SCIENCE AND TECHNOLOGY CHALLENGES OF 21ST CENTURY- NATIONAL PERSPECTIVE

97TH INDIAN SCIENCE CONGRESS

Inaugural Address

by

Dr. Manmohan Singh
Hon'ble Prime Minister of India

January 3, 2010

UNIVERSITY OF KERALA,
THIRUVANTHAPURAM, KERALA

Shri R.S.Gawai, Governor of Kerala,

Shri V.S. Achuthanandan, Chief Minister of Kerala,

My cabinet colleagues Shri Vayalar Ravi, Shri Prithviraj Chavan and Shri Shashi Tharoor,

Dr G. Madhavan Nair, the President of 97th Indian Science Congress,

Professor C.N.R.Rao,

Dr T.Ramasami, Secretary, Department of Science & Technology,

Distinguished delegates to the Indian Science Congress,

Media personnel,

Ladies and gentlemen,

I am truly delighted that my first important engagement in the New Year is the inauguration of the 97th Indian Science Congress. If India has to re-emerge as a knowledge power in the 21st Century, then it can only be through a strong

capability in science and technology. It is particularly appropriate that the Congress is being held in Kerala which has led the way in education. I recall it was in Thiruvananthapuram that we launched India into the era of space exploration. I wish the people of Kerala - this “God's Own Country” - a joyous year ahead.

Ladies and Gentlemen:

In the past few years we have invested heavily in expanding and upgrading the science, technology and innovation system in the country as well as the supporting educational base. We have worked hard to do what is good for science. We are determined to ensure that what we have announced gets implemented. We also know that we need to do more because scientific capability is what will determine our ability to overcome the challenges which lie ahead. We face new challenges of climate change and management of water resources. We also face old challenges of food security and disease control. In all these areas, our success will depend

critically on the quality of our institutions of science and technology.

Last month, world leaders came together at Copenhagen to grapple with the threat that climate change poses to our planet and to our way of life. It is a problem that is challenging the knowledge and wisdom of humankind. We were able to make only very limited progress at the Copenhagen Summit and no one was satisfied with the outcome. And yet, there is no escaping the truth that the nations of the world have to move to a low greenhouse gas emissions development path.

All over the world, countries are chalking out strategies to achieve greater energy efficiency and a shift to renewable energy. They are also chalking out strategies for adapting to such climate change as is inevitable. India must not be behind in these areas. Indeed we should plan to be among the leaders in the development of science and technology related to mitigation and also adaptation. The market for such

technologies is not just India. It is the whole world.

As far as energy is concerned, renewable and clean energy supplies will need to pay a much bigger role than what they do currently. Nuclear and solar energy supplies will need to increase considerably. The agreement reached last year with the Nuclear Suppliers Group represents a landmark in lifting long standing restrictions on transfer of nuclear fuel and technology to India. I am confident that we can now plan for an accelerated nuclear power development programme.

We have also decided to launch a Jawaharlal Nehru National Solar Mission for establishment of 20,000 MW of solar generation capacity by 2020. The mission provides an opportunity to our indigenous scientific institutions to contribute in this important area. I am happy that a PAN IIT programme for Solar Energy Research has been launched by the Ministry of Science and Technology to drive down the costs of solar energy technology options through

R&D-led innovations. The Ministry has also launched joint development programmes with knowledge networks of EU and UK on solar energy research with investments of 5 million Euro and 5 million UK pounds respectively on each side.

Ladies and Gentlemen,

We live in an increasingly complex world with growing interdependence among different sectors of our economy. Every solution to a particular problem has consequences in other areas. Take forests for instance. When we thought of forests as an economic resource the focus of forest planning was almost exclusively on growing the stock of timber and other commercially valuable forest products. This led to decisions about the choice of tree species and planting practices that we now know were sub optimal because they did not pay sufficient regard to other functions of forests like controlling water run off or protection of bio-diversity.

A single-minded focus on carbon reduction could lead to a similar distortion if forestry choices are based solely on how good they are in sequestering carbon. Mitigation of greenhouse gas emissions is an important goal. But it must co-exist with other equally important goals.

Ladies and Gentlemen,
Water resource management is a very important area for us given the fact that per capita availability of water is declining as population has increased. The urgency of action in this area increases because of the threat of climate change. The scientific input in evolving an adaptation strategy is very important. I am happy that the Ministry of Science and Technology has initiated a Technology Mission for Winning, Augmentation and Renovation (WAR) of water. Technology solutions for 25 different water related challenges are being found through pilot trials under real field conditions in about 60 locations covering all our 20 river basins. These solutions will then be applied to 100,000 population clusters to study their financial viabilities and location neutral

applications. If the project completes successfully by 2011, it will have an important demonstration effect of the virtues of investment in scientific solutions.

Ladies and Gentlemen,
Strengthening food security is another area of emphasis in our scientific efforts. Better weather forecasting is critical for agricultural management. A Geo-spatial Technology Applications Mission to provide crop planning and monitoring as well as flood management has been mounted.

Developments in biotechnology present us the prospect of improving yields in our major crops by increasing resistance to pests and also to moisture stress. BT Cotton has been well accepted in the country and has made a great difference to production. The technology of genetic modification is also being extended to food crops though this raises legitimate questions of safety. These must be given full weightage, with appropriate regulatory control based on strictly scientific criteria. Subject to

these caveats, we should pursue all possible leads that biotechnology provides that might increase our food security as we go through climate related stress.

Providing affordable health care and improving the quality of life of the elderly is another major challenge of the 21st century. It is a matter of pride that scientists of the Council of Scientific and Industrial Research have recently succeeded in mapping the genome of an Indian through a collaborative national effort. I also commend the DRDO for developing a new and rapid diagnostic method for detecting the H_1N_1 virus. We must build our scientific capabilities in a way that they can respond in real time to problems such as pandemics.

Ladies and Gentlemen:
Scientific capability depends critically on our S&T education and research infrastructure. I am happy to say that our efforts to improve this base are progressing well. Since I addressed this Congress last year there has been progress on a number of initiatives.

Under the Innovation in Science Pursuit for Inspired Research or INSPIRE scheme, we will soon be announcing the name of at least one science awardee per school in the age group of 10-15 in the entire country.

The Government is considering the revision of the value of doctoral and post-doctoral fellowships as well as the formulation of schemes that would cover all research scholars with some funding support.

We are keen to make our science education outreach inclusive and affordable. Last year I had announced a special package for the North Eastern Region. We have since started implementing a similar package for the S&T sector in Jammu and Kashmir. We are planning similar investments in other regions of the country like Bihar to bridge asymmetries.

One of the imbalances in our scientific resource pool is the under representation of women. We should redouble our efforts to attract many more talented young women to take up careers in

science. A step in this direction is a new scheme available for women's universities named Consolidation of University Research, Innovation and Excellence (CURIE). This scheme provides financial help for complete upgradation of facilities in such universities.

I am happy to announce that the National Science and Engineering Research Board will start functioning before March 2010. A National Policy for Data Sharing and Accessibility has been formulated. The Protection of Intellectual Property Bill, focused on sharing revenue from intellectual properties with researchers will be taken up for discussion in parliament soon.

Ladies and Gentlemen:
All Indians felt proud that an Indian origin scientist, who earned his early spurs in India, was a recipient of this year's Nobel Prize in Chemistry. I salute Dr Venkatraman Ramakrishnan for his creativity, his talent and his commitment to good science. I have also noted Dr Ramakrishnan's recent comment on

the need for greater "autonomy from red tape and local politics" for Indian scientists.

It is unfortunately true that red tape, political interference and lack of proper recognition of good work have all contributed to a regression in Indian science in some sectors from the days of C V Raman, Meghnad Saha, J C Bose, Homi Bhabha, Vikram Sarabhai, Satish Dhawan and other great pioneers of Indian science.

I urge our scientific institutions to introspect and to propose mechanisms for greater autonomy, including autonomy from the government, which could help to improve standards. We must make a special effort to encourage scientists of Indian origin currently working abroad to return to India, including coming to our universities or scientific institutions for a short period. In this way we can, convert the “brain drain” of the past into a “brain gain” for the future. This will require special incentives. We need to think creatively on how this can be done so that high quality minds are attracted to teaching and research.

Much of what we have to do to improve science requires money but this is only one part of what is needed. It also requires a change in mindset, including, if I may say so, the mindset of senior faculty and university administration. Sometimes that is the hardest thing to do.

I invite you to explore all these issues and engage with us so that we can do what is needed to liberate Indian science from the shackles and deadweight of bureaucratism and in-house favouritism. Only then we can unleash the latent talent and creative energies of our scientists and engineers.

Ladies and Gentlemen:
Our Government has declared 2010-2020 as the "Decade of Innovations". We need new solutions in many areas to achieve our goals of inclusive and sustainable growth – in healthcare, energy, urban infrastructure, water, and transportation, to name only a few. We cannot continue with business as usual. Solutions from developed countries are not always applicable. They are often too costly and at times not sustainable.

The country must develop an Innovation Eco-system to stimulate innovations. Innovators must be challenged to produce solutions society needs. And innovative solutions with potential must be nurtured and rapidly applied.

Our scientific establishments must be central to the Innovation Eco-system. But the system must include industry, and providers of venture funds, as well as regulators who set high standards of performance for products. We also need to think creatively on how to increase private investment in R&D. Some innovative policy readjustments may be required to build vibrant Public-Private Partnerships in the S&T Sector.

Our elite institutions such as the IITs must do more to address the technological challenges of 21st Century. Their research goals and the expectations of the industrial and social sectors must be better aligned.

The Planning Commission has set up an Expert Group to strengthen the Innovation Eco-system

in the country and also to point to areas where innovations are required to meet the country's goals of more rapid, inclusive, and sustainable growth.

I have said the Indian scientific establishment is a vital component of the Innovation Eco-system. However, to fulfill its role, it should have a strong outward orientation. It must work in partnership with industry. We need to concentrate on strengthening the linkages between academia, research and industry. Today each operates within its own silo. Unless we close those gaps, our research and development sector may report high performance in terms of published papers but our challenges of the 21st century will remain unsolved.

Lastly, Indian science should have a strong outward orientation. Our science establishments should step up global alliances that will expose our scientists to the best in the world and enhance our competitiveness.

Ladies and Gentlemen,
The time has come to give a new boost to science in India. I hope the 97th Indian Science Congress will come forward with specific proposals to this end. I hope each one of you will return to your laboratories and class rooms re-energised to do good science, and do it for the good of our people, and of humanity.

In conclusion, I wish you all a very happy, prosperous, purposive and peaceful New Year and wish your proceedings all success.

Jai Hind!