

Recommendation of the 89th Indian Science Congress

The 89th session of Indian Science Congress was held for fifth time at University of Lucknow on January 3-7, 2002. The focal theme of the congress was **Health Care, Education & Information Technology**.

The Congress was inaugurated by the Prime Minister of India, Shri Atal Behari Vajpaye, on 3rd January 2002. While extending hearty greetings for the New Year, Prime Minister exhorted the scientists and technologists to build powerful collaborative networks to check the menace of terrorism and religious extremism. Dwelling at length on Research & Development, the Prime Minister expressed concern over low investment by the private sector. While encouraging collaboration between universities and private industries to address the complex issues of higher education in our country, the Prime Minister said : "that R & D in our university system is not receiving as much attention as in specialized agencies and laboratories. Creative universities are the bedrock of every developed nation's S &T strategy. It is a matter of concern that science departments in India's vast university system have suffered greatly due to lack of investments, both material and in terms of faculty`.

He also emphasized prioritization of areas like meteorology, oceanography, ecological recovery and environmental protection, disaster prevention and management, renewable energy and energy efficiency, effective medicine for both the prevention and treatment of communicable diseases and conservation and sustainable utilization of our rich biodiversity. The Prime Minister also honoured distinguished sci_en_tists of the country and released Biological Dictionary of Indian Sciences on the occasion. Prof. Murali Manohar Joshi, Hon'ble Minister for Science & Technology, Government of India in his address focussed briefly on the contributions of Science & Technology in tackling issues of health, nutrition, poverty and environment. He also mentioned the schemes and opportunities for the students to pursue a fruitful career as scientists and stressed the need for the resurgence of science and scientific temperament as the source of strength for the new millennium. Prof. S.S. Katiyar, General President of Indian Science Congress Association in his presidential address dwelt on the focal theme of the Congress. He also discussed spectacular achievements of science, engineering and technology in making enormous impact on Society. A Tech-Vision 2002 was organized on the occasion of the 89th session of the Congress from January 3-7, 2002. The Tech-Vision was organized by Wistex Foundation and sponsored by public & private sector organizations. The highlights of the exhibition were the exhibits, including missiles of the Indian Space Research Organization (ISRO) and the Defence Research and Development Organization (DRDO). Prof. Murali Manohar Joshi, inaugurated the exhibition which was open to public. Eminent educationists and scientists and experts from all over India and delegates from abroad participated in the Congress and made recommendations for developing effective treatment and preventive strategies with special reference to our country, establish linkages of information technology with the field of education and health care. The programme of the Congress was organised in eight plenary session namely : (i) Genome to Health Care, (ii) Digital Empowerment of Societies, (iii) Molecules to Mind, (iv) Ensuring quality in teaching and research in Universities, (v) Heath Care : Reaching

the unreached, (vi) Diagnostic Techniques of today and tomorrow, (vii) Indian excellence in global competitiveness in information technology and (viii) Drug discovery : Retrospect and Prospect. For public foras were organized on : (i) Science and Technology (ii) Health care delivery, (iii) Financing of Higher Education and (iv) Information Technology : Societal Impact. Four evening lectures were also organised which were delivered by eminent scientists. Dr. A.P.J. Abdul Kalam, ISRO Distinguished Professor, Bangalore, delivered first evening lecture on Integrated Action for Societal Transformation. Dr. Kalam stressed the need for integration of various technologies to transform the country from developing to a developed nation. He also suggested integrated action in the areas of agriculture and food processing, reliable and quality electric power for all parts of the country, education and health care, information technology and strategic sectors such as space, defence and other technologies, to transform India into a developed nation. Dr. R. A. Mashelkar, Director General CSIR and Secretary, DSIR gave an evening lecture on Intellectual Property Rights and Wrongs : A Developing World Perspective. Dr. Mashelkar said that in the present century, issues of generation, validation, protection and exploitation of in_tel_lec_tu_al property (IP) were going to be critically important all around the world. He also emphasised on the need to compile traditional knowledge to avoid patents by other countries. Prof. M.S. Valiathan, Hony. Advisor. MAHE, Manipal and President, INSA delivered the Evening Lecture on Health : The Goal Forever, while Sir Walter Bodmen of John, Radcliffe Hospital, Oxford, England delivered the fourth evening lecture on Ge_net_ic diversity and disease susceptibility : The impact of the human genome project. He discussed in detail the genetic diversity and the susceptibility of the individuals diseases. He also briefed about impact of unravelling of the Human Genome Project in understanding genetic and individual susceptibility.

Beside plenary and evening lectures, concurrent technical sessions were organised in 16 different sections namely ; (i) Agricultural Sciences, (ii) Anthropology & Archaeology, (iii) Biochemistry, Biophysics & Molecular Biology, (iv) Botany, (v) Chemistry, (vi) Computer Sciences, (vii) Earth System Sciences, (viii) Engineering Sciences, (ix) Medical and Veterinary Sciences, (x) Material Sciences, (xi) Mathematics, (xii) Physics, (xiii) Physiology, (xiv) Psychology & Educational Sciences, (xv) Statistics, (xvi) Zoology, Entomology and Fisheries. The special features of this Science Congress were 6 different panels namely : (i) Biotechnology :The New Frontier, (ii) Cardiac Care : Future Vision, (iii) Environment and Health, (iv) Information Technology & Social Development, (v) Pulmonary Medicine : Changing Face and (vi) Science for School Children, where concurrent technical sessions on innovative aspects were organised. Poster sessions were also organised to promote young scientists to highlight their research and interact with the experts in the area. All the sessions were well attended.

The delegates participating in the Congress had further deliberated on the theme of the Congress and offered valuable inputs and strategies for accomplishing and implementing the goals. The followings are the major recommendations that emerged in the Congress relating to R & D and policy related matters.

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Recommendations

I. Society Development

Integrated action for societal transformation by applying an integrated approach to ensure participation of various sectors such as agriculture, energy, information technology, space and defence. Use science as a tool for development in education and health care with the thrust among the scientific community to work for the economic development and economic security of the country and a better quality of life.

II. Higher Education

Develop international quality standards in teaching and research that is comparable to the best Universities and Centres of learning at the global levels to ensure innovative research, products and processes to give our country a competitive edge.

Higher education be provided adequate funding to maintain quality and excellence with atleast 6% of GDP be invested in education compared to present investment of 3.7% (even a number of developing Asian countries have a higher percent of investment than this). Need to set up an Educational Development Bank on the lines of the Industries Development Bank of finance the education of poor students.

In view of the expansion of higher education and huge expenditure involved in it, supplementary and alternative means of funding have to be found. Generation of financial resources based on recommendations of Justice Punnaya Committee 1993 be implemented in a time bound manner. However, it has to be ensured that private funding is without strings and should not be detrimental to the quality and societal role of education.

Attempts be made to ensure that all deserving and meritorious, even poor or other underprivileged students, have an equal access to the opportunities in the higher education to garner a broader pool of intellectual resource. There should be a provision of soft loans to the poor students with minimum possible guarantees and conditions.

To provide higher education to a very large segment of Indian population including tribal, rural, hilly, women and other underprivileged groups desirous of seeking education, an Open University system be promoted. It may be pointed out that in India only 6 percent of the population is going for higher education whereas even in some of the Asiatic developing nations 15 to 25 percent of the population are going for higher education. This percentage needs to be enhanced gradually.

Open book examination system and evaluation of teachers by the students to help make teaching more exciting. The corporate sector must come to help bright talented students in a big way by starting scholarships.

Upgrade medical colleges and modify the existing medical curriculum to make it need-based. Creation of a specialty in the public health and family welfare.

Educationists should have a greater say in national planning and development. Primary and middle school level curriculum should be made free from anxiety, tension and phobia for happy learning. It may be noted that teacher-student ratio in primary schools is 1:50 compared to many developing Asiatic countries where this ratio is 1:20-25.

Intellectual Property Right (IPR) should be considered as an important issue in the area of Science & Technology, research and development in the country to make the nation IPR-literate. Efforts be made to introduce IPR in college curricula across the country.

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III. Technology

To develop technology keeping in mind the cultural and social values of the country and according to the specific need of our country. Technology should advance keeping in mind sustainable development as the goal.

Ensure inventions in the universities and educational institutes. They should become the centres for development and upgrading of technology. This should help in expedited availability of better quality products at lower or competitive costs. University-industry consortia should be formed for the technological advancement in the country.

Creation of a separate department of technology, focusing on development of agro-based industry and modernization of the agriculture sector for increased production.

IV. Research and Development

It is appreciated that the DST has launched a FIST programme to improve the R&D infrastructure in universities and colleges. This needs to be continued to further strengthen the infrastructure of all universities.

Need to conserve wild flora and develop agro-technology for medicinal plants and ensure drastic increase in Indian share in global herbal drug market.

Take initiatives to harness the power of science and technology, traditional wisdom of India and the youth power for eradication of poverty, disease and squalor from the country and usher an era of prosperity and peace.

R&D priorities should be fixed in four thrust areas : globally competitive basic research, mission-oriented research, industry-oriented research and most importantly, country-specific research.

The humanistic and ethical perspective of human genome research should be given due consideration. Anthropological dimension of human genome diversity should be given importance in India.

There is an urgent need to encourage research and implementation of environment-friendly strategies in chemical research. The research on topic such as Microwaves in

chemical synthesis, electro-synthesis, medicine from nature, novel aids for agriculture, advanced materials should be encouraged and strengthened.

Steps must be taken to utilize the recent trends in internationalization and globalization of advanced research in general and chemical research in particular.

The research in sciences should attain relevance and quality through creating core centre for excellence, establishing effective linkages with industry and partnership between institutions.

Knowledge and skill development of professionals deployed in engineering education, industries and research institutions has to be continuously updated to meet the fast changing requirements of technical developments.

V. Information Technology

To develop new digital techniques so that people could directly interface with the technology with particular emphasis to develop voice system for transmission of knowledge in India. Digital revolution should no longer remain confined to the scientists and the country needs to develop its digital technology, telecommunication so that its benefits reach common man/society on affordable prices.

Stress for improving computer hardware in India and creating internal markets for software production with the aim to develop inexpensive PCs, create jobs at low investment and provide universal access to the internet. The reach of computers to common man is poor in India as compared to China and some of the other Asiatic countries and developed nations. This must be enhanced significantly.

Special initiatives are to be taken to increase PC penetration rate and number of the internet users. At present the rate is 4.3 per 1000 which is very less compared to that of any developing country. We can try to increase penetration by lowering the cost of a PC or increase the value proposition. Lowering cost will be more difficult as all PC manufacturers around the world are continuously trying to lower cost and create access devices of lower cost. Increasing value will be easier because it has regional social/cultural/economic factors that can be handled only here. Value is increased by creating applications that people care about.

Technological and financial support needed for computer awareness programme and for computer education among the rural population of the country by introducing IT immediately in Indian languages.

Computers and internet connectivity should be made available in every school and institution of higher education. All institutions of higher education and R&D institute should be networked in order to improve the quality of education.

Steps are to be taken to boost IT for agricultural and integrated rural development in the country.

It is recommended to have a national policy on information security, privacy and data protection for handling computerized data.

To ensure provisions of Tele-Medical consultation for the benefit of masses and particularly for the population belonging to deprived section of the society in rural and urban areas alike.

VI. Biotechnology

Biotechnology to be promoted in a big way in the coming years and along with information technology should turn out to be the core area of development. Biotechnology should also become the driving force of economic development and play a determining role in guiding the country's future.

As with unraveling of the human genome, the starting point of all biological inventions will be theoretical, more stress should be laid on bioinformatics in the next decade in the country.

Need for development, application and commercialization of biotech product and implications of indigenous biotech tools in the achievement of human health for every India.

The need for having an appropriate regulatory system in place in our country and elsewhere that will ensure that the new technologies bring, in balance, benefit to the majority of people and not lead to the exploitation of the masses.

It is appreciated that Biotechnology Park has been set-up in Lucknow. Similar park should be made in other states.

VII. Environment and Health

The subject of health is as important as agriculture and industry and therefore, the status of ICMR be raised to the level of ICAR and CSIR.

Panchayati-Raj be entrusted with the jobs to provide primary health care and information technology be used to monitor the working of Panchayats. The Panchayati Raj should provide the necessary condition for people's health sector where a bottom-up rather than top-down approach to solve community's health and medical problems. The conditions of primary health centre must be improved and made functional as most of these centres are not functional at present.

With the implementation of World Trade Organization (WTO) patent rules, all efforts should be made to scientifically exploit the wealth of knowledge enshrined in our traditional systems of medicine.

An advisory panel be established to address national environmental health issues including environmental health problems. The panel should develop long term perspective and also coordinate among academia, R&D centres and regulatory agencies for research, education and training activities on environmental health.

An agency such as the Institute of Environmental Health Sciences (IEHS) be established on priority. The institute should play a major role in planning of resources (manpower and funding) required to meet the current and future needs of the public environmental health concerns. It should also serve as a national resource for environmental health information, training and education and environmental awareness among the health, R&D professionals including the public at large.

Environmental cleanliness and sanitation so as to reduce the infections in children. Education of the public through media and public forum about the preventive measures and need for strengthening government run secondary and tertiary care medical hospitals and institutes.

Disease profile is going to be influenced by life-style, special efforts need to be made to monitor, evaluate and control these emerging maladies.

Health and not just disease should be included in the curricular of medical schools.

Continuing education (and may be re-registration) should be mandatory for all professionals.

Brain remains the last frontier of ignorance, utilizing the wealth of knowledge in our ancient literature, the country should initiate efforts to explore brain/mind relationship using modern techniques of neuroscience.