Education for Sustainable Development (ESD)

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After the Second World War the western countries witnessed very rapid industrialization. The human race leapt into the space age and stepped on the Moon. Successful expeditions were executed on other planets. While this was happening there was a simultaneous population explosion particularly in the developing countries like India.Famine, limited scale wars caused great havoc in different parts of the world. Considering India, the food scarcity of the 1950s was overcome by importing inexpensive wheat from USA.Subsequent to that the Green Revolution enabled India to achieve self-sufficiency in this regard. Nevertheless malnutrition is still a serious issue.Further; foodgarin production has maintained the earlier momentum over the last decade while increase in population has continued unabated. This imbalance is already causing fears about another spell of food shortages. Other social evils of different forms in different countries like The Taliban in Afganistan, Female infanticide and socio-economic deprivation of some sections in various parts of India, etc. are additional causes of serious concern. While this all is happening in the developing/underdeveloped countries, the developed nations have continued their unbridled exploitation of the resources on the Earth. This haphazard exploitation for a consumer oriented, luxury loving society has wasted precious resources without any stoppage. The alarm bells were set ringing in the 1960s itself.However, in the last two decades it has become clear that the limited resources of the Earth cannot sustain an unbridled growth in consumption. The rich will continue to have their luxurious

life style even with limited resources but the poor nations will suffer the most. Another aspect of unbridled consumption is the generation of huge amounts of wastes which are injurious to not only the Human race but to the whole Eco-system as such. In the last 5-6 decades the Eco-system has suffered greatly because of the release of toxic wastes in all forms (solid/liquid/gaseous). If this was not sufficient, large tracts of forests were razed and brought under cultivation to feed the ever increasing population. The use of pesticides/fertilizers on an ever increasing scale is another threat to the Eco-system. The tremendous toxic waste released during the unbridled industrialization has spread over large portions of land/air/water in a highly dilute form which makes remediation very expensive. Rachel Carson's 1962 book "Silent Spring" was the first recorded warning of this looming catastrophe. Rachel Carson argued that man is not above Nature but an integral part of it and hence must ensure a peaceful co-existence with all the species.Ms.Carson had made a forceful case in favor of banning DDT and what she implied as indiscriminate poisoning of our world for what was termed efficient agriculture.Ms.Carson was severely criticized in the 60s by pro industry circles. She was not spared later this year in even her birth centenary. However, this criticism of her views as "heretical" is much more muted now and close to being accepted by the mainstream society. The changing beliefs started with a 1968 meeting of some eminent Scientists and Economists. They established a platform for discussions on related issues. This forum severely criticized the unbridled consumption and even went to the extent of suggesting a complete stop to all industrialization. This totally negative approach was obviously not

acceptable to the political and industrial establishment anywhere in the world in the best of their dreams.Further; a complete stop to all development related activity would have caused immense harm to the Human race in terms of stagnation of the economies in the developing world. Subsequently, this abysmally negative approach was replaced by a more balanced, constructive approach of industrial development in consonance with a more Eco-friendly industrial policy catering to the Socio-economic needs of the population of that region. The 1972 UN Conference on Human Environment held in Stockholm brought into focus environmental concerns. The global community appreciated these concerns and expressed a desire for understanding of the inter-relationship between environment and socio-economic issues of poverty, deprivation of certain classes of the society and underdevelopment in general. This viewpoint gave rise to the concept of Sustainable Development in the 80s."Our Common Future" published by the World Commission on Environment and development defined Sustainable Development as "Development that meets the needs of the present without compromising the ability of future generations to meet their own needs". This definition abhors senseless consumption and waste creation. A complementary definition of Sustainable Development given in 1991 in "Caring for Earth: A strategy for Sustainable Living by IUCN, UNEP and WWF was: "Improving the quality of human life while living within the carrying capacity of the supporting eco-system". A glaring example of the earlier unbridled industrialization is that of loss of the best/richest resources (e.g. copper ores) on the Earth already consumed by the previous generation. This has left relatively

low grade resources for the present and future generations. The 2002 World Summit on Sustainable Development expanded the previous definitions identifying “three overarching objectives of Sustainable Development to be (1) eradicating poverty (2) protecting natural resources and (3) changing unsustainable production and consumption patterns.

A matter of more serious concern is the present galloping increase in world population. At the present rate of increase of ~1.4 % in about 722 years the population density will be 1 human/m^2, a situation which is totally infeasible. A warning that cannot be ignored comes from Science: “All physical processes have a maximum after which the rate falls”. Physical processes here imply processes necessary for the survival of life on this planet. The overall ecological damage that the increasing population can cause is obvious.However; country wise the damage is not necessarily directly proportional to the population of country but rather depends upon the life style of populace. The Ecological Footprint of a USA citizen is 13 times that of an Indian and 52 times that of a Somalian.An illustrative example: the common USA citizen uses a machine and some kind of surfactant for dishwashing. As against this majority of the Indian population living in the villages use ash from the Chullah, used lemon, etc. for cleaning utensils and hand wash. Sensible Indian house wives go a step further. Before the utensils are cleaned they are rinsed and the rinse water is fed to the live stock. (My late mother used to do this regularly).Such methods result into conservation of vital resources and hence lessen the ecological damage and in turn a lower Ecological Footprint. With reference to India, the issue of Sustainability was addressed

(albeit indirectly) by none other than Mahatma Gandhi whose slogan of "Self sufficiency" was another incarnation of Sustainability. Taken in the present perspective, the Matama's call for equitable distribution of the resources and eradication of social evils like untouchability was a part of the movement for social justice which is a part of the UN's mission on overall Sustainable Development. His own frugal life style was an example that illustrated how one can live within the constraints imposed by economic deprivation. However, it is equally true that this Great Soul also desired upliftment of all sections of the society so that they can live a contented life. His definition of a contented life was in stark contrast to the luxurious life style of the rich which he abhored.That The Mahatma was correct is now borne out by the concerns about the unbridled consumption and its deleterious effects on the current as well as future generations.

There are examples of Nature lovers in the west who have also changed their life style but these are a very small minority. It is virtually impossible to change the mindset of a complete society in a single generation. Thus we will have to live with continued exploitation of the limited resources and as the population grows the exploitation will also grow. The focus then should also be on stopping the population explosion if not reversing it. This is also a rather difficult challenge because of the means to be adopted for meeting it. The forced sterilization in China's one family-one child policy naturally does not fit into the UN's Human Rights oriented approach (the latest reports suggests that China has stopped it). The approach must be conciliatory rather than forcible. In a country like India, the

most important reason for the increase in population is the great urge for a male child supposed to ensure continuity of the patriarchal family set up. Examples of couples having more than a half a dozen female children are not rare. This happened because the couples wished a male child and when they did not get it the first time, they tried a second, third time and so on till either they got a male child or stopped trying in sheer frustration. Most unfortunately this is more common to the poor/deprived sections bereft of education and hence easy prey to wrong beliefs/traditions. Changing the beliefs/traditions in a single generation is as difficult as changing the life style mentioned above. This will require a highly concerted effort on the part of the national, state and local government bodies.Evidently, funding is available but the will to implement a democratic change is lacking. Television is a powerful tool for educating the masses because it has reached the remotest parts of India in the local languages. This medium needs to be given more attention.

Education is the greatest asset of a society. It has not only the power to eliminate deep rooted evil practices but also to improve on the societal patterns. The mindset required for peaceful co-existence can be created through education. The totally unnecessary armed conflicts between nations are a big drain on the precious resources and hence must be avoided**. Education here does not imply a society which can read and write but it refers to a society at peace with itself and its surroundings** which is ***this author's interpretation*** of Rachel Carson's argument. An educated person is not necessarily a cultured person (*un homme tre comme ill faut*) in this sense. The UN Conference on Environment and

Development, 1992 **and the Earth Summit stressed the importance of Education as a tool for better implementation of the policy of Sustainable Development.** Chapter 36 of Agenda 21 and all subsequent UN Conferences have clearly acknowledged Education as a facilitator for changes in Societal outlook necessary for implementing Sustainable Development. Realizing the importance of Sustainable Development and the pivotal position of education in achieving it, UNESCO have declared 2005-2014 as the Decade of Education for Sustainable Development (DESD). In the opinion of this author this concept of Education for Sustainable Development needs to be included in all educational programmes.**However, it is of utmost importance to Administrators and Engineers. The first category decides the Governmental policies and their implementation. The second category has the very important role of providing the Technologies for Sustainable Development. Clearly in the absence of such Technologies Sustainable Development will not be achieved.**

Sustainable Development is closely connected with all branches of Engineering and Technology. Indeed, all such programmes should include that part of Sustainable Development related to the particular branch. In Electrical Engineering all aspects of sustainable generation, transmission and distribution of electricity may be included. Civil Engineers should be taught sustainable methods of construction involving alternate raw materials yielding long life. Architects should have courses on designing buildings which consume minimum electricity (abundant sunlight-less need for lamps).Chemical Engineers should have courses on efficient utilization of precious raw materials (high atom efficiency),energy

efficient, zero discharge processes, smaller plants, sustainable separation processes (Membrane Separations vis-à-vis conventional ion exchange process) ,etc.Mechanical/Automobile Engineers may have courses dealing with the development of IC engines running on alternate green fuels. An important essential part of all these programmes should be on energy conservation, Green technologies and prevention of all types of pollution. Besides, the typical technical parts mentioned above, all Engineering and Technology programmes should also contain the socio –economic aspects of Sustainable Development as enshrined in its definition by the UN. A full course on Sustainable Development may also be taken up by Universities/Institutions which have multiple disciplines required to cater to it. Such a course is already planned by the Asian Institute of Technology in Thailand.

As a final step, besides Engineers and Technologists, a course comprising the basic tenets of Sustainable Development must also be an integral part of the training imparted to all civilian bureaucrats/administrators, Indian Institutes of Management,etc.