YEAR END REVIEW - MINISTRY OF SCIENCE & TECHNOLOGY AND OCEAN DEVELOPMENT

SARAS RAISES INDIAN SCIENCE TO A NEW HIGH

SUDOTERB HOLDS PROMISE FOR FASTER CURE FOR TB

THE COUNTRY GETS READY FOR THE FIRST EVER NATIONAL BIOTECH POLICY

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**YEAR END REVIEW**

It was a momentous year for the Ministry of Science & Technology and the Department of Ocean Development as the Indian scientific community scaled new heights in research and development. Some of these achievements are listed below.

**SARAS- The Indian aircraft for the future**

The test flight of India's first indigenous civilian aircraft SARAS on 22, August, 2004, heralds the linking of small towns and remote areas of the country. The fourteen-seater pressurized aircraft has been designed for short take-off and landing runways for tropical countries, with a range of 900 kms and cruise speed of 450 kms/hour. The multi role aircraft is aptly suited for ambulance services, troop transport, surveillance, air taxi and feeder airline. Development of SARAS is a unique example of synergy among multiple government agencies, public and private industrial organizations.

**A New Anti-TB Drug After 40 Years**

A leading Mumbai based Indian pharmaceutical company partnering with four R&D institutions has developed a new therapeutic anti-tuberculosis molecule 'sudoterb'. The molecule makes it possible to clear the total infection in two months time from the current level of 6 to 8 months. An Investigational New Drug (IND) application has been filed for clinical trials on human beings.

**Bio-Suite: The First Indian Global Bioinformatics Product**

India's leading IT company in collaboration with 18 of the best of academic and R&D institutions launched globally a portable, versatile, cost effective bioinformatics package for genomics and rational drug design. The soft ware will enable Indian R&D laboratories and small entrepreneurs to undertake bioinformatics activity.

New models of public-private partnership in biotechnology have been formulated for accelerating research & development, technology perfection, absorption, and commercialization. Over 20 projects in the areas of development of drugs, vaccines and diagnostics are under consideration

**Diagnostic Kit for Japanese Encephalitis**

An ELISA system for Japanese Encephalitis has been developed through collaborative work between two public funded R&D institutions and a medical college. A Bangalore-based biotech company has commercialized the product as a diagnostic kit named 'JEV CheX'.

**Eco-friendly biopesticides**

Two biopesticide formulations named 'Nirmal Bio Prahar' for management of agriculture crop pests and 'Nirmal Bio-Wooly Kill' for sugarcane weevil developed at International center on biotechnology, Delhi have been commercially launched by a small Indian private entrepreneur.



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**Bamboo Applications Mission**

Bamboo, a hardy grass is a renewable resource and has wide range of applications. It grows on several million hectares of forestland and private plantations. National Mission for Bamboo Applications was launched on 26th November 2004. The emphasis is on innovative applications and markets. Bamboo applications for low cost earthquake resistant housing, wood substitutes, composites and energy generation have been developed through S&T interventions. Large-scale demonstration and proliferation of the products has been taken up for generating income, employment and empowerment at the grass root level.

**Nano-Science and Technology Mission**

Nano materials are finding all-pervasive applications in medicine, electronics and industry. Based on the tenable R&D capacity, a Technology Mission to realize the benefits of this emerging field for the people of India is ready for launching.

**National Mission on Tuberculosis**

Every year, 2 million persons in India develop TB. A massive national tuberculosis prevention programme is operational. The current therapy requires uninterrupted treatment of 9 months leading to significant drop out rate. An inter-ministerial mission is planned to develop new anti TB therapeutics including vaccines and diagnostics to overcome the present drawbacks.

Other National Missions on the anvil are: National Mission on Alternative Energy Resources and National Mission on S&T for Rural Economic Advancement.

**Monsoon and Weather Predictions**

Indian economy is monsoon driven. Monsoon predictions play a crucial role in the life of people. Indigenously developed statistical models for long range forecast of monsoon are currently applied. Reliable prediction of monsoon still remains a formidable and challenging task. To overcome the current limitations, large-scale upgradation of the observational systems has been taken up for enhancing the number and distribution of observatories, increasing the number of automatic weather stations and acquiring advanced computational facilities. This will enable better weather forecasting at district level.

The government has also set up coordination mechanisms for synergizing dispersed institutional efforts for devising improved weather prediction models for medium range (14-21 days) at district level.

An integrated meteorological data reception and analysis system of processed information has been made available on an ordinary PC to different users.

**Creating an enabling geospatial infrastructure**

In today's world geospatial data is an essential requirement for all developmental activities. The present regulations for mapping prohibit the digital publishing of Indian maps with heights and contours in view of "Strategic Implications". A new Mapping Policy formulated is under the active consideration of the Government. This would facilitate the availability of diverse type of geospatial data on authentic maps.

In order to realize this objective a National Spatial Data Infrastructure (NSDI) is being set up to ensure the availability of standardized geospatial data collected by various agencies through a single source.

Steps have been taken to provide GPS compatible spatial data/map for motor vehicles in six major metros viz. Delhi, Mumbai, Chennai, Kolkata, Hyderabad and Bangalore to enable vehicle navigation and tracking. The Government also plans to establish a comprehensive village information system that would map local utilities and facilities and integrate this with other information data sources for micro-level planning and development.

**Mapping the Neighbourhood**

Mapping the Neighbourhood is a unique programme recognized by the President of India as one of the nine technological innovations of the year 2004. It involves participation of the students in the preparation of maps of the neighborhood using a hand-held computer coupled with Global Positioning System (GPS) and indigenously developed GIS software. The programme at present implemented in 20 schools of Almora and Nainital districts will be expanded to cover 30,000 schools.

**Rural Bioresource Complexes**

A Rural Bioresource Complex (RBC) is a cluster of several contiguous villages in which economically viable and ecologically compatible technologies are provided to the people for their economic empowerment. These are being initiated at five locations in partnership with

state governments, Agricultural Universities, Banking institutions and NGOs

**Mitigating drinking water problem**

Islands and coastal rural areas lack sources of fresh water and often times have limited sources of power. One solution devised indigenously is to desalinate water by using the temperature difference between the surface and deep sea-layers. A 5000 litres per day low thermal desalination plant was inaugurated at chennai in June 2004 . A 100,000 litres per day low thermal desalination plant is under installation at Kavarati. Deployment of barge mounted desalination plants is also being considered.

**Realising synergy of Public - private Partnership**

Government seeks to craft alliances between Indian industry leaders and publicly funded R&D institutions for capturing global leadership. A few of the success stories are:

**National Data Buoy Programme**

Data buoys facilitate collection of information on oceans to help improve oceanographic services and predictive capability of short and long term weather forecasting. The indigenously developed data buoys give considerable reduction in the costs and better operational life. The product was launched on the Ocean Day celebrated in July, 2004. The industrial production is being explored.

**Centers of Excellence and Advanced Facilities**

In order to enhance India's global competitiveness in frontier S&T areas, government has taken up the establishment of clusters and centers of excellence for research and human resource development.

**Facilitating food trade- GM referral center**

Foods based on genetically modified (GM) crops such as soybean, corn foods are increasingly being traded world over. The national and international regulatory regimes necessitate detection of GM crop derived food. To comply and build capacity in this emerging sector, a GM food referral facility has been set up at the nodal Codex food laboratory at Mysore. R&D programmes have also been launched for development of analytical techniques for rapid detection of transgenic traits in GM Foods and products in 3 other public R&D centers.

**Clinical Proteomics**

Clinical proteomics is a field with a great potential for drug discovery and development of vaccines, diagnostics and biomarkers. Three facilities are being established in Delhi focusing on screening and identification of individuals/groups for most of the chronic diseases.

**Stem cell research and tissue engineering**

Establishment of two interdisciplinary centers, one each at Delhi and Pune has been taken up. Additionally stem cell research is being promoted by forming city clusters involving basic researchers, clinicians and industry at Delhi, Vellore, Hyderabad, Pune and Bangalore.

**Centre for Biotechnology for Public Health, Faridabad**

The center, with strong basic science and clinical research facilities will speed up conversion of laboratory technologies to commercial scale through Public-Private partnership. The initial focus is on vaccines, diagnostics, biomarkers, therapeutic biomolecules for infectious diseases and nutraceuticals.

**Magnetic Resonance Image Facility For Brain Research**

The foundation stone was laid for the facility in September 2004. Functional magnetic resonance imaging (fMRI) enables brain morphometric (volume) measurements and to examine the neural correlates of complex human perception and behaviour. This facility will be used by researchers from all over the country for better understanding of brain function.

**New Technology Demonstration Vessel - Sagar Nidhi**

The construction of new Technology Demonstration Vessel 'Sagar Nidhi is to commence in early 2005. The ship would act as a support platform for various oceanographic research activities.

**Strengthening International partnershipsGermany**

To celebrate 30 years of Indo German Science Cooperation, the German Chancellor,

Gerhard Schröder and the Indian Minister for Science and Technology and Ocean Development inaugurated the Indo-German Science Circle on October 6th, 2004.The Virtual Science Circle will provide an interactive forum on various topics at www.science-circle.org. The Max Planck Society of Germany and the Department of Science and Technology signed an MoU, launching the new cooperation programme.

**Indo-US agreement for biotechnology**

A Letter of Intent was signed in June, 2004 between the Governments of India and the United States of America for expansion of Indo-US collaboration in Agricultural Biotechnology Research and Development. The main objective is to increase the range of safe and environmentally sound technological options available for producing improved crop varieties with pest and disease resistance and drought tolerance. The first meeting of the Joint Working Group held in December 2004 identified joint projects

**Indo-Us S&T Forum**

The office of the Indo-US S&T Forum was inaugurated at New Delhi in December, 2004 .On the occasion , a roundtable conference on "Indo-US Public-Private Partnership in R&D Endeavours" was held in partnership with FICCI.

**India-Brazil-South Africa (IBSA)**

The inaugural meeting of the India-Brazil-South Africa (IBSA) Science & Technology Ministers was hosted by India at New Delhi. It was a historic event bringing together three leading developing countries from three different continents. It was agreed that cooperation may be strengthened in the areas of: HIV/AIDS, TB and Malaria; Biotechnology in health and agriculture; Nano science and technology and Oceanographic Sciences

UNESCO Centre for biotechnology training to Asian countries

Initiatives have been taken to establish the Centre for capacity-building and development in biotechnology in the Asian region. It would facilitate transfer of knowledge and technology at the regional level and can be a hub of biotechnology expertise addressing human resources needs.

**Indo -Dutch agreement**

A Memorandum of Understanding for cooperation in Biotechnology was signed between India and Denmark in October 2004 by the Minister for Science and Technology of India and the Minister of Science, Technology and Education of Denmark. The specific areas for collaborations are agriculture and medical biotechnology.

**Cooperation with China**

State Councilor of China and the Indian minister of Science and technology have agreed to constitute a Joint Steering Committee to formulate a plan of cooperation in the field of Science and Technology. The committee would identify areas of cooperation between the two sides.

**Serbia and Montenegro**

During the visit of Minister of Science and Technology to Serbia and Montenegro in October 2004 an inter-governmental agreement on science & technology cooperation was signed. The agreement envisages establishment of a Joint Committee on scientific and technological cooperation to identify specific areas of cooperation

**Indo-Israel R&D initiative**

A statement of intent for industrial R&D cooperation was signed by between the Israeli Vice Prime Minister and Minister for Industry, Trade and Labor and the Indian Minister for Science and Technology to support joint industrial R&D projects.

**National Biotech Policy**

An Expert Task Force has been constituted, under the chairmanship of Secretary, DBT to draft a "Biotechnology Developmental Policy". Special working groups involving diverse stakeholders have been constituted to prepare action Plan in key areas of human resource development, industry and trade, regulatory and legislative issues and public understanding.

**Road map for Bio-informatics**

Based on wide spread consultations the road map for development of bio-informatics in the country has been prepared. The key elements addressed are: human resource development, private-public partnership, inter-agency coordination and industrial development.

**Regulatory procedure for recombinant pharma drugs**

A Committee constituted by the Ministry of Environment & Forests has prepared a draft to streamline the regulatory approvals of all recombinant products in consultation with the concerned stakeholders. Various protocols of regulatory approvals are under the process of finalization, which would be implemented soon under the Rules 1989 of Environment Protection Act.