

Science and Technology Reporter

A Quarterly Newsletter of the Haryana State Council for
Science and Technology



Vol. 2, No. 1
Jan.-Mar., 2010



Editorial Board

Patron:

Shri SS Prasad, IAS
Financial Commissioner & Principal
Secretary, Science & Technology
Department, Haryana and
Chairman/EC, Haryana State
Council for Science & Technology

Sh. Sandeep Garg, IAS
Director, Science & Technology
Department, Haryana and
Secretary/EC, Haryana State
Council for Science & Technology

Editor:

Dr Renu,
Senior Scientific Officer-1,
Haryana State Council
for Science & Technology

Members:

Dr AK Dhawan,
Director (Technical),
Centre for Plant Biotechnology

Dr RS Hooda,
Chief Scientist,
Haryana Space Application Centre

EDITORIAL

This year Department of Science & Technology, Haryana has embarked upon a number of new initiatives in order to popularize science and to address new emerging issues in the State of Haryana. Most of the initiatives are focused on promotion of science education in the state.

A decline in number of students opting for science stream in Haryana is being observed, thus creating shortage of science graduates / post graduates for jobs in this sector particularly teaching. In order to motivate the students and nurture their science talent by way of awarding them with scholarships/fellowships, the department has initiated few schemes from this year with a hope to reverse this declining trend. The schemes namely Haryana Science Talent Search Scheme, Promotion of Science Education (POSE) Scholarship Scheme and HSCST Fellowship Programme have been launched with an objective is to capture the students at young age and nurture the upto PhD level. The detailed guidelines of these schemes are available on www.dstharyana.org website. Under HSCST fellowship programme this year 26 research scholars have been awarded with the fellowship for pursuing their PhD in science subjects. In POSE scholarship scheme, 100 students have qualified for the scholarship.

A scheme on Setting up of Centre of Excellence/Common Research, Training & Education Facility in emerging areas of Science & Technology has also been initiated and two Centres of Excellence, one on "DNA testing and diagnostics facility for research and application in Haryana" at Centre for Plant Biotechnology, Hisar and second on "Renewable Energy Test Centre (RETC)" are being set up at Deenbandhu Chhotu Ram University of Science & Technology, Murthal.

In order to ensure integration of S&T for overall socio-economic development of Haryana State Grant-in-aid to R & D programme has been redesigned in order to support the projects giving deliverables having socio-economic benefit.

The current issue of newsletter gives insight into various activities undertaken during the first quarter of the year.

(Renu)

SCIENCE CONFERENCE TO CELEBRATE DR. HOMI J. BHABHA BIRTH CENTENARY AT KURUKSHETRA UNIVERSITY



Hon'ble Chief Minister, Haryana, Sh Bhupinder Singh Hooda addressing audience in Science conference at Kurukshetra University



Hon'ble Chief Minister, Haryana, Sh Bhupinder Singh Hooda unveiling a portrait of Dr. Homi J. Bhabha at Kurukshetra University

Department of Science and Technology, Government of Haryana and Kurukshetra University Kurukshetra jointly organized a Science Conference to celebrate Dr. Homi J. Bhabha Birth Centenary on January 23rd -24th, 2010 at Kurukshetra University, Kurukshetra. Dr. Homi J. Bhabha was undoubtedly one of foremost scientists of India, the chief architect of India's Nuclear Programme, and to mark the occasion of his birth centenary a series of lectures by world renowned scientists were organized. The basic concept behind the programme was to motivate the young students to take basic science as a study and career option. Scientists including Dr. S Banerjee, Chairman Atomic Energy Commission of India, Dr. Anil Kakodkar, Former Chairman Atomic Energy Commission of India, Professor Mustansir Barma, Director, Tata Institute of Fundamental Research (TIFR), Professor J. V. Yakhmi, Bhabha Atomic Research Centre, Professor Ajay Sood, Indian Institute of Science Bangalore, Prof Manindra Aggarwal and Professor G.K. Mehta, IIT Kanpur, Professor Ravi K. Mamchanda and Professor A.K. Grover, TIFR, and Professor K.K. Bhutani, NIPER were invited to interact with about 1800 students drawn from schools, colleges and universities in Haryana.

The Science conference was inaugurated by Hon'ble Chief Minister of Haryana, Sh. Bhupinder Singh Hooda. Sh. Randeep Singh Surjewala, Science and Technology Minister, Haryana and Smt. Geeta Bhukkal, Education Minister, Haryana were also present on the occasion. The Chief Minister lauded the effort of Department of Science and Technology and Kurukshetra University for organizing this unique interactive event between students and scientists to promote the study and research of basic sciences among the youth of the Haryana. The Chief Minister thanked the Chairman of Atomic Energy Commission Dr. S. Banerjee for sanctioning a 1200 mega watt power project at Kumahrian in

Fatehabad district of Haryana. Sh Randeep Singh Surjewala called upon the young students to take science as a subject and career option. He also informed about various projects being run by the Department of Science and Technology, Government of Haryana. Lt. General Dr. D.D.S. Sandhu, Vice Chancellor Kurukshetra University welcomed the chief guest and the eminent scientists to Kurukshetra University. Dr. Sandhu also requested the scientific fraternity to collaborate with the science departments at Kurukshetra University to initiate new projects in the upcoming areas of science. Sh. S.S. Prasad, IAS, Financial Commissioner and Principal Secretary, Science & Technology Department, Haryana gave a detailed report about the programmes being run by the Department of Science and Technology, Haryana Government including new initiatives in promotion of science education in Haryana.

The Chief Minister, Sh Bhupinder Singh Hooda also released a Souvenir containing articles on 'Homi J. Bhabha', 'Haryana: Dawn of a New Era of Development in Science and Technology' by Sh. Bhupinder Singh Hooda, 'India's Nuclear Programme', 'Development of Science and Technology in Haryana', 'Kurukshetra University', 'Contribution of Kurukshetra University in Science Education and Research' and abstracts of lectures by scientists. The Chief Minister also unveiled a portrait of Dr. Homi J. Bhabha in the Department of Physics. A science exhibition and Liquid Nitrogen show were also organized for the young students.

The conference was highly successful event which provided a unique platform to the students to know about scientific areas including Nuclear Energy Needs of India, Soft Matter, Wonderful World of dead Stars, Magnets with no Magnetization, Two Problems on Number Theory, the Emerging world of Nano-Technology and Random Walks.

MULTIPLICATION OF ELITE BAMBOO GENOTYPES FOR PROMOTION OF BAMBOO BASED INDUSTRIES IN HARYANA

There are 91 genera and about 1000 species of bamboo (family Poaceae) found in diverse climates ranging from cold mountains to hot tropical regions. India is the second richest country in the world in terms of genetic diversity of bamboo with 136 species spread over around 12.8% of the country's forest area. This 'miracle plant' is a strong, resilient and ecofriendly resource with a wide variety of uses ranging from edible products, construction material, paper and pulp production, timber substitution, charcoal and vinegar production, handicraft industry, packing material, furniture, etc. Bamboo housing is a climate friendly and safer alternative in seismic zones. This 'ordinary plant' with 'extraordinary qualities' has been an integral part of daily lives of people throughout Asia with more than 1500 documented uses from cradle to coffin. It therefore, has the potential to play a central role in economy of a country, especially for the rural poor by generating income, as well as, employment opportunities. Development of bamboo based industries like edible shoot processing units, handicraft units, paper manufacturing units, flooring and paneling units, incense sticks and match sticks, will generate quantum of job opportunities for the skilled and un-skilled rural youth of the country.

The potential of bamboo in India has not been fully tapped. As against an estimated demand of 26.9 million tons of bamboo, India currently produces only 13.47 million tons. The commercial consumption of bamboo globally is worth about 10 billion dollar and is expected to reach 20 billion dollar by 2015. Expansion of handicraft and bamboo based cottage industry can create 3 million new jobs.

Government of India has therefore given a focused attention to the bamboo sector to rediscover bamboo and transform this

'orphan' plant into 'green gold'. The National Mission on Bamboo Technology and Trade Development established in 2003 has attempted to develop a strategy for using bamboo in rural poverty alleviation and employment generation, production and processing of bamboo shoots, consumption of bamboo as a part of the national effort to eliminate micronutrient deficiency and the use of bamboo as a means to reclaim degraded land, conserve soil and improve environment. Centre for Plant Biotechnology, Hisar is a part of this national mission.

Out of a total of 8.96 million hectares of area under bamboo cultivation, Haryana accounts for only 4200 hectares, the second lowest in the country next only to J & K (1500 hectares). Bamboos once established in the field require little inputs for growth and maintenance. Therefore, there is enough potential to develop bamboo based plantations and processing units in Haryana. However, supply of planting material on large scale will become a bottle neck in the process due to inefficacy of conventional propagation techniques like seed and vegetative propagation. Hence, tissue culture appears to be a viable alternative to achieve this goal.

Centre for Plant Biotechnology, Hisar as a part of National Bamboo Mission has already proved its potential in achieving above objective by planting 70 hectares of land in Haryana during the last three years with *in vitro* raised planting material of bamboos. Their effort has unequivocally demonstrated the potential of tissue culture technique for commercial production of bamboos. The centre has the infrastructure and the scientific skills required for large scale multiplication of planting material of bamboo species as well as other economically important plants. Northern part of Haryana has a climate suitable for cultivation of most bamboo species, however, the southern parts of the state can grow species of *Dendrocalamus* and *Bambusa* that are known to grow in and adapt to dry and arid regions and are also listed in the priority species list of bamboos.

Development of bamboo plantations in the state will provide raw material for bamboo based industries in the state and will also improve the economic status of the rural masses by generating employment. In addition, it will increase the green cover and reduce soil erosion and land degradation. It is with this hope that CPB, Hisar pursues its responsibility in Government of India's National Bamboo Mission.



Multiplication of bamboo through tissue culture (A) and field trial of tissue culture raised plants growing at Forest Department land, Yamunanagar (B, C & D) by CPB, Hisar under National Bamboo Mission

Rajwant K. Kalia* and A. K. Dhawan
Centre for Plant Biotechnology,
CCS HAU New Campus, Hisar
*Email – rajwantkalia@yahoo.com

SIGNIFICANCES OF TRADITIONAL WATER BODIES

Water is necessary for the survival of the living being. Over 70% of the planet earth's surface is covered by water. Of all the available water on the earth, 97.5% is salt water, leaving only 2.5% as fresh water. Nearly 70% of this fresh water is frozen in icecaps and less than 1% of the world's fresh water (0.007% of all water on the earth) is accessible for direct human uses. This water is found in lakes, rivers, reservoirs and in shallow aquifers. The anthropogenic activities like growing population, agriculture, industrialization and urbanization have put great stress on the water resources especially on the fresh water which is already in less quantity. Similarly, the natural causes like climate change and less rainfall have also put the water resources under pressure and have triggered the less availability of fresh water in future. The water table depth is going on declining and the aquifers are going on drying. The results are



Tanka in a village used for storing water/rainwater

coming in the form of water scarcity for drinking, irrigation and industrial purposes. In the present context of technological era, anthropogenic activities have developed very fast and the human have exploited the natural resources in a blind way without thinking the future existence of the natural resources. The technological advancement has also put pressure on the natural resources. Human have forgotten the traditional methods of management/conservation of natural resources. In the present context of technological domain, the role of traditional water bodies can not be ignored. Their significances

are as such as were in the past. From ancient times, ponds, tanka, khadin, earthen dam in villages are used for rainwater harvesting and have multifarious uses including the maintenance of ecological balance.

The various utilities of the traditional water bodies are following :

- ♦ Rainfall run-off collection.
- ♦ Recharging of groundwater.
- ♦ Quality improvement in poor groundwater quality areas such as in fluoride, nitrate and salinity affected areas.
- ♦ Availability of water in lean period for animals/people.
- ♦ Drought proofing.
- ♦ Flood management.
- ♦ Eco-tourism.
- ♦ Natural habitations for wild animals and migratory birds.
- ♦ Ecosystem management especially micro-level ecosystem.



Societal relevance of pond in a village

- ♦ Biodiversity maintenance.

Presently, there are number of traditional water bodies which require their proper maintenance and utilization. There is need of use of modern techniques like remote sensing, GIS and GPS to generate database of these water bodies for their renovation and planning of water resource management.

Anup Kumar^{1*} and R.S.Hooda¹
¹**Assistant Scientist, Haryana Space Applications Centre,**
CCS HAU Campus, Hisar, Haryana
^{*}**E-mail: anup0106@yahoo.com**



Students participating in DCSC organized at Yamuna Nagar

DISTRICT CHILDREN SCIENCE CONGRESS

District Children Science Congress (DCSC) is organized every year in collaboration with district administration and Haryana Vigyan Manch, Rohtak.

During the year 2009-10 Haryana State Council for Science & Technology provided grant to 10 districts for organizing DCSC. The theme for this year was **'Planet Earth- Explore Share & Care'**. Rashtriya Vigyan Evam Prodyogiki Sanchar Parishad, Govt. of India, selected the theme for congress.

CPB, HISAR ORGANIZES WORKSHOP ON “BIOTECHNOLOGY AND IPR ISSUES”



Sh. S.S. Prasad, IAS, Financial Commissioner and Principal Secretary, DST, Haryana addressing the participants of workshop

A workshop on “Biotechnology and IPR Issues” sponsored by Haryana State Council for Science and Technology, DST, Haryana was organized by Patent Information Centre (PIC), Haryana and Centre for Plant Biotechnology (CPB), HSCST, Hisar on 18.3.2010 in the Conference Hall of CPB, CCS HAU, Hisar.

Eighty scientists, researchers, research scholars, faculty in the field of Biotechnology from different Universities like CCS Haryana Agricultural University, Hisar; Maharshi Dayanand University, Rohtak; Kurukshetra University, Kurukshetra; Chaudhary Devi Lal University, Sirsa; Guru Jambheshwar University of Science and Technology, Hisar; Forensic Science Laboratory, Madhuban and various Govt. Post Graduate Colleges registered for the workshop.

Sh. S.S. Prasad, IAS, Financial Commissioner and Principal Secretary, DST, Haryana in his remarks as a Chief Guest emphasized on the importance of such kind of workshop as biotechnology being an emerging area, it is important for researchers to be aware of IPR issues involved in genetically modified organisms, genes, gene products and new vaccines for biological sources. He commented on the role being played in this area by DST, Haryana through its Centre for Plant Biotechnology, Hisar.

Dr. A.K. Dhawan, Director (T), CPB, Hisar highlighted the objectives of the PIC and elaborated the work done by PIC and CPB so far.

Sh. R. Saha, Director, Patent Facilitating Centre, TIFAC, Department of Science and Technology, Govt. of India, New Delhi elaborated exhaustively on the topic, “New Dimension of IPR”. He emphasized the scientists to patent their inventions instead of the publications and maintain the log books of the research in the laboratories.

Dr. C.P. Malik, Director (Life sciences), Jaipur National University delivered an interesting lecture on the topic, “GM Food Crops – A Reality Check”.

Dr. H.S. Chawla, Nodal Officer and Professor, Department of Genetics and Plant Breeding, Gobind Ballabh Pant University of Agriculture and Technology, Pantnagar deliberated exhaustively on, “IPR and Biotechnology”.

Dr. B.S. Sooch, Regd. Patent Attorney and a faculty member in the Department of Biotechnology, Punjabi University, Patiala systematically provided details of “Patenting in Biotechnology : An Indian Overview”.

SPACE BASED INFORMATION SUPPORT FOR DECENTRALIZED PLANNING (SIS-DP)

SIS-DP project is being sponsored by Indian Space Research Organization (ISRO), Department of Space, (DOS) GOI. Under the priority component of the project, ISRO has selected 5 states which include Haryana. Project would include creation of resource information on 1:10,000 scale on land cover, infrastructure, slope, abadi, lake, ponds, reservoirs, drainage/rivers for the entire state. Project would also include creation of digital village cadastral maps and overlaying on the satellite image. All the line departments would be required to provide the information required under the project for digitization. Ownership of the database and resource information will be with respective line Departments.

Haryana Space Applications Centre (HARSAC), Department of Science and Technology, Hisar will be the nodal agency for the creation of database and execution of the project. Spatial data to be created under the project will be made available to the user departments through SWAN connectivity in the state. National

Remote Sensing Centre (NRSC), ISRO, Hyderabad will act as an enabler for the project by providing satellite imageries, technical guidance, methodology development and technical manual preparation, establishment of knowledge centre, etc.

In order to execute the activities under the prioritized component of the project a sum of Rs. 4.0 crores would be provided by ISRO. There would be no financial liability on the state government. The project would be completed in three years time.

A workshop of the Administrative Secretaries of all the stakeholder departments has also been organized under the chairpersonship of Chief Secretary, Haryana on 25.01.2010 at Chandigarh to discuss and approve the implementation of the project. A state level Project Implementation Committee (PIC) has been constituted by Haryana Government under the chairmanship of Chief Secretary Haryana for effective monitoring and implementation of the project.

BRAINSTORMING MEETING ON STATE SCIENCE & TECHNOLOGY COUNCILS

A brainstorming meeting on "The role of State S&T Councils in emerging National Context" was held on March 27, 2010 under the Chairmanship of Prof. C.N.R. Rao, Chairman, Scientific Advisory Council to the Prime Minister (SAC-PM) at Indian National Science Academy, New Delhi. The main focus of the meeting was strengthening of existing mechanism of S&T Councils. The meeting was attended by Sh. S.S. Prasad, IAS, Financial Commissioner and Principal Secretary to Haryana Govt., Science & Technology Department, Sh. Sandeep Garg, IAS, Director Science & Technology Department Haryana and Dr Deepak Gupta, Chief Scientific Engineer, Haryana State Council for Science & Technology, Panchkula.

Sh. S.S. Prasad in his presentation highlighted the various objectives of the Council and increase in plan budget from 452.00 lakhs to 2800.00 lakhs. He also briefed the members about the following new initiatives taken by the Department in addition to the regular schemes:

1. Setting up of Centre of Excellence / Common Research, Training and Education Facilities at Centre for Plant Biotechnology, Hisar and Deenbandhu Chhotu Ram University of Science & Technology, Murthal.

2. Setting up of Science City at Rohtak.
3. Haryana Science Talent Search Scheme.
4. Promotion of Science Education (POSE) Scholarship Scheme.
5. HSCST Fellowship Programme.
6. Counseling cum awareness camp.
7. Haryana Vigyan Ratna and Haryana Yuva Vigyan Ratna Awards.
8. Honoring meritorious students of Haryana.
9. Collaborative Science and Technology Programme.
10. Exposure visit for meritorious students.
11. Science and Technology Reporter, a quarterly newsletter.
12. Haryana Vigyan Darpan, a quarterly science magazine in Hindi.
13. Setting up of Observatory at Panchkula.

Dr T. Ramasami, Secretary, Department of Science & Technology, Government of India and other members appreciated the new initiatives taken by the Department.

ANNULAR SOLAR ECLIPSE

The solar eclipse on January 15th, 2010 was the longest annular solar eclipse of the millennium. It was visible as only a partial solar eclipse in Haryana. Special arrangements were made by Kalpana Chawla Memorial Planetarium (KCMP), Kurukshetra for the visitors to observe the eclipse safely.

Telescopes and Small mirrors fixed on balls were arranged for projecting the image of eclipsed sun. Solar filters were also distributed by the planetarium among the visitors during the eclipse. KCMP developed a special informative panel on this occasion for the visitors to create awareness among them.



Visitors during Solar Eclipse on 15th January, 2010 at KCMP



Informative Panel developed by KCMP on Annular Solar Eclipse

“A TRIBUTE TO KALPANA CHAWLA” PROGRAM



Students participating in painting competition at KCMP

Kalpna Chawla Memorial Planetarium organized a special program 'A Tribute to Kalpana Chawla' on seventh death anniversary of Dr. Kalpana Chawla on February 1st, 2010. Students and teachers from around 20 Schools of Kurukshetra district participated in this program. Painting Competition and Hunt the Exhibit Contest were organized to mark the day. A Popular Science Lecture on the topic 'Mysterious Outer World' was delivered by Professor Nafa Singh, Dept. of Physics, Kurukshetra University, Kurukshetra. Sh. Rakesh Tripathi from National Science Centre, Delhi conducted the workshop 'Hands on Telescope'. Apart from this, special Night Sky Observation activity 'Amazing Sky' was also organized for invited students.

INAUGURATION OF NEW OFFICE OF PATENT INFORMATION CENTRE



Sh. S.S. Prasad, IAS, Financial Commissioner and Principal Secretary, DST, Haryana inaugurating new office of PIC, Haryana at CPB, Hisar on on 18.3.2010. Also seen Sh. R. Saha (extreme left) and Dr A.K. Dhawan (extreme right)

New office of Patent Information Centre, Haryana was inaugurated by Sh. S.S. Prasad, IAS, Financial Commissioner and Principal Secretary, Department of Science & Technology, Haryana in the presence of Sh. R. Saha, Director, Patent Facilitating Centre, TIFAC, Department of Science and Technology, Govt. of India, New Delhi on on 18.3.2010 at Centre for Plant Biotechnology, Hisar. Dr. A.K. Dhawan, Dr. H.S. Chawla, Dr. B.S. Sooch, Dr. Rajwant K. Kalia, Dr. Subhash Kajla, Dr. Satish Mehta and many others were also present on this occasion.

DR. RAJWANT KAUR KALIA AWARDED BOYSCAST FELLOWSHIP



Dr Rajwant Kaur Kalia, Senior Scientist at CPB, Hisar, has been awarded BOYCAST (Better Opportunities in overseas research organizations in frontline areas of for Young Scientists in Chosen Areas of Science and Technology) fellowship for the year 2009-2010 by Department of Science & Technology, Government of India, New Delhi. Dr. Kalia will be working with Dr. Jian Kang Zhu at Institute for Integrative Genome Biology, Botany and Plant Sciences, University of California, Riverside, USA for one year. She will try to understand the molecular mechanisms of salt tolerance in Salt cress (*Thellungiella halophila*) leading to elucidation of the pathways and identification of key genes. The identified genes are expected to be useful in engineering salt tolerance in other plant species of economic and agricultural importance.

SATELLITE DATA BASED PRODUCTION ESTIMATES OF WHEAT AND MUSTARD FOR THE YEAR 2010

Based upon the analysis of the satellite data for January to March, 2010, Haryana Space Application Centre, Hisar has estimated the area and production of wheat and mustard crops in Haryana state for 2010. The state level area and production for mustard has been estimated to be 5.35 lac ha and 8.19 lac tons, respectively, whereas state level area and production for wheat has been estimated to be 24.40 lac ha and 107.34 lac tons, respectively. The district wise area and production estimates for mustard and wheat are provided in Table 1 and 2 below:

Table 1. Area and production estimates of mustard for 2010

District	Acreage ('000 ha)	Production ('000 tons)
Hisar	49.89	84
Fatehabad	10.73	20
Sirsa	47.87	77
Bhiwani	145.28	198
Jhajjar	38.68	59
Gurgaon	15.5	28
Mewat	34.52	56
Mahendragarh	84.8	120
Rewari	66.12	117
Total 9 Districts	493.39	760
Haryana State	534.91	819

Table 2. Area and production estimates of wheat for 2010

S.	Districts	Acreage ('000 ha)	Production ('000 tons)
1	Hisar	227.08	1019.74
2	Fatehabad	187.81	869.17
3	Sirsa	269.10	1210.15
4	Bhiwani	144.71	561.48
5	Rohtak	100.60	418.95
6	Jhajjar	91.20	367.32
7	Sonapat	143.17	658.83
8	Gurgaon	45.16	186.41
9	Faridabad	34.68	152.73
10	Mewat	72.40	267.42
11	Karnal	172.80	804.34
12	Panipat	89.80	414.67
13	Kurukshetra	113.20	539.24
14	Kaithal	180.15	829.29
15	Ambala	82.80	338.84
16	Panchkula	15.09	38.36
17	Yamunanagar	90.20	378.89
18	Jind	211.00	972.82
19	Mahendergarh	42.96	186.31
20	Rewari	46.02	195.18
21	Palwal	80.02	324.05
	STATE	2439.95	10734.19

TRAININGS/WORKSHOPS ATTENDED

1. Dr. Rajwant K Kalia (Senior Scientist), Dr. Rohtas Singh (Research Associate) and Mr. Manoj K. Rai (Research Associate) attended the 3 day Indo-US Bilateral workshop on **"Plant Genomics in Crop Improvement with reference to Biotic and Abiotic Stresses"**, organized by the Department of Biotechnology and Molecular Biology, CCSHAU, Hisar, from 25th to 27th February, 2010.
2. Dr. Kamla Malik, Technical Officer and Dr. Minakashi Pal, Research Associate, CPB, attended a 7 days training course on **"Bioinformatics in Plant Science"** organized by Bioinformatics Section, College of Basic Sciences & Humanities, CCSHAU, Hisar from 12th to 19th March, 2010.
3. Mr. Sumit, Curator, Kalpana Chawla Memorial Planetarium Kurukshetra participated in 6 days training program on **"Museum Marketing"** Organized by National Council of Science Museums held at Kolkatta from 15th to 20th March, 2010.
4. Dr. Manoj Yadav, Assistant Scientist, HARSAC participated in the workshop on **"Agricultural Drought Monitoring and Vulnerability Assessment"**, held at National Remote Sensing Centre, Hyderabad from March 10th to 11th, 2010 and presented a paper on Agricultural drought assessment mechanism in Haryana state.

CONFERENCES AND SYMPOSIA ATTENDED

1. Dr. R. S. Hooda, Chief Scientist alongwith Dr. Sultan Singh, Senior Scientist from HARSAC, Hisar participated in **Map India 2010**, the 13th Annual International Conference and Exhibition on Geospatial Technologies held at Gurgaon from 19th to 21st January, 2010 and delivered two invited lectures.

Haryana State Council for Science & Technology,
Bays 35-38, Sector 2, Panchkula, Haryana
Ph. : 0172-2561339, 2560339, Fax : 0172-2560018
Website : <http://dstharyana.org/>

Kindly send us your feedback to renulari@rediffmail.com
Available online on www.dstharyana.org

Published by : Dr. Renu, Senior Scientific Officer - 1, on behalf of Haryana State Council for Science & Technology, Panchkula
Designed & Printed at : Azad Offset Printers (P) Ltd., 144, Press Site, Indl. Area-1, Chd. Ph. : 0172-2652349, 2651316