

THE HUNDREDTH FIFTH SESSION OF INDIAN SCIENCE CONGRESS, IMPHAL

INAUGURAL SESSION

The 105th Indian Science Congress was inaugurated on 16 March at Manipur University, Imphal, by Shri. Narendra Modi, Hon'ble Prime Minister of India. Dr. Harsh Vardhan, Union Minister of Science and Technology & Earth Sciences, Dr Najma Heptulla Governor of Manipur, Dr Jitendra Singh MOS for the Ministry of DONER, , Prof. Adya Prasad Pandey Vice Chancellor of Manipur University, were on the dais of the inaugural function. Prof. Achyuta Samanta, General President, The Indian Science Congress Association spoke on the focal theme for 105th Indian Science Congress “Reaching the Unreached through Science and Technology”.

Over 5,000 invitees took part, including 2,000 research scholars and scientists from all over the country . Senior officials of the Union and State government, and scientists from the country and abroad also attended the inaugural function.



CHILDREN SCIENCE CONGRESS

The Children Science Congress in the 105th Indian Science Congress was inaugurated by Shree Padmanabha Balakrishna Acharya , the Hon'ble Governor of Nagaland on 17th March 2018 in the presence of Shri L RadhaKishor Singh, Chairman, Manipur Pollution Control Board & Khadi & Village Industries Board, Manipur, Prof Adya Prasad Pandey, Vice-Chancellor of Manipur University, Prof. PP Mathur, General Secretary (Scientific Activities), ISCA, Prof. Gangadhar, General Secretary(Membership affairs),ISCA and Dr. Amit Krishna De, Executive Secretary, ISCA. Prof. Ashok Kumar Saxena, Former General President, ISCA presided over the function. Prof. N.Mohilal Meitei, Convener, Children's Science Congress, Manipur University conducted the Programme. In his inaugural speech, the Hon'ble Governor of Nagaland delivered an inspirational message for young children and addressed them as the “Future of India” and emphasized that science is important for the development of the society and the country.

Infosys ISCA Travel Award 2018 was also given to top 10 students for their best write ups in the field of Science & Technology (Annexure VI).

Besides a Science Model Competition was organized for the Schools and undergraduate students by the nationally selected ISCA Chapters competitors (Annexure – VII).



The Valedictory Function was held at 4 pm on Sunday, the 18th March, 2018 at the Academic Building, MIT, Manipur University. Prof. Ashok kumar Saxena, Former General President, ISCA presided over the function.. Prof. Adya Prasad Pandey, Hon'ble Vice-Chancellor, Manipur University; Prof. P.P. Mathur, General Secretary (Scientific Activities), ISCA; Prof. Ranjit Kumar Verma, Treasurer were the Presidium members. Dr. Arun K. Pandey, Assistant Executive Secretary, ISCA delivered Vote of thanks.

Around 10,000 students participated in this mega event on the day of the Inauguration and at an average per day 4000 Students visited the venue of the Children's Science Congress during the two days.

WOMEN'S SCIENCE CONGRESS

The 7th Women Science Congress was inaugurated as part of the 105th Indian Science Congress, 2018, at the Centenary Hall of Manipur University, Imphal. The inaugural function was graced by Shri Keshari Nath Tripathi, Hon'ble Governor of West Bengal as the chief guest. The Manipur University Vice Chancellor, Prof. Adya Prasad Pandey attended the function as the key note speaker. The function was presided by Prof. Ashok Saxena, Former General President of ISCA. Prof. Vijay Laxmi Saxena, former General Secretary, ISCA and Ms Namita Gupta, Scientist, Department of Science and technology were the guest of honours. Prof. P. P. Mathur, General Secretary (Scientific Activities), ISCA opened the function with his welcome address. The function was

concluded by Prof. Gangadhar, General Secretary (Membership Affairs), ISCA delivering his vote of thanks.



The 7th Women Science Congress opened with two sessions categorized into two themes: Women and Science - Reaching the Unreached and Women and Health Issues respectively. Eminent women science professionals took part on the first day of the women science congress by presenting their research papers on the two given themes.

The Valedictory function was graced by Dr. K. Sobita Devi, Chairperson, Manipur State Commission for Women as the Chief Guest, Dr. Veena Pandey, Ex-Member, Legislative Council, Uttar Pradesh as the Guest of Honour and Prof. Ashok Saxena, Former General President, ISCA as the President of the function respectively. Prof. P.P. Mathur gave welcome speech and Prof. Memcha Loitongbam, the convener summarized the sessions and brought forward the take away recommendations for the welfare of the women from the congress.

SCIENCE COMMUNICATORS' MEET

Science and technology communication can help spread scientific way of thinking among people and make science accessible to them. Establishing science centres in villages can help achieve this, said Y. Joykumar Singh, Deputy Chief Minister of Manipur, while addressing the 11th Science Communicators' Meet at the Indian Science Congress on 19th March, 2018. Prof. Adya Prasad Pandey, Vice Chancellor, Manipur University said, "using innovations in science and technology as an instrument of socio-economic change will have an impact in making sure that efforts in science and technology are not limited to scientific laboratories and academic institutions but are reaching to common people." Prof. P. P. Mathur, General Secretary (Scientific Activities), ISCA delivered welcome address. The function was presided by Dr. Ashok Kumar Saxena, Former General President of ISCA. The function concluded with vote of thanks by Prof. Gangadhar, General Secretary (Membership Affairs), ISCA .

There were different presentations in the meet on various topics like science and technology in rural area in Indian society, technological advancement in agriculture and medical sciences of society, key role of bioinformatics in science and technology, role of communication media in revamping science education.

Ever since its inception a decade ago, Science Communicators' Meet is held every year at the Indian Science Congress. It provides opportunity to academicians, science journalists, activists, film makers, scientists and communicators to deliberate and exchange their views on science communication.

There were sixteen oral presentations, sixteen poster presentations and five special invited lectures. Among the keynote speakers were Dr. CM Nautiyal, Prof. A. Surjalal Sharma, Maryland University, USA; Dr. D.C. Goswami, former scientist with NEIST ; Dr. Arup Kumar Misra, Director, Assam, Science, Technology & Environment Council, Guwahati; and Dr. Manoj Kumar Patariya, Director, NISCAIR. The meeting was supported by the National Council for Science and Technology Communication of the Department of Science and Technology.

Valedictory function was conducted on 20th March, 2018 . The guests were welcomed by Prof.P.P.Mathur General Secretary, Scientific Activities, ISCA. Sri Th Radheshyam Singh, Hon`ble Education Minister, Govt of Manipur was Chief Guest. Dr Rajinder Singh, NCSTC, DST and Prof N Rajmuhun Singh, Convener, Science Comuunicators' Meet were present. Finally Vote of Thanks was given by Prof K. Jugindro Singh, Manipur University.



SCIENCE EXHIBITION: PRIDE OF INDIA EXPO

The Pride of India (PoI) Expo, one of the major attractions of 105th Indian Science Congress (ISC) was inaugurated by Dr. Harsh Vardhan, Hon'ble Union Minister of Science and Technology,

EF&CC and Earth Sciences in the presence of Secretary DST, GoI, Vice Chancellor, Manipur University and other dignitaries.

The PoI Expo, spread over an area of approx. 18,000sqm, received excellent response with the participation of over 175 organisations. The expo depicted confluence of new ideas, innovations and products covering the entire canvas of scientific world. It was a splendid display of cutting-edge technologies, leading scientific products and services, path breaking R&D initiatives and achievements of India's foremost and leading public and private sectors, government departments, research labs, educational institutions, corporate, defence etc.

The special pavilions like "Edu Vision" brought various educational institutes under one roof while "Make in India" was directed towards our Hon'ble Prime Minister's vision. Manipur showcased various initiatives and achievements in the "Host State Pavilion". All the pavilions were highly appreciated by all the dignitaries and visitors.

The PoI Expo received tremendous response with lakhs of visitors during the 5 days, especially students.

VigyanJyot (VJ) – *Flame of Knowledge* was flagged off by Dr. Najma Heptulla, Hon'ble Governor of Manipur ceremoniously, mounted on a float on 14th March 2018 from Raj Bhawan and was received by the Hon'ble Vice Chancellor, Prof Adya Prasad Pandey at Manipur University in the presence of former General Presidents, dignitaries, academicians and students.

VALEDICTORY SESSION

During the Valedictory Function on 20th March 2018, Prof A P Pandey, Vice Chancellor, Manipur University, gave the welcome address. Young Scientist Awards and Best Poster Awards were presented by Dr. Najma Heptulla, Hon'ble Governor of Manipur in the presence of Prof. Achyuta Samanta, General President, ISCA, Dr. Manoj Kumar Chakrabarti, General President (Elect), Prof Narayana Rao, Immediate General President, ISCA Dr A K Saxena, immediate Past General President, ISCA, Prof. P. P. Mathur, General Secretary (Scientific Activities), ISCA, Prof. Gangadhar, General Secretary (Membership Affairs), ISCA, and other dignitaries.. Valedictory address was delivered by Dr. Najma Heptulla, Hon'ble Governor of Manipur .The Vigyan Jyoth was handed over by Prof. Achyuta Samanta, General President to Dr. Manoj Kumar Chakrabarti General President Elect. The function ended with vote of thanks by Prof Arun Kumar, Local Secretary.



105TH INDIAN SCIENCE CONGRESS
MANIPUR UNIVERSITY, IMPHAL
16 – 20 MARCH, 2018

RECOMMENDATIONS FROM SECTIONS

Agriculture & Forestry Sciences

1. A System based holistic approach including land resource information on 1:10000 scale is recommended for sustainable development for the unreached small and marginal farmers as alternative for the component and commodity based approach.
2. The holistic approach constituting of selection of right land use, right technologies (Resource Conservation Technologies (RCTC), Conservation Agriculture and Organic farming in the context of regional socio-economic profile of the farmers) on well defined soil system is recommended as the tool to prevent the impact of climate change, land degradation and food insecurity.
3. IT enabled Extension Mechanism including Geoportal, Mobile Labs, geo-informatics etc. is recommended to be used for communicating science and technology development to the unreached living in the farthest and remotest corners of the country.
4. Integrated Farming System, a climate resilient technology can be a potential approach to meet the target of enhancing 40% crop productivity, reducing 30% poverty and 20% emission for small and marginal farmers of the country.
5. System and Holistic approach for sustainable development of small and marginal farmer is very much regarded as replacement for the component and commodity approach presently practiced.
6. Organic farming, though a good concept, should be for selected crops and selected pockets of land and not to entire North-East Region of India.
7. The existing IFS modules developed for hill and valley farmers should be fined tuned.
8. Crop and location specific customized fertilizers should be developed for NEH region.
9. Emphasis on development of small water storage structure in each farm holding for used during the off season.
10. Climate smart agriculture – involving adaptation strategies for land use, crop planning and utilization strategies like resource conservation technology (RCTC), conservation agriculture, and organic farming are promising for bringing food security in a sustainable manner.

11. ICAR-NBSS and LUP developed modelling software- BHOOMI Geoportal can be used as a potential tool for land resource management and use of planning of our country.
12. Soil management offer promises for climate change adaptation through modifying crop management practices, improving water management, adopting new farm techniques such as RCT and harnessing the indigenous technical knowledge of farmers.
13. Database repository of information on soils in relation to quality and productivity expertise and backstop from other scientific organisations and exchange of information needs to be developed.
14. For quick identification and mapping of degraded land, MODIS time series, NDVI data supported by DEM and legacy data can be reliable tool.
15. Up-scaling methodology framework developed for Goa state may serve as model of updating the soil resource information of other states of the country in a detailed, cost effective, time bound and accurate manner.
16. Implementation of site specific nutrient management can be upscaled and used in farmers field with Nutrient Expert DSS tool towards doubling of farmer's income.

Animal Veterinary and Fishery Sciences

1. In the courses of New Biology like Biotechnology, Microbiology, Bioinformatics, etc the Basic Biology should be made integral part at undergraduate and Post-graduate studies.
2. Check list of biodiversity at each Mandal/Village level should be prepared identifying endemic and endangered species.
3. Develop conservation methods for each species. Identify new bio resources to meet future food, health and economic needs of man but to a special care for environment and sustainable development.
4. It was unanimously resolved and strongly recommended that the students of biology group, specially studying the subject of Zoology, dissections must be an essential component of their curriculum.
5. The assemblage of species with which we share the planet represents a vast untapped genetic diversity, with undiscovered pharmaceutical and beneficial substances. So program needed to be initiated for the exploration of other less known potential varieties of life forms with a view to ensure rural livelihood, food health and financial security for unreached ones.
6. Documentation of traditional technical knowledge, (TTK) and indigenous technology, its revival and strengthening for sustainable development in the area of bio-resources and adaptation to climate change should be made for the benefit of unreached ones.
7. Bio-resources are the wonderful gift of nature to the mankind whose sustainability can be effectively linked to rural livelihood and economic development, so science education should aim at attracting students for proper management and sustainable utilization of bio-resources with emphasis on sustainable development.

8. Programme needs to be initiated for exploration of other less known varieties of life forms with the view to ensure livelihood, food and health security.
9. Application of molecular tools for wildlife conservation, especially of endangered and endemic species may be given greater importance.
10. Promotion of public awareness on biodiversity conservation role of individuals for minimizing ecological footprint and maintaining health and hygiene in the vicinity should be made.
11. Multivoltine race of silkworm (*Bombyx mori*) should be tested under different agro-climatic Zones of India for proper evaluation of their improvement efficiency.
12. Bio-economic modeling of different ponds and reservoir management with view to increase fish production should be carried out.
13. Public-private partnership (PPP) should be encouraged to solve the environmental problems and conservation and proper utilization of all sorts of ecosystems and life forms, which ensure food, health and livelihood security.
14. Public participation in decision-making should be ensured and integration of environmental, economic and social sustainability with food, health and livelihood security of the people.
15. Various disease problems (in aquaculture and animal husbandry etc.) and their management should be worked out in details.
16. Launching of massive training programmes to link economically important bio-resources such as silkworm, honey bee, aquaculture, vermiculture, pearl culture livestock etc. with a view to promote/accelerate more rural livelihood should be intensively initiated.
17. Since Science and Technology is now providing important tools for food, health and livelihood security, short term training should be initiated for unreached in rural area for better production of entables which will contribute in increasing National GDP.

Anthropological and Behavioural Sciences (Including Archaeology, Psychology, Education and Military Science)

1. More and more psychologists and other behavioural scientists should be involved in Government agencies for putting their efforts in reaching the unreached.
2. Psychological and Anthropological approaches should be encouraged in researches on unreached groups for getting more realistic results.
3. An institute should be established for studying the unreached group.
4. A proper psychological approach is needed for Tharus as well as for the other tribal groups of our country in order to reach in unreached.
5. Anthropologists, Psychologists and other behavioural scientists should integrate research methodologies and approaches in future research in reaching the unreached groups.
6. There is a need to conduct more studies on rural population as much work has been done on urban population. So Anthropologists, Psychologists and other behavioural scientists have to move towards the villages.

7. Efforts have to be made in shortening the psychological distance between reacheds and unreacheds.
8. The unreached sections of the society have to be motivated for their upliftment by Anthropologists, behavioural scientists and Psychologists.
9. Government should involve more and more Anthropologists, Psychologists and behavioural scientists in planning and administration schemes for welfare of unreached groups including tribals of India.
10. The unreached group has to be converted into developing and developing into the developed one. This process has to be continued till an optimum stage of equilibrium is achieved. We as behavioural scientists must have yearn to reach the unreached sections of society.

Earth System Sciences

1. Climate change has become a serious issue globally, human interference has catastrophically increased its negative impact. Together, the scientific community/managers/ discussion makers need to take desired steps towards the mitigation of impact of climate change. For better understanding and mitigating the Climate Changes there is a need to incorporate the geological principles as they are bases for such changes.
2. In disposing the nuclear wastes safely, India has taken a great initiative & should continue the strategic plan of safe disposal so as to prevent living beings from getting affected. Such proposals be implemented taking into account the existing norms.
3. The occurrence of earthquake correlates well with the loading & unloading of reservoirs. This requires a systematic study & planning. Research work towards early warning of earthquakes needs to be strengthened.
4. LIDAR and UAV is the new era of remote sensing. Its application need to be increased, especially in the field of atmospheric pollution/chemistry and cryospheric sciences.
5. New Austrian Tunnelling Method (NATM) is most suitable for tunnelling activity in the difficult terrain region like Imphal .
6. Groundwater in Manipur Valley is contaminated with heavy metals and need immediate attention and remediation.
7. Satellite data is easily available with ISRO. The users should actively use it to address the real problems of the society including disaster mitigation, natural resources management and monitoring environment.

8. Monitoring, assessing and combating desertification is extremely important in today's World and can be easily done using satellite data. As one fourth of land in India is under desertification combating measures should be aggressively done.
9. Unmanned Aerial Vehicle (UVAs) have multiple application and should be constructively employed to address various societal issues.
10. VEDAS, a revisualization platform, devised by SAC/ISRO, Ahmedabad to find monthly, yearly potential of solar, winds & wave energy, apart from the weather of information available on various grounds/themes.
11. Landslide signals should be observed well in advance so as to apply mitigation measures to prevent it.
12. The Earth System Sciences Section organised the first Industry academia meet on 17th March to highlight the gaps between the requirements of the Industries and the method's to fill up the gap between academic pursuits and the industrial requirement, and made the following recommendations:
13. NCERT books should include the detailed information as a chapter on Earth System Sciences and modern and latest concepts be included in the books so as to increase the awareness of the students at any early age and to give them the correct information.
14. Code of stratigraphic nomenclature should be standardized so that the geoscientist refers to the correct terminologies within the India region and Globally and for industrial applications.
15. The information about the 36th IGC 2020 is scheduled is to be held in India so a special request be made to some of the funding agencies to give travel grant to atleast 200 students from North Eastern regions for awareness & exposure to students and to provide them an opportunity to enhance their knowledge and participation.
16. Rare Earth Metal needs to be explored with concerted efforts.
17. There is a need to have more training programs and workshops for better exposure to the researchers and students of the NE region on the subjects like disaster management, tectonics etc.
18. Special emphasis should work on real time problem.
19. Special emphasis should be on skill development & utility skills of the students through training & workshops.

Engineering Sciences

1. Rejuvenation of Indian Rivers in general and Ganga in particular using Pro-people Technology and use of Low-cost treatment systems needs to be highlighted.
2. Low cost CO₂ capture and low temperature gasification technology need to be utilized for opening up new Horizons of Hydrocarbon Engineering.
3. Importance of Engineering Education and its relevance in the national development should incorporate for better education and service policy making.
4. Reaching the Unreached can be achieved using discriminate use of “Science and Technology” viz. Atom Economy, Cradle to Cradle Mechanism, Viability Rader, Bio Mimicry, and Nature Inspired Holistic Science & Technology with Man/society at its centre.
5. Intigrated water resource management should be given importance in the national development of trough innovation in Science and Technology.
6. Policy makers need to incentivize the reduction of solid waste materials and put more responsibilities on the manufacturer for their products to control the quantity of waste generated.
7. Technical, socio-economic and environmental performance evaluation of nature based drinking water systems”, can play a important role in rural water supply plocymaking.
8. Holistic and Integrated Rural Development from Engineering Perspectives needs to be addressed.

Environmental Sciences

1. “Citizen Science” has emerged as use of sound science based approaches by members of the general public by turning them into responsible “Citizen Scientists”.
2. To improve the expansion of science and efficacy of governance ‘Citizen Science’ approach is *‘the future’*. Integration of new technologies with people’s involvement in systematic data collection and real time information from ground provides opportunities for public participation in scientific research and resource management.
3. Use of mobile phone technology, motivation to participate in environmental issues, and a mechanism for effective participation through ‘*Citizen Science*’ is a ‘participatory solution’ for stakeholders. Students participation as volunteers is good investment of time and resources for their intellectual growth.
4. Citizen science approach will play a pivotal role in managing important tasks in –
 9. developing ‘Early Warning System’ before the disaster
 10. implementing ‘Mitigation Measures’ during disaster
 11. mobilizing ‘Resource Allocation and Recovery’ after the disaster

5. Participatory resource appraisal with combination of geospatial technology will effectively respond to the increasing environmental uncertainties arising from global/climate change projections.
6. There is need to develop indicator-based frameworks and evidence-based policies, which could be implemented at the ground level to restore and preserve this socio-ecological system of the country.
7. Tailor-made management policies are required for proper implementation to check environmental degradation, and other obviate socio-ecological disasters in the Himalayan region.
8. Good science to support decision-making and integration among the various agencies are crucial to meet the challenges of climate change and environment. Resilience building with solutions acceptable to Himalayan communities are extremely crucial. There is a need for research, development and policies to implement adaptation more rigorously and move towards resilience building especially in the Himalayan region.
9. Keeping in view the potential of use of wild edibles for various purposes there is need to adopt sustainable approaches for conservation and utilization of Himalayan wild and medicinal plants.
10. There is need to re-visit ancient Indian literature in the framework of modern holistic methods of sustainable development of biodiversity.
11. An air connectivity between the capital cities of North-Eastern Himalayan states is the need of the hour to speed up the mobility and resource sharing.

Information and Communication Science & Technology (Including Computer Sciences)

1. Digital initiative be taken to reach the common man by issuing and linking the micro details of all residents of India.
2. GIS can be effectively used to identify and increase the Agriculture land. And also to help the farmers to increase their farm productivity using satellite images.
3. More Health Care related sessions be organized in the ICT section.
4. Organizing more Deep Learning and Artificial Intelligence related sessions in ICT section.

Material Science

1. New Function Materials for Health, Energy and Clean Environment
2. 2 D Materials for Device Applications in IOT area
3. Printed Sensors and Devices for Smart Applications
4. 2 D Materials for Biological Applications

Mathematical Sciences (Including Statistics)

1. Mathematics curriculum should be reoriented in all levels including School and College curriculums, keeping in mind about the advances in Science and Technology revolution across the globe to apply in the practical applications.
2. A well-defined methodology should be found to impart basic mathematics. Also, sufficient funding should be made available to carryout advanced researches in mathematics and related areas for its applications in Defense Studies, Biological Studies, Environmental Studies, Space Sciences, Computational & Information Sciences and Social Sciences. This will also help to enhance interdisciplinary applications in practical problems for the benefit of the common man for development of our nation.
3. Further, the year 2018 has been announced as the year of Mathematical Biology by the European Society of Mathematics (ESM) and the European Society for Mathematical and Theoretical Biology (ESMTB) to celebrate the significant impetus for Mathematical Biology relevant events should be organized to encourage the young researchers, which will help to define future road map of further applications.

New Biology (Including Biochemistry, Biophysics & Molecular Biology and Biotechnology)

1. Natural products are important sources of new pharmaceutical compounds. Therefore natural product drug discovery programme should have an integrative approach solving smart screening methods, robotic automated technique for compound separation and structural elucidation. Metabolic engineering, synthetic biology, metagenomics and genome mining tools should be used as drug discovery from the natural products. We need to undertake concerned programme in these areas.
2. Infectious disease and drug resistance among the pathogens require the search for novel therapies and new drug leads such as anti infectious, anti pathogenic drugs which includes anti quorum sensing compounds, quorum quenching agents and bio films inhibitors. A strategic initiative in this direction is required.
3. To gradually shift from harmful agrochemical accelerated research is needed for development of biofertilizers, bio-pesticides and bio-stimulants suited to N.E. and other parts of India.
4. Large scale research must be taken to exploit rhizospheric and endophytic microbes of unique flora such as medicinal plants and black rice in Manipur for their potential on rice and other major crops.

Physical Sciences

1. The science and technology empowerment can reach the unreached by the “ pathway attention to the village people” or “connecting rural India to the world”
2. By promoting wired and wireless systems of communication, electrical supplies, thermal and solar energy supply systems etc.
3. The computer aided and internet knowledge centre can be linked to a community radio network to ensure that information relevant to needs and livelihoods reach the unreached.
4. In Dec 1996, in the Beijing conference recommendations were made to enlarge the role of women in science and technology development and discussion.
5. Technology is rapidly changing the world and has affected the developing countries. It is very much essential that women should be benefited from technology and should also participate in the process from design to the application, monitoring and evaluation stages.
6. Necessity to mobilize recent advances in science and technology for meeting the basic needs of the economically and socially underprivileged sections of the human family through community base village knowledge .
7. The information and communication revolution will allow very rapid growth as well as ability to access the universe of knowledge and to communicate through low cost electronic networks as well as highly interactive distance learning.
8. Remote sensing and other space satellite outputs are providing detailed geographic information useful for land and natural resources management.
9. The widespread availability and convergence of computers, digital networks, telecommunication, television etc have led to unprecedented capacity for dissemination of knowledge and information. This can be used to development of rurals.
10. The advent of computers and the internet has brought significant changes to the individuals and communities.
11. We can use information and communication technology to empower the rural poor in the developing world through enhanced access to relevant information.
12. The US govt has setup a Biotechnology Advisory Committee made up of Scientists, farmers, industry groups, professional, environmentalists, regulatory agencies and members of the public. Such bodies can help Govt to take decisions on various issues. It is the duty of scientific establishment and science academies to nurture and faster the growth of young researchers capable to initiating and managing the change in goals and strategies in the coming century.

Plant Sciences

1. There is still urgent need to explore, identify and authenticate the biodiversity of different groups of plants and microbes as many of the areas are still unexplored in the country.

2. The efforts should be made to sensitize youngsters to carry out research and bring it to some logical conclusion to be of use to the society. In this case, the documentation and authentication of indigenous technical knowledge is very essential. Though steps have been taken in this direction, in our vast traditional country, the ethnic knowledge bank is still not appropriately filled.

3. In the present context, ethnic and conventional documentation needs to be supplemented/corroborated with the molecular techniques to make it holistic, foolproof and to bring it at par with international standard.

4. There is need to give extra emphasis on medicinal and aromatic plants considering the dwindling wealth of this natural resource. Microbial wealth also needs to be properly explored and authenticated for traditional and novel microbial products which have become very important in biotechnological ventures.

5. Entrepreneurship ventures should be encouraged in tissue culture, herbal products, biofertilizers and mushroom cultivation to motivate the rural population to undertake entrepreneurship linked to society through science and technology.

