace. With education comes knowledge, power, safety, security, and peace. One study by UNESCO found that income around the world would be 23 percent higher per capita in countries with education for all. If poverty were reduced, violence would follow suit.

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## 7 Education Increases Political Involvement

Educated citizens are less likely to stand for government corruption and can spur more government accountability. For women, education can even the playing field, and they are more likely to participate in political discussions, town meetings, and decision making, therefore leading to a government that represents its citizens more equally. Because educated women are less likely to support terrorism (see number 8), they can promote alternatives through politics.

## 8 Education Reduces Support of Terrorism & Militancy

According to a [University of Maryland School of Public Policy survey](#), uneducated women are more likely to support militancy and terrorism, and educated women are less likely than their educated male peers to support this way of life. And if a woman doesn't support it, perhaps she can talk her husband into not supporting it, and then her kids, other family members, and other members of her community.

## **9 Education Builds Empathy & Tolerance**

The Human Rights conventions declare: “Education must prepare a child for responsible life and effective participation in a free society in a spirit of understanding, peace, tolerance, equality of sexes and friendships among all peoples, ethnic, national and religious groups and persons of indigenous origin.” Therefore with quality education, a child can learn the quality of empathy and understanding towards those who are different from them. And they may be more accepting of others and less likely to solve problems with violence.

## **10 Education Cultivates Respect**

In the classroom, students learn to respect their teachers and their peers. They are taught to let others speak and express opinions, not to interrupt, how to deal with stress, and how to conduct themselves within a group setting. Perhaps this learned respect for other humans can be practiced on a global scale, where there’s a respect for each and every life, not just those who share the same religious beliefs and backgrounds.

## **d) INTEGRATION OF GLOBAL PEACE AND ENVIRONMENTAL CONCERNS IN SCHOOL CURRICULUM**

Peace education is the vital element in the education and it helps the Children to grow and develop as full-fledged human beings. It constitutes the foundations from which they can build a truly just and humane society. Peace education emphasizes the need to sensitize the country’s young minds through the knowledge of our common cultural heritage. There is a greater need of integrating peace education in the educational system. Therefore, the peace education could be integrated in the six media such as subject content, subject perspectives, curricular and co-curricular

activities, teaching methods, staff development, and classroom and school management.

Peace education can be introduced into a classroom as a program in itself. Peace education can also be a part of the ongoing curricula in a classroom, with concepts being introduced as they seem to fit. The conceptual framework of each subject should encompass the spread of peace values and enduring attitudes in the students' mind. Thus, the peace education messages can be woven into the content of the formal subjects taught in the school. For primary and secondary level, subjects like language, social science, mathematics, science, Arts and Design form core curricular subjects which can be used to infuse peace. Language : The integration of peace issues into the language syllabus can stimulate both learning and teaching, creating space in the classroom which is interactive, instructive and fun. The activities of reading, writing, speaking, listening, role play debates and negotiation related to peace issues would help the children to enhance their peace ability of conflict management in their life. Social Science Students can study the role of peace makers and peace movements for non-violence in the past and present. The lesson could be focused on the right to life and responsibility not to kill, on the role of UN security council. Mathematics Peace concepts can be effectively integrated in the mathematics. While teaching graphs, charts and so on, it could be produced to display some of the relationships of our country with others. Students could be made to be aware of the world problems involving cost of defense budgets and local impact. Science Environmental protection, environmental sustainability, ethics of scientific research, Nuclear war effects and pollution control are the some of the topics could be included in the science subject. Art and Design Future perceptions of peace could be revealed by diversity of societies through art and crafts. Students can be encouraged to do specific

projects highlighting the necessity the peace of 28 human community. Students could design their own symbol or logo to promote a culture of peace. Subject Perspectives

The subjects teaching in the educational institutions are meaningful and help the learners to attain their life goal. Both teachers and taught should understand the ultimate purpose of teaching learning process in the institutions. A subject is not learned merely for the subject's sake the teachers have to make a subject meaningful. The subjects have to be interpreted in such a manner so as contribute to learner's social, emotional, intellectual and moral self-development peace Education attempts to humanize subjects through bringing in human perspectives and effective dominion into learning. The activities can be planned to build peace vision attitude in Children. It strength lies in the affective component it inherits. The subjects such as Language teaching, social studies, religious education, mathematics and science teaching could be effectively taught with integration of peace components. Different instructional strategies appropriate to teach peace education could be adapted in teaching of all subjects in the educational institution. Peace-building activities, self-development, activities, story of civilization, religions harmony, all faith prayer, environmental awareness and self discipline activities could be integrated as hidden activities of all subject matters.

### Teaching Methods

Teaching in the broadest sense is any act or experience that has a formative effect on the mind, character and physical ability of an individual. In the process of integrating peace education, how to teach is more important than what to teach. The teaching methods already practiced by the teachers for the existing subjects

can be used for teaching peace education also. But some of the specific teaching methods discussed below could be more useful.

Cooperative Learning . Story telling 2. Group Discussion 8. Service learning 3. Peer Teaching 9. Experimental Teaching 4. Brainstorming 10. Inquiry based learning and teaching 5. Role play 11. Dialogues 6. Energizers

These methods would be helpful in making peace a subject of study, concern and action, both in the classroom and beyond. But these methods should be used deliberately to support learning aims to relate the knowledge, skills, and attitudes of peace education.

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1. Cooperative Learning : Cooperative learning is a successful teaching strategy in which small groups, each with students of different levels of ability use a variety of learning activities to improve their understanding of a subject. In cooperative learning environment, the teacher is a facilitator for the class, a mature trusted person who will guide an advice the students. This method increases problem – solving skills, enabling students to devise more solutions that demonstrate good creativity and practicality. All of these outcomes would be consistent with the aim of peace education.

2. Group Discussion: The class can be divided into small groups to discuss about the peace topics such as : a) What is peace b) Why is UNESCO necessary c) What is the purpose of rule and law ? d) What are the importance of social integration ? e) Discussion on conflict management f) International conflicts and solutions

3. Peer Teaching: Peer teaching helps students share their knowledge, ideas and experience among themselves. In this technique the students are divided into small groups. Before the groups move off to discuss the topic, the teacher should give

them an overview of the topic and provide each group with specific task they must meet within a given time frame. Topics such as how children learn violence from war toys, video games, the mass media contributions of Gandhi, Martin Luther King, and other great peace makers, could be taught by their own peers. Through peer teaching, both the peers and other students get benefits of imbibing peace values. Effective peer teaching provides students with opportunities to develop awareness and understanding of community issues, problems to develop social responsibility.

4. Brain Storming : It is famous techniques formally used by Socrates a great philosopher. In the field of psychology this method is used to foster the creativity among the students. Brain storming is a technique for creatively solving problems and breeding fresh ideas. The teacher's responsibilities are guiding the session, encouraging participation and writing ideas down. Teachers should devote most of their effort to design their teacher to bring peace to the classroom. The first stage in the Brain storming technique is "identifying problem". In this phase, the individual will identify the problem in well-defined manner. The second phase in the "Consolidation phase". In this phase, a well – defined topic should be developed by merging the ideas into one large idea map. During this consolidation phase, students may discover a common understanding of the issue as they share the meanings behind their ideas. The third and final phase is the "Assessment Phase". After refining the problem students should be made to draw a mind map which should have principles of analyzing the problem in the context of causes, consequences, impact of the problem and finding solution to the problem, emotions to be managed during the process, human values to be cultivated and sustained and the ways to explore the problem in depth.



5. Role play: Role play in general refers to situations when a participant assumes a “role” by playing a part in a specific situation or scenario. In the context of peace education, students can also play the role of ministers who offer advice to country to avoid participation in terrorism. Students can play the role of amazing peace heroes such Gandhi, Luther King, Nelson Mandela, Mother Teresa, Swami Vivekananda and other heroes, who have made significant contributions to peace during their lives.

6. Energizers : School can become quite a bore, if students are not able to stretch and move during class. Students of all ages are better learners if they take periodic rests. Motivational activities can be used throughout the day and after some practice, it will only take 5-10 minutes to energize the students. The students can be asked to watch the clippings, news, journals and magazines regarding peace education. This activity can be used to motivate the student in peace education.

7. Story Telling Story telling is considered as far-reaching teaching methodology for education for peace, whereby listening to and vocalizing the lived experiences of those in dominated roles within society counters the power of “Conscientised” minds. Teacher can make use of this method in unique and innovative ways to promote positive social change for peace. Peace building stories need to be shared in as many different ways as possible.

8. Service Learning Service Learning is a teaching and learning strategy that integrates meaningful community service with instruction and reflection to enrich the learning experience, civic responsibility, and strengthen communities, providing service experience to students would help them to understand diversity and mutual respect among all individuals. And also it helps the students develop interpersonal skills in conflict resolution skills and group decision making skills.

Therefore “service learning activities enhance the peace building behaviour among the individuals.

9. **Experiential Teaching** Experiential teaching is a model which promotes learning by doing. During experiential learning, students are not necessarily taught how to do something but how to find out the answer to problem they are looking for through trial and error. According to Pfeiffer and Jones, 1981, the five step experiential model includes: Experience (doing activity), share (Communication with others), process (analyse and reflect on experience), Generalise (relate experience to real word), and Apply (use what was learned in a different situation). Hence, teaching becomes an interaction between the leader and student awakening the learner’s curiosity and intelligence, through experiential learning.

10. **Inquiry-based learning and Teaching** As inquiry – based learning and teaching has to begin with questions; teacher can make students answer the questions. By asking critical questions and actively participating with their communities in the classroom, students are made to be engaged with issues at the core of contemporary society. Through this inquiry-based method of learning, sharing of personal knowledge and experiences, ability to ask critical questions and active listening would increase. Moreover, students can experience a range of thoughts and perspectives for cultural understanding, non-violent communication and learn conflict management skills.

11. **Dialogues** Dialogues is the highest form of communication, it involves there two-way communication where each student draws the other out, searches for new meaning, voices ones own opinion with integrity, all in search for truth or a mutually – acceptable course of action. Dialogue creates a shared space where students can come together through discussion. The dialogues related for

promoting the principles of tolerance, peace, respect for diversity, human rights and citizenship and for promoting the peace process between the two nations. Openmindedness and tolerance will enhance through dialogue method by perceiving the world openly and providing the ability to accept differences.

### Curricular and co-curricular activities

Curricular activities are the subject specific and content specific. For instance, Learning of mathematics, science, languages and social studies content in curricular activities. In addition, practical and extension reading related to the specific subject's content also curricular activities. Whereas co-curricular activity is a programme or out-of-class activity which provides curriculum – related learning and character building experiences. Co-curricular activities prepare students practically for the future. Co-curricular activities are particular good at providing opportunities for students to work in teams, to exercise leadership, and to take the initiative themselves. In response to a world that seems to be growing increasingly violent. Peace education programmes should find their way into the co-curricular activities which may start in a variety of different 33 ways through Assembly, sports and Games, Debates, club activities, organizing uniformed groups and cultural meets.

### Staff Development

The teacher, student and curriculum are the important components in teaching learning process. Among these components, teacher play paramount role in enhancing the learning outcome of the student. Especially, in integrating peace education in the present curriculum, staff development is most warranted. Making a school a placed of peace is an achievement of a cooperative effort and the

commitment of the whole staff under the supportive leadership of a competent school principal. Therefore, all the staff involved in the educational system should be given proper training in the peace education curriculum. The in-service programme could be conducted in the line of promoting peace building culture among the staff. The peace value to be inculcated through staff meeting, discussion forums, intensive training programmes, seminars and workshops.

### Classroom and School Management

Management is considered as highest form of cognitive skill which need to be developed among teachers and administrators. A culture of teaching peace would begin formally in preschool and progress developmentally through university studies, extending outward into every facet of life. Classroom and educational institution are the main media that will address how student's conflicts can be resolved in a way that will improve their relationships with their teacher and peers. Philosophy of classroom management and school management are based on morals, ethics, values, personal responsibility, and so forth. Therefore, the teachers and administrative heads of the institute should inspire the followers through their refined way of managerial skills. Teachers should exhibit good morals and values, display proper manners, teach right from wrong, mediate peer conflicts, employ effective and impartial listening, and show support for students.

### **e) ROLE OF TEACHERS IN PROMOTING SUSTAINABLE DEVELOPMENT**

Teachers are a key component of any education system, and quality teaching is a prerequisite for success . However, teacher quality is often defined and reduced to student performance in national tests and closely linked to a human capital

understanding of education's role in economic growth. While the economy is important, we should not underestimate both the need for and the role of education and teachers in promoting peace, building social cohesion and promoting nation-building and national identity inside and outside the classroom.

A broader perspective on teachers' role in promoting sustainable peace, social cohesion and development often focuses on the teachers' role in such things as life skills, citizenship and peace education, moral and ethical education, child protection, human rights, skills for sustainable livelihoods, challenging gender inequalities, and practising learner-centredness. While these are important concerns, which posit that dialogue, and mutual interaction and engagement in the classroom setting is important, it should also be acknowledged that strong forms of social cohesion and peacebuilding recognise the historic and structural inequities produced and reproduced in diverse contexts. Thus, promoting social cohesion in and through teaching needs to be structural as much as psychological, recognising that education and teaching in and of itself cannot remedy all forms of inequity, particularly when they are enduring, systemic, and structural in nature and that an holistic approach needs to combine the interpersonal with the struggle to transform unjust structures.

Development is a holistic process in which a people systematically enhance their capacity to solve their own problems while promoting their cultural, social and economic well-being. Sustainable development occurs when this process is conducted in a manner that can be sustained over the long term. It is evident that adults, particularly those in decision making positions in government and industry, have a fundamental role to play in determining whether development is sustainable. What is not necessarily that obvious is that every citizen, through his

or her individual choices and actions, has a part to play in this determination. In order to have development that is sustainable, all citizens need to function responsibly and with awareness. It is usually stated that young people are the future. What can be easily overlooked is that they are also the present. Their actions now also contribute to the issue of whether sustainable development is being achieved. When a young person feels emotionally secure and self confident, learns to take full responsibility for his/her actions, respects self and others, trusts his/her own thinking and respects the opinions of others even when different from theirs, and fully respects individuals of different cultures, she or he is likely to behave in socially responsible ways. These socially responsible behaviours are essential to sustainable development. It is very difficult for a young person to feel emotionally secure and self confident if that person is subjected to constant invalidation or other forms of mistreatment whether at home or at school. Teachers play a key role in the appropriate socialization of young people for sustainable development. It is important that, irrespective of the academic subject matter for which a primary or secondary school teacher is responsible, the teacher's major overall responsibility be seen as the moulding of socially and emotionally well-adjusted individuals. The teacher needs to assist the young students to feel good about themselves; to be emotionally secure and self confident, to respect themselves and others, and to take full responsibility for their actions. However, it would be difficult for teachers to function in the nurturing and validating manner required for promoting such qualities in young people in their charge, if they themselves do not feel good about themselves and possess these attributes. But it is not unlikely that when they themselves were young, either their own parents or teachers were unaware of this important dimension of their respective roles. To equip teachers to function effectively for the appropriate socialization of young people, the workshop programme 'Empowering Teachers with Emotional Coping

Skills' has been developed, within the context of the UNESCO Participation Programme, in collaboration 13 with the Trinidad and Tobago National Commission for UNESCO and the Trinidad and Tobago Ministry of Education.

## UNIT-II

**Conservation of natural resources: Environmental conservation in the globalized world, Deforestation in context of tribal life, Role of individual in conservation of natural resources:water, energy and food.**

**Conservation of natural resources**, the wise use of the earth's resources by humanity. The term *conservation* came into use in the late 19th cent. and referred to the management, mainly for economic reasons, of such valuable natural resources as timber, fish, game, topsoil, pastureland, and minerals, and also to the preservation of forests (see [forestry](#)), wildlife (see [wildlife refuge](#)), parkland, [wilderness](#), and [watershed](#) areas. In recent years the science of [ecology](#) has clarified the workings of the [biosphere](#); i.e., the complex interrelationships among humans, other animals, plants, and the physical environment. At the same time burgeoning population and industry and the ensuing [pollution](#) have demonstrated how easily delicately balanced ecological relationships can be disrupted (see [air pollution](#); [water pollution](#); [solid waste](#)).

Conservation of natural resources is now usually embraced in the broader conception of conserving the earth itself by protecting its capacity for self-renewal. Particularly complex are the problems of nonrenewable resources such as oil and coal (see [energy, sources of](#)) and other minerals in great demand. Current thinking also favors the protection of entire ecological regions by the creation of biosphere reserves. Examples of such conservation areas include the Great Barrier Reef off

Australia and Adirondack State Park in the United States. The importance of reconciling human use and conservation beyond the boundaries of parks has become another important issue.

Natural resources, especially water and soil, are essential for the function and structure of agricultural production systems and for the overall social and environmental sustainability.

Agriculture accounts for roughly 70% of total freshwater withdrawals globally. Farming also contributes to water pollution from nutrient and pesticide run-off and soil erosion. Without improved efficiency measures, agricultural water consumption is expected to rise by about 20% globally by 2050. Climate change is already affecting water supply and agriculture through changes in the seasonal timing of rainfall and snow pack melt, as well as with higher occurrence and severity of droughts and floods.

One-third of the planet's land is severely degraded and fertile soil is being lost at the rate of 24 billion tonnes a year as a consequence of bad farming practices, such as heavy tilling, multiple sequential harvests and abundant use of agrochemicals.

An increase of productivity can help push progress towards future food security and the general wellbeing of producers and rural communities globally, but given the limited natural resource base on which agriculture depend, sustainable development will ultimately depend on the responsible management of the planet's natural resources.



SAN proposes a series of good practices to help reduce agriculture's pressure on natural resources, and build more efficient and resilient production systems.

Our approach to a sustainable use of natural resources includes practices that:

- Encourage the protection and restoration of water sources, and promote water use optimization.
- Require the implementation of systems for wastewater treatment before reuse or disposal.
- Foster soil conservation and improved carbon stocks.
- Promote waste reduction, recycling and responsible disposal.

## **DEFORESTATION IN CONTEXT OF TRIBAL LIFE**

Human rights are the fundamental rights which every human deserves and has a claim to. The scope of human rights law has increased over the years but it is still devoid of a lot of developments which are taking place in the present everyday society. As the dynamicity of the society increases the demands for human rights also amplify.

One of the most frequent victims of human rights violations are the tribal communities since they do not have the power to raise a voice. In the name of development people have been indulging in deforestation in large numbers thus snatching away the homes of the tribal. The tribal community has not only lost the

physical entity of land because of deforestation but has lost its heritage, its culture, its legacy and inheritance because of one simple act of the authorities.

The forced mass displacement of people because of interference of the non-tribe members has not seen its harshest effects as of yet; they will only be visible in the future where the long lasting effects of the exodus will be understood. Giving tribal people their right is not only a legal obligation of the countries under municipal laws but a social and ethical obligation as well. Humanity knows no class, caste, creed or boundary, and that is what we must strive to protect.

India is one of the most diverse countries on planet Earth in terms of its demographic features. The country has a rich history wherein every kind of person is accommodated and given adequate means to live. India has an abundance of natural resources accommodating all elements of nature like seas, mountains, rivers, oceans, valleys, plateaus, deserts, forest and so on. Along with these natural resources India even possess the most number of people in its eligible workforce. *A 65.9% qualify to be a part of the working sector of the country i.e. they belong to the working age group of 14-65 years of age.* This means that if the natural resources and human resources are mixed cautiously then it will lead to fast growing balanced growth of

Human rights are the fundamental rights which every human deserves and has a claim to. The scope of human rights law has increased over the years but it is still devoid of a lot of developments which are taking place in the present everyday society. As the dynamicity of the society increases the demands for human rights also amplify.

- One of the most frequent victims of human rights violations are the tribal communities since they do not have the power to raise a voice. In the name

of development people have been indulging in deforestation in large numbers thus snatching away the homes of the tribal. The tribal community has not only lost the physical entity of land because of deforestation but has lost its heritage, its culture, its legacy and inheritance because of one simple act of the authorities.

- The forced mass displacement of people because of interference of the non-tribe members has not seen its harshest effects as of yet; they will only be visible in the future where the long lasting effects of the exodus will be understood. Giving tribal people their right is not only a legal obligation of the countries under municipal laws but a social and ethical obligation as well. Humanity knows no class, caste, creed or boundary, and that is what we must strive to protect.
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Different natural resources like forests, water, soil, food, mineral and energy resources play a vital role in the development of a nation. While conservation efforts are underway at National as well as International level, the individual efforts for conservation of natural resources can go a long way.

## **I. Conserve Water**

Don't keep water taps running while brushing, shaving, washing or bathing.

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Check for water leaks in pipes and toilets and repair them promptly. A small pin-hole sized leak will lead to the wastage of 640 liters of water in a month.

Use drip irrigation and sprinkling irrigation to improve irrigation efficiency and reduce evaporation. Install a small system to capture rain water and collect normally wasted used water from sinks, cloth-washers, bathtubs etc. which can be used for watering the plants

Build rain water harvesting system in your house. Even the President of India is doing this.

## **II. Conserve energy**

Turn off lights, fans and other appliances when not in use.

Obtain as much heat as possible from natural sources. Dry the clothes in sun instead of drier if it is a sunny day.

Use solar cooker for cooking your food on sunny days which will be more nutritious and will cut down on your LPG expenses.

Grow deciduous trees and climbers at proper places outside your home to cut off intense heat of summers and get a cool breeze and shade. This will cut off your electricity charges on coolers and air-conditioners.

Try riding bicycle or just walk down small distances instead of using your car or scooter.

### **III. Protect the soil**

While constructing your house, don't uproot the trees as far as possible. Plant the disturbed areas with a fast growing native ground cover.

Make compost from your kitchen waste and use it for your kitchen-garden or flower-pots. Do not irrigate the plants using a strong flow of water, as it would wash off the soil.

If you own agricultural fields, do not over-irrigate your fields without proper drainage to prevent water logging and salinisation.

Use mixed cropping so that some specific soil nutrients do not get depleted.

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#### **IV. Promote Sustainable Agriculture**

Do not waste food. Take as much as you can eat Reduce the use of pesticides.

Fertilize your crop primarily with organic fertilizers.

Eat local and seasonal vegetables. This saves lot of energy on transport, storage and preservation. Control pests by a combination of cultivation and biological control methods.

#### **b) Culture Of Peace And Human Rights: Ideas Of Thinkers Like Mahatma Gandhi, Martin Luther King**

Gandhi proposed and adopted "Satyagraha" as an moral equivalent to war and conflict. As we all know the successful conduct of war involves two things. On the one hand, suppression of the virtues of kindness, friendliness, forgiveness and consideration for the sufferings of fellow human beings , and on the other, encouragement of the feelings of unqualified hatred , anger and hostility towards so called enemies. Thus war leads to total violation of the liberal democratic principles of respect for persons and dignity of the individual. On the contrary, satyagrahi while resisting injustice, shows respect for his opponent by making moral appeals to him and expecting him to be responsive. Satyagrahi aims at conversion of the opponent's heart by making him aware of his ill will or inhuman behaviour through self- suffering". Satyagraha aims at winning over opponent by love and gentle persuading and by arousing in him a sense of justice rather than forcing him to surrender out of fear. The method of Satyagraha is purely moral and humanistic as it involves faith in the inherent goodness and good sense of the opponent coupled with goodwill towards him and readiness to come to an understanding and compromise. In fact Satyagraha aims at settlement of issue or issues with the opponent without causing him even psychological injury but it implies soul - force, courage and determination

A well-conducted Campaign of Satyagraha absolutely untouched by violence in word and deed, made the hypocritical opponent suffer from split personality as his own moral consciousness getting alarmed by the exposure of the immorality of his action. Gandhi believed in the technique of Satyagraha , because he had faith in the goodness of human nature. The moral and humanistic grandeur of satyagraha as method of resolving conflict and securing justice has been appreciated by several thinkers , politicians and social workers. Conflict can not take place if we behave on kantian maxim that

humanity (rational beings) should always be treated as an end-in-itself. If we wish to keep peace, we ought to follow the UN charter of human rights, according to which dignity of human life must be honoured and maintained without reference to caste, colour, creed etc. We have to redefine the concept of Development and Progress as Human Welfare and well-being by replacing the prevalent misleading concept of development and progress in terms of Economic Development and material progress. If we want peace, we have to replace the humanity negating industrial consumerist culture by idealistic humanism. Belief in the spiritual constitution of man led Gandhi to affirm equality of all human beings and to declare innate goodness of men. Humanism as the philosophy of Globalism or Global philosophy implies non-discrimination with regard to race, sex language, region, religion, political ideology, social and economic status, international status of the country etc. ,since the basic structure and nature of human beings all over' the world is same .We must rationalise our ways of thinking and to think of the world in terms of maps and markets, we should think of it in terms of men, women and children i.e. in terms of mankind. To prevent conflicts caused by religious bigotry, Gandhi suggested "Sarva Dharma Sambhav". According to him all religions are true and man can not live without religion so he recommends attitude of respect and tolerance towards all religions. Since the scientific and technological researches aimed at material comforts are ruining human sensitivity and sentiments i. e. human feelings and relations, so scientists and technocrats must be reminded of their moral obligation to choose peaceful means and so to perform their first and prior duty towards humanity .They should not invent biological, chemical , nuclear, laser and other kinds of sophisticated weapons, which verifies the assumption that science and technology one frequently used as instruments of exploitation, domination and destruction rather than as means in the service of mankind and peace.



Ideological extremism is also a cause of violent confrontation, as it makes the ideologues incapable of dialogue and negotiation while confrontational determination to counter force by force must be replaced by a policy of dialogues and negotiations. Democracy facilitates such policy, so Gandhi approved the democratic way of governance and life. We can say that Gandhi has been the champion not only of political democracy but also of economic and spiritual democracy as he committed to 'the vedantic view of Unity-in-multiplicity and was a supporter of economic equality. Mutual trust and bilateral negotiations, preparedness to discuss the problem collectively with open mindedness, tendency to examine and change (if necessary) our own belief i. e. flexibility is also required to escape conflict.

Total disarmament is the need of the hour but it can not take place unless and until the hearts and minds of persons who manufacture, sale and purchase weapons are changed. Public pressure could play an important role. Organisations, in addition to individual pacifist must pressurise the governments or the policy makers to adopt peaceful means to resolve the problems. It is very shocking to note that no serious and sustained consideration is given to human search for peace or peace studies in academic institution and syllabi, while ours is a world of nuclear giants and moral infants. Each and every citizen of the world must be educated to escape conflict, as ultimately person himself is the insurmountable barrier in conflict resolution. Every educated person should be made aware of the fact that the issues relating to peaceful co-existence basically belong to each citizen. So every person must be trained to rise above communal pressures, religious loyalties, regional and other interests etc. Harmonious interpersonal relationship must be developed through formal and informal education i. e. through audio-visual media. Hence reconstitution of present education system by re-considering its goal is a very urgent task.

Awareness and awakening of creative qualities must be a part of education policy and curriculum. Instead of over-emphasizing destructive instincts, we must try to make a person cultured by encouraging to cultivate constructive aspects of his personality, because constructive aspect is related to human values and virtues as well as their incorporation in cognitive, conative and affective dimension of our personality.

The foregoing outlines of Gandhi's Philosophy Of peace endorses the truism that Gandhi is one of the very relevant precursors of conflict-resolution movement with his comprehensible philosophy of peace based on the psychology of human nature, awareness of social realities and knowledge of economic and political systems and situations.

### **Role of Educational Institutions And Teachers In Developing Culture Of Peace**

Teacher Education can be infused across the whole curriculum (theoretical subjects,Practicals, Teaching Practice, co-curricular activities, games and sports) of teacher education program. Integration of peace education in teacher education program will also guide the teacher trainees about the ways and means of including peace education in school programs when they enter teaching profession. Its Multidisciplinary area, overlaps and inter linkages are intricate. The complex nature of subject emphasizes Peace Education methodology to be focused on learners' interests and needs.

Teacher Education curricular aspects as well as practices employed in teacher education best suited for imparting peace education are discussed in this paper.

### **PEACE EDUCATION AS PART AND PARCEL OF THE TEACHER EDUCATION CURRICULUM**

Teacher education should best prepare teachers to contribute to Peace Education in schools. Curriculum framework for teacher education has subjects like Learner Nature and Development, Philosophy and sociology of education, Educational Technology, School Organization and management, Guidance and Counselling, Methodology of teaching and Optional (any one of these): Adult education, Children with Special Needs, Environmental Education, School evaluation, Distance Education, Peace education, etc.

The subject matter of ‘Learner Nature and Development’ gives an insight about the topics

like contribution of Heredity and Environment in learner’s development, knowledge of

different developmental stages with particular reference to adolescent stage, individual differences, motivation and learning, factors affecting personality and assessment techniques of personality, etc. to pupil teachers. They understand and analyse behaviour of learners from psychological perspectives. They are able to find out why students learn and not learn; why they are different from each other in terms of motivation, interest, intellect and aptitude; why their personalities are different; why some of them are backward, some are gifted. They observe group dynamics and social interaction etc. in classrooms during teacher practice and find out that

these consequences have a lot of impact on the student’s

independence/dependence, self-reliance or frustration, high or low self-esteem, etc. and ultimately, his positive (peace) or negative (violent) behaviour, inside and outside the class. Pupil teachers also observe the factors responsible for developing various personal characteristics of confidence, achievement motivation, self-reliance, resilience leading to higher self-esteem, etc. or frustration, depression, low self concept leading to aggression and violence. Such experiences help pupil

teachers in adopting effective strategies for reducing various kinds of violence from the hearts of their students. Besides this, projects and activities such as use of socio-metric techniques to study classroom dynamics, case studies of different type of children (peace loving, truants and delinquents), observation of students behaviour inside and outside the class help teacher trainees place emphasis on a respect for life, the quality of personal life, aesthetics in nature, ethical/moral issues and cultural and societal priorities.

Through the Philosophy and sociology of education student teachers understand the true

Indian society, the evolving and emerging modern Indian society, sociological and the philosophical tenets as determinants of the social development, unity in diversity, ways and means of imparting values education and education as a uniting force for diverse society of India. By careful analysis of different social trends in the country, and the ways these trends influence education, can develop deep understanding in student teachers of the social diversity of the country where education works as a uniting force. Projects and activities such as writing about teacher's contribution to

the peaceful evolution of the society, strategies for conflict resolution, value clarification and value analysis suggestion can help in instilling peace in the mind of students. While studying School Organization and management pupil teachers come to know about the concept of discipline-internal and imposed, types of administration and supervision, autocratic and democratic, relationships of pupils with teachers, parents with teachers,

teachers with headmaster and school authorities etc. All these are guiding principles for future teachers to discipline their students to make them peaceful citizens. This also imparts training to teacher trainees for maintaining or disturbing peace in the organization. Introduction to educational technology helps student teachers to choose the method and materials according to the learners' characteristics, the content and the objectives of teaching. More weight age is given to collaborative learning and sharing of technology and teaching aids. It gives them training on the use of technology for peaceful purpose such as facilitating learning

– teaching process. Activities such as choosing participatory method of learning and evaluation while controlling rivalry and conflicts, preparation of lesson plans and teaching aids on peace education by using technology can help them imparting peace education concepts in an innovative way as The teacher educator must deliberately create a web of activities that moves the teacher education institution progressively toward achieving organizational goals aligned with the emerging vision of 21st century schools. Peace Education is a holistic, participatory process that includes teaching for and about human rights, justice, gender equality, environmental sustainability, disarmament, and human security. The methodology of peace education encourages reflection, critical thinking, cooperation, and responsible action. It promotes multiculturalism, and is based on values of dignity, equality, and respect. Some of practices employed in teacher education and helpful in developing in culture of peace are discussed here.

### **UNIT-III**

#### **Individual, society, Government, ICT and Media in Environmental Education**

**a) Literacy, democracy , human rights and universal values-contribution to global peace and sustainable development**

Sustainable development is largely seen and understood to be linked with ecological and environmental aspects. This is because the main champions of sustainability have hitherto been the environmentalists. However, conservation of biodiversity and thoughtful and considered use of natural resources such as minerals, water, oil and other forms of energy is not the only aspect of sustainability. Human livelihoods and human security, both personal and societal, are important aspects of sustainable development. Human development involves responding to basic needs such as food, shelter, health, education, and other emotional and social necessities. Human development is largely based on individuals and societies feeling secure about their immediate needs, and human security depends on access to education and employment. This provides a strong link to the idea of peace and living together and as such sustainable livelihoods provide a basic conduit to societal peace. But it's equally fundamental that no long term human security and consequential peace can be obtained so long as inequalities, inequities and injustices remain within a community, society, or indeed a nation.

In that sense, peace is not just an absence of conflict, or armed conflict for that matter, but it is about ridding the society of inequities which create social divisions from within. Poverty, gender inequality, and deep seated cultural and societal prejudices are some of the main causes and threats to lasting peace. Sustainable human development, cognizant of these interlink ages can provide the basis for lasting peace. It can therefore be argued that not only peace and sustainable

development are linked and interdependent but sustainable development may well be ahead in the sequence of those two processes.

It is important for an institute that aspires to inculcate global peace and sustainable development in systems of education, to provide some clarity between these issues. It is equally important to emphasize more prominently the human, economic, and societal aspects of both peace and sustainability, and to seek to provide practical ways in which these could form an integral part of the education process at all levels. There is also a need to consider the advocacy and promotion of peace and sustainability in all three phases of education, namely, the formal, the informal, and the non-formal. This would require strategies beyond a school based learning programme for peace and sustainability requiring a much wider set of stakeholders to be engaged with and to be mobilized.

“Promoting literacy must stand at the heart of this new agenda,” she said. “By empowering individual women and men, literacy helps to advance sustainable development across the board – from better healthcare and food security to eradicating poverty and promoting decent work.”

“Today, 757 million adults still lack basic literacy skills – two thirds are women,” she said, and the number of out-of-school children and adolescents is on the rise, standing at 124 million worldwide – while some 250 million children of primary school age are failing to master basic literacy skills even in schooling.

UN Secretary-General Ban Ki-moon agreed that literacy, a human right that empowers individuals and advances societies, is needed more than ever as the

United Nations prepares to adopt a new global agenda for sustainable development.

“Agenda 2030 is ambitious and transformative, aiming to eradicate poverty, reduce inequality and preserve our planet,” said the UN chief, adding that its adoption by world leaders later this month offers an opportunity to recommit to promoting literacy as part of our collective push for a life of dignity for all.

“All of these people, whatever their age, deserve the chance to learn to read. When we give them that opportunity, we will create more productive, stable and secure societies for all.”

The ideas and reality of sustainable development and democracy can and do overlap. They can be interdependent and reinforcing. For example, common to interpretations of both sustainable development and democracy is participation – the ability of people to come together and be involved in decisions about how we live, and the goals we want to achieve as societies. Democracy can enable high levels of innovation and responds quickly to challenges. The justice, legitimacy and transparency achieved by democratic contests and safeguards can also make the achievement of sustainable development fairer, more widely justified, and accepted. The survival of democracy will be challenging in an unequal, resource-constrained and overheated world. In other words, sustainable development is a pre-requisite for flourishing democracies.



**What is sustainable development?** (Adapted from FDSD's website) The idea of 'sustainable development' became widespread with the 1987 publication of Our Common Future, a report from the World Commission on Environment and Development (the Brundtland Commission). Its definition of "development which meets the needs of the present without compromising the ability of future generations to meet their own needs" still provides the broad underpinning for current thinking and practice, based on balancing people's economic and social needs with the preservation and enhancement of natural resources and ecosystems. Sustainable development can be understood as both a process (a way of doing things, including principles and values) and a set of desirable outcomes (such as the UN Sustainable Development Goals being developed in 2015). However, there are different ways of thinking about how sustainable development is best conceptualised, and put into practice. Our understanding continues to change, particularly with increasing scientific knowledge of environmental impacts, and through participatory processes which help articulate and determine priorities and desired goals.

**What is democracy?** (Adapted from FDSD's website) Democracy has long been a deeply contested idea and set of practices. Its value rests on the core principle of political equality. All members of a political community have equal rights to affect decisions made in their name. This simple formula ensures individuals and social groups are treated with dignity and respect and have the necessary autonomy and freedom to flourish. To be recognized as 'democratic', institutions and systems also need to realise a number of aspects: Inclusiveness: all members of a political community have the right to participate and should have their• voices heard: Popular control: decisions rest with the political community as a whole:

- Considered judgement: individual and collective decisions should be based on people being adequately
- informed and understanding the positions of others: Transparency: decision-making should be open and accountable
- Practical elements of a flourishing democracy are generally agreed to be: a strong civil society, an active and free press, strong and fair legal system, checks and balances on power, and free and fair elections. However, democracy is about much more than elections and representative government. More deliberative decision making, and other ways of choosing who is in power, such as by lot, have long been part of democratic political systems, as has the importance of contributing to society.

#### Existing liberal democracies

- Responsive and adaptive, although with tendency to short-termism
- Defined political geographies and legally defined citizens
- Economic growth given primacy
- Environmental limits not generally taken into account.
- Tendency towards policy silos and the use of socio-economic policy tools for choice and resource allocation.
- Competing ideas , Individual freedom as dominant ethic.

#### **Sustainable development implications**

- Long-term impacts and focus on intergenerational equity and stewardship.
- Drivers and impacts cross political geographies, and governance levels. Affected people include those in other political jurisdictions and future generations.

- Sustainable development requires integration and trade-offs between economic, environmental and social considerations.
- Environmental limits to human activity.
- Integrated and precautionary policy in recognition of complex and uncertain environmental, economic and social impacts and interactions; supported by multi-criteria and multi-discipline policy tools.
- Shared goals.
- Shared values which incorporate future orientation and concern for nature.

Sustainable development is generally seen as both a process (or way of doing things underpinned by principles such as integration or participation) and as a set of outcomes. These outcomes are not necessarily concrete goals. However, in practice, it appears that only with the development of some clear goals and targets, have communities and governments begun to make the idea real and tangible, and develop appropriate policies. This does not mean that such goals cannot change and be debated, adapt to different cultures, or be temporary stepping stones on any sustainable development pathway. However, their development implies processes very different to the contest of competing propositions made by political parties. Since, 2012, for example, the UN has encouraged member states to develop together inter-connected Sustainable Development Goals to be implemented nationally. Democracy is often seen simply as a way of getting things done and making decisions. Principles such as ‘popular control’ and ‘political equality’ inform what democratic activities should look like, but they do not tell us anything about the goals we should aim for, other than those which protect the democratic system itself. Contested ideas are a core and necessary part of democracy. In representative electoral systems competing political parties suggest their own visions of the ‘good life’ and how to achieve

this. On some issues, though, there is a recognition of the need for more effective cross-party collaboration. For example, before the UK's 2015 General Election, the then three main parties jointly committed to work together to combat climate change.

**b) Role of individual, society and community for prevention of pollution, management of natural resources., Responsible Environment Behaviour**

Over population and pollution are potent ecological forces impinging upon man by affecting the quality of the environment. All efforts aimed at bringing more and more people above the poverty line actually increase the pressure on natural resources.

Careless management of natural resources is disrupting the ecological processes so much so that earth's life supporting capacity is being substantially threatened.

Unmindful exploitation of the finite resources of the biosphere has a severe ecological backlash because no development is sustainable unless it is environmentally compatible. Environmental compatibility demands that the economic and social development should be linked with environmental management.

Articles 48.A and 51.A of our constitution provide for environmental protection. According to the National Committee of Environmental Planning and Co-ordination, the framework for environmental protection aims at:

- (a) Control of environmental pollution
- b) Conservation of natural resources
- (c) Land management
- (d) Development of non polluting sources of energy
- (e) Environmental education
- (f) Environmental laws.

Pollution is the burning issue of the day at the global level. A combined effort to control pollution has to be made by all government agencies, technologists, industrialists, agriculturists and last but not the least the common man.

An international conference on “Human Environments” was held in Stockholm in 1971, to emphasize the need to control pollution.

**Several measures were recommended by the scientists participating in the conference, e.g.:**

- (a) The first step should be to identify those causes of pollution that have global implications, and to devise protective measures to be adopted.
- (b) The second step should be to find out the carrying capacity of the environment and reduce the emission of the major sources of pollution.
- (c) The third step should be to find a neutralizer for each type of pollutant.

(d) The fourth step should be to ensure that anti-pollution measures are adopted by all industries.

(e) The fifth step should be the identification of areas where the cause of pollution is poverty and lack of environmental education. Contamination of food and water are the basic causes of pollution in such areas.

(f) Most important is initiation of adequate research to devise measures for controlling pollution.

**Environmental monitoring is urgently required for controlling pollution. This involves:**

(a) Careful scrutinisation of the environmental characteristics.

(b) Laying down the standards of environmental quality

(c) Regular assessment of the above mentioned environmental characteristics.

(d) Keeping track of the changes in the environmental characteristics and educating people about the pollution due to these changes.

(e) Devising measures to combat the menace of pollution.

(f) Enacting environmental laws and taking legal action against environmental offenders.

**Efforts are required to be made by each individual to control pollution. These efforts include:**

(a) Installation of proper sewage disposal methods.

(b) Dumping of non biodegradable wastes in low lying areas.

- (c) Installation of gobar gas plants in areas of high availability of cow dung.
- (d) Reduction of smoke emission and treatment of chimney smoke to remove solid carbon particles.
- (e) Judicious use of fertilisers, pesticides and detergents (Detergents of low- level phosphate content are less harmful).
- (f) Growing plants like Pyrus (apple), Pinus (chir) and Vitis (grapes) is advocated because of their capability of metabolizing gaseous nitrogenous pollutants like nitrogen dioxide etc. and plants like coleus, ficus (banyan) can fix Carbon monoxide.

## **Pollution**

Pollution is an undesirable change in physical chemical and biological characteristics of soil, water and air. This is harmful for all humans as well as other organisms on the Earth.

So there is an immediate need to take proper care and manage the natural resources to sustain them and conserve our environment for sustainable development.

There are international laws, organizations, different acts working towards the protection of our environment.

The awareness about the problems has lead to the conservation of the environment and natural resources. For example- The Ganga Action Plan.

Ganga Action Plan is a massive multi - crore project implemented in 1985 which has undertaken to make the river Ganga pollution free.

It was noticed that due to continuous dumping of waste into river Ganga, the number of bacteria coliform increased to an alarming level. This bacteria is otherwise found in human intestine. This has led to pollution of the river. As people use the water for bathing, washing clothes and many other activities that affects the ph level of water and makes it contaminated.

We can reduce the pressure on the environment by following 3R's- Reduce, Recycle and Reuse.

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Reduce: it means to use less natural resources, like :

- Switch off the electrical appliances when not needed
- Save fuel by walking etc
- Save food by not wasting it

Recycle: it means processing of waste to form new products. Practicing recycling saves resources, saves cost, also reduces the piling of waste materials.

Reuse : it means using an article again and again, like -



- reuse of used envelopes.
- The containers of jams and pickles are reused by storing other things.
- Use cloth bags instead of using polyethene, etc.

### **Why do we need to manage our Resources**

We are in immediate need to manage our resources because everything that we consume is obtained from resources present on the Earth. They have to be carefully handled as natural resources are limited. Management also ensures the availability of these resources always- today for us and tomorrow for future generations.

### **Forests and wildlife**

In forests, we do see biodiversity (i.e. a wide variety of species of plants, animals and microorganisms are seen in a natural habitat).

These forests are our natural resources as well as a habitat for wildlife and need to be conserved.

### **Stakeholders**

They are the persons and the parties having a binding interest in an asset.

## **The stakeholders are :**

Locals: who live around the forests and depend on forest products.

The forest department: a government body which looks after the forest.

industrialists: they take raw materials for running their industries.

Wildlife and natural enthusiasts: those who need to conserve forest.

## **Sustainable Development**

It is controlling the use of resources in such a way that there is an equitable availability and continuous flow of products and services for the present and future generations without any impact on the environment.

**Wildlife** refers to living beings comprising of animals, plants and microorganisms found in natural habitats which are neither cultivated nor domesticated.

It is threatened due to a high degree of exploitation and human interference like-

- Habitat destruction
- Over exploitation
- Hunting

There is a large number of plants and animals that are facing exploitation and a risk of extinction. These species are called endangered species.

## **Wildlife conservation**

Conservation can be done by following methods-

- Maintenance of wildlife in protected areas: it is done by maintaining the following-
- National parks- a protected area where cultivation, grazing, hunting, etc. are not allowed. For example- Jim Corbett National Park.
- Sanctuaries- They are the protected areas where hunting is not allowed but all other activities are allowed.
- Biosphere reserve- A protected area meant for conservation of wildlife, traditional lifestyle of tribals and their domesticated animals.
- Protection of their natural habitat.
- Protection through legislation- There are a number of wildlife acts like :
- IBWL ( indian board of wildlife), 1952.
- Wildlife Protection Act, 1972.
- MAB (Man And Biosphere Programme), 1971.
- CITES (Convention Of International Trade In Endangered Species),1976.

## **Water For All**

Water is very important for us. It is not only required for drinking but also for bathing, washing, irrigation, industry, construction work and disposal of sewage. The consumption of water has increased. For example, a villager requires just 25 litre of water in a day but an urban dweller requires at least 350-700litre of water a day.

The reason due to which we fail to sustain underwater availability are as follows-

- Loss of vegetation cover.
- Diversion for high water demanding crops.
- Pollution from industrial effluents and urban waste.
- Irrigation methods like dams, tanks and canals.

## **Dams**

Dams are large water bodies that are built by government agencies across the rivers to regulate the flow of water and generate electricity.

The advantages of dams are as follows-

- They ensure adequate amount of water for irrigation through a canal.
- Water in dams is used for generating electricity.
- They ensure uninterrupted water supply.

**Problems caused by the construction of large dams are as follows-**

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Due to construction of high rise dams, a vast area of land gets submerged under water resulting in the displacement of a large number of people.

- They lead to deforestation and loss of biodiversity.
- They need huge expenditure.

### **Water harvesting**

It is capturing, collection and storage of rainwater and surface runoff for filling either small bodies or recharging ground water.

**Benefits of water harvesting are as follows-**

- It ensures water availability.
- It reduces the chances of flooding during the rainy season.
- The groundwater is regularly recharged.

**Khadin system:** it is a traditional rainwater harvesting system for agriculture in Rajasthan. It consists of a very long earthen embankment down the slope of the catchment areas which helps in retaining run off water. A shallow well is often dug behind the embankment to store extra overflowing water. The stored water slowly percolates down into the ground. The area is then used for growing crops and for vegetation.

### Watershed management

It act as a raised area which is a source of run off water to low lying areas and watershed management emphasis is the scientific method of soil and water conservation in order to increase the biomass production. It actually aims at developing primary resources of land and water to produce secondary resources of plants and animals for use in a manner which will not cause ecological imbalance. Advantage of watershed management are as follows-

- Growing more trees in watershed areas, increasing the retention of more rain water and protection of soil from erosion.
- It enhances productivity that increases the income of watershed community.
- it reduces draughts and floods.
- It increases the life of downstream dams and reservoirs because of less silting.

There are a lot of advantages of groundwater recharging like-

- it does not evaporate.
- It spreads out to recharge wells.
- It provides moisture for vegetation over a wide area.
- It doesn't get contaminated by human or animal waste.

## Coal and petroleum

They both form fossil fuels and as we know that they require much time to get replenished, so their judicious use is recommended in order to save them for future generations.

- Using the principle of 3R's i.e. Reduce, Reuse and Recycle.
- Using unleaded petrol in vehicles.
- Using local transport like buses or trains.

Q2-Can you suggest some changes in your school which would make it environment-friendly?

Ans-School management can do the following to make school environment-friendly:

- Growing more and more trees in and around the school.
- Employing rain water harvesting system in school.
- Maintaining a small park in the school premises
- Encouraging students to become environment friendly.
- By planting more and more trees as this will solve the issue of deforestation
- By banning the hunting of animals
- By organizing campaigns to aware people about the importance of forests and wildlife

## Water Resources

- By not wasting water
- Reuse of waste water in cleaning or watering the plants
- By practicing rainwater harvesting
- Using drip irrigation method

## Coal and Petroleum

- Using clean sources of energy such as LPG for cooking

- Use of public transport instead of personal vehicles in order to save energy resources
- Use of solar cooker for cooking
- Use of public transport instead of private vehicle
- Conserving water during rains
- Reuse of waste water for cleaning and watering plants
- Switching of unnecessary electronic equipments
- Use of electronic equipment that consume less energy. such as LED bulbs
- Use of solar cooker for cooking
- Use of public transport instead of private vehicle
- Conserving water during rains
- Reuse of waste water for cleaning and watering plants
- Switching of unnecessary electronic equipments
- Use of electronic equipment that consume less energy. such as LED bulbs

c) **Role of ICT, text books, Media in creating awareness about human rights , environmental and peace values.**

**Information and communication technologies for development (ICT4D)** refers to the application of **information and communication technologies (ICT)** toward social, economic, and political development, with a particular emphasis on helping poor and marginalized people and communities. It aims to help in international development by bridging the **digital divide** and providing equitable access to technologies. ICT4D is grounded in the notions of "development", "growth", "progress" and "globalization" and is often interpreted as the use of technology to deliver a greater good.<sup>[1]</sup> Another similar term used in the literature is "digital development".<sup>1</sup>

ICT developmental assistance and projects vary depending on the categorization of the areas of work. Thus, ICT4D has been categorized according to its sectoral and thematic applications. ICT4D sectors are mainly the following:

- infrastructure which covers the both the vertical and - horizontal infrastructure projects;
- industry, agriculture and natural resources sector;
- social sector which consists of health and education;
- private and public sector.

The thematic applications on the other hand, may cover one or more sectors. Examples are environment, gender, participation, sustainable development, governance, sub-regionalization, regionalization and globalization among others.

ICTs can be a supportive tool to develop and serve with reliable, timely, high-quality and affordable health care and health information systems and to provide health education, training and improve health research.<sup>[91]</sup>

According to the [World Health Organization](#) (WHO), 15% of the world's total population have disabilities. This is approximately 600 million people wherein three out of every four are living in developing countries, half are of working age, half are women and the highest incidence and prevalence of disabilities occurs in poor areas.<sup>[92]</sup> With ICT, lives of people with disabilities can be improved, allowing them to have a better interaction in society by widening their scope of activities.

Goals of ICT and disability work

- Give disabled people a powerful tool in their battle to gain employment
- Increase disabled people's skills, confidence, and self-esteem
- Integrate disabled people socially and economically into their communities;
- Reduce physical or functional barriers and enlarge scope of activities available to disabled persons
- Develop a web content that can be accessed by persons with disabilities especially the visually impaired and hearing impaired

The convergence between telecommunications, broadcasting multimedia and information and communication technologies (ICTs) that is driving the development of the global 'Information Society' is responsible for the



transformation of a variety of economic and political sectors, as well as the socio-cultural strata of nations around the world. The benefits of information and communication technologies (ICTs) lie not purely in the range of their functionality but in the variety and versatility of their application. Much has been written about the potential of ICTs to 'revolutionize' society, particularly in the context of their role as catalysts of the 'Information Revolution'. This 'revolution' is often juxtaposed with its predecessor, the Industrial Revolution, usually for the purpose accentuating the idea that communication networks are as integral to the process of development as was the birth and development of industry in the 19th century. While it is the question of access that has risen to the forefront of development agendas in the context of the famed 'digital divide' , much work remains to be done in analyzing and understanding how these technologies are utilized and applied to bring about expected revolutionary societal and economic changes and improvements.

Well-designed environmental content for information and communications technologies and social media could counteract their tendency to promote isolation and addiction, and open users to the natural world and the satisfaction of more sustainable lifestyles. The social media have great scope to communicate environmental messages, especially those linked to values. Social media will be more resonant to content with an ethical or values-based approach than to purely scientific information. Young people are looking for positive actions that they can take and causes that they can commit to, and linking ethical, social and environmental responsibility can be very attractive.

On-line education has great potential, so Massive Open Online Courses (MOOCs) should be developed on values-based education. Courses that combine scientific information, say on climate change, with their ethical or even spiritual implications have been shown to motivate and create lifelong commitment to changes in behaviour and lifestyle.

If the SDGs aim for a fundamental transformation in society, this also means changing the lives of each and every one of us. Social mobilization and behaviour change start at the individual level. People do not usually welcome change, which requires effort at a very fundamental level, the level of ethics, values and emotional, even spiritual commitment. Educational activities have a greater chance of success if they include building a culture of change based on values as a positive way forward.

The Universal Declaration of Human Rights has properly enunciated the idea that education “shall be directed to the full development of the human personality and to the strengthening of respect for human rights and fundamental freedoms ... [and] promote understanding, tolerance, peace and friendly relations between nations and all racial or religious groups

.”<sup>1</sup> The Convention on the Rights of the Child further explains that education should be directed to<sup>2</sup>

- development of the child’s personality, talents, and mental and physical abilities to their fullest potential;

- development of respect for human rights and fundamental freedoms, and for the principles enshrined in the Charter of the United Nations;
- development of respect for the child's parents, his or her own cultural identity, language, and values; for the national values of the country in which the child is living or the country from which he or she may originate; and for civilizations different from his or her own;
- the preparation of the child for responsible life in a free society, in the spirit of understanding, peace, tolerance, equality of sexes, and friendship among all peoples, ethnic, national, and religious groups and persons of indigenous origin (Article 29 [1] [a, b, c, d]).

The question, therefore, is: Do textbooks support the full development of the human personality and promote respect for human rights and fundamental freedoms? In certain cases, as will be discussed below, the question may be: Whose human rights and fundamental freedoms are the textbooks privileging? Textbooks are a major educational tool for students.

3 Much of what students need to learn (basic curriculum content) is in required textbooks.<sup>4</sup> Textbook content may determine the educational development of the students.

**Textbooks on History** In recent years, history textbooks have been linked to controversies that extend beyond the confines of the education system. The controversies are not only national in character but extend to relations between states, reflecting unresolved international disputes. The presentation of historical events in the textbooks is affected by notions of national identity as well as by ideological perspectives. Race is also a factor in certain cases. These controversies involve deep-seated beliefs held by certain sections in society as well as by those

given the authority to write or approve the textbooks. Views about preserving national identity, developing national pride, or characterizing neighboring countries in a negative light figure prominently in the controversies. The issues affecting history textbooks in particular and national educational policies in general impact on human rights.

The role of the mass media in promoting the nations' awareness level, expanding the discourse and modern concepts like human rights, democracy and peace are obvious. They also affect the way governments function. Today, using the media within the international context for planning a major strategy of the great powers possess an important status. The level of using the new media includes communication satellites, large news agencies, press and numerous radio and TV stations as well as Internet sites, for they cut across geographical borders with the least cost and target minds and the way people think in other countries. It looks that advancement and qualitative and quantitative developments in the "mass media", have transformed the nature of the exchange and the symbolic production in the world intensively and irreversibly. The present age is called "communication age ". In other words, because of the existence and application of mass media whose influence and effects are increasing, they have developed a new form and have overshadowed the developments within the human societies. In such a way today such media for the colonial powers are of high importance for consolidating and fixing the cultural and political domination and are regarded effective tools for capturing identity and public opinion (Broadcasting service, 2002). With the status the mass media and communication tools have found from the birth of man till his death in the modern life, they could be categorized in the social institutions and be regarded as major effective factors in the process of the accepting norms, social values and socialization. People usually learn values, norms, beliefs, inclinations as

well as behavioral theses from the others and through the process of the social education and socialization or within the various frameworks of the social, recognized and institutionalized values. Mass Media The century in which we are living is concurrent with a great revolution that man has ever seen. It is the “age of communications and that of the media dominance” on the humans’ lives . By the mass media, it is meant that the flow of the information from a public affairs source could be available to millions of people fast and efficiently. The mass media are tools that are created in the new civilizations and are applied widely. The salient feature of them is their expanded scope of power. The term mass media indicates a type of communication whose aim is to establish a relationship with a group of people.

Role of Press and Media Campaigning is always the first step to a noble cause and aims at building awareness among the masses. In a great country like ours, the largest democracy of the world, campaign is the authentic way to social change. The mass media can be an instrument for educators, educational institutions and Governmental and Non-Governmental Organizations for the emancipation of Human Rights.

The concept of sustainable development has been experiencing a shift from being considered an exclusive subject of interest for the academic, institutional and scientific communities, to a familiar term and an issue of concern for the general public. Being a complex and holistic idea, it needs to be popularized and engaged with at the grassroots level. Discussions in the Global Media Forum unpacked the dynamism of the meaning of “Sustainable Development”, and debated initiatives by media and ICTS to empower and engage people about the issues. Information and public awareness campaigns are indispensable tools in making the general public understand the concept and be aware of its importance. The media is a key

vector that can help give practical meaning to the concept and its relevance to daily life.<sup>4</sup> Not only through traditional print and broadcasting, but through the use of ICTs, media provides a channel for dialogue and discussion between experts, institutions and citizens. In recent decades, the development of ICTs has advanced at such speed and on such a scale that it represents a global economic and social revolution, full of hope, even though there are challenges. In this context, the free exchange of ideas and knowledge, which UNESCO promotes as one of its principal mandates, is more than ever a practical driver of sustainable development. The Global Media Forum was one example of free exchange, sometimes critical and provocative, about how different stakeholders are impacting on media's role in sustainable development.

## **UNIT-IV**

### **COMPETENCIES IN TEACHERS FOR EDUCATION FOR SUSTAINABLE DEVELOPMENT**

Education for sustainable development (ESD) needs complex teacher competences. There are more and more international policy documents like Learning for future (UNECE, 2011) and scientific models like the CSCT model (Sleurs, 2008) describing the complexity of teacher competencies needed for effective ESD. United Nations has adopted the 17 Sustainable Development Goals (SDG-s) in September 2015 (UN, 2015), among them Quality education. But education is considered as a significant tool to reach the other 16 goals too. This way ESD has become one of the most significant tasks for education globally.

Hungarian teachers' view on ESD-related issues were studied in 2016 in a series of research. The paper summarizes results considering Hungarian teachers' view on

teacher competences for ESD. After analysing the above mentioned scientific and political documents the following aspects of teacher competencies were chosen as the focus of the study:

- interdisciplinarity,
- support students' critical thinking
- global understanding
- dealing with locally relevant issues, problems
- participative learning, social decision-making
- support learning by doing
- teaching about adaptation possibilities for environmental challenges
  - To fulfil this list of aspects is an enormous or even impossible challenge for many if not most teachers working in practice. There are several factors explaining this situation but the fact that initial teacher training has not prepared teachers for these complex challenges, and that they have not received enough support to change their simple teaching routines are among the main explaining factors. As a consequence, there is an urgent need to develop complex supporting systems including teaching materials, on-line and off-line training courses, supporting web platforms and possibilities for exchanging experiences personally and on-line. These efforts could only succeed if they are targeted on those aspects of teacher competencies, which are really lacking from teachers' everyday pedagogical practices.

That's why the first aim of the paper is to identify those aspects of teacher competencies, which are defined as important or even essential for effective ESD by policy and research papers but are seen by Hungarian teachers as non-important or very difficult to realize or even non-existing in practice. Based on this knowledge more targeted development programs could be launched to improve these lacking competencies of Hungarian teachers in order to improve the quality of ESD in Hungary.

The second aim of the study is to give evidence using the results of data of a quality insurance study on in-service ESD training that at least some of these lacking teacher competencies could be improved even by a short in-service training.

Sustainable development, however, is neither a general guideline, nor a clearly defined objective. The concept tells us little about how justice should be achieved. »The concept of sustainable development – as this document suggests – is not a simple one, and there is no road map to prescribe how we should proceed« (UNESCO, 1997, Preface). The way to reach that aim needs to be renegotiated for any given situation. All relevant stakeholders should be included. A sustainable economy and society can only be the outcome of a social process of searching, learning and design . The ability to constructively contribute different conceptions and interests will be of crucial relevance . Sustainable development can serve as a guiding principle and framework for reflection on this process of such a search.

The term of education is an integral part of any programmatic political document on sustainable development. This fact underlines the significance that is assigned to education in the context of sustainable development. It leads to the question of what competencies teachers need in order to develop and implement educational offers in the field of Education for Sustainable Development (ESD) so that they can aspire to and attain specific educational goals with their students. This touches on the question of the building of corresponding competencies in teacher education and further education. So far, few attempts have been made to describe teachers' competencies regarding ESD and to develop corresponding competence models. The following article presents two models-Curriculum, Sustainable Development, Competences, Teacher Training (CSCT Model) and Learning for the future: The Competences in Education for Sustainable Development (ECE Model)-and



discusses their benefit for teacher education and further education. These models differ in how broadly they define ESD and in what audiences they target at. This comparison shows and explains why competence models should focus on profession-specific core competencies if they are to be used as a basis for the conception of educational offers in the field of ESD in education and further education of teachers. The drawn conclusion consists in initial considerations for the conception of another competence model.

## **b) INDIVIDUAL LIFE STYLE, CARBON FOOT PRINTING**

A way of living of individuals, families (households), and societies, which they manifest in coping with their physical, psychological, social, and economic environments on a day-to-day basis.

Lifestyle is expressed in both work and leisure behavior patterns and (on an individual basis) in activities, attitudes, interests, opinions, values, and allocation of income. It also reflects people's self image or self concept; the way they see themselves and believe they are seen by the others. Lifestyle is a composite of motivations, needs, and wants and is influenced by factors such as culture, family, reference groups, and social class.

A lifestyle typically reflects an individual's attitudes, way of life, values, or world view. Therefore, a lifestyle is a means of forging a sense of self and to create cultural symbols that resonate with personal identity. Not all aspects of a lifestyle are voluntary. Surrounding social and technical systems can constrain the lifestyle choices available to the individual and the symbols she/he is able to project to others and the self.

The lines between personal identity and the everyday doings that signal a particular lifestyle become blurred in modern society. For example, "green lifestyle" means holding beliefs and engaging in activities that consume fewer resources and produce less harmful waste (i.e. a smaller ecological footprint), and deriving a sense of self from holding these beliefs and engaging in these activities. Some commentators argue that, in modernity, the cornerstone of lifestyle construction is consumption behavior, which offers the possibility to create and further individualize the self with different products or services that signal different ways of life.

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Lifestyle may include views on politics, religion, health, intimacy, and more. All of these aspects play a role in shaping someone's lifestyle. In the magazine and television industries, "lifestyle" is used to describe a category of publications or programs

### **CARBON FOOT PRINTING.**

A carbon footprint is the amount of greenhouse gases—primarily carbon dioxide—released into the atmosphere by a particular human activity. A carbon footprint can be a broad measure or be applied to the actions of an individual, a family, an event, an organization, or even an entire nation. It is usually measured as tons of CO<sub>2</sub> emitted per year, a number that can be supplemented by tons of CO<sub>2</sub>-equivalent gases, including methane, nitrous oxide, and other greenhouse gases.

A carbon footprint measures the total greenhouse gas emissions caused directly and indirectly by a person, organisation, event or product.

A carbon footprint is measured in tonnes of carbon dioxide equivalent (tCO<sub>2</sub>e). The carbon dioxide equivalent (CO<sub>2</sub>e) allows the different greenhouse gases to be compared on a like-for-like basis relative to one unit of CO<sub>2</sub>. CO<sub>2</sub>e is calculated by multiplying the emissions of each of the six greenhouse gases by its 100 year global warming potential (GWP).

A carbon footprint considers all six of the Kyoto Protocol greenhouse gases: Carbon dioxide (CO<sub>2</sub>), Methane (CH<sub>4</sub>), Nitrous oxide (N<sub>2</sub>O), Hydrofluorocarbons (HFCs), Perfluorocarbons (PFCs) and Sulphur hexafluoride (SF<sub>6</sub>).

### **Types of carbon footprinting**

The main types of carbon footprint for organisations are:

#### **Organisational**

Emissions from all the activities across an organisation, including buildings' energy use, industrial processes and company vehicles.

#### **Value chain**

Includes emissions which are outside an organisation's own operations (also known as Scope 3 emissions). This represents emissions from both suppliers and consumers, including all use and end of life emissions.

## **Product**

Emissions over the whole life of a product or service, from the extraction of raw materials and manufacturing right through to its use and final reuse, recycling or disposal.

## **Supply chain**

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Emissions from the raw materials and services that are purchased by an organisation in order to deliver its service(s) and/or product(s).

## **How is a carbon footprint calculated?**

When calculating a carbon footprint, a lot of factors are taken into consideration. For example, driving to the grocery store burns a certain amount of fuel, and fossil fuels are the primary sources of greenhouses gases. But that grocery store is powered by electricity, and its employees probably drove to work, so the store has its own carbon footprint. In addition, the products that the store sells were all shipped there, so that must also be factored into the total carbon footprint. Beyond

that, the fruits, vegetables, and meats that the store sells were all grown or raised on farms, a process that produces methane, which has a greenhouse effect 25 times greater than CO<sub>2</sub>. All of those elements must be combined to understand the full carbon footprint of a given activity.

### **How can I calculate my carbon footprint?**

Although adding up one's individual carbon footprint can be difficult, online calculators can do some of the work for you, giving a rough estimate of your carbon footprint based on the size of your household, the efficiency of your appliances, how much you drive or fly, what you eat, and how much you recycle.

Fossil fuel use and electricity consumption play a major role in your carbon footprint.

This isn't perfect, but it is a good way to measure your activities so you can understand roughly how much CO<sub>2</sub> they generate and take steps to reduce your carbon footprint.

### **How can I reduce my carbon footprint?**

Methods of reducing your carbon footprint include driving more-efficient vehicles (or making sure that your current vehicles are properly maintained), taking public transportation, using energy-efficient appliances, insulating your home to reduce heating and air conditioning costs, consuming food that doesn't require as much transportation, and eating less meat, which has a higher carbon footprint than fruits and vegetables. Individuals and companies can also offset some of their CO<sub>2</sub> emissions by purchasing carbon credits, the money from which can go into projects such as planting trees or investing in renewable energy.