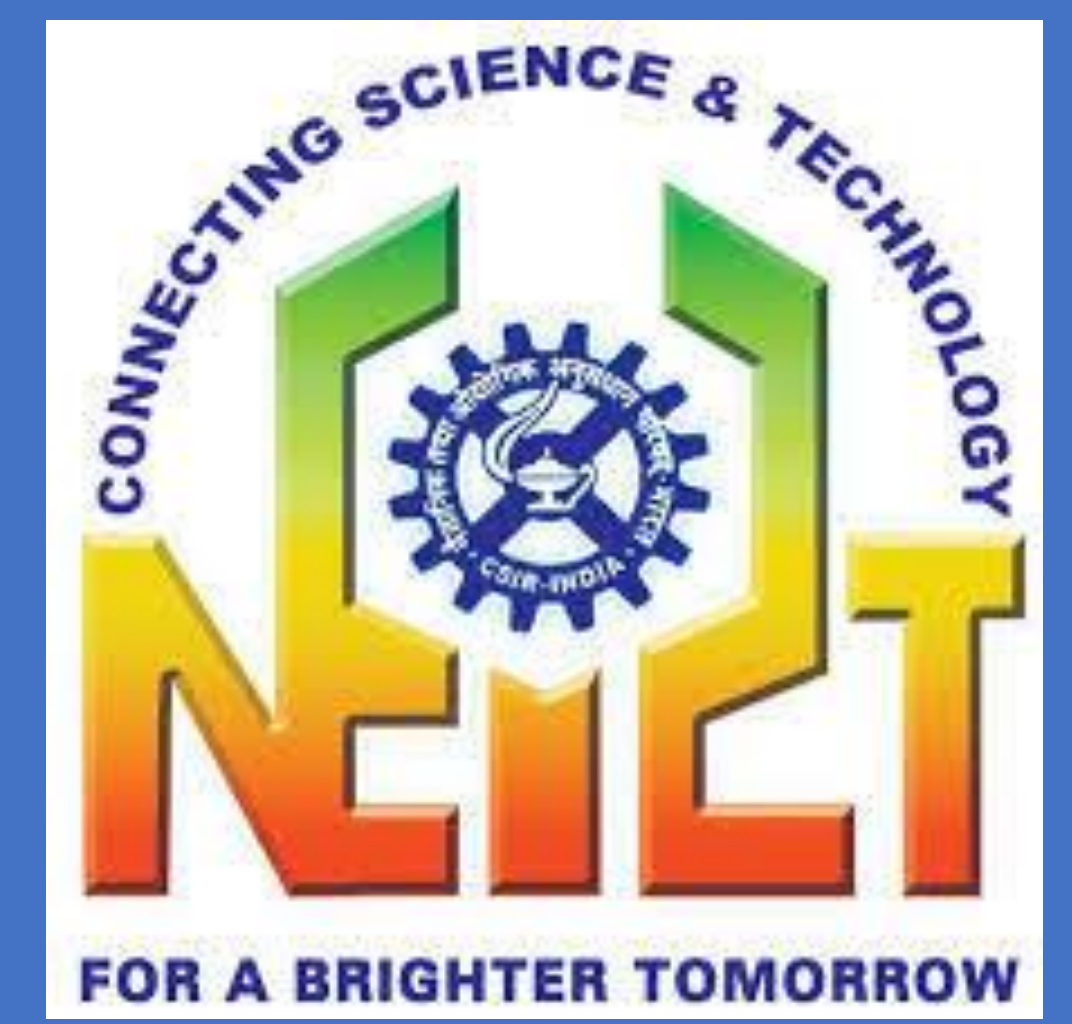




International Conference on Engineering Sciences & Technologies For Environmental Care (ESTEC-2020)



ESTEC Bulletin

FOOD FOR THOUGHT SPECIAL EDITION
Day 1 (20th Feb, 2020)

HIGHLIGHTS OF FOOD FOR THOUGHTS

Food for thought was held at Social Activity Centre, CSIR-NEIST, Jorhat, on 20th Feb 2020, under the Chairmanship of Dr. G. Narahari Sastry, Director, CSIR-NEIST and External Observer Dr. Arup Kr Mishra, Director, ASTEC, Assam. Other dignitaries who took part in the discussions were Dr. KSMS Raghava Rao, Director, CFTRI, Dr. Sebastiano D'Amico, Malta, Ms. Sonmoni Chowdhury, APL, Ms Mayuri Deka, APL, Dr Rabah Boukheroub, France, Dr (Mrs) Madhavi Sastry, Schrodinger Inc., Dr. Pradosh Chakraborty, IICT and host of other dignitaries. Discussions were held over 8 topics related to 7 UN sustainable goals.

Topic 1: Petroleum Research: Responsible Consumption and Production

Topics discussed were on pinch technology; optimization of thermal efficiencies of plants, value addition for refineries in Assam, mapping and reviewing of technologies, optimization of water splitting technologies, heavy residue upgradation techniques, short path distillation, whether the refineries are using catalytic process or normal process in Assam. International collaboration/probable collaboration for developing process technology which can be further adapted in industry, methanol as domestic fuel for future generation, multiple uses of petrochemicals.



Round Table Discussion on Topic 1

In session II, Problems faced in running industry were sketched out. These were interrupted electricity-based problems, gas pressure fluctuations. Solutions given by team were: setting up of small level plant which could be run by LPG (emergency purposes), conversion of chemical energy (methanol) to power grid, upgradation in the equipment to incorporate methanol as fuel (from pneumatic to automation).

Topic 2: Coal & Energy: Responsible Consumption and Production

Effective measures for coal and energy were discussed in session I and II. Need for environment friendly hybrid system, increase in efficiency of Si-based solar cells, perovskite based solar cell which is essential for our country. Others points that were discussed elaborately were on conversion of coal to other kind of energy and use sustainably, organized bio-diesel production for its feasibility in India, justified use of natural gas with the existing infrastructure for better utilization, Kitchen waste utilization for bio-gas/syn-gas production is needed for domestic application.

Topic 3: Process Engineering: Partnership for the Goals

The discussion in session I and II were about the Haber process for ammonia production and how Hydrazine hydrate is the green fuel for future space technology. The team also discussed upon how transparency and discussion among members in a project is important and uniqueness of each process should be maintained to make it to global level. Use of automation and machine learning together and collaboration of fundamental science with process engineering will take process engineering to greater heights.



Round Table Discussion on Topic 2



Discussion on Topic 3

Topic 4: Food Engineering and Agrotechnology: Zero Hunger

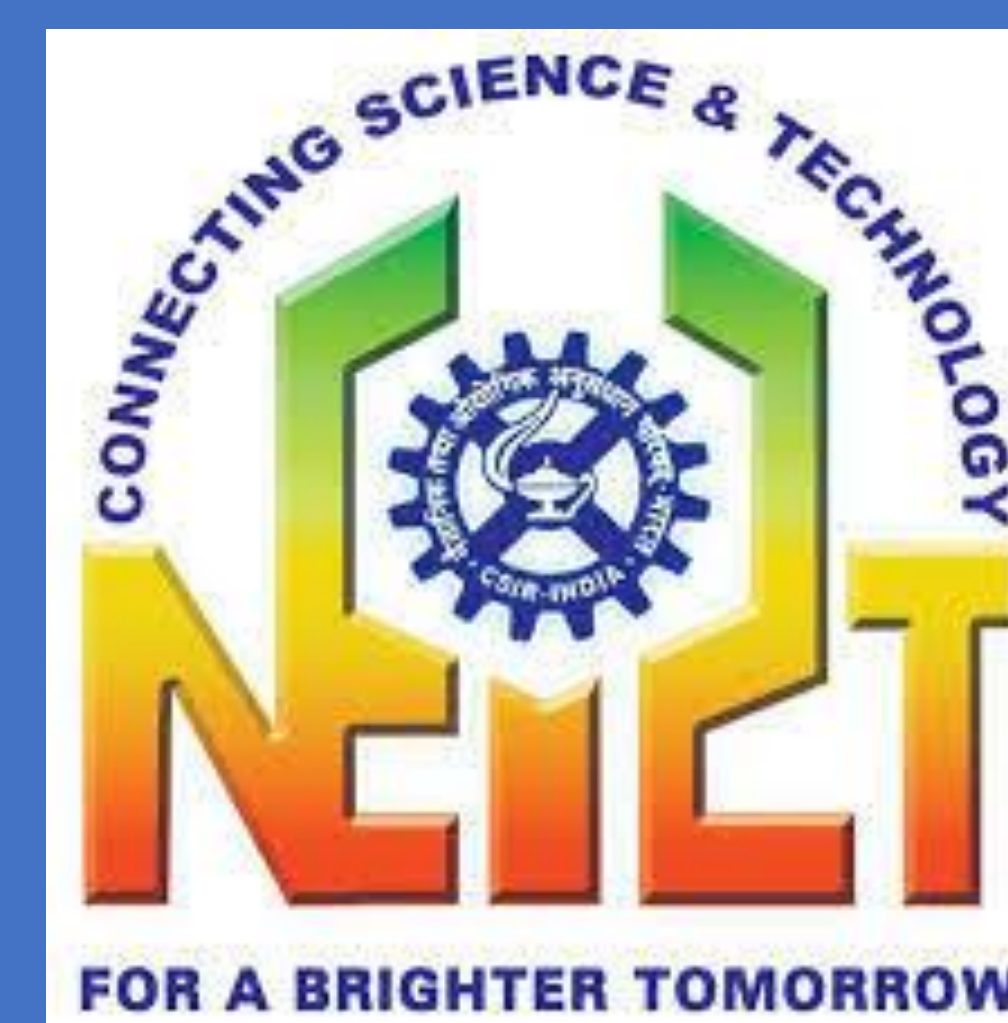
Problems related to production, processing and storage of raw materials/traditional foods were discussed. As solution to these problems, the members came up with the ideas of sustainable production of raw materials, introduction of storage facility and co-operative processing till commercialization for a profitable food processing business. They also raised the concern about controlled use of pesticides and their proper monitoring.



Discussion on Topic 4: Food Engineering and Agrotechnology: Zero Hunger



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Round Table Discussion on Topic 5

Topic 5: Urban Development and Pollution under Sustainable Cities and Communities

In session I and II, problems related to the given topic were raised like lack of planning in policies, lack of acceptance for new ideas, corruption, asymmetrical development behind problems related to urban development, maintenance cost problems in buildings, e.g., building materials under freezing and thawing resulting in application of cyclic loading in NE. Solutions that were put forward were strong policies and acceptance of new materials by the government and people, alternative materials for building, prefabricated structures, development need to be spread everywhere other than cities so as to maintain the balance, development in rural areas by increasing happiness index, health index in order to attract the population and control over corruption.

Topic 6: Environmental Care under Life on Land

In both the sessions, some of the major problems of NE related to environmental care, such as, oil spill contamination, open cast mining of coal, pesticides etc. and their solutions were discussed. For solving the oil spill contamination issue, speakers have discussed on membrane filtration technology, separation techniques, low cost sensor systems and biomarkers identification for monitoring air quality, microbial treatment, involving animal behaviour to study the changes in the environment etc. Topics like land slide, soil erosion, collaborative work between government, NGO and the research institutes were also covered.



Round Table Discussion on Topic 6

Topic 7 : Water under Clean Water and Sanitation

Implementation of water treatment plant is important in industries and laboratories. Along with the scientists, every citizen and the government are equally responsible for solving water related problems. Problems of North East India related to water and sanitation were raised in the first session like As, F, Fe contamination, sludge, water problem in Tea tribal areas, Karbi Anglong, excessive consumption of ground water, microplastics in drinking water, RO etc. Solutions that were projected were monitoring of pesticides, fertilizers, use of surface water use of river sludge in brick making, awareness camp, government active role. In session 2, solutions for country as a whole were discussed. Points placed were bringing in cheap and affordable technology for proper maintenance, Engineers should be trained and motivated towards better scaling up of technologies, gap between scientists and industries should be bridged. Link between scientist and society is required, overuse of pain killers detected in animal carcass leading to vulture death needs proper attention. AcSIR should implement confidential PhD to develop technologies in research laboratories as implemented in European countries.



Round Table Discussion on Topic 7

Topic 8: Machine Learning under Sustainable Development

Topic that was placed for discussion in the first session was on understanding the water pollution based on geographical, chemical composition, seasonal, variation data, collection of data on different region of Assam at different time period, selection of features for the development of ML model (i.e., pre-processing, multivariate filter features etc.) and applying different ML for the best developing model. In session 2, landslide and earthquake problems of NER were discussed. Data points collection from last event and from those data prediction in earthquake and landslide prone areas using GPS data. Drone based solutions for collection of real time data (altitude, longitude, time). Also topic of Images of welding data and clarification of welding data were discussed



Round Table Discussion on Topic 8



Concluding Remark Session