

GOVERNMENT OF ASSAM,
OFFICE OF THE DIRECTOR OF HIGHER EDUCATION, ASSAM,
KAHILIPARA, GUWAHATI-19.

No.DHE/EG/Misc-25/2017/85

Dated Kahilipara, the 06/09/2019

From: - Smti G. Phukan, ACS
Director of Higher Education, Assam
Kahilipara, Guwahati-19.

To,

The Principal,
All Provincialised & Govt. Colleges/Mahavidyalaya.
P.O: Dist:

Sub :- Requesting for facilitating Participation of Teachers in the National Children's
Science Congress (NCSC) 2019 in Assam.

Ref :- Letter No. ASREC/Env/1930/2019/1747 dtd. 07/06/2019.

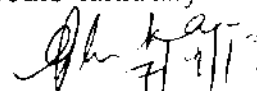
Sir,

With reference to the subject cited above, I would like to enclose herewith a letter alongwith relevant documents received from Director and President, State Organizing Committee National Children's Congress 2019 Assam in connection with participation of Teachers in the National Children's Science Congress (NCSC) which has already started in Assam.

In this connection, you are requested to depute the concerned faculties of your college, engaged in the programme to depute in the National Children's Science Congress (NCSC) 2019 in Assam without fail.

Your Co-operation in the programme is highly solicited.

Yours' faithfully


Director of Higher Education, Assam
Kahilipara, Guwahati-19.
Dated Kahilipara, the 06/09/2019

Memo No.DHE/EG/Misc-25/2017/85-A

Copy to:

1. The Jt. Secretary to Govt. of Assam, Higher Education Department, Dispur, Guwahati-06.
2. The Director, Assam Science Technology and Environment Committee NCSC 2019, Assam BigyanBhawan, G.S. Road, Guwahati-05.

Director of Higher Education, Assam
Kahilipara, Guwahati-19.

অসম বিজ্ঞান প্রযুক্তিবিদ্যা আৰু পৰিৱেশ পৰিষদ
(বিজ্ঞান আৰু প্ৰযুক্তি বিভাগ, অসম চৰকাৰ)
Assam Science Technology and Environment Council
(Department of Science and Technology, Government of Assam)

Bigyan Bhawan, G.S. Road
Guwahati -781005
Assam, India
Website: www.astec.gov.in



Telephone : 0361-2450646
2464621
Fax : 0361-2464617
E-mail : astec@rediffmail.com

Dr. Arup Kr. Misra
Director
& President
State Organising Committee
NCSC-2019, Assam

ASTEC/Env/1930/2019/1747

To,

The Director of Higher Education, Assam
Kahilipara
Guwahati-19

Sub: **NATIONAL CHILDREN'S SCIENCE CONGRESS (NCSC) 2019 IN ASSAM
- REQUEST FOR FACILITATING PARTICIPATION OF TEACHERS**

Ref: Letter No. DHE/EG/Misc-25/2017/36 Dated Kahilipara the 14/08/2018

Sir,

You will be happy to know that the District and State Level activities of National Children's Science Congress (NCSC) for the year 2019 have already started.

NCSC is a programme of the Department of Science and Technology, Government of India. It is a nationwide science communication activity for the children in the age-group of 10-17 years. This Council is the State Coordinating Agency for Assam while Science and Technology Department, Govt. of Assam extends necessary support in the programme.

The support and co-operation of your good office always have resulted in the improvement of performance of the children. This year also it is expected that the Directorate of Higher Education would issue necessary direction to the Colleges and Institutes of Higher Education to take up these activities as part of their outreach programme and extend full cooperation to the District Organisers, Resource Persons, Guide Teachers and Evaluators by granting them necessary leave, thereby ensuring participation of large number of schools in this unique national event. Similar letter of previous year is enclosed herewith.

Your kind cooperation in this regard is solicited.

Encl: As stated above

ASTEC/Env/1930/2019/1747(C)

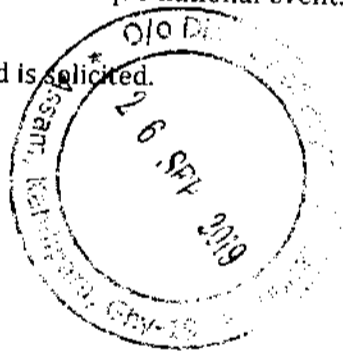
Copy to:-

- 1) The Principal Secretary to the Govt. of Assam, Higher Education Department, Dispur, Guwahati 781006 for your kind intervention in the interest of the children of the state.
- 2) The Deputy Secretary to the Govt. of Assam, Science and Technology Department, Dispur, Guwahati 781006 for kind information in the interest of the children of the state.
- 3) The District Coordinator and District Academic concerned requesting your active participation in the activities for the interest of the children of the state.
- 4) The Principal concerned with a request to spare his services as and when required for the interest of the children of the state.
- 5) Sri Romen Gogoi, State Co-ordinator, NCSC-Assam, No. 2 Bamungaon, PO Chengeligaon, Jorhat PIN 785010 for kind information.

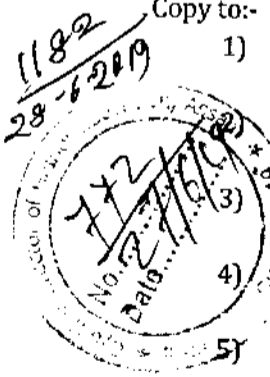
Yours faithfully,

(Director)

Date: 07/06/2019



(Director)



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27/8/19

(83) *[Handwritten initials]*

Head/EG/Env/
11.08.18

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03.10.18

STA (SG)
P. C. Sankar
AS AP
[Handwritten signature]
03/10/18

GOVERNMENT OF ASSAM,
OFFICE OF THE DIRECTOR OF HIGHER EDUCATION, ASSAM,
KAHILIPARA, GUWAHATI-19.

No.DHE/EG/Misc-25/2017/36

Dated Kahilipara, the 14/08/2018

From: - Smti G. Phukan, ACS
Director of Higher Education, Assam
Kahilipara, Guwahati-19.

To: **The Principal,**
All Provincialised & Govt. Colleges/Mahavidyalaya.
P.O: Dist:

Sub :- Requesting for facilitating Participation of Teachers in the National Children's Science Congress (NCSC) 2018 in Assam.

Ref :- Letter No. ASREC/Env/1864/2018/2412 dtd. 28/06/2018.

Sir,

With reference to the subject cited above, I would like to enclose herewith a letter alongwith relevant documents received from Dr. Arup Kr. Mishra, Director and President, State Organizing Committee National Children's Congress 2018 Assam in connection with participation of Teachers in the National Children's Science Congress (NCSC) which has already started in Assam.

In this connection, you are requested to depute the concerned faculties of your college, engaged in the programme to depute in the National Children's Science Congress (NCSC) 2018 in Assam without fail.

Your Co-operation in the programme is highly solicited.

Yours' faithfully

/

Director of Higher Education, Assam
Kahilipara, Guwahati-19.

Memo No.DHE/EG/Misc-25/2017/36-A

Dated Kahilipara, the 14/08/2018

Copy to:

1. The Principal Secretary to Govt. of Assam, Higher Education Department, Dispur, Guwahati-06.
- ✓ 2. The Director, Assam Science Technology and Environment Committee NCSC 2018, Assam Bigyan Bhawan, G.S. Road, Guwahati-05.



[Handwritten signature]
16/8/18

Director of Higher Education, Assam
Kahilipara, Guwahati-19.

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16/8/18

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List of District Coordinator and District Academic Coordinator of National Children's Science Congress

	District Coordinator	District Academic Coordinator
1.	Baksa Mr. Dilip Kumar Nayak AT, Kumarikata H.S.School Vill-Bahbari Kumarikata, PIN: 781360 Ph: 7002551764, 9854550268	Mr. Hemanta Kumar Das AT, Ramechuburi High School Vill-Dongpar Po-Dongpar PIN: 781368 Ph: 7002532592, 9864475937
2.	Barpeta Mr. Kuldeep Das Secretary, SHUBHAM Barpeta, Near Girls' College Sundaridiya, PIN: 781301 Ph: 8638881500, 9854124733	Mr. Malay Kumar Barman Assistant Professor, Dept of Physics, M.C.College, Barpeta Chandanpur, Barpeta Road PIN: 781315 Ph: 9435124662
3.	Biswanath Mr. Ridul Kr Das Assistant Teacher, Pavai High School Pavai, PIN: 784176 Ph: 7002626348, 9435383121	Mr. Ripunjoy Bordoloi Asstt. Teacher, Chengamari High School Chengamari PIN: 784175 Ph: 9864366161, 8473804833
4.	Bongaigaon Mr. Dilip Kr. Sarma Assistant Teacher, J.B. High School Mulagaon, PIN: 783380 Ph: 9957903990	Mr. Chakradhar Das Head, Dept. of Electrical Engineering Bongaigaon Polytechnic PIN: 783380 Ph: 9954869459
5.	Cachar Mr. Ragib Hussain Choudhury Assistant Teacher (Science) East Kazidahar High School Kazidahar Part I, PO: Kazidahar, PIN: 788115 Ph: 94013 02861, 8761932181	Mr. Abhijit Nath Asst. Prof. GC College, Silchar, GC College Sukanta Sarani, NS Avenue, Silchar PIN: 788005 Ph: 9401275639, 9435378795
6.	Charaideo Mr. Noren Bikash Changmai Asstt. Teacher, BPBM Higher Secondary School Sonari Parbatipur PO: Sonari, PIN: 785690 Ph: 9707332856	Mr. Aditya Borthakur Asstt. Teacher Mothurapur Higher Secondary School Mothurapur, PIN: 785685 Ph: 7636978236
7.	Chirang Mr. Ananda Prakash Mushahary Principal, Amguri HS School, Vill & PO Amguri Bazar, PIN: 783393 Ph: 9435314158	Mr. Danda Dhar Dev Headmaster, Raja Ajit Narayan Dev High School Vill & PO- Sidli Ph: 9957632270
8.	Darrang Dr. Kangkan Sarma Assistant Professor, Dept. of Physics Mangaldai College Mangaldai, PIN: 784125 Ph: 9435825378	Dr. Simajyoti Assistant Professor, Deptt. of Zoology, Mangaldai College PIN: 784125 Ph: 8638172540
9.	Dhemaji	

	Megha Nath Teye A/ H.M, Frontier United High School Archipathar Bhagawan, PIN: 787059 Ph: 9435258371	Mr. Kandorpo Tamuli A/T, Dhemaji Higher Secondary School Dhemaji PIN: 787057 Ph: 9859915846
10.	Dhubri	
	Er. Nazrul Islam Post Graduate Teacher(PGT) Agomani H.S.School Agomani, PIN: 783335 Ph: 03662-282255/9435849132/9085512065	Mr. Emdad Hussain I/C, Head Master, Khash Khamar M.E.School Bidyapara Part-II PIN: 783323 Ph: 9435129715
11.	Dibrugarh	
	Dr Jitu Ranjan Chetia Sr Instrument Officer Department of Chemistry Dibrugarh University PIN: 786004 Ph: 9954481645	Mr. Mridupaban Phukan Free launch Wildlife Activist, Milan Nagar, Naharkatia, Dibrugarh PIN: 786610 Ph: 9401611270
12.	Dima Hasao	
	Mr. Sanjeevan Langthasa Teacher, Tularam Memorial Good Shephard School Gunjung, Haflong Ph: 7002541950, 9577954924	Ms. Hemlata Langthasa Teacher, Tularam Memorial Good Shephard School Gunjung, Haflong Ph: 6000871419
13.	Goalpara	
	Dr. Anjam Hussain Barbhuiya Assistant Professor, Department of Zoology, Golapara College Goalpara, PIN: 783101 Ph: 9435379603, 7002215815	Mr. Anup Kumar Boro Assistant Teacher, Daranggiri H.S. School P.O. Daranggiri, Dist. Goalpara, Pin-783134 PIN: 783134 Ph: 9508728175, 9678022630
14.	Golaghat	
	Mr. Atul Kr. Dutta Subject Teacher, Gurjagani H.S. School Halodhibari Barua Bamun Gaon, PIN: 785618 Ph: 9435418064	Mr. Atonu Barukial B.Sc. Teacher, Buthbari S.B. School Kamargaon PIN: 785619 Ph: 9435843704
15.	Hailakandi	
	Mr. Lutfur Rahman Barbhuiya Cluster Resource Centre Co-Ordinator, Block Elementary Education Office, Lala C/O. Principal, Royal High School, Hailakandi Ratanpur Road, PIN: 788155 Ph: 9435567357	Dr. Pinak Pani Nath Choudhury Asstt. Prof., S. College, Hailakandi Town Wand No.-15 Tool Road, Pin- 788151 PIN: 788151 Ph: 9435883155
16.	Hojai	
	Mr. Tara Sankar Dutta Lecturer, Krishna Bora B.Ed College Lanka, PIN: 782446 Ph: 9435310720/9859691960	To be nominated

(81) 20

17.	Jorhat	
	Mr. Dhiren Kr. Gogoi Science Teacher, Dahotia Middle School, Dahotia, Dohabora Road Jorhat, PIN: 785001 Ph: 9854172496, 9678673114	Mr. Azahar Inamul Hussain Asstt. Teacher, Namgarumara B.B. H.S. School Namgarumara Ph: 8638458872
18.	Kamrup	
	Mr. Aitaf Hussain Khandakar HM, Kamrup Vidyapith H School Vill & PO: Barpalaha, PIN: 781121 Ph: 9101077891	Mr. Tirtha Mani Deka A.T. (Science), Pub Par Madartola H S Baruajani, PIN: 781380 Ph: 9864509631
19.	Kamrup (Metro)	
	Mr. Manab Deka Associate Prof., Pragjyotish College Santipur, Guwahati Bharalumukh, PIN: 781009 Ph: 0361-2544531/0361-2527222, 9435041524	Mr. Tarun Deka Surveyor, Survey of India Ganeshguri, Guwahati PIN: 781006 Ph: 9854120660
20.	Karbi Anglong	
	Mr. Bhabananda Khakhlary Assistant Teacher, Howraghat English Medium School Ward No. 2 Howraghat, PIN: 782481 Ph: 9957310567	Mr. Mridupaban Borgohain Asstt. Teacher, Khorsing Terang High School, Joparajan Joparajan PIN: 782480 Ph: 7002924104
21.	Karimganj	
	Mr. Gadapani Sarma Asst. Prof, Dept. of Economics Karimganj College Karimganj, PIN: 788710 Ph: 7002200337/ 9401418400 (Mobile).	Mr. Suroj Kanoo Science Teacher, Lowairpoa H.S. School Lowairpoa PIN: 788726 Ph: 9401418400, 9401848695
22.	Kokrajhar	
	Mr. Chakramani Brahma Asstt. Teacher, Kokrajhar Girls' H.S. School RNB Road Kokrajhar, PIN: 783370 Ph: 9435027181, 9101423360	Mr. Khanindra Nath Brahma Asstt. Teacher, Dotma H.S. School P.O.- Dotma, Dist.- Kokrajhar PIN: 783347 Ph: 9957042130
23.	Lakhimpur	
	Dr. Nikhil Hazarika Librarian, Madhabdev College Narayanpur Dikrong, PIN: 784164 Ph: 9854273684, 8437813577	Mr. Biman Handique Assistant Teacher, Gezera HS School Dhakuakhana, Lakhimpur PIN: 787055 Ph: 8011380698
24.	Majuli	
	Dr. Narayan Chandra Sharma Associate Professor, Majuli College Kamalabari, PIN: 785106 Ph: 9435835025	Dr. Prasanta Dolakasharia Headmaster, Auniati High School P.O.Auniati, Via : Kamalabari PIN: 785106 Ph: 9508777031/9401113374;

25.	Morigaon	
	Mr. Mrinal Kumar Hazarika Assistant Teacher, Dandua Secondary School Morigaon Town, Ward No -8 Niz Dandua, PIN: 782104 Ph: 9435223171	Mr. Imdad Ali Asstt. Teacher, Doloichuburi High School Vill- Borigaon, P.O- Solmari PIN: 782104 Ph: 9864671873
26.	Nagaon	
	Mr. Bhabendra Boruah Asstt. Teacher, Missa High School Niz Missamukh, PIN: 782138 Ph: 8876391337, 7002427827	Dr. Smarajit Ojah Lecturer, Dept. Of Geography Nowgong Girls College, Nagaon, PIN: 782002 Ph: 94354-79403
27.	Nalbari	
	Mr. Pradip Mahanta Dakhin Barbhag Girls High School Arngamow Vill & PO Kotalkuchi, PIN: 781347 Ph: 9864037105, 7664000000	Dr. Samujjal Bharadwaj Dental Consultant, Jonaki Kareng, Vill & P.O-Kazipara, PIN 781341 PIN: 781341 Ph: 7399933675
28.	Sivasagar	
	Mr. Avijit Buragohain Science Facilitator, Nazira H.S. & M.P. School Old Amulapatty (GohainChuk) Sivasagar, PIN: 785640 Ph: 9954434220	Mr. Gauranga Mohan Sharma Assistant Teacher, Dikhowmukh H.S. School Ward No.-6, Kachari Line, Amguri, PIN: 785680 Ph: 9864592173
29.	Sonitpur	
	Dr Palash Moni Saikia Associate Prof., Darrang College Tezpur, PIN: 784001 Ph: 9435082506, 8638815719	Mr. Ganesh Sarmah Asst. Teacher, Dhekiajuli H. School Dhekiajuli, PIN: 784110 Ph: 9854189889
30.	South Salmara and Mankachar	
	Mr. Rofiul Alam Ahmed District Programme Officer (AS&ST), SSA, South Salmara Mankachar, Office of the DMC, SSA, South Salmara Mankachar DC Office Campus, Hatsingimari, PIN: 783135 Ph: 9678685201	Dr. Mohammed Ali Asstt. Professor, Hatsingimari College PO Hatsingimari PIN: 783135 Ph: 76896298960
31.	Tinsukia	
	Mr. Diganta Kumar Bhajani Science Teacher, Mechaki High School Saikhowaghat, Assam., PIN: 786154 Ph: 9401946212(M) / 9706778801(W)	Mr. Monoranjan Sonowal A/T, Phillobari High School Phillobari, PIN: 786160 Ph: 9101840134(M)
32.	Udalguri	
	Mr. Gajendra Baruah Coordinator, ASC, Khoirabari, Khagara High School, Nizchinakona Barangabari (Khoirabari), PIN: 784522 Ph: 9864678399	Mrs. Deepa Sarma PGT, Orang Higher Secondary School Dist- Udalguri PIN: 784114 Ph: 7002236508
33.	West Karbi Anglong	
	Mr. Biren Deka Asst. Teacher, Kheroni Girl's High School Hamren Kheroni, PIN: 782448 Ph: 7896225053	Mr. Pranab Sarma A/T, Hawaipur High School Hawaipur, West Karbi Anglong, Hamren PIN: Ph: 9957903788, 9678615869



27th NATIONAL CHILDREN'S SCIENCE CONGRESS



STATE LEVEL CHILDREN'S SCIENCE CONGRESS-2019, ASSAM

Focal Theme-

**Science, Technology and Innovation (STI)
for Clean, Green and Healthy Nation**



A Programme of

**National Council for Science and Technology Communication
Department of Science and Technology, Govt. of India
Technology Bhavan, New Mehrauli Road, New Delhi - 110016**

**In Assam the programme is also supported by
Science and Technology Department Govt. of Assam**

State Co-ordinating Agency



ASSAM SCIENCE TECHNOLOGY AND ENVIRONMENT COUNCIL

in association with



SSEAEP, Nagaon



STO, Silchar



BJVV, Assam

CONTACT FOR DISTRICT LEVEL PARTICIPATION

27th National Children's Science Congress 2019

REGISTRATION FORM -A

Fill this form in Capital letters and submit to your District Coordinator

1. STATE										
2. DISTRICT										
3. TALUKA										
4. TITLE OF THE PROJECT										
	5. SUB-THEME CODE									
6. LANGUAGE USED						7. AREA [RURAL/URBAN]				
8. NAME OF THE INSTITUTION										
Address										
	PIN									
9. NAME OF GROUP LEADER										
	Gender [Male/Female]									
Date of Birth		/		/		AGE		Whether has disability (Y/N)		Type of disability (see code)
Address										
PIN			Phone				E-mail ID			
10. FATHER'S NAME										
11. MOTHER'S NAME										
12. NAME OF GROUP MEMBER										
	Gender [Male/Female]									
Date of Birth		/		/		AGE		Whether has disability (Y/N)		Type of disability (see code)
Address										
PIN			Phone				E-mail ID			
13. NAME OF GUIDE										
	Gender [Male/Female]									
Address										
PIN			Phone				E-mail ID			

Name & Signature of District Coordinator

Name & Signature of Head of Institution

Date:

Sub Theme Codes : 01-Ecosystem and Ecosystem Services, 02-Health, Hygiene and Sanitation, 03-Waste to Wealth, 04-Society, Culture and Livelihoods, 05-Traditional Knowledge Systems

Types of Disabilities /Codes: Visual Impairment: VI, Low Vision: LV, Totally Blind: TB, Mental Retardation: MR, Hearing Impairment: HI, Speech Impairment: SI, Multiple Disability : MI, Learning Disability : LD, Autism: AUT, Orthopedically Impaired: OI, Cerebral Palsy : CP

Age should be between 10-17 years as on 31st December of the current calendar year
District Coordinator to verify the age of all participants with Birth Certificates.

Copy of this form to be enclosed in the Project Written Report

WHAT IS CHILDREN'S SCIENCE CONGRESS:

Children's Science Congress (CSC) is a forum of children of the age-group of 10-17 years, both from formal school system as well as from out of school, to exhibit their creativity and innovativeness and more particularly their ability to solve a societal problem experienced locally, using the method of science.

OBJECTIVES:

- To provide a forum to children to pursue their natural curiosity and quench their thirst for creativity.
- To relate the learning of science to the environment around with hands-on activities.
- To encourage children to visualize the importance of natural resources of the country and environment around and make them aware of conservation of clean and natural environment.
- To stimulate scientific temper through the use and internalisation of the method of science i.e observation, collection of data, experimentation, analysis and then arriving at conclusions.

WHO IS ELIGIBLE TO PARTICIPATE:

- Any child in the age group of 10-17 years can participate in the Congress. It is not necessary that a participant should be a school/college student.
- A child scientist cannot participate in the National Level CSC two times, as a group leader, in the same age group.
- There will be 2 (two) age groups. First is 10 to less than 14 years and the other is 14 to less than 17 years. To determine the age, the base will be 31 December of the calendar year.

However, Group of Children with Disability will have no restrictions of age. Usually sixth to ninth standard children will come under junior group and tenth to twelfth standard children under senior group, irrespective of their ages. Children with different disabilities can form one team, so that both the team members can complement each other with their abilities and the total disability of the team can be nullified. A group may also consist of one of the two Children with disability.

Language is not a barrier for participation in National Children's Science Congress- children can carry out their project in any schedule language or any language which is recognised as the medium of education by the respective State Government or Central Government in India.

WHAT YOU HAVE TO DO:

The project is to be done by a group of two children. Select an important and significant issue of your area, based on the focal theme as the topic of your work. This may also be a problem. You should be sure why you have selected this topic. Try to find out the causes and interrelationships. Minute observation of the issue is a must. Collect relevant data, through experiments/ survey. Analyse the results methodically and try to find out a solution. These works are to be done under the supervision of a Guide. The Guide may not be a school teacher rather any person (but not your relative) with a fair knowledge about method of science and have the aptitude of dealing with children can guide the CSC project.

HOW TO PROCEED:

- Fill up the attached Registration Form and submit to your District Co-ordinator as soon as possible.
- Make a group of 2 children with your friends of the same age group. Now select a guide to facilitate your project work. A guide can be your teacher, a professional in the field of your interest area or an ex-child-scientist. Your parents/guardians cannot be the guide of your project.
- Some ideas about projects are given here. It is not that you have to choose these ideas only. Children's Science Congress always appreciates new ideas, concepts and innovation.
- Collect/draw a map of the geographical area of your project. Identify the location of that particular area in the map of your district, state and country so that person from any part of India can have a knowledge of the location of the work-area. Show in the map the relevant information collected during the project wherever necessary. Data collected should be accurate and relevant to the project.
- Prepare a plan for taking up the activities you have proposed and start systematically. You should not confine yourself only on survey. Try to do some experiment and practical work yourself. Choose a small but important problem. Analyse the data collected to arrive at conclusion. Suggestions for follow up action should also be given.

NCSC-2019

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 to help in progress of the nation	An approach/process/means to attain national growth and development with the principle of "think globally and act locally".

As we know, 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. Exploitation of natural resource beyond its carrying capacity leads to ecosystem disturbances with implications on ecosystem's health. On the other hand, faulty sanitation practices not only degrade water quality, but also degrade the quality of ecosystem services. Scientific understanding, analysis and interpretation on such issues help in developing appropriate technologies for overall management of natural resources along with managing sanitation according to the principles of reduce, re-use and recycle (3Rs). Focus on local and regional issues in these sectors may lead to innovative thinking and new solutions.

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 have positive impact on the ecology, economy and social health of a nation play a very crucial role to foster sustainability in the society. Further the role of indigenous knowledge based systems and practices which have evolved from local experience, economic practices and resource management approaching maintaining overall health of the society also needs attention. Evaluation, validation, re-adaptation of such systems are the key to tackle impending dangers of resource destruction, climate change risks etc. apart from the commonly visible negative impacts of injudicious use of natural resources and inappropriate technologies.



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 -

1. Ecosystem and Ecosystem Services.
2. Health, Hygiene and Sanitation.
3. Waste to Wealth
4. Society, Culture and Livelihoods
5. Indigenous Knowledge Systems.

Sub-Theme I

Ecosystem and Ecological Services

Ecosystem is a community of plants and animals interacting with each other in a given area, and also with their abiotic (non-living) environments. The abiotic environments include weather, climate, sun light, soil and water. The functional relationship within and between biotic and abiotic components ultimately helps the organisms to survive within an ecosystem. These organisms in the ecosystem receive energy to support their metabolism either directly from the sun (producer organisms) or indirectly via the food chain (consumers feeding on plants or through predation, parasitism, or decomposition etc) Among all biotic components, microorganisms are highly versatile and can extract nutrients from soil, water, food, or other organisms.

Depending on several factors like distribution of organisms, the biophysical environment and spatial interactions, 10 categories of eco-systems have been identified by the international community as:

1. Marine; 2. Coastal; 3. Inland Water; 4. Forest; 5. Dryland; 6. Island; 7. Mountain; 8. Polar; 9. Cultivated; 10. Urban

Ecological services are the benefits arising out of from the ecological functions of the ecosystems. Such services benefit all living organisms in the niche, including animals, plants, and human beings. The concept of ecosystem services was given increased public recognition through the Millennium Ecosystem Assessment (MEA) launched in 2001 by the UN Secretary General and completed in 2005. These services can be classified as-

- Provisioning Services - refers to various products obtained from ecosystems e.g. Food, Fresh Water, Fuel Wood, Fibre, Biochemicals, Genetic Resources.
- Regulating Services - refers to benefits obtained from regulation of ecosystem processes e.g. Climate regulation, Water cycle regulation, Disease regulation, Pollination etc.
- Socio-cultural Services - refers to non-material benefits obtained from the ecosystems e.g. Recreational, Aesthetic, Educational, Heritage, Spiritual.
- Supporting Services - refers to services that are necessary for all other ecosystem services e.g. Soil formation, Nutrient Cycling, Primary Production.

India is one of the mega-diversity countries in the world enriched with diverse ecosystems and bio-geographical features. Based on the geographical, climatic and biological features, the entire sub-continent has been divided into 15 Agro-ecological Zones, each of which has distinct features and different types of ecosystems having unique characteristics and significance. However, all these ecosystems across the ecological zones face various challenges. These challenges can be categorized as Natural and Anthropogenic challenges. Natural challenges are climate induced viz. impact of weather and climatic anomalies, natural calamities and disasters, etc. Anthropogenic challenges emerged with growth of human population, in the form of agricultural, mining, industrial activities and expansion of human settlement including urbanization that led to various short and long term impacts on ecosystems.

The modification of the ecosystems impacts ecosystem services which are being manifested in various ways. In post industrial revolution period, development of transport systems, urbanization and use of fossil fuel increased greenhouse gases in the atmosphere leading to global warming, climate change and related consequences. Rate of deforestation has also scaled up in an alarming rate. It is estimated that during 2000 and 2012, 2.30 million sq. km forests around the world were cut down. Deforestation causes depletion of biodiversity, changes in climate, soil erosion, desertification and triggers migration of indigenous communities apart from affecting regulatory ecosystem services. On the other hand, changes in land use pattern and lack of consideration of eco-sensitive approaches in land use planning lead to fragmentation of natural habitats, which impacts species persistence and ecosystem sustainability. Further, this also leads to replacement of native species by detrimental non-native species, resulting in biodiversity degradation and loss of integrity of the affected natural areas. Further, Anthropogenic influences on the wetlands, which are one of the most productive ecosystems of the world, have also resulted in degradation of these highly crucial ecosystems. For example, India lost 40% of its mangrove area during the last century. Mangroves loss reduces biodiversity, eliminate fish nursery habitat, adversely affects adjacent coastal habitats and eliminate a major resource for human communities that traditionally rely on it for numerous products and services.

While talking about the interaction of human being with natural environment, concepts like Community Conserved Areas (CCA) needs specific mention. These CCA are natural or modified ecosystems having immense biodiversity values and ecological services being conserved and protected by people through customary laws and practices. The CCAs includes sacred groves, panchayat and community forests, farm lands, wastelands, wellands, coastal habitats, heronries, wintering wetlands of birds, catchment forests, turtle nesting sites, pastures, desert ecosystems, river systems etc. In India, sacred groves are one of the prominent community conserved areas distributed in almost all the states. Presence of medicinal plants, wild relatives of cultivated species or wild cultivars of crop plants with better stress tolerance and productivity is highly significant in terms of the value of such groves. The role of sacred groves as resource forests offering both livelihood sustenance and ecological security is also of considerable importance apart from ecosystem functions like biodiversity conservation, aquifer recharge and soil conservation. But, these important biodiversity areas are also facing threats like pressure of increasing fodder and wood collection, rapid urbanization and developmental interventions such as roads, railways tracks, dams, etc. including commercial forestry, encroachment, proliferation of invasive species as well as changing cultural value systems

As we are aware that human being is completely dependent on healthy environments for their health and well-being. The integrity of peoples' food systems, culture and survival is intimately connected to the overall health of the environment. Recent decline in environmental quality, loss of biodiversity and environmental contamination combined with social, economic, political and cultural factors have threatened health and well being of people. That is why, understanding the ecosystems and the services provided by them as well as the nature of various interactions between man and ecosystem is crucial for a sustainable human society. Keeping this in view, this sub-theme has been introduced under the focal theme, with the following objectives-

- To improve the understanding on environmental components in a broader context
- To develop sensitivity and ability to assess the status, quality and timeline changes in the dynamics of ecosystems.
- To develop attitude of monitoring and analyzing the impacts of anthropogenic activities on the natural systems and to question the undesired changes caused to surrounding environmental components.
- S & T based innovative / practical interventions to address and mitigate the problems
- To promote community participation in management and governance of natural resources for clean, green and healthy environment to avail better ecological services.

The sub-theme will cover aspects related to the understanding of the ecology and ecological/ecosystem services including ecological niche, their assessments as to current status vis-a-vis the historical changes that occurred to the system, the reasons thereof causing the current degradation, if any as well as of preserving and augmenting the existing systems. It will also include solutions related to compensate the loss and restoration of original conditions, piloting activities to test and validate the remedial measures and application of innovative scientific and technological methods to preserve the integrity of natural cycles of the ecosystems with community participation.

Some project ideas:

- Ecological significance of the local wetland and impacts of anthropogenic activities on its ecosystem services.
- Sacred groves (orans) as ecologically important, community conserved areas.
- Mangroves: impacts due to anthropogenic effects, biodiversity, social, ecological and economic aspects.
- Application of GPS tool in studying distribution of particular plant or animal or group of species.
- Application of Geographical Information System - Remote Sensing (GIS-RS) techniques in studying ecosystem or species.
- Assessment of living and non-living components of an intermediate zone (Ecotone) and its associated conservation issues.

Sub-Theme-II Health, Hygiene and Sanitation

Health is the level of functional and metabolic efficiency of a living organism. The World Health Organization (WHO-2006) defined human health in its broader sense as "a state of complete physical, mental, and social well-being and not merely the absence of disease or infirmity." Over the last decade, there has been gradual focus on the relationship of human and environment (Brown, 1994) and thus emphasis has been given towards adoption of an 'ecological' approach for promoting health (Kickbusch, 1989) with the environment as an integral part of human development (Hancock, 1993a).

Hygiene is a set of practices performed to preserve health. As per WHO, "Hygiene refers to conditions and practices that help to maintain health and prevent the spread of diseases." In medicine and everyday life settings, hygiene practices are employed as preventative measures to reduce the incidence and spreading of disease. In the manufacturing of food, pharmaceutical, cosmetic and other products, good hygiene is a critical component of quality assurance.

Sanitation generally refers to the provision of facilities and services for the safe disposal of human urine and faeces. The word 'sanitation' also refers to the maintenance of hygienic conditions, through services such as garbage collection and wastewater disposal (WHO).

Environmental sanitation envisages promotion of health of the community by providing clean environment and breaking the cycle of disease. On the other hand, Ecological sanitation, which is commonly abbreviated to ecosan, is an approach, characterized by a desire to "close the loop" (mainly for the nutrients and organic matter) between sanitation and agriculture in a safe manner. "Ecosan systems safely recycle excreta resources (plant nutrients and organic matter) to crop production in such a way that the use of non-renewable resources is minimized". Sustainable sanitation considers the entire "sanitation value chain", from the experience of the user, excreta and wastewater collection methods, transportation or conveyance of waste, treatment, and reuse or disposal. As per the definition of Sustainable Sanitation Alliance in order to be sustainable, a sanitation system has to be economically viable, socially acceptable, technically and institutionally appropriate, and it should also protect the environment and the natural resource.

Objectives:

The primary objective of this sub theme is to explore, document and analyze the role of health, hygiene and sanitation on the health of humans as well as entire ecosystem and thus its impact on sustainable development in terms of use of science, technology and innovative approaches and ideas. The brief objectives could be:

- i) Identifying the status of prevailing sanitary and hygiene conditions which affect the health and wellbeing of living beings, which can impact economic productivity in a massive way.
- ii) Addressing mental health problems amongst children and adolescents which include depression, anxiety, eating and sleeping disorders
- iii) Improving health conditions of the urban/peri-urban and rural citizens, especially children, women and elderly.

Why this sub-theme?

The relationship between children and sustainable development is symbiotic. Progress in sustainable development underpins child rights and well-being, and conversely, child rights and well-being underpin lasting and equitable development. Finding the balance to achieve progress for all in today's world and for future generations depends upon three key propositions:

1. Sustainable development starts with safe, healthy and well-educated children;
2. Safe and sustainable societies are, in turn, essential for sensitive groups such as children, women and elderly; and
3. Children's voices, choices and participation are critical for the sustainable future we want.

As we know, good health is not possible without good nutrition. When we talk about sustainable development, it needs to be kept in mind that -

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- Today more than 1 billion people are chronically undernourished and food insecure.
- Undernourishment compromises immune systems, which leads to a higher incidence of illness and disease that in turn contribute to lower productivity and life expectancies.
- Poor nutrition undermines economic growth. Chronic undernourishment in children creates a vicious cycle of compromised physical and cognitive development that reduces their economic productivity when they become adults, thus making increasing poverty, which leads to chronic undernourishment and poor health in the next generation.
- A massive disease burden is associated with deficient hygiene, sanitation, and water supply and is largely preventable with proven, cost-effective interventions.
- Hygiene, sanitation, and water supply are development priorities, yet the ambition of international policy on drinking water and sanitation is inadequate.
- Hygiene, sanitation, and water supply continue to have health implications in the developed world.

The concept of WASH, groups together water, sanitation, and hygiene and aims at addressing the overlapping impacts of deficiencies under each areas and thus have the potential to influence public health immensely. Access to WASH, in particular safe water, adequate sanitation, and proper hygiene education, can reduce illness and death, and also affect poverty reduction and socio-economic development. Further, we also need to understand the fact that, current practices of sanitation are not ecologically safe in the long run and thus are against sustainability. Hence, three fundamental principles of ecological sanitation i.e. preventing pollution, sanitizing excreta and recycling of safe products are to be considered for long term sustainable sanitation. Sanitation apart from minimizing health and environmental risks, may also yield multiple benefits in areas from health to food security, resilient livelihoods, business growth, energy, and ecosystem services. Fundamental to fighting under nutrition, reducing child mortality, overcoming antibiotic resistance, and advancing access to education, hygiene underpins the delivery of several other SDGs and ultimately advances gender equity, dignity, and human rights, thereby paving the way for a clean, green and healthy nation.

Project Ideas

- Bio-filtration/bio-remediation processes to improve water quality for reuse
- Study of plant and animal diversity in a pond as an indicator of water quality
- Personal hygiene - for not missing out on studies
- Improving quality of potable water
- Hygiene at personal / familial / community level and its impact on community health
- Waste management (e.g. Diapers, Sanitary Napkins)
- Diseases (microbial / parasitic) and their impact of social / economical / environmental parameters
- Comparison of sanitation before and after Swachh Bharat campaign, in terms of behavioural change
- Gender specific health and hygiene and its control / management.

Sub Theme-III Waste to Wealth

Background :

Waste is a natural by-product of the phenomena of life and growth of societies. Wastes are unwanted or unusable objects or materials which are discarded after primary use, or declared as worthless, defective and of no use. Plants shed leaves, animals excrete. Humans in their day to day life create a boundless heap of waste of countless variety. Industrialization, an inevitable component of development leads to demand for a variety of goods for improving habitat and standards of living, higher production as well as consumption thus increasing amount and variety of wastes, many of which degrade the environment. Lack of proper waste disposal and management practices, result in loss of aesthetics of living spaces as well as cause pollution and poses a major health and life hazard to all organisms.

Efficient handling of waste is an important factor for a healthy and developed nation. Effective management of waste is now a national priority as seen through the Swachh Bharat Mission, which seeks to sensitize every citizen, especially the young, and make them a partner in creating a clean nation.

It should be understood that waste is deeply linked to lifestyle choices. Simple decisions like using the blank side of a printed paper, turning off lights and fans on leaving a room, not using a plastic bag, can contribute towards reduction of wastes. In fact, since times immemorial, all societies and cultures have looked for effective management of waste and often, to put it to good use by transforming discarded materials to artefacts, use of leftover foods and so on. Practices like less waste generation, reuse of consumables, recycling and recover of valuable resources from wastes conserve natural resources, energy and reduce environmental damage. Thus waste management is strongly linked with the idea of sustainable development. But, finding innovative solutions for effective management of waste is difficult as breakdown of waste requires special processes that entail time, energy, and expense. Hence, targeting wastes at the point of its generation is the latest approach for waste management. Considering 'waste' as valuable 'resource' is core to this approach. This process of conversion of waste to a product that can be put to primary use can be viewed as a process of generating wealth. Hence the phrase 'Waste to Wealth'.

Waste management that leads to generation of substances and products that can be put to primary use is an emerging major sector for employment to meet the livelihood needs of the vast majority of India's rapidly growing population. Given the magnitude of waste generated, innovative waste conversion processes can create micro-entrepreneurship opportunities on a massive scale leading to economic upliftment. In India, though the potential of waste to wealth enterprise is very high, much has not been done on this sector and thus demands immediate attention.

Different types of wastes and their management:

Municipal Solid waste (MSW) are the household trash/refuse that are generated daily due to our day to day actions and requirements.

Hazardous waste is any waste which by reason of characteristics such as physical, chemical, biological, reactive, toxic, flammable, explosive or corrosive, causes danger or is likely to cause danger to health or environment, whether alone or in contact with other wastes or substances.

Biodegradable (Bio-waste) are composed of waste from living organisms and the actual plant, animal or other organisms when its life ends. Apparently, though these wastes are harmless, they also pose serious health risks if not managed properly and can also impact the environment. Organic agriculture by using composts, green manure and such other biodegradable waste derivative inputs, generation of bio-fuels from biomass or bio-waste are some of the examples of wealth generation from bio-wastes.

Non-biodegradable waste includes materials that cannot be decomposed by microbes and abiotic elements or dissolved by natural agents or biological processes. These include glass, metal, baked pottery, ceramics and plastic items, Biomedical wastes; E-wastes; Construction and demolition waste (C&D) etc. Plastics are an important category of these wastes. Biomedical Waste is

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generated during the diagnosis, treatment or immunization of human beings or animals or in research activities pertaining thereto or in the production or testing of biologicals. Electronic products nearing the end of their "useful life" are termed as "E-waste". Construction and Demolition Waste refers to materials that are unused, damaged or unwanted during construction and the demolition debris

Disposal of non-biodegradable waste is a major challenge. It ends up taking space, cluttering habitat and creating land mess or being burnt, dumped in water bodies and landfills. Such waste deposits cause large scale pollution of land and water posing several environmental and health problems. Categorization of non-biodegradable wastes as recyclable and non-recyclable wastes is important for its management. Recyclable wastes can be put to use again in the same or different form by reuse, refurbishing or recycling, thus reducing the resource consumption. Non-recyclable waste are the materials which cannot be put to use again. Traditionally these are disposed of by (i) transporting to a distant site and dumping them in a landfill; and (ii) incineration or burning. Modern management systems like preventing leachate leakage from landfills by using base liner systems, methane extraction from landfill, transformation of waste to solid ash by municipal solid waste incinerators etc. contributes to resource efficiency and wealth generation through what is termed as a circular economy.

The principle of waste management at home starts with the basic rule of waste segregation in to different categories of wastes like - Wet and Dry (not very appropriate for proper management), Organic, Paper, Plastic, Glass, Metal, E-waste and Sanitary wastes during disposal. This type of waste segregation at its source itself also increases the potential of efficient utilization and treatment of wastes at later stages.

Objectives:

- This sub-theme has been introduced to increase the understanding of the children about -
- how day-to-day activities generate waste;
- classification of different types of waste and mechanisms for their disposal;
- concept of 5R: Refuse, Reduce, Reuse, Recycle, Recover;
- health and environmental hazards of waste and safety measures to be adopted in handling waste;
- innovative processes that generate products from waste creating wealth;
- the scope of livelihood generation through entrepreneurship.

Why this sub-theme?

The primary focus of this sub theme is to understand the science and art of waste management and product development. It will trace the life cycle of various forms of waste, starting from its generation to diverse forms of disposal, classification as biodegradable or non-biodegradable and hazardous or non-hazardous; process for management; mechanisms for conversion to usable products, if any; impact on health, environment and socio-economic issues.

According to Central Pollution Control Board Report 2014-15, 51.4 million tonnes of solid waste was generated in the country. Of this, 91 per cent was collected, and 27 per cent was treated and remaining 73 per cent disposed of at dump sites. Thus, there is a critical need for developing sustainable wealth generating models for India's waste. This requires a concerted effort from all stakeholders of the nation. Considering this, this particular sub-theme has been integrated in NCSC's quest for a clean, green and healthy nation.

Project Ideas:

1. Conversion of leftover mid-day meal to animal protein
2. Organic material to compost
3. Efficacy of natural additives in recycled paper for use as shelf liner for prevention of infestation by household pests
4. Effect of applying different waste material as mulches, on population density of macro-organisms.
5. Handling of E-Waste
6. Preparing natural dyes from leaves, flowers, fruits of weeds
7. Conversion of discarded flowers into useful products
8. Innovative techniques for converting agriculture wastes into useful products

Sub-Theme-IV Society, Culture and Livelihoods

Society can be defined as group of individuals united by certain relations or mode of behaviour which differentiate them from others outside such relations or with different behaviour. There are five basic components of a society, viz. Population, Culture, Material Product, Social organization and Social institution. Culture is a pattern of ideas, customs and behaviours as well as the way of life shared by a particular people or society. Livelihood means making a living and comprises of the capabilities, assets and activities required for a means of living. A livelihood is sustainable when it can cope with and recover from stresses and shocks and maintain or enhance its capabilities and assets both in present and in the future, while not undermining the natural resource base.

Society, culture and livelihood share a common linkage with the environment of a region. Scarcity of natural resources and other environmental stresses like drought, flood, storm etc. promotes different social systems or institutions, customs and livelihood practices among communities which may help in developing resilience or disaster risk reduction strategies. Further, environmental stresses affect the livelihoods of people in an area, forcing them to migrate which may lead to changes in their socio-cultural practices, gender roles and social structures within a community.

Objectives :

The primary objective of this sub-theme is to explore, document and analyze the role of all the components of a society and culture in the contexts of sustainable livelihoods and lifestyles as well as environmental security. Also, under this sub-theme, focus will be given on innovations based on socio-cultural knowledge and wisdom that can contribute towards sustainable development.

Why this sub-theme:

This sub-theme will deal with various aspects that interlink society, culture and livelihood in the areas of natural resource management, biodiversity conservation, climate change resilience and/or disaster risk reduction, energy conservation and management, sustainable production and consumption, sanitation and health, impact of technology on society as well as livelihood opportunities created by new technologies. These focus areas will allow the child scientists to explore critical linkages among society, culture and livelihood components and identify means to achieve sustainable lifestyles with a responsible production and consumption system with the objective of demystifying superstitions & myths and redefine cultural value systems.

Focus Areas:

Natural Resource management : Communities that depend on natural resources for their livelihoods develop specific knowledge of required natural resource management and several customs and norms also evolve from such knowledge. Similarly many communities have traditional institutions and management practices related to Common Property Resources (CPR) which sustain their livelihoods. Apart from traditional customs and practices, new and innovative approaches may also contribute towards new livelihood opportunities by facilitating better nature resource management.

Biodiversity conservation: Traditional customs, norms and beliefs that promote biodiversity conservation to a great extent ensures sustainable livelihoods for communities. From experiences and observation, indigenous communities have realized that conservation of biological resources are important for their life and livelihood and such realizations have led to development of various customs and norms, which ensures conservation of crop, fish or animal diversities. In contemporary contexts also, cultural norms, societal traditions and conservation of biodiversity can give rise to new aspects of livelihoods like eco-cultural tourism, thereby ensuring sustainable economic development.

Climate change resilience and/or disaster risk reduction: Indigenous communities have their own mechanisms of adaptation to any changes in their environment or any type of disasters. These knowledge or mechanisms are integral part of their culture and social set up and linked with their livelihoods. These customs and traditions can help them in preparing efficient strategies for disaster risk reduction (DRR) as well contribute towards climate resilient development. In contrary to these positive aspects, certain norms and traditions may also have negative impacts on developing climate resilient communities as well as in

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reducing disaster risks. So, a careful exploration of such aspects is required to make everyone in the society resilient to climate induced or no-climatic disasters.

Energy conservation and management: Societies have their own traditional methods for the energy conservation and sustainability. Techniques like sun drying, pickling, Sanjha chulah or community ovens are some of the practices that help in reducing fuel consumption in cooking. There is a need of scientific verification and documentation of such best practices of energy use or conservation as well as identifying and documenting the linkages to socio-cultural practices and traditions, in order to achieve sustainability in energy sector.

Sustainable production and consumption: Unsustainable production and consumption practices exerts immense pressure on natural resources. However, Indian traditions have always preferred low carbon footprint lifestyles enriched with sustainable and eco-friendly practices like the ones based on principles of reduce, reuse and recycling. A careful observation and analysis of such practices can give us a new outlook towards increasing sustainability of our consumption behaviour. Simultaneously, we may also need to analyze how changing developmental paradigm, social dynamics etc. have led to an unfavourable shift in our consumption and production behavior

Sanitation and health: Apart from the traditional medicine and healing practices, many sanitation, hygiene and cleanliness related customs are also available across different communities of India. While some of such practices have health benefits, many of these practices are harmful. Customs related to menstruation, puberty and pregnancy often enhances health risks among women. Further, under existing socio-cultural contexts and systems, women's health tend to receive lesser priority, which eventually result in increase of disease burden on women. Considering this, we need to identify and analyse the positive and negative aspects of sanitation and health related traditions existing in our society so that the best practices can be promoted and harmful ones can be avoided. Understanding and optimizing the societal practices on health and hygiene, and identifying the changes that needs to be made can pave the pathway for a clean and healthy nation.

Use of technology and impact on society: Traditional technologies and tools are developed by the communities using locally available material and skills based on local knowledge base to suit the local needs. Further, traditional agricultural practices prevailing in India provides for collective involvement of communities in the production system, thereby ensuring a minimum employment opportunity to every household of a community. However, advent of modern technologies have altered such scenarios including widening of gender gaps by reducing women participation in agriculture along with harmful impacts on the environment, which threaten the sustainability of the food production systems. So, emphasis should be given on technologies that are economically, environmentally and socially sustainable.

New technologies and livelihood opportunities: While discussing about technologies, we need to understand the livelihood opportunities brought about by innovative technologies. New innovations in the field of renewable energy have brought many opportunities to rural areas including creation of various jobs, apart from contributing towards CC mitigation as well as reducing the difficulties of people in remote areas. Clean energy technologies have also contributed towards CC mitigation, reduction of health risks among women as well as effective utilization of wastes. All in all these have been helpful in nation's progress towards a clean, green healthy and economically productive society.

Project Ideas:

- A study on traditional homestead garden of your locality with its potential for climate resilience
- A study on the role of multi-purpose tree species (MPTS) in your locality
- Impact of agri-machinery on employment opportunities of women in rural areas
- "Disaster induced migration and its impact of social, cultural and livelihood practices" - case study of a community
- Study on impact of scientific intervention in optimizing the production of traditional handlooms.
- Eco-cultural mapping of a locality to develop eco-tourism operational plan.
- Study on local festivals /rituals and its relationship with mapping of agricultural/animal husbandry practices and studying the underlying local knowledge base.
- Analysis of local superstitions / myths and its impact on human development in a sociological perspective.

Sub-Theme-V Traditional Knowledge System

Background:

Traditional Knowledge System (TKS) is the know-how of the people, gathered through day-to-day walk of life, to overcome the hurdles and tap the potentialities from their immediate neighbourhood and reflects people's specific knowledge, understanding as well as observational and experimental information about their environments, along with skill and technology to design a suitable lifestyle in that environment.

It is designed and developed by the local communities through their constant observation, trial and modification/customization and thus are characterised by local, empirical, time tested dynamisms. Moreover, TKS is always transferred from one generation to another and also between communities mostly orally and/or visually. With various challenges like climate change, natural disaster, biodiversity loss, environmental imbalance, food and nutritional inequality, problems of sanitation and health and so on ahead of human being, it is important to focus on TKS for searching alternative solutions to tackle the challenges and design a sustainable lifestyle.

TKS can be categorised as

- i) Traditional Ecological Knowledge (TEK) - knowledge associated with natural resources and environmental management
- ii) Traditional Technical Knowledge (TTK) - knowledge associated with tools and appliances used and
- iii) Traditional Value and Ethics (TVE) - value, norm, institution and policy framework evolved with traditional knowledge based practices.

Traditional Ecological Knowledge (TEK) refers to the evolving knowledge acquired by indigenous and local people over hundreds or thousands of years through direct contact with the environment and includes the relationships between different components of the environment that are used for livelihood and sustenance of life. All these can be categorised as natural resource management and are linked to prioritization of uses along the line of sustainable harnessing, wise use, equitable sharing of benefits, management of future stocks through conservation, defining threshold limits etc..

Traditional Technical Knowledge (TTK) represents the knowledge related to design and development of tools, implements and gears for different application and are related to agriculture fisheries, animal husbandry, forestry, handloom and handicraft etc. Moreover, TTK also represents the knowledge and skill about design and construction like housing, water harvesting structure, roads and bridges, etc.

Traditional Value and Ethics (TVE) is linked to traditional cultural practices which prioritize dos and don'ts in relation to natural resource harvesting, conservation, and equitable sharing etc. This involves seasonality based practices and customs as well as development of institutions that aim at controlling use and exploitation of natural resources.

Exploration and documentation of such practices in local context will help in understanding these practices, creating a knowledge base and analysis and validation of its scientific base. This will help to identify the prospects for the future adopting lifestyles, habitat management, environment, natural resource management, wildlife protection, etc.

Some examples :

Traditional Water harvesting practices like step well, taanka, johad, zabo, pukhuri or suraangas across India have evolved from the need of water resource management and are based on simple technology and defined management principles. Bamboo drip irrigation practices from north-east India varies from one another based on variation of rainfall patterns, thus reflecting the uniqueness of traditional knowledge system of the local communities.

Traditional Housing systems, also termed as Vernacular Architecture are examples of traditional technical knowledge of architectural style and design based on local needs, availability of construction materials and reflects local traditions.

Traditional agricultural practices are followed in selection of crop varieties, land selection, land preparation, soil fertility management, pest and disease management, irrigation, harvesting, post-harvest management, seed preservation etc. in many parts of India. Moreover, there are different tools and implements used, which vary from each other based on factors like soil quality, terrain condition, crops and varieties etc. Different types of ploughs and sickles available across the states, different land races and cultivars of crops with stress tolerance capacities, seed preservation techniques are examples of such traditional knowledge.

Weather Forecasting/ Prediction are available among the farming communities across India, which help them in preparing for various weather related issues. The Karbi Hill Tribes of Assam have a traditional calendar system which is used for agricultural planning.

Traditional practices in animal husbandry can be considered as old as domestication of various livestock species. Women play a very important role in such practices. But lack of practicing and absence of documentation increase the possibility of eroding out of these knowledge systems. Thus, it becomes very important to collect and document the practices and also to evaluate their validity.

Similarly there are many such traditional practices related to different sectors and thus it is important to explore such practices with the objectives to identify merits and demerits of such practices and its usefulness in the context of climate change adaptation, earthquake resistance, environmental sustainability, economic productivity etc.

Objectives :

This sub-theme aims to study various aspects of traditional, ecological and technological knowledge based practices related to settlement, housing, agricultural and allied activities, natural resource management, food systems, disaster management, mitigation of human and wildlife conflict, handloom and handicraft, traditional medicine along with values and ethics etc. The primary objectives of the sub-theme are -

1. Observation and identification of the practices
1. Detailed scientific documentation of traditional knowledge
1. Scientific validation of core principles behind these practices and knowledge

Why this sub-theme:

Communities in India are enriched with TKS based practices which have the potential to act as leverage to sustainable development. In different agro-climatic zones of India, various environmental and cultural practices nurture different traditional knowledge based practices for adapting to their respective environmental set-up. All these practices have some age-old history, progression and empirically tested observation, which essentially require documentation, validation and testing for applicability. These practices on careful exploration and technological innovation can lead the way for a decentralised, inclusive development, thereby facilitating a clean, green and healthy nation.

Project Ideas:

- Study of the use of herbal medicine for the treatment of dengue fever.
- Ethno-botanical study of various important medicinal plants and their important phytochemical properties
- Study of traditional indigenous knowledge techniques in coping with the climatic vulnerability
- Evaluation of nutritional values of traditional food
- Study on biodiversity of a particular local community and developing people's biodiversity register
- Different architectural structures and its importance in maintaining the ecosystem (e.g. housing, bridges, water distribution canals)
- Various agricultural farming systems and its importance with the future scope
- Traditional knowledge of various agricultural tools and its applicability in organic farming
- Traditional knowledge of fisherman and its links to sustainable livelihoods
- Study on community seed bank and its relation to food security
- Traditional knowledge on Food Preservation Techniques and its importance as source of livelihood
- Traditional knowledge on natural fibre and its uses in modern context