

## Science, Technology and Innovation for A Clean, Green and Healthy Nation



Clean, green and healthy are some common words of discussions in the context of planning and development since days of the evolution of the concept of welfare economics. It was started with measuring utility in terms of monetary value of social welfare, where life expectancy, per capita income, literacy, employment rate, etc. are considered as indicators, instead of only Gross Domestic Product (GDP) to measure growth . The progression of idea led to the concept of Human Development Index (HDI), with broad consideration of long and healthy life, knowledge and standard of living, taking into account Gender Development Index (GDI) considering variation of situation in the context of man and woman.

However, all these approaches are more or less anthropocentric in nature where status of ecosystems was not in prime consideration in assessing human progression. Brundtland Commission's Report on sustainability brings new light to the concept of sustainable development by interlinking ecology, economy and society and providing the core functionality of Sustainable development .

Here, ecosystem or ecological sustainability deals with eco-system integrity, carrying capacity, protecting and managing biodiversity. Economic sustainability focuses on growth, development, productivity and benefits at grassroots; whereas, social sustainability focuses

on equity, empowerment, accessibility, participation, sharing, cultural identity and institutional stability. In the contemporary period after reviewing through the challenges of development, Millennium Development Goals (MDG) were conceptualized in 2000. The MDG focussed on eradicating poverty and hunger, attaining universal primary education, gender equality and empowerment, reduce child mortality, improve maternal health, and ensure environmental sustainability through its respective goals.

Later on, after reviewing the progress of MDG in July 2014, the UN General Assembly's Open Working Group (OWG) proposed a new set of agenda with 17 goals to be put forward for the General Assembly's approval in September 2015. That document set the ground for Sustainable Development Goals (SDGs) and the global development agenda spanning from 2015-2030. In SDG, cleanliness, environmentally sound sanitation and health focused with emphasis including No poverty, Zero hunger, Good health and Wellbeing, Clean water and Sanitation, Responsible consumption and production, Climate action, Life below water, Life on land through its goals -1,2,6, 12,13, 14 and 15 along with other focuses. It is noteworthy that in the spirit of SDG, India also launched its own mission of Clean India ( *Swachh Bharat Abhiyan*) in 2014. In this perspective leveraging through application of science, appropriate technological facilitation and capacity building are the means for implementation of goals of SDG and other national missions.

Therefore the focal theme for National Children's Science Congress – 2018 and 2019 has been decided as “**Science, Technology and Innovation (STI) for a Clean, Green and Healthy Nation**”. The focal theme has been designed considering the following operational definition and desired dimension

In fact, natural resources in general, and water in particular, along with sanitation and health are integral parts of ecosystem, economy and society. Sustainability of an ecosystem, economy and society depends on sustainable natural resource management, water and sanitation related practices and their management; which regulate the status of health and environmental security. Ecological base of a region with its abiotic and biotic attributes determine the state of availability of natural resources and ecological services. Overuse of natural resources and associated practices are responsible for degradation of ecological security. When the amount of exploitation of natural resources exceeds its carrying capacity, it gives rise to ecosystem disturbances with implications on ecosystem's health. On the other hand, practices of sanitation are a major responsible factor not only for degradation of water quality but also for degradation of environmental services from an ecosystem.

“Sanitation generally refers to the provision of facilities and services for the safe disposal of human and domestic wastes. The word ‘sanitation’ also refers to the maintenance of hygienic conditions through services such as garbage and wastewater management.”<sup>11</sup> Hence, hygiene is linked to sanitation, which refers to conditions and practices that help to maintain sound health and prevent the spread of diseases. Hygiene includes all circumstances and practices, lifestyle issues, premises and commodities that endanger a safe and healthy environment.

Hygiene in home and everyday life settings plays an important role in preventing spread of infectious diseases. It includes procedures used in a variety of domestic situations including hand hygiene, respiratory, food and water and general home hygiene (hygiene of environmental sites and surfaces), care of domestic animals, and home healthcare (the care of those who are at greater risk of infection etc.

Scientific understanding, analysis and interpretation on such issues help in developing appropriate technologies for harnessing water, its wise usage and management as well as treatment and storage for drinking water, along with managing sanitation according to the

**Table-1. Operational definition of key words mentioned in the focal theme**

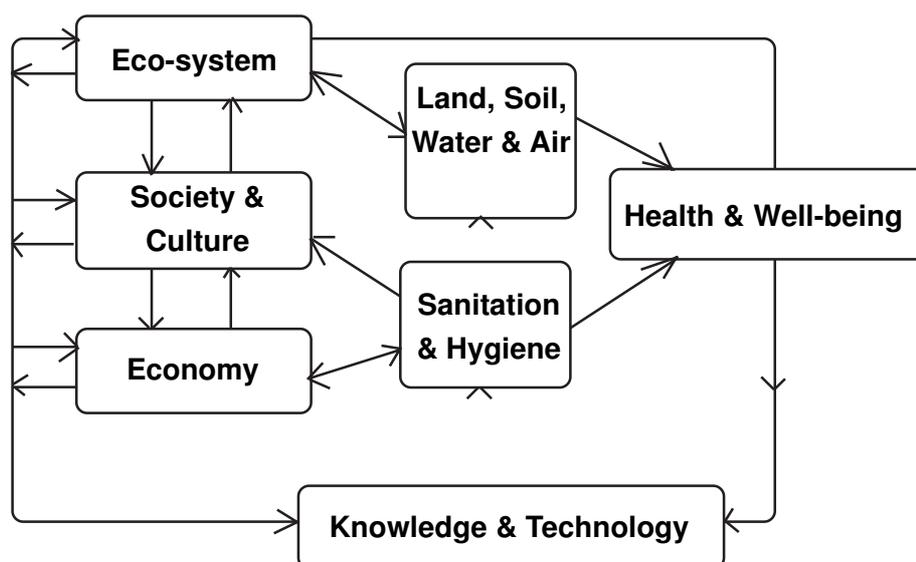
Key aspects	Broad view points	Desired dimension of outcome
Science	System of acquiring knowledge, following steps of observation, measurement, classification, comparison, analysis, interpretation, summarization, conclusion.	Leads to – From 'known to unknown or General to specific'.
Technology	The branch of knowledge that deals with the creation and use of technical means and their interrelation with life, society, and the environment.	Application of knowledge and understanding for practical ends. A solution (in certain cases increase of efficiency) derived through application of knowledge by certain processes and devices. Where process stands for principle followed and device can be means to address the problem.
Innovation	New idea, process, device or method.	It may be a new process/ approach/ means/ device/ product which helps in managing, maintaining and facilitating green, clean and healthy society for subsequent sustainable nation building
Green	A concept leading to environmental or eco-system sustainability (considering both the physical and human environment).	An approach/process/means to attain environmental sustainability For maintaining the carrying capacity of an ecosystem which comprises both manmade and natural elements
Clean	State of hygienic condition with absence of contamination, dirt, infection, adulteration (as per the standard derived by national norms, rule, law, act etc.)	An approach/process/means to attain the clean state linking sustainability of physical and human environment.
Healthy	It is the state of normal balanced situation in case of physical environment and a sound state of physical and mental condition.	An approach/process/means to attain ecosystem wellbeing.
Nation	A Nation is a country with its well defined physical, environmental, social and political structure and state. It also stands for people of the country. In this context how our issues of study or solution help in progress of the nation towards sustainable development.	An approach/process/means to attain national growth and development with the principle of "think globally and act locally".

principles of Reduce, Re-use and Recycle (3Rs). Pondering on such areas with overt local and regional issues may lead to innovative thinking and new solutions. At the same time, there is a need for societal and community mobilization to develop ideal scientific practices of hygiene management at individual, family and community levels. In the inter-connected world, issues of natural resource management, maintenance of balanced ecosystem sanitation and human health security is a global, national, as well as regional and local issue.

### Frame work

While considering the overall health of nation, one cannot ignore the role of society and culture and its interconnectedness to livelihoods, lifestyles and above all sustainable progress. Clean and Green technologies and practices which, by definition, have positive impact on the ecology, economy and social health of a nation and plays a very important role to foster sustainability in the society.

One should also find out how indigenous knowledge based systems and practices were evolved from local experience, economic practices and resource management approach which have added values to overall health of the society. Evaluation, validation, re-approaches



of such systems are the key to tackle impending dangers of resource destruction, climate change risks etc. apart from the commonly visible negative impacts due to irrational uses of non-renewable energy sources, technologies which have negative impacts on the ecosystems.

With these perspectives the following sub-themes have been proposed under the focal theme of National Children’s Science Congress to promote the spirit of inquiry based science learning by the children in the year 2018 and 2019 based on their curricular, observational and experiential learning in their immediate neighbourhoods.

For convenience of the children, the focal theme has been narrowed down to the following five sub-themes-

- I. Ecosystem and Ecosystem Services.
- II. Health, Hygiene and Sanitation.
- III. Waste to Wealth
- IV. Society, Culture and Livelihoods
- V. Traditional Knowledge Systems.

### **Meeting point for inclusiveness:**

It is very essential to guide the Person with Disabilities (PWD) for NCSC project work with respect to their potentialities. In relation to the present focal theme and sub-themes, it is expected that one can think on the specific issues related to access to Natural Resources Management (NRM), Health, Energy, Food, Nutrition, Hygiene (specially for people with orthopedic impairments having no mobility crawling on streets etc), equity, quality, impact due to lack of NRM to PWDs, study related to problems of PWDs in certain hostile ecosystems, problems related to Disasters with special focus on PWDs as they are the most affected ones, problems of livelihoods (and lifestyles also) for PWDs etc. One can also think of accessibility audit of public buildings, validating inclusive, innovative teaching methodologies, studies related to validation and field testing of accessibility gadgets and improving them with users' feedback, and many more.

### **End note**

1. <http://www.economicdiscussion.net/essays/essay-on-welfare-economics/18053>
2. <http://policonomics.com/fundamental-theorems-of-welfare-economics/>
3. [http://hdr.undp.org/sites/default/files/hdr2016\\_technical\\_notes.pdf](http://hdr.undp.org/sites/default/files/hdr2016_technical_notes.pdf)
4. Pisani Jacobus A. Du (2006) " Sustainable development- historical roots of the concept", Environmental Science, 3 (2), 83-96; <http://www.tandfonline.com/doi/pdf/10.1080/15693430600688831>
5. Kahn, M. 1995 . "Concepts, definitions, and key issues in sustainable development: the outlook for the future". Pro-ceedings of the 1995 International Sustainable Development Research Conference, Manchester, England, Mar. 27- 28,1995,, Keynote Paper, 2-13.
6. McArthur John W. (2014), " The Origin of the millennium development goal" SAIS Review, vol. XXXIV, no. 2 (summer –fall), pp.5 -24 ; <http://johnmcarthur.com/wp-content/uploads/2015/01/SAISreview2014mcarthur.pdf>
7. <http://www.sdgfund.org/mdgs-sdgs;>
8. <http://www.undp.org/content/undp/en/home/sustainable-development-goals.html>
9. [http://www.pmindia.gov.in/en/government\\_tr\\_rec/swachh-bharat-abhiyan-2/](http://www.pmindia.gov.in/en/government_tr_rec/swachh-bharat-abhiyan-2/)
10. It is the benefits obtained from ecosystems. These include provisioning services, such as food and water; regulating services, such as regulation of floods, draught, land degradation and disease; supporting services such as soil formation and nutrient cycling and cultural services such as recreational, spiritual, religious and other non-material benefits.
11. <http://www.who.int/topics/sanitation/en/>; retrieved on 27.04.17
12. <http://www.who.int/topics/hygiene/en/>; retrieved on 27.04.17
13. UNSECO Discussion paper on " Water in the post-2015 development agenda and sustainable development goals" UNESCO International Hydrological Programme Paris, France 2014