

ANNUAL REPORT 2011-2012

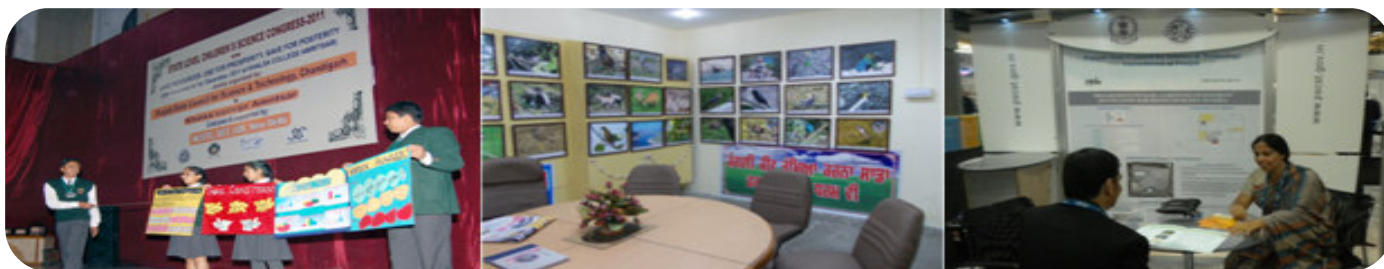


PUNJAB STATE COUNCIL FOR SCIENCE & TECHNOLOGY

MGSIPIA Complex, Near Sacred Heart School, Sector 26, Chandigarh-160019

Telephones: 0172-2793300, 2793600, 2792325, Fax: 0172-2793143

Website: www.pscst.com



Our Mission

Sustainable Development through Science & Technology

Our Vision

“PSCST endeavors to harness the potential of science & technology as an instrument of socio-economic change. The Council strives to ensure that efforts in science & technology are not restricted to scientific laboratories and academic institutions but percolate to the users so that science, technology & innovation increasingly become part of the everyday life of our people as well as transform rural Punjab.”

I N D E X

<u>Subject</u>	<u>Page No</u>
Prologue by Executive Director	7-8
Executive Summary	9-14
Role & Organization	15
International Collaborations during 2011-12	16-22
Activities	
Sustainable Development	23-35
Pollution Control	36-40
Socio-Economic Development	41-45
Intellectual Property Rights	46-55
Science Communication & Popularization	56-63
Outreach Programmes	64-76
Publications & Resource Material	77-79
Personnel of PSCST during 2011-2012	80-82
List of Training Programmes Organized by the Council during 2011-12	83-85
List of Conferences/Meetings attended by Scientists/Engineers of the Council	86-88
Annexure – I	89
Annexure – II	90
Annexure – III	91-92
Annexure – IV	93-97
Annexure – V	98
Annexure-VI	99-100
Annexure-VII	101-102
Annexure-VIII	103-104
Annexure- IX	105-106

From the Executive Director

It is my privilege to present the Annual Report of Punjab State Council for Science & Technology (PSCST) for the year 2011-12. The Council during this period remained committed to its mission of infusing scientific attitude, improving & protecting the environment and initiating projects for socio-economic development of the State.

It took up several initiatives for creating links with S&T organizations, both national and international, for taking up collaborative programs for the betterment of the state and society. One of our major achievements was our recognition as Regional Centre of Expertise (RCE-Chandigarh) by Global RCE Service Centre UNU-IAS, Japan (United Nations University – Institute of Advanced Studies) for carrying out Education for Sustainable Development in formal and non-formal sectors after international review by Ubuntu Committee of Peers. This is the 10th RCE in the country and 100th member of the Global RCE network. It will strengthen institutions of Punjab for effective education for sustainable development with inputs from international RCE network. Since there is no separate budget for this scheme, the Council will integrate ESD programme with other ongoing schemes namely National Green Corps Programme, NEAC, ENVIS and Science Popularization.

As a further initiative to our endeavor to build international networks, a team of five scientists from Punjab, under the leadership of the Council, visited University of St. Andrews, Scotland for research collaborations and staff and student exchanges in biotechnology, crop science and the environment. The proposal was jointly sanctioned by DST-GOI & the Royal Society. The Council's team of officers were also selected as one of the four teams from India for participating in another international program on 'Education for Sustainable Development' sponsored by SIDA and organized jointly by Ramboll Natura, Sweden, Centre for Environment Education, India and WESSA, S. Africa. The program is in five phases. The Council participated in the first phase at Ahmedabad and second phase in Sweden which included discussions and training on ESD in Policy & Practice, Assessment of ESD performance indicators, tools and approach in SD, business education for sustainability, role of values in education, etc. Further, based on our previous publications, the Council scientists were invited by United Nations Asia & Pacific Centre for Agricultural Engineering & Machinery (UNAPCAEM) and Food & Agriculture Organization (FAO) to present papers in "Round Table Conference on Sustainable Agricultural Mechanization in Asia" at Bangkok, Thailand. One of our scientists was also nominated for United Nation's Group Training Course on "Regional Development by Sustainable use of Biodiversity" at Japan sponsored by Japan International Cooperation Agency (JICA). Further, our ongoing programs with NASA on Cloudsat Education Network (CEN) continued in eight schools of the state.

At the National front, under the UNDP-GEF project on energy efficiency improvement in brick industry prepared jointly by TERI & PSCST, the year saw organization of a series of awareness workshops to motivate brick industry in the region for large scale mechanization of manufacturing of resource efficient bricks. Consultancy Services on Clean Development Mechanism (CDM) were provided to PEDDA and PCA and Energy Audit was carried out for PGSC, Kapurthala. Further, DST, GOI sanctioned projects amounting to Rs. 180 lakhs for setting up of demonstration units for energy conservation in re-rolling mills, cupola furnaces and environment friendly technology in metal finishing units.

PSCST coordinated conservation and management of wetlands by taking up activities such as afforestation, soil conservation, biological control of water hyacinth, promotion of organic farming, promotion of livelihoods, public awareness involving state government departments at three Ramsar Sites (wetlands of International Importance - Harike, Kanjli and Ropar) and Nangal (national wetland). Ministry of Environment & Forests, Govt. of India provided

Rs.89.54 lacs for this project. Similarly, PSCST is coordinating the development of the Mohali Biotechnology Park in Knowledge City by State Govt. and Govt. of India in public private partnership. A Section 25 company has been incorporated to oversee development of the Park.

The Patent Information Centre and Intellectual Property Facilitation Centre (IPFC) conducted 36 patent searches, organized 7 awareness workshops/camps, filed 3 patents, 5 trade marks, 3 design registrations and created 3 new IPR cells in leading universities of the state. The Centres received financial assistance of Rs.30.00 lac including Rs.7.00 lac from Govt. of Punjab during the year. Further, the State Innovation Council was also set up under the Chairmanship of Chief Secretary, Punjab.

Our works in the area of environmental preservation, biotechnology and public outreach has also been continuing. We continued to provide technical and administrative support to Punjab Biodiversity Board. During the year, the Board conducted studies on bioresource based industries in Punjab, identified rare and threatened flora and fauna of the state and launched its own website www.pbb.gov.in with help from PSCST.

Further, DBT, GOI also sanctioned a project to PSCST for promoting cultivation and processing of aromatic crops in Dhar Block of district Gurdaspur at a cost of Rs.85.61 lacs. The following grass root projects are also being promoted for rural development and women empowerment, with project cost of Rs. 50 lacs approx., supported by DST, GOI:

- Production of natural vinegar and non-alcoholic naturally carbonated beverages from horticultural produce.
- Production of low cost sanitary napkins from cotton knitwear
- Genetic literacy program for SC population

Several outreach projects were taken up under Science popularization. These included annual Science Communication & Awareness programmes such as National Science Day, National Technology Day and Childrens' Science Congress, Capacity building programs such as Workshops on 'Micro-biology: Let us observe and learn', 'Science Communication through Digital Media' and Training Programme for Northern Zone on "Transit of Venus-2012". The year also saw implementation of project on 'History of Science & Technology in Punjab' for which data from primary and secondary sources was collected and visits were made to historical and archaeological sites and museums. Photography, preparation of posters, meeting with experts and preparation of draft document depicting achievements of the region in various sectors of Science & Technology during different eras was taken up.

Further, with a support of Rs. 1.3 crore from Govt. of India and as part of our usual Outreach activities, the NGC program continued in 5000 schools reaching out to 0.2m students. Children Science Congress activity involved more than 450 schools. The Council continued the ENVIS programme for ICT enabled outreach and published the monthly Punjab Science magazine 'Nirantar Soach', two quarterly newsletters 'Future Frontiers' & 'ENVIS News', besides, several books, booklets and posters.

The Council will strive to do more for the socio-economic development of the people of the state through scientific interventions, during the next year.

Dr. (Mrs.) Neelima Jerath

Executive Summary

The Punjab State Council for Science & Technology functions under the aegis of the Department of Science, Technology & Environment, Punjab. Its purpose is to promote socio-economic changes and environmental awareness through the application of science & technology and to bring science & technology out of the laboratories and into the life of the common man.

The focus of the Council during 2011-12 was on creation of scientific awareness through various means, patent information and awareness, prevention and control of industrial pollution, socio-economic development, conservation of natural resources, sustainable development and outreach programs. A summary of activities taken up by the Council during 2011-12 is as under:

1. Pollution Control

The low cost pollution control technologies developed for Air Pollution Control in Cupola Furnaces, Brick Kilns and Re-rolling mills have been replicated in 82 units in the State of Punjab. During the year, the following work was taken up:

1. PSCST is the Local Resource Centre for northern States under UNDP GEF project on “Energy Efficiency Improvement in Brick Industry”. A series of awareness workshops were organized to motivate brick industry in the region for large scale mechanization of manufacturing of resource efficient bricks which has resulted in commissioning of 3 mechanized plants in the State of Punjab.
2. The Department of Science & Technology, Government of India has sanctioned projects amounting to Rs. 180 lakhs for setting up of demonstration units for energy conservation in re-rolling mills, cupola furnaces and environment friendly technology in metal finishing units.
3. PSCST worked on developing National Emission Standards for Brick Kilns under a project sponsored by Central Pollution Control Board
4. The Council has initiated work on Energy Audit and CDM consultancy for PGSC and PEDDA, respectively. State Action Plan for Climate Change is also under preparation.

2. Conservation of Natural Resources

(i) Wetlands:

PSCST coordinated conservation and management of wetlands by taking up activities such as afforestation, soil conservation, biological control of water hyacinth, promotion of organic farming, promotion of livelihoods, and public awareness involving state government departments at three Ramsar Sites (wetlands of International Importance - Harike, Kanjli and Ropar) and Nangal (national wetland). Ministry of Environment & Forests, Govt. of India provided Rs.89.54 lacs for this project.

(ii) Conservation of Bio-diversity

The Council has taken up Biodiversity Conservation programs in the state. It has notified the Punjab Biodiversity Board (PBB) as a statutory body to conserve biodiversity and implement the Biological Diversity Act, 2002. Hon'ble Chief Minister is the Chairman of the Board. PBB conducted study on bioresource based industries in Punjab, identified rare and threatened flora and fauna of the state and launched its website www.pbb.gov.in. An amount of Rs.14.50 lac was received from Govt. of Punjab and National Biodiversity Authority.

3. Socio-economic Development

Initiatives for Promotion of Biotechnology Sector in Punjab:

(i) Setting up of Mohali Biotechnology Park

The Council has been making consistent efforts for development of world-class infrastructure in Punjab in the area of biotechnology. Towards this end, the Council is coordinating the setting up of Mohali Biotechnology Park for promotion of biotechnology industry. The Park is being developed jointly by the Department of Science, Technology & Environment (DSTE), Govt. of Punjab and Department of Biotechnology (DBT) Govt. of India through public-private partnership. During the year, DSTE has transferred land for the Park to Section 25 (non-profit) Company incorporated jointly by State Govt. and DBT-GOI to oversee development of the Park and promote knowledge commercialization in the State.

(ii) Production of natural vinegar & non-alcoholic self carbonated beverages from natural bioresources

The Council is undertaking project on promotion and production of natural vinegar and Non-Alcoholic Naturally Carbonated (NANC) beverages from local bioresources in collaboration with Department of Microbiology, PAU. During 2011-12, R&D studies on natural vinegar & NANC beverage production were carried out and awareness programmes & training workshops were organized.

(iii) Project titled 'Field Demonstration of Cultivation & Processing of selected Aromatic Crops in Dhar Block of District Gurdaspur, Punjab'

A project for promoting cultivation and processing of aromatic crops has been initiated by the Council in Dhar Block of district Gurdaspur with the support of DBT, Govt. of India in coordination with Kelkar's Scientific Research Centre (KSRC), Regional Research Station, Gurdaspur of PAU and Unati Cooperative Marketing-cum-Processing Society at a total cost of Rs. 143.83 lacs, with a share of Rs. 85.61 lacs for the Council. The project involves standardization of agro technologies under local conditions for optimal yield production of five aromatic crops, evaluating their performance in 50 acre area in farmers' fields, organizing training programmes for capacity building of farmers, setting up two farm scale distillation units for value addition through extraction of essential oils and arranging marketing tie-ups for its buy-back.

(iv) **Initiatives for Women Empowerment through S&T Interventions**

PSCST has been consistently promoting S&T innovations relevant to socio-economic developmental needs of women especially those from the rural areas of Punjab. For this purpose, a number of projects / programmes have been undertaken over the years. As a further endeavour in this direction, following programmes / activities were taken up during this year:

- Project titled *“Promotion and Pilot Production of Low Cost Sanitary Napkins using Cotton Knitwear Waste in Punjab”* at Ludhiana
- Promotion of Cultivation & Value Addition through Post Harvest Processing of Bioresources in Shivalik belt
- Promotion of Neem based Biopesticide as Environment Friendly Biodegradable Alternative to Chemical Pesticides
- Assessment of prevalence of genetic disorders, existing genetic literacy and its augmentation among SC population of Punjab – New project sanctioned by DST, GOI

4. Protection of IPRs

Patent Information Centre (PIC), Punjab in the Punjab State Council for Science & Technology has been providing patent search and filing facilities at the door step of innovators, researchers, R & D establishments and entrepreneurs, organizing patent awareness workshops & faculty training camps for ITIs & Polytechnics. The Centre has introduced IPRs as a compulsory subject in the curriculum of vocational training in Punjab, besides making efforts to introduce it in certain areas of higher education. The centre has conducted more than 250 patent searches and filed 26 patents applications (out of which 7 have been granted) with 15 in pipe line. In order to reach out to a large number of innovators the centre has adopted a decentralized approach by setting up Patent Cells in Universities and Student IPR clubs in technical & higher education institutions. The centre has been granted category-I status by PFC, TIFAC since 2008. Further, Intellectual Property Facilitation Centre for Micro, Small and Medium Enterprises of Punjab has also been set up in PIC-PSCST to facilitate small scale industry.

The following activities were taken up by PIC during 2011-2012:

1. Strengthening of 7 IPRs Cells in Universities
2. Patents Filed : 3
3. Patent Applications Forwarded to TIFAC for Filing : 6
4. Patent Searches Conducted: 36
5. Women Scientist Trained : 3
6. Number of Summer IPR trainings imparted to students: 5
7. Patent Awareness Workshops: 2
8. IPRs Awareness Camps for Faculty of ITIs: 6
9. Strengthening of Student IPR Clubs: 16
10. Celebration of World IP Day, 2011
11. Special Lectures on IPRs: 1
12. Exhibition on IPRs: 1

IPFC, Punjab undertook following activities during 2011-2012:

1. Workshops: 1
2. Patents filed: 4
3. Designs filed: 4

5. Scientific Temper

The Council has taken up programs for developing scientific attitude and capacity building in a big way through organization of short-term workshops, long term programs and publication of literature for students, teachers, voluntary organizations and general public. Some of the activities undertaken to popularize science and create scientific awareness during the year were:

- (i) Celebration of National Science Day-2012 involving 85 organizations and more than 1,00,000 students, teachers and general public
- (ii) Celebration of National Technology Day-2011 involving 29 organizations
- (iii) Orientation workshop for district coordinators of Children's Science Congress -2011
- (iv) Organization of Children's Science Congress-2011 in Punjab at district levels in all districts involving more than 550 schools
- (v) Organization of State Level Children's Science Congress-2011 at Khalsa College, Amritsar involving 106 teachers and 495 students.
- (vi) Organization of Science Essay Writing Competition at district and state levels involving nearly 500 students.
- (vii) Organization of two workshops on 'Micro-biology: Let us observe and learn' at Punjabi University, Patiala and Panjab University, Chandigarh
- (viii) Uploading and maintenance of PSCST Website
- (ix) Training Program on 'Science Communication through Digital Media' at PU, Chandigarh
- (x) 2nd Advisory Committee Meeting of Viyan Vikas Evam Sanchar Kendra (VVSCK) at Chandigarh
- (xi) Incentives to Young Scientists of Punjab for travel and short term student projects
- (xii) Master Resource Person's Training Programme for Northern Zone on "Transit of Venus-2012"
- (xiii) Implementation of DST, GOI project for compilation of 'History of Science & Technology in Punjab'- Collection of data from primary and secondary sources, visits to historical and archaeological sites and museums, photography, preparation of posters, meeting with experts and preparation of draft document depicting achievements of the region in various sectors of Science & Technology during different Eras.
- (xiv) Regular publications- *Nirantar Soach (monthly)* and *Future Frontiers (quarterly)*

6. Outreach Programmes

Punjab State Council for Science & Technology has been actively taking up public awareness programme on environmental issues. It has also been working as nodal agency for implementation of NGC Programme and National Environment Awareness Programme in the State which are focused for creating environmental awareness amongst the masses. Council is also coordinating activities for celebration of various environment related days like Earth Day, International Biological Diversity Day, World Environment Day and International Day for Preservation of Ozone Layer in the State by involving schools, other educational institutions and NGOs. The following outreach programmes were organized during 2011-12:

- Celebration of important environment related days
- Implementation of National Green Corps Programme in 5000 schools
- Implementation of National Environment Awareness Campaign

(i) ENVIS Centre on 'State Environment Issues'

The Environmental Management Capacity Building-Environmental Information System (EMCB-ENVIS) Node on 'State Environment Issues' was established at PSCST in 2002 to identify and highlight the state environment and related issues. The Node was upgraded to ENVIS Centre in January, 2005. The Centre is collecting, collating and disseminating information on 'Status of Environment and Related Issues' through publications such as books, booklets, Newsletters, posters for public awareness. The Centre has a bilingual (English & Punjabi) website "www.punenvs.nic.in" with a dynamic query response system. The Centre took up regular Publications, Website Updation, Query /Referral Service for the website, development of ISBEID Database, Data Collection, and Coordination of NASA's Cloudsat Education Network Programme (CEN). The Council coordinated with NIC for Designing & Development of New Template of Website.

(ii) Biotechnology Awareness Programmes

In order to ensure effective percolation of the benefits of biotechnology, the Council continues to take up outreach programmes for varied target groups. The programmes organized in 2011-12 included: Popular Biotechnology Lecture Series, Training & Awareness Programmes on Neem Biopesticide, Solid Waste management through Vermicomposting and Natural vinegar & non-alcoholic carbonated beverages.

7. Honours and Recognitions:

- ❖ **Dr. Neelima Jerath**, ED was selected as team leader for International Seminar/Networking Conference on '*Scotland-Punjab Collaboration*' at University of St. Andrews, Scotland, UK under DST-Royal Society Network Program
- ❖ She was also selected as principal participant in *International Training Program in Education for Sustainable Development in Formal Education* at Sweden
- ❖ She alongwith Mr. Gurharminder Singh, SSO was invited by UNAPCAEM and FAO for presenting papers in *Round Table Conference on Sustainable Agricultural Mechanization in Asia* at Bangkok, Thailand
- ❖ Further, as Member Secretary, Punjab Biodiversity Board, she has been nominated as a coordinator for the organization of exhibition of all State Biodiversity Boards for COP-11
- ❖ She is also nominated as member of the following GOI/GOP Committees:
 - Working Group on 'Promoting Public-Private Partnership and Public-People Partnership for Technology Development' constituted by Planning Commission-GOI for the 12th Five Year Plan

- Working Group of DST-GOI constituted by Planning Commission-GOI for the 12th Five Year Plan
 - Member, Expert Committee on Project Evaluation by DST, GOI
 - Member Secretary, Punjab State Innovation Council by GOP
 - Chairperson, State Expert Appraisal Committee for Environment Clearance of Projects by MoEF-GOI
- ❖ **Dr. Jatinder Kaur Arora**, Addl. Director (Biotechnology) was a member of Indian delegation (BIO MISSION) led by Secretary, Department of Biotechnology, Govt. of India to USA coordinated by II and participated in BIO International Convention 2011 at Washington, DC, USA.
 - ❖ She was also selected as member of team of Scientists that visited Scotland to explore Punjab-Scotland collaboration in Biotechnology, Crop Science and Environment under DST-Royal Society Network Programme.
 - ❖ She has been nominated as member of following committees:
 - Member, State Expert Appraisal Committee for Environment Clearance of Projects constituted by MoEF-GOI.
 - Member of Committee constituted by State Govt. (Department of Agriculture) for reviewing applications for field trials of genetically modified crops in Punjab.
 - Member, Finance Committee of National Institute of Pharmaceutical Education & Research, Mohali.
 - ❖ **Sh. Gurharminder Singh**, SSO (Env.) was nominated for United Nation's Group Training Course on "*Regional Development by Sustainable use of Biodiversity*" at Japan from 2nd Oct. to 3rd Nov. 2011.

8. Publications:

- Nirantar Soach- Monthly Science magazine-12 issues
- Future Frontiers- Quarterly newsletter-4 issues
- A Summary Book containing the summaries of projects presented at State Level Children's Science Congress-2011
- ENVIS Newsletters-4 issues
- Status Reports on Solid Waste & its Management in Punjab
- Posters on 'Let's save our native cow breeds'
- Neem Booklet
- Booklet titled 'Biotechnological Advancements in Food Processing'

Role & Organization

The Punjab State Council for Science & Technology was established on July 21st, 1983 under the financial and administrative control of the Department of Science Technology & Environment, Punjab.

*The Council is headed by the Chief Minister, Punjab, who is the Chairman and Minister for Science & Technology is the Vice Chairman. The General Body, which is the apex body of the Council, has 40 members representing various departments of the State, Vice Chancellors of the 4 universities and eminent scientists representing state and national level scientific institutions. Principal Secretary for S&T is the Member Secretary of the Council. The Executive Committee of the Council is headed by the Chief Secretary, G.O.P. It has 16 eminent members from various Departments such as Agriculture, Technical Education, Industry, PSEB etc and eminent scientists from social & scientific organizations. Executive Director is the Chief Executive of the Council. The organizational structure of the Council is at **Annexure-I**.*

The Council is undertaking activities under the following areas:

- *Popularization of Science*
- *Biotechnology, Environment*
- *Consultancy Cell*
- *Water Regime Management*
- *Patent Awareness*

Objectives

- *To identify, generate, utilize and promote new technologies relevant to the development needs of the State in the light of Socio-Economic developmental objectives*
- *To popularize science and spread scientific temper and attitude among the people of the State*
- *To promote and establish pilot-plants and programmes including demonstration units and commercial exploitation of Science and Technology for priority developmental needs of the State*
- *To interact with other State and National S&T bodies having similar or related objectives*
- *To establish infrastructure, institutions, organizations etc. necessary to achieve the aforesaid objective.*



International Events during 2011-12

1. **Advanced International Programme: Education for Sustainable Development in Formal Education.**

The United Nations has declared the decade 2005 to 2014 as 'Decade of Education for Sustainable Development' (ESD). In this regard, an '*Advanced International Programme on Education for Sustainable Development in Formal Education*' is one of a number of programmes supported by the Swedish International Development Cooperation Agency (SIDA). The programme is a collaborative effort between Ramboll AB (Sweden), the Southern African Development Community Regional Environmental Education Programme (WESSA & SADC REEP) (South Africa) and the Centre for Environment Education (CEE-India). The programme extends over a period of one year and is designed to orient Environment Education (EE) to Education for Sustainable Development (ESD) and support sustainable development initiatives and workplace-based learning. The objectives of the programme are to promote an increased understanding of and ability to analyze sustainable development challenges from environmental, social and economic perspectives, an increased knowledge of current trends and international initiatives in EE & ESD and develop the ability to analyze how EE & ESD can be integrated into formal education and teacher training.

Applications were invited by SIDA from South Asian and African countries for participation. Four applications were selected from India based on strengths of the organization, past experience and utility and applicability of a project to be undertaken as a part of the programme (PSCST - a State Govt. Undertaking; Department of Education, MS University, Baroda – an educational institution; WWF-an International NGO and Lokmitra-a rural based NGO). PSCST submitted its application under Shri H.S. Kandhola, Additional Secretary, Science Technology & Environment, Govt. of Punjab as Supervisor of the Change Project with Dr. Neelima Jerath, Executive Director, PSCST as the Principal Participant and Dr. S.S. Ladhar, Joint Director (Environment), PSCST as the Co-Participant. The Council identified the National Green Corps (NGC) Programme as the focus programme of its Change Project.



The programme is divided into four inter-linked Modules (i.e. change process in institutional settings, understanding sustainable development, educational responses for sustainable development and institutional frameworks in formal education) and five phases. Phase-I is dedicated to focus on understanding of ESD in an organizational work context through a national workshop. Phase-II provides a platform for

exchange of ideas at the international level through a 3-week programme in Sweden. Phase-III pertains to preparing the Change Project within the institutional work context. Phase-IV comprises a National Workshop to focus on a tangible product and Phase-V covers Change Project implementation in the respective work area. During 2011-12, National Workshop at Ahmedabad, a three week International Programme at Stockholm and Uppsala at Sweden and a two week regional program at Ahmedabad were completed. Dr. Neelima Jerath visited Sweden from



10th to 28th September, 2011 to participate in the International Programme. The visit was sponsored by SIDA and included discussions and training on ESD in Policy & Practice, Assessment of ESD performance indicators, tools for SD and integration in ESD models and methods, positive approach to ESD, business education for sustainability, role of values in education, etc. The visit offered a good learning experience for implementing ESD and moving forward from EE in the social context.

Since the Council is regularly conducting Training Programmes for Master Trainers of NGC on Environment Education, the Council is developing an Activity Book for High School Children and a Training Module based on ESD for use by Master Trainers and eco-club teachers. The drafts have been discussed at field level and final drafts are being prepared.

2. India-UK Scientific Seminar/Workshop on 'Scotland-Punjab collaboration

A delegation comprising team of Scottish Scientists had visited PSCST and other R&D bodies in Punjab and India in October 2010 under Scottish Life Science Mission supported by British Council to discuss the possibilities of taking up collaborative programmes. The Council, being an apex body for promotion of Science & Technology in the State provided detailed information on issues of interest / relevance to the State of Punjab. As scientists from the University of St. Andrews in Scotland, a 600 years old university of repute, showed keen interest in collaborative research and scientists' exchange (both students & faculty) programmes, the Council developed a project in collaboration with them for organizing India-UK Scientific Seminar/Workshop on 'Scotland-Punjab collaboration: exploring possibilities for research collaborations and staff and student exchanges in biotechnology, crop science and the environment'. The proposal was jointly sanctioned by DST-GOI & the Royal Society and a team of 5 scientists from Punjab and 15 scientists from UK participated in the said workshop held at University of St. Andrews, Scotland from 22-24 August, 2011. Dr. Neelima Jerath, Executive Director, PSCST lead the Indian team comprising Dr. Rakesh Tuli (Executive Director, National Agri-Food Biotechnology Institute), Dr. S.S. Gosal (Director of Research, PAU), Dr. Jatinder Kaur Arora (Addl. Director-Biotech, PSCST) and Dr. N.G. Prasad (Asstt. Professor, Indian Institute of Science Education & Research, Mohali). The coordinator from UK side was Prof. Alyson K. Tobin, Dean, Faculty of Science, University of St. Andrews and the team members included scientists from Universities of St. Andrews; Dundee; Edinburgh; Abertay; Aberdeen; The Robert Gordon University; Heriot-Watt University and Scottish Crops Research Institute.

After focused discussions during the workshop, 18 areas of mutual interest were identified viz. 1. Integrated nutrient management (improving nutrient use efficiency in cereals and potatoes); 2. Plant health management in solanaceous plants; 3. Molecular breeding, Genome sequencing and managing large data sets especially w.r.t. wheat; 4. Development of precision farming techniques; 5. Characterization of biochemical and genetic diversity of economically important crops; 6. Mitigation and development of adaptation technologies for changing climate; 7. Management of agricultural residues especially rice straw (whole crop use for biofuels, *in-situ* decomposition); 8. Water conservation (improving crop water use efficiency, root traits in cereals and modeling root growth & development); 9. Integrated disease management and integrated insect management for crop protection; 10. Development of plant disease diagnostic kits; 11. Regulation of methane production from rice fields having standing water; 12. Carbon foot printing and carbon sequestration; 13. Detection of human pathogens in field crops; 14. Waste water management and bio-remediation; 15. Long-term effects of soil compaction; 16. Site specific nutrient management using Geographical Information System (GIS) and

Global Position System (GPS); 17. Technologies for effluent treatment especially use of Fluidised bed photo catalytic reactors; 18. Mathematical modeling of human and animal disease spread.

As an immediate step, it was decided that two major and one minor collaborative R&D projects and one student exchange programme can be developed for financial support by Governments of India and Scotland. The major R&D Projects include (1) Germplasm Enhancement and Health Management of four Solanaceous Crops (potato, tomato, brinjal, chilly pepper) and (2) Bioprocessing of agri-surplus and agri-waste for value-addition with respect to barley, rice and wheat. Further, as the use of treated waste water is being promoted for on-land irrigation in Punjab, a focused study on 'Human pathogens in treated waste water and their interactions with plant systems especially vegetable crops' was identified to be taken up as collaborative minor R&D Project. It was also agreed in principle to initiate a Student Exchange Programme between Indian Institute of Science Education & Research, Mohali and University of St. Andrews.

3. Participation in Bio-Mission and Bio-International Convention (BIO 2011), USA.

PSCST participated in India Pavilion at the Bio International Convention (BIO 2011) on behalf of the Govt. of Punjab. The convention was held at Washington DC, USA from 27-30 June, 2011. Bio International Convention is an annual feature and the largest global event in biotechnology sector organized by Biotechnology Industry Organization (BIO), USA. The India Pavilion at the convention was organized by Confederation of Indian Industry and Association of Biotechnology Led Enterprises (ABLE) with the support of Department of Biotechnology, Govt. of India. The initiatives of Govt. of Punjab & PSCST in biotechnology sector were showcased in this Pavilion in the Bio Exhibition that covered 61 state and international pavilions. A Biotechnology Mission led by Secretary, DBT-GOI was also taken by CII for this convention. As Punjab Govt. is in the process of setting up Mohali Biotechnology Park, as per approvals of State Govt. and DBT-GOI, the then Chief Secretary, Punjab and Dr. Jatinder Kaur Arora, Additional Director (Biotech.), PSCST were selected to be members of Indian delegation led by Dr. M.K. Bhan, Secretary, DBT-GOI. Chief Secretary could not participate because of an exigency while Dr. Jatinder Kaur Arora represented the State Govt. in the Convention and Biotechnology Mission. The Mission held bilateral meetings with US and Indian Life Science industries and visited various universities for scientific interactions.



Dr. Jatinder Kaur Arora interacting with visitors in the exhibition area set up by PSCST on behalf of Govt. of Punjab in BIO 2011 at Washington DC, USA.

4. Participation in UNAPCAEM and FAO Joint Roundtable on Sustainable Agricultural Mechanization in Asia held in Bangkok, Thailand

United Nations Asian & Pacific Centre for Agricultural Engineering & Machinery (UNAPCAEM) and Food & Agriculture Organization (FAO) had jointly organized a roundtable meeting on “Sustainable Agricultural Mechanization in Asia” at Bangkok, Thailand on 8th -9th December, 2011. The objectives of the roundtable were to discuss status of agricultural mechanization in Asia and identify constraints as well as best options for achieving environmentally sound sustainable agricultural mechanization in the region. Based on “State of Environment Report- 2007” and the work put up by PSCST on ENVIS Centre website, UNAPCAEM and FAO invited two experts from PSCST to present papers relevant to roundtable objective. Dr. Neelima Jerath, Executive Director and Mr. Gurharminder Singh, Senior Scientific Officer (Env) attended the roundtable meeting as special invitees and presented the following papers:-

1. “Intensive Agriculture in Punjab: An Environmental Appraisal” by Dr. Neelima Jerath
2. “Farm Mechanization in Punjab and its Social, Economic and Environmental Implications” by Mr. Gurharminder Singh



Dr. Neelima Jerath presenting her paper



PSCST publication being presented to Head UNAPCAEM

The visit was sponsored by UNAPCAEM. The meeting was attended by representatives of 14 Asia-Pacific region countries including India, Asian Development Bank and John Deere (Tractor Manufacture). The roundtable brought together key country stakeholders and experts on agricultural mechanization to discuss the modalities in developing Sustainable Agricultural Mechanization Strategies (SAMS) as well as gauge country interest in conducting SAMS in individual countries. A draft regional framework for SAMS was also developed after various country presentations, discussions and group work. Copies of PSCST publications ‘State of Environment, Punjab-2007’ and ‘Climate Change, Biodiversity and Food Security in South Asian Region’ were presented to Mr. Hiroyuki Konuma, Director General & Regional Representative FAO and Mr. LeRoy Hollenbeck, Head of UNAPCAEM by Dr. Neelima Jerath.

5. Participation in UN Group Training Course on “Regional Development by Sustainable use of Biodiversity” organized by UNCRD & JICA at Japan

United Nations Centre for Regional Development (UNCRD) and Japan International Cooperation Agency (JICA) had organized “A Group Training Course in Regional Development by Sustainable Use of

Biodiversity” in Japan from 2nd October 2011 to 3rd November 2011” under the Technical Cooperation Programme of Govt. of Japan. The objective of training course was to facilitate regional development plans with the perspective of biodiversity conservation and its sustainable use. Mr. Gurharminder Singh, Senior Scientific Officer, PSCST who was nominated by Deptt. of Science, Technology & Environment, Govt. of Punjab was selected against one of the 7 worldwide positions available for the above said training. The other participants were from China, Ecuador, Chile, Philippines, Vietnam and Malaysia. All travel and training expenses were borne by JICA.

The training course provided information on preliminary identification of the current situation of biodiversity and the issues pertaining to the respective participant countries, understanding specific measures and methodologies pertaining to biodiversity conservation and Administration in Japan, sustainable production and consumption, Establishment of Recycling-Oriented Society and Characteristics and Utilization of Regional Resources. The course included field visits, exercises, discussions and group presentations followed by formulating a draft Action Plan on the priority issues.



Mr. Sadako Ogata, President JICA awarding training certificate to Mr. Gurharminder Singh, SSO (Env.)

6. **NASA’s Cloudsat Education Network Programme (CEN)**

Council had initiated the Cloudsat Education Network Programme of NASA in eight schools of the country, all from Punjab (Districts Mohali & Jalandhar). Under the programme, schools are trained to take up cloudwatching activities and provide cloud cover data to NASA whenever the Cloudsat Satellite passes over the area. The programme continued to be operational during 2011-12 when Council provided cloudpass dates to schools, which in turn, provided cloud cover data to NASA. The programme has helped raise awareness on atmospheric sciences amongst school children. Other activities undertaken during the year were: poem recitation competition, drawing competition with the theme ‘Scroll on Clouds (Angels of Rain)’, celebration of World Environment Day, 2011’ through Essay writing on ‘Clouds and Environment’, Tree plantation and Poster competition. A summer vacation task was assigned to CEN students to find out stories related to clouds (Indian culture) from parents, grandparents or teachers and pen them down and to draw oil paintings of clouds. Further, Dr. Neelima Jerath, Executive Director presented the activities of CloudSat Programmes in State level Seminar ‘Concepts and Role of Information Technology in Education: Perspectives from the formal sector’, organized by The Energy and Resources Institute (TERI), on 4th November, 2011.

Photographs of the CEN program:



Poem Recitation Competition and Painting Competitions

Poem

What's fluffy, white, and floats up high,
 like piles of ice cream in the sky ?
 Cumulus clouds are the one
 Seeing them is too much fun
 And when the wind blows hard and strong,
 What brings the rain?
 what brings the snow
 that showers down on us below
 these are nimbus cloud
 there lightening is too loud
 what's flat, and hazy
 which bring a light drizzle or snow.
 Stratus clouds are these
 Which brings drizzle and breeze
 Like piles of ice cream in the sky?
 Cumulus clouds are the one
 Seeing them is too much fun
 And when the wind blows hard and strong,

Sustainable Development

1. Conservation and Management of Wetlands in Punjab

Wetlands, forests and oceans are known as three globally important ecosystems. Wetlands are life-supporting systems providing fish, water, biomass, erosion buffering, water storage, groundwater recharging, wildlife, recreation and tourism, besides playing an important role in flood control.. They are important repositories of aquatic species particularly endangered & threatened ones and play a critical role for the rural poor as they impinge on their health, livelihood and economic prospects. Wetlands are also important breeding ground for migratory birds. Yet of late they are being greatly exploited. The state of Punjab has been left with less than 1% of the area under wetlands.

There are three Ramsar sites (wetlands of International importance) in Punjab- Harike, Kanjli and Ropar. These wetlands are important habitats for waterfowl, fish and diversity of other flora and fauna including endangered and vulnerable species.. Two other wetlands- Ranji Sagar and Nangal are National wetlands. Ranjit Sagar is an interstate wetland spreading over in three states (Punjab, Himachal Pradesh and J&K) .There are 5 small wetlands considered as state wetlands owing to their rich biodiversity and ecological characters. These are - Keshopur-Miani Jheel, Kahnuwan Chhamb ,Jastarwal Jheel, Mand Bharthala and Dholbaha Reservoir.

In all, Punjab has 12 important natural and 9 manmade wetlands.

The Council is coordinating the scheme “National Wetland Conservation Programme (NWCP)” sponsored by Ministry of Environment & Forests, GOI. Under the scheme, conservation activities were initiated in 1987-88 at Harike wetland, in 1988-89 at Kanjli and in 1998-99 at Ropar. Conservation measures at Nangal were initiated in 2008-09. The activities are taken up through various executing departments which include afforestation of native tree species for habitat improvement, soil conservation to prevent siltation, conservation of wildlife and fisheries, weed control, water quality monitoring and public awareness, etc. Ranjit Sagar National wetland (which is an interstate wetland of H.P., Punjab and J&K) is being managed by Ranjit Sagar Dam Design Organisation under Deptt. of Irrigation.

Harike was included in the list of Ramsar sites in 1990 and subsequently Ropar & Kanjli were also added in the Ramsar list during 2002. Ranjit Sagar was declared National wetland in 2006 and Nangal wetland in 2008.

i) **Harike wetland:**

Harike wetland is a very important abode for the water birds migrating from across the international frontiers. It supports more than 400 species of avifauna. It has also been notified by the Govt. of Punjab as Wildlife Sanctuary in 1982. This wetland is facing problem of siltation as vast areas along the right side of river Beas falling under villages Chamba Kallan, Kamboh Dhairwala, Kirrian and Harike are degraded with deep cuts due to formation of ravines over the years. Erosion in this area transfers silt into Harike wetland.

Conservation measures were initiated in Harike wetland in 1987-88. Activities taken up include survey and mapping, plantation (69.5ha), fencing (22845 rft), construction of mounds (192), shallow water ponds (15), demarcation pillars (200) and watch towers (2). 1184 ha catchment area has been treated with vegetative structures, trenches, gully plugging, land terracing, etc. Soil conservation measures also include construction of earthen check dam (58 m long), earthen field bund (50km), earthen silt detention structures/ masonry drop structures (255 no.), stream bank protection with vegetative structure (60km), & periphery bandh (14,373 m). Soil conservation work has been completed in 34 out of 54 ravines in immediate catchments. As reported by deptt. of soil conservation, silt inflow of about 90,000 metric ton has been abated due to the soil conservation measures taken. About 2250 acre area has been improved in village chohla sahib and is being used for agriculture. Land value has increased substantially which resulted in socio-economic upliftment of farmers.



Total area to be treated in immediate catchment-3463 ha

Area treated: 723 ha

Other activities included Remote sensing studies with the help of Punjab Remote Sensing Centre, biological control of water hyacinth, water quality monitoring, camps on promotion of organic farming, public awareness, wetland education centres in schools, awareness kiosks & hoardings, publication of books (*Harike, Plants at Harike*), Posters, Pamphlets, Film “Destination Harike”, Interactive Video CD on wetlands, Yearly Planners, Table calendar etc. Biological control of water hyacinth is taken up by Irrigation & Power Research Institute through release of weevils (*Neochetin sp*

at 13 strategic locations). The biological control method has been found effective in land locked areas and ponds. About 6 Acre ponded area has been cleared of water hyacinth.



Council is promoting handicraft from water hyacinth as a livelihood activity by active involvement of an NGO. An interpretation centre has also been developed at LMB for awareness purpose.

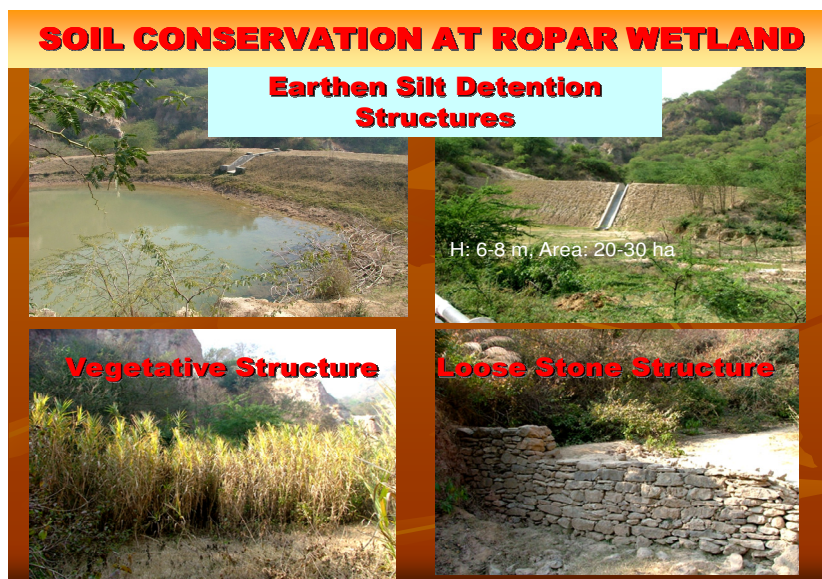
During 2011-12, the following activities were undertaken with released funds amounting to Rs. 14.62 lacs:

- Soil conservation works such as Vegetative measures 9 km, Plantation of trees and bushes 1800 no, Plantation of fruit trees 2100 trees & Masonary drop structures/retaining wall of various crest length 12 no structures.
- Setting up of hoardings (3 nos). Activity is being taken up in consultation with WII and expected to be completed shortly.
- Promotion of organic farming - Camps organized at vill. Chamba Kalani.
- Biological control of water hyacinth – release of weevils (30,000 no.) at strategic locations.
- Wetland Education Centres in 10 schools – Awareness activities on wetlands issues.
- Strengthening of interpretation centre – Activity (Signages, Panels) is being taken up in consultation with WII and expected to complete shortly.

ii) Ropar wetland:

Ropar wetland came into existence in 1882 through construction of a head work at river Sutlej near Ropar. Since this wetland is located right by the side of damaged and eroded Shivalik foothills, a large amount of silt and nutrients gets transported into the wetland every year.

Conservation measures were initiated in Ropar wetland in 1996-97. Activities taken up include survey & mapping, plantation (115 ha) and fencing (12000 rft). Apart from this artificial nests (50 no.) have also been installed at strategic locations. 14 silt detention earthen structures and 37 loose stone structures constructed ,live hedges-2500 m, crate wire structure-2 for silt control, Total area treated- **415 ha** and total silt abatement is about **14,700** tons.



Total area identified for treatment is about 27,290 ha

Total area treated -415 ha

Other activities include water quality monitoring, remote sensing studies, camps on promotion of organic farming, public awareness, wetland education centres in schools, publication of book on “Ropar wetland”, posters, hydrographic studies, Social Impact Studies, promotion of livelihood activities through preparing handicrafts from local weeds, etc.

During 2011-12, the following activities were undertaken with released funds amounting to Rs. **29.62 lac**:

- Plantation work in 35 ha of catchment area
- 2 no. SDS, live hedges-2500 m, crate wire structures-2 Nos.
- Biological control of water hyacinth - 18,000 nos. of weevils released in infested drains and ponds.
- Promotion of organic farming through camps - Camps organized in vill. Katli, Khwaaspura & Miani.
- Setting up of 5 hoardings - Work is being taken up in consultation with WII and expected to complete shortly.

- Wetland Education Centres in 10 schools – Awareness activities on wetlands issues.
- Strengthening of interpretation centres – Activity (Signages, Panel, Life size birds' models, etc.) is being taken up in consultation with WII and expected to be completed shortly.

iii) **Kanjli wetland:**

Kanjli wetland, which is located near Kapurthala on Holy Bein, is extremely important for its hydro-ecological and socio-religious values. It is spread over 12 villages, covering an area of 183 ha. Being a part of rivulet Kali Bein (now known as Holy Bein), this wetland has unique socio-religious importance. As the major area is under agriculture, the inflow of agro chemicals leads to eutrophication problem in the wetland.

Conservation measures were initiated in Kanjli wetland in 1988-89. Activities taken up include survey & mapping, plantation (62 ha) and fencing (17588 rft.). Eutrophication is a major problem which resulted in growth of water hyacinth weed in some pockets of wetland. For manual and mechanical removal of water hyacinth, two conveyor belt systems, one motorboat, tractor & trolley have been fabricated. For biological control of water hyacinth, weevils are have released at 7 locations in Kanjli Lake and Holy Bein. Other activities include water quality monitoring, remote sensing studies, camps on promotion of organic farming, public awareness , publication of book' Kanjli wetland', posters, livelihood activities through handicrafts from water hyacinth, wetland education centres in schools, setting up of awareness kiosk, hoardings and strengthening of interpretation centre, etc.



Awareness Centre at Kanjli

During 2011-12, activities were undertaken with released funds amounting to Rs. 11.00 lacs:

- Plantation work in catchment area of 5.7 ha and Maintenance of 11.5 ha old plantation

- Biological control of water hyacinth - (36,950 nos. of weevils released in infested part of wetland).
- Promotion of organic farming in villages around wetland - Camps to be organized shortly.
- School wetland education centres setup in 10 schools to conduct awareness activities on wetlands issues.
- Development of sun boards/ Hoardings
- Setting up of five hoardings - Work is being taken up in consultation with WII and expected to be completed shortly.

iv) Ranjit Sagar Wetland:

Ranjit Sagar Dam located on river Ravi about 24 km upstream of Madhopur Headworks in Gurdaspur district is a manmade, riverine and lacustrine wetland with fresh water ecology. It is spread over an area of 87.60 sq km. falling in three states of Punjab, Himachal Pradesh and J&K. This dam became operational in August, 2000. Large area came under water with its impoundment and marshy features developed in considerably significant zone along the reservoir. Benefits of this reservoir include flood control, assured irrigation water supply and hydroelectricity generation.

Ministry of Environment & Forests, Govt. of India has included Ranjit Sagar under national wetland conservation programme at the instance of Hon'ble Governor of Punjab in 2006. To prepare a Joint management action for this wetland by three states, Ministry has constituted a steering committee .The work is in progress. The Punjab area of wetland is managed by Ranjit Sagar Dam Design Organization under Deptt. of Irrigation, Punjab.

v) Nangal wetland:

Ministry of Environment & Forests, Govt. of India has included Nangal lake under national wetland conservation programme in 2008. Activities taken up include plantation in 80ha area, stream bank protection with Stone masonry structure-10nos, small check dams-2 nos. constructed, contour bunding-3000rmt, Veg. hedge 7540 m for silt control. Total area treated is 185 ha and silt abatement is about 264 tons. Other activities include setting up of hoardings depicting important birds of Nangal wetland, promoting organic farming in the catchments so as to reduce agro-chemical runoff into the wetland and setting up of awareness/interpretation centre at Nangal wetland, remote sensing studies, setting up of wetland education centres (10No.) and promotion of livelihood activities through preparing handicrafts from local weeds.



Interpretation Centre at Nangal

During 2011-12, activities undertaken with the funds released amounting to Rs 34.30 lacs:

- Stone masonry (10 nos.) check dam (30 cumt), Stone masonry water harvesting dam (2 nos. 250-300 cumt), 3000 rmt Contour bunding, 4000 rmt hedge, Tree Plantation
- Promotion of organic farming in villages around wetland - Camps organized in vill. Talwara & Kherabagh.
- School wetland education centres (10No.) setup to conduct awareness on wetlands issues.
- Setting up of four hoardings - Work is being taken up in consultation with WII and expected to complete shortly.
- Strengthening of interpretation centre – Activity (Signages, Panels) is being taken up in consultation with WII and expected to complete shortly.

vi) Conservation of Wetlands of State importance:

There are sixteen small wetlands in Punjab. Out of these, five wetlands namely Keshopur-Miani Jheel, Kahnuwan Chhamb, Jastarwal Jheel, Mand Bharthala and Dholbaha Reservoir have been designated as wetlands of State importance owing to their ecological importance. Keshopur-Miani Jheel has also been declared as community reserve. Council has taken up preliminary survey of these wetlands and published pamphlets. Threats for these wetlands are also identified which include-

- Lack of public awareness towards their responsibility for conservation of these ecosystems
- Drainage of wetlands for irrigation
- Indiscriminate discharge of domestic and industrial effluents and intensive use of agro chemicals severely affecting the wetland flora and fauna
- Siltation of wetlands due to erosion caused by deforestation and loss of vegetative cover particularly around Dholbaha

Punjab Remote Sensing Centre (PRSC) has conducted GIS studies of Keshopur Miani wetland which has been declared as a Community Reserve. The study includes detailed landuse/ land cover mapping and preparation of digitized map.



vii) Keshopur Miani wetland

During 2011-12, state Govt. released Rs.5.0 lac for developing wetland education centres in schools along all 5 state wetlands installing fibre glass models of birds and providing water testing kits, field scopes/binoculars for birds watching. The centres will be set up shortly.

2. Biodiversity Conservation

Punjab Biodiversity Board

Punjab Biodiversity Board was notified on 23rd December, 2004 under section 22 Biological Diversity Act, 2002, as a statutory body to conserve biodiversity in the state (including agricultural biodiversity) to ensure sustainable use of its components and fair and equitable sharing of the benefits arising out of the use of the biological resources. The Board has been re-notified from time to time. Since its inception, the Board is being serviced by Punjab State Council for Science & Technology with ED-PSCST as its Member Secretary. The following activities were carried out during the year 2011-12:- Fifth Meeting of the Punjab Biodiversity Board was held under the chairmanship of Hon'ble Chief Minister, Punjab.

- i. The Board imparted training to 6 district level (Amritsar, Fatehgarh Sahib, Roopnagar, Hoshiarpur, Sangrur and Patiala) Biodiversity Management Committees for the preparation of People's Biodiversity Registers (PBRs) with active support of PSCST scientists.
- ii. International Biodiversity Day (2011) was celebrated on 22nd May, 2011 on the theme "Forest Biodiversity" by various institutions/ BMCs/ NGOs like Pushpa Gujral Science City, Kapurthala, Punjab Agricultural University, Ludhiana, Four NGOs i.e. Institute of Ecology & Environment, Pathankot; Sai Dharam Singh Foundation, Derabassi; People Forum, Bargari and Environment Protection Society, Global College of Pharmacy (Anandpur Sahib) etc. 265 different programmes on Biodiversity were organized in 120 schools of the state covered under National Green Corps (NGC) programme. These were facilitated by Environment division of PSCST.
- iii. The Board has developed its website on URL www.pbb.gov.in and has organized contests on Documentation of Local Biodiversity by School Students and Preparation of Biodiversity Mascot. In all, 314 entries were received from different districts for the former contest and 169 entries for the latter.
- iv. The PBB jointly with PSCST, also put up exhibition stalls at the following venues:-
 - a) Punjab Destination Fair at Amritsar from 7th Oct to 11th Oct, 2011 inaugurated by S. Sukhbir Singh Badal, Hon'ble Deputy Chief Minister of Punjab
 - b) A stall on 'Biodiversity' on behalf of MoEF and NBA in CII Conference on "Sustainability Solutions" at New Delhi from 25th & 26th November, 2011 which was visited by several dignitaries like, Sh. Salman Khurshid, Cabinet Minister for Law & Justice, Sh. Veerappa Moili, Minister of Corporate Affairs, Mr. Hem Pande, Joint Secretary, MoEF, Dr. Bala Krishna Pisupati, Chairman NBA, and Sh. Nik Sharma, CBD, Montreal, etc.



3. Climate Change and Waste Management

i. State level Strategy and Action Plan on Climate Change:

Punjab State Council for Science & Technology is coordinating the programme for preparation of state level Strategy and Action Plan on Climate Change (SAPCC) as per the frame work of Ministry of Environment & Forests, Govt. of India and National Action Plan on Climate Change (NAPCC). Under this programme action plan as per Eight National Missions namely National Solar Mission, National Mission for Enhanced Energy Efficiency, National Mission on Sustainable Habitat, National Water Mission, National Mission for Sustaining the Himalayan Ecosystem, National Mission for a Green India, National Mission for Sustainable Agriculture and National Mission on Strategic Knowledge for Climate Change identified by the Ministry is being developed involving concerned state departments and in consultation with GIZ (Deutsche Gesellschaft for Internationale Zusammenarbeit). Draft SAPCC has been submitted to the Ministry. Further action is being taken to finalize the same with technical inputs from the experts and consultants.

ii. Environmentally Sound Management of Medical Waste in India through assistance from UNIDO

Mismanagement of medical waste poses risk of contamination of water, air, soil and sediments thereby creating serious infections related diseases. Its uncontrolled incineration leads to formation of Persistent Organic Pollutants (POPs) particularly furans and dioxins. Problems due to POPs are to be specifically addressed under the Stockholm Convention. In this regard, Govt. of India has committed to initiate programmes for environmentally sound management of medical waste. United Nations Industrial Development Organization (UNIDO), therefore, initiated formulation of a project for five selected states namely Punjab, Gujarat, Maharashtra, Karnataka and Orissa for funding from Global Environment Facility. Punjab State Council for Science & Technology actively coordinated with PPCB, Department of Health, Deptt. of Medical Education & Research, Punjab Health Systems Corporation & Deptt. of Animal Husbandry to support project formulation by UNIDO. It facilitated signing of MoU by working out the state contribution in kind only. State will get assistance from UNIDO to the tune of Rs.10.00 crores during five years period of implementation of this project. The project has been approved by GEF in principle.

iii. Studies on Waste Management:

The Punjab State Council for Science & Technology conducted studies on Management of Municipal Solid Waste (MSW), Bio-medical Waste and Plastic Waste Management & Inventorization of Plastic Recycling Units in Punjab with support from Punjab Pollution Control Board (PPCB), Patiala. The Punjab ENVIS Centre actively participated in this study.

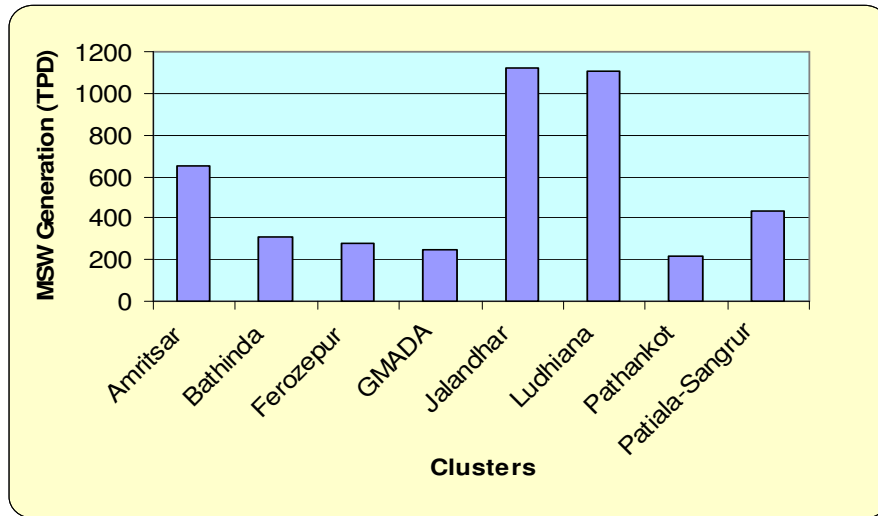
A three step methodology starting from literature review & development of questionnaires was adopted to assess the status of waste generation & its management and the role of formal and informal sector in its management in the state.



MSW: Solid waste management has emerged as the most challenging task for all local bodies. For effectively carrying out this activity, the Department of Local Bodies, Govt. of Punjab has identified & grouped all the 140 municipal bodies into eight clusters. They include namely, Amritsar (8 ULB's), Bathinda (18 ULB's), Ferozepur (16 ULB's), Greater Mohali Area Development Authority-GAMADA (20 ULB's), Jalandhar (27 ULB's), Patiala-Sangrur (18 ULB's), Ludhiana (14 ULB's) and Pathankot (12 ULB's). These municipal bodies in eight clusters together generate 4361.64 TPD of MSW with maximum contribution from Jalandhar and Ludhiana cluster (Fig 1). Physical composition of MSW varies from town to town and from season to season. Some recommendations for proper solid waste management are mentioned below:

- urgent need to enhance public awareness about issues associated with MSW with the objective of facilitating their active participation for its proper management.
- need to introduce environmentally safe and scientific methods for collection, segregation, transportation and disposal of municipal solid waste.
- regular trainings and capacity building of staff involved in handling of MSW.
- promote the concept of 3R principle with emphasis on segregation of waste at the generation level, strengthen the mechanism to facilitate use of biodegradable waste as manure and retrieval of recyclable materials.
- stop open dumping in residential areas, roadsides, railway lines, vacant plots, drains/nallahs, riverbanks, etc.
- proper development of landfill sites to prevent seepage of leachates from MSW disposal areas.
- Creation of sufficient green belts with suitable evergreen species of trees, shrubs and grasses.

Fig.1 Overall MSW generation by towns in eight different clusters in the State



Source: Based on townwise information from Do-LG, GoP and IL&FS data (2010).

Table 1: Plastic Waste Generation in Punjab

S.No.	Name of Cluster	Names of Districts	Plastic Waste Generation (TPD)	Plastic Waste Generation (%)
1.	Amritsar	<ul style="list-style-type: none"> Amritsar Taran Taran 	<ul style="list-style-type: none"> 12 - 32 0.65-1.69 	<ul style="list-style-type: none"> 1.9 -5.1 1.9 – 5.1
2.	Bathinda	<ul style="list-style-type: none"> Bathinda Mansa Muktsar 	<ul style="list-style-type: none"> 6.1-12.3 0.02-8.25 6.0-7.44 	<ul style="list-style-type: none"> 6-12 0.02-8.41 6.4 -8
3.	Ferozepur	<ul style="list-style-type: none"> Ferozepur Faridkot Moga 	<ul style="list-style-type: none"> 0.24-4.14 11.39 2.9 	<ul style="list-style-type: none"> 2.74 - 9.86 8.5 5
4.	Jalandhar	<ul style="list-style-type: none"> Jalandhar Hoshiarpur Kapurthala S.B.S. Nagar 	<ul style="list-style-type: none"> 1.5 4 0.01-1.50 0.03 	<ul style="list-style-type: none"> 0.3 1 0.15 - 3.2 0.01-2.5
5.	GMADA	S.A.S. Nagar	4.6-6.4	5 -7
6.	Ludhiana	<ul style="list-style-type: none"> Ludhiana Rupnagar Fatehgarh Sahib 	<ul style="list-style-type: none"> 0.10-3.00 .002-0.6 0.50-4.00 	<ul style="list-style-type: none"> 1.5-15.7 0.04-8.3 8.0-16.6
7.	Patiala-Sangrur*	<ul style="list-style-type: none"> Patiala Sangrur 	26	10
8.	Pathankot	Gurdaspur	8.08	10

‘Plastic Waste Management and Inventorization of Plastic Recycling Units in Punjab’: The Council collected information from various towns/ municipal authorities as per eight clusters of Amritsar, Bathinda, Ferozepur, Greater Mohali Area Development Authority (GAMADA), Jalandhar, Patiala-

Sangrur, Ludhiana and Pathankot identified by the Department of Local Govt., Govt. of Punjab (DoLG, GoP) on plastic waste generation and collated district-wise information.

To assess the amount of plastic waste generation in the state, the information from formal and informal sector (Kabariwalas & ragpickers) was collected. The quantity of the plastic waste component in MSW of the state broadly ranged from 0.02 to 16 percent.

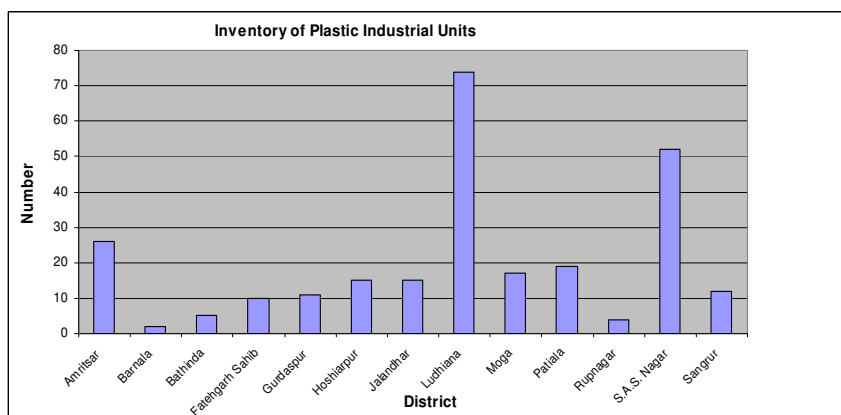
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S.No.	Name of Cluster	Names of Districts	Plastic Waste Generation (TPD)	Plastic Waste Generation(%)
1.	Amritsar	<ul style="list-style-type: none"> ▪ Amritsar ▪ Taran Taran 	<ul style="list-style-type: none"> ▪ 12 - 32 ▪ 0.65-1.69 	<ul style="list-style-type: none"> ▪ 1.9 -5.1 ▪ 1.9 – 5.1
2.	Bathinda	<ul style="list-style-type: none"> ▪ Bathinda ▪ Mansa ▪ Muktsar 	<ul style="list-style-type: none"> ▪ 6.1-12.3 ▪ 0.02-8.25 ▪ 6.0-7.44 	<ul style="list-style-type: none"> ▪ 6-12 ▪ 0.02-8.41 ▪ 6.4 -8
3.	Ferozepur	<ul style="list-style-type: none"> ▪ Ferozepur ▪ Faridkot ▪ Moga 	<ul style="list-style-type: none"> ▪ 0.24-4.14 ▪ 11.39 ▪ 2.9 	<ul style="list-style-type: none"> ▪ 2.74 - 9.86 ▪ 8.5 ▪ 5
4.	Jalandhar	<ul style="list-style-type: none"> ▪ Jalandhar ▪ Hoshiarpur ▪ Kapurthala ▪ S.B.S. Nagar 	<ul style="list-style-type: none"> ▪ 1.5 ▪ 4 ▪ 0.01-1.50 ▪ 0.03 	<ul style="list-style-type: none"> ▪ 0.3 ▪ 1 ▪ 0.15 - 3.2 ▪ 0.01-2.5
5.	GMADA	S.A.S. Nagar	4.6-6.4	5 -7
6.	Ludhiana	Ludhiana Rupnagar Fatehgarh Sahib	<ul style="list-style-type: none"> ▪ 0.10-3.00 ▪ .002-0.6 ▪ 0.50-4.00 	<ul style="list-style-type: none"> ▪ 1.5-15.7 ▪ 0.04-8.3 ▪ 8.0-16.6
7.	Patiala-Sangrur*	Patiala Sangrur	26	10
8.	Pathankot	Gurdaspur	8.08	10

During the field visits, it was observed that in the major towns of the state the plastic waste was found littered around the collection bins, along roadsides, in the streets and in the drains creating unhygienic conditions. Though the informal sector plays a very important role in recycling and management of plastic waste, despite unhygienic conditions in which they work, but they are in the profession due to socio-economic compulsions.

In order to prepare an inventory of plastic industry in the state, a questionnaire was developed and various concerned agencies were contacted including PPCB, Deptt. of Industries, District Industries Centers, Plastic Industries Associations and some plastic manufacturing/using industrial units. Besides, information provided in Statistical Abstracts and internet was also compiled. Based on information received from these sources, inventory of plastic industries is prepared as shown in Fig. 2.

Fig. 2. Inventory of plastic industries



Biomedical Waste: The report reveals that in the state 2376 government and private hospitals were operational with total capacity of 38864 beds in the year 2009 as per authorization of PPCB under Biomedical Waste (Management & Handling) Rules, 1998. Total biomedical waste generated by these hospitals was 6494.4 tonnes. However, total waste collected and treated by four CBWTF was 1649.22 tonnes during 2009. Review of available data received/collected from various hospitals/medical institutions also shows that waste generation per bed vary from approximately 0.20 kg per day to 1.50 kg per day. Some recommendations of the study are as under:

- urgent need of proper segregation of bio-medical waste in hospitals according to the colour coding as per Biomedical Waste (Management & Handling) Rules.
- proper maintenance of records of biomedical waste by all Health Care Establishments (HCE's).
- regular monitoring of emissions of toxins (particularly for dioxins & furans) from the incinerators being operated by the Common Biomedical Waste Treatment Facility(CBWTF) .
- large scale awareness programmes at block and district levels:
 - to motivate all medical personnel (especially paramedical staff) for ensuring segregation and disposal.
 - to strengthen the activities for environmentally sound management and disposal of biomedical waste for all levels of hospital staff especially for class III & class IV employees working in wards & OPDs .
 - for use of safety equipments like gloves & masks.
 - for stake holders, especially rag pickers, rag dealers besides general public to make them aware of the medical hazards of re-using disposables like, metal, glass and plastic wastes discarded as part of biomedical waste.

POLLUTION CONTROL

1. UNDP-GEF Project on “Energy Efficiency Improvement in Indian Brick Industry”

UNDP-GEF has sanctioned a project on “Energy Efficiency Improvements in Indian Brick Industry” with an objective to reduce energy consumption and restrict Green House Gases (GHGs) by creating appropriate infrastructure for sustained adoption of new and improved technologies for production and use of Resource Efficient Bricks (REBs) in India. The Council has been recognized as Local Resource Centre (LRC) for the States of Punjab and Haryana.

As per the scope of the project, the Council has been interacting with Brick Kiln Owners at cluster level and through one-to-one interactions for their capacity building. It has conducted 20 interactive meetings and 2 workshops for brick entrepreneurs and associations wherein the doubts and issues pertaining to the mechanization for producing REBs, its benefits & marketing aspect were clarified. Further, emphasis has also been laid on creating awareness amongst end users. The Council has organized two sensitization workshops-cum-interactive meets for the government officers, architects and building contractors wherein the renowned architects and consultants were invited to



share their experiences and present case studies on the use of REBs. In order to further sensitize the brick fraternity and public about the benefits of REBs, the Council has set up an REB Corner in its office wherein all the models of REBs have been displayed. The Council has also exhibited REBs at various workshops, engineer’s day celebrations at Ludhiana, CII Fair at Amritsar, Bureau of Energy Efficiency Workshop on Energy Efficiency in Commercial Buildings at Chandigarh etc. The Council has been receiving a number of queries from brick manufacturers regarding REBs, its manufacturing process and market demand. Five brick manufacturers from J&K, Himachal Pradesh, Haryana and Punjab visited Council office and their visits to REB manufacturing facility and construction sites were facilitated.

The Council has been supporting and technically guiding the brick entrepreneurs for setting up of REB producing facility. It has also been helping the local entrepreneurs to upscale their operation in manufacture of REBs. The Council is in touch with various brick machinery manufacturers in India and abroad, experts of machines & testing of clays for providing necessary support to the entrepreneurs.

Three Model Detailed Project Reports (DPRs) involving different level of mechanization and production capacity have been prepared to facilitate the bank finance for the brick entrepreneurs. The Council has interacted with banks/financial institutions for technical appraisal of these reports. The Corporation Bank has already approved model DPR. The information pertaining to the DPRs have been uploaded at website www.resourceefficientbricks.org.

With all the efforts of the Council and support of UNDP GEF in sensitizing the brick fraternity of this region, a movement has been initiated in Northern India wherein brick manufacturers have started looking for technologies for manufacture of REBs. One entrepreneur near Dera Bassi has upscaled his REB manufacturing capability and produced around 26 lakh bricks during the last working season. Three more entrepreneurs from Ludhiana, Hoshiarpur and Nangal have also installed machines capable of producing both REBs and solid bricks with production capacity of around 5000 bricks/hour. The objectives of UNDP GEF project as such are being achieved meticulously.

2. CPCB Project on “Revision of Comprehensive Industry Document for Brick Kilns

Central Pollution Control Board (CPCB) had entrusted the Council with a project on “**Revision of Comprehensive Industry Document for Brick Kilns**” in May 2010 with duration of 2 years. The scope of the project involves, preparation of inventory of brick kilns, detailed monitoring of emissions in 10 kilns from each of the 5 zones of the country, energy audit, material balance etc. so as to arrive at most techno-economically feasible standards to be enforced at the national level. Council got in touch with various State Pollution Control Boards, State Council’s for Science & Technology, Brick Kiln Owners Associations and Technology providers throughout the country to obtain information on various types of kilns, types of fuel being used, production capacity, the work practices being adopted and type of market existing in various regions. The information from 13 states has been received whereas the same is awaited from the remaining states.

The Council has engaged the services of M/s. AES Lab. Pvt. Ltd., a NABL accredited lab, for carrying out environmental monitoring of brick kilns. The detailed study including energy audit of 10 brick kilns has been completed in North and Central Zone of the country. The monitoring of all the 50 kilns is likely to be completed by June 2012 end.

3. Setting up of Consultancy Services on Clean Development Mechanism (CDM) Projects :

Punjab Energy Development Agency (PEDA) had awarded a project for preparation of Project Design Document (PDD) and Project Concept Note (PCN) for their 1 MW Solar Power Plant at Village Phulokhari, District Bhatinda. During the year, the Council has prepared and submitted PDD to PEDA. The Prior Consideration Form (PCN) in the shape of Form-F was submitted to UNFCCC which has been hoisted by UNFCCC on their website.

The Council organized Local Stakeholders Meeting, one of the mandatory requirement of CDM Project at Village Phulokhari, District Bhatinda in May, 2011. The final PDD and PCN have been submitted to PEDA for onward transmission to NCDMA for its approval. The project once registered will get 1392 Certified Emission Reductions (CERs) per annum for 10 years.

4. Project entitled “Evaluation & Improvement in design for clamp kilns for brick manufacturing, good practices and practicable energy conservation”

PSCST along with TERI had taken up a project for Central Pollution Control Board, Govt. of India on “Evaluation & Improvement in design for clamp kilns for brick manufacturing, good practices and practicable energy conservation”. The scope of the project includes monitoring of emissions and energy audit of seven pre-dominant designs of clamp kilns throughout the country, suggest modifications so as to arrive at most economical and feasible design of energy efficient clamp kiln and its demonstration at one of the sites.



The detailed monitoring of emissions & energy audit of seven pre-dominant designs of clamp kilns has been carried out. Based on in-depth study of results of monitoring & energy auditing with regard to variation in fuel used, brick setting pattern, emissions during various stages of operation vis-à-vis published literature on clamp kilns; Council recommended the design of clamp kiln, siting criteria and setting pattern of bricks along

with fuel placement with an objective to improve the energy efficiency in clamp, provide better insulation ultimately leading to better quality of bricks.

The report on field study and recommendations have been submitted to CPCB. The demonstration of clamp kiln will be done on approval of design by CPCB and sanction of funds for demonstration.

5. Energy Audit of Pushpa Gujral Science City (PGSC), Kapurthala.

PGSC has awarded the work for carrying out energy audit of its campus at Kapurthala to PSCST at a total cost of Rs. 2.25 lacs. The scope of work includes energy audit of various electrical energy intensive equipments such as pumps, motors, transformers, DG sets, HVAC systems, Lighting, etc. The total duration of the project was four months.

The detailed energy audit was carried out jointly with National Institute of Secondary Steel Technology (NISST), Mandi Gobindgarh having adequate infrastructure for energy audit. The data collected with regard to each equipment was analyzed for identifying the scope of energy conservation.

The study concluded that there is a scope of 28% electrical energy saving per annum (Rs. 25.44 lacs) with capital expenditure of Rs. 10.25 lacs on implementation of all the energy conservation measures. The final report indicating energy conservation measures, cost benefit analysis, payback period etc., was submitted to the PGSC in December, 2011.

6. Techno-Economic Feasibility Study for examining the necessity of providing a covered shed/enclosure around mechanical drier in dry rice shellers for abatement of pollution.

The above said study was entrusted to PSCST by Punjab Pollution Control Board (PPCB) at a cost of Rs. 9.45 lacs in July, 2011. The Hon'ble High Court of Punjab & Haryana during hearing on 04.08.2011 also directed PSCST to submit its report by 10/11/2011. Accordingly, a Working Group comprising officers from PSCST, PPCB and other experts was constituted by the Govt. of Punjab vide orders dated 14.09.2011.

The Working Group visited 23 rice shellers located in various clusters of the State and interacted with consultants/machinery manufacturers and analyzed data from 488 rice shellers as provided by PPCB to study the problem in detail. The major source of dust emissions are unloading area, elevators, pre-cleaners and driers. The maximum dust load from these sections was reported to be 5300 mg/Nm³ against prescribed emission standard of 500 mg/Nm³.

The Working Group recommended that the separate cyclones be provided with (a) pre-cleaner and (b) unloading area & elevators followed by a common bag filter for the cleaning section and bag filters for the driers to achieve the prescribed emission standard of 500 mg / Nm³. Further, it was recommended that two demonstration units each, for LSU drier and Tray Drier be setup to establish the technology before its replication at a wider scale.

The total capital cost of the APCD for both, Cleaning & Drying Section, is estimated to be in the range of 7-10% of the total capital cost of plant & machinery. The final report prepared by the Working Group was submitted to Department of Science, Technology & Environment, Govt. of Punjab on 04.11.2011.

7. Environmental Management Framework (EMF) in 8 Industrial Training Institutes (ITIs) of Punjab

Punjab State Council for Science & Technology (PSCST) had submitted a project proposal amounting to Rs. 24.16 lacs to Department of Technical Education & Industrial Training (DoTE&IT), Punjab for implementation of EMF in 8 ITIs of Punjab. The major components of the project proposal are:

- Energy audit of various electrical equipments in each ITI to identify the energy conservation measures and their cost benefit analysis.
- Design of rain water harvesting system for each ITI and their cost estimates.
- To assist DoTE&IT for preparing the tender document for implementation of the energy conservation measures and rain water harvesting schemes.
- Supervision during implementation of schemes.
- Training to staff.

The project was sanctioned by DoTE&IT vide letter No. 340 dated 18.03.2011 and an amount of Rs. 20.00 lacs has been released by the Department.

8. Scientific Evaluation of Water Purification Systems in the State of Punjab (Phase-II : Selection, Installation & Assessment).

Department of Science & Technology, Government of India had entrusted the Council with a project on **“Scientific Evaluation of Water Purification Systems in the State of Punjab (Phase-II : Selection, Installation & Assessment)** and a grant of Rs. 64.02 lakhs was released during last year. This project envisages installation of site-specific Water Purification Systems (WPSs) in 20 selected schools in the State. These schools have been identified in consultation with Department of Education, Government of Punjab to represent various geographical parameters of the State.

The raw water quality of these schools has been got analyzed from NABL accredited laboratory. The capacities and technologies of the Water Purification Systems have been finalized for each school in consultation with Department of Science & Technology, Govt. of India based on raw water quality, strength of school, water requirements etc. The preparation of tender document for inviting the financial bids from suppliers/agencies, already working in the State successfully for the Deptt. Of Water Supply & Sanitation, is under preparation and is likely to be finalized by 31st May, 2012. The WPSs are likely to be installed in schools by October, 2012 followed by their performance evaluation for one year. The project is likely to be completed by 31st March, 2013.

9. Project entitled “Replication of Successful Model (RP) of Energy Efficient Cupola Furnace integrated with Air Pollution Control Device”

The above said project has been sanctioned by Department of Science & Technology, Government of India in November, 2011 at a total cost of Rs. 61.77 lacs with duration of the project as 2 years.

Council had developed a technology in the form of wet cap (simple scrubber) for control of air pollution being generated during melting of raw materials. This technology is able to achieve the emission norms (suspended particle matter and sulphur dioxide) prescribed by Punjab Pollution Control Board. Further, no power is required to operate the air pollution control device except one small recirculation pump with around 2 HP motor. The operation and maintenance cost was found to be around ` 30-50/- per ton. Under this project, successful model of energy efficient cupola furnace integrated with Air Pollution Control Device is to be replicated in ten cupola units in the State of Punjab.

10. Project entitled “Demonstration of Waste Heat Recovery System (Recuperator) in Steel Re-Rolling Mills in the State of Punjab”

The above said project has been sanctioned by Department of Science & Technology, Government of India in December, 2011 at a total cost of Rs. 15.09 lacs with duration of the project as 18 months. Under this project, three demonstration units of waste heat recovery system are to be set up in steel re-rolling mills in Punjab.

11. Project entitled “Promotion of environmental Friendly Plasma Nitriding/ Nitro-carburizing for wear and corrosion resistance of industrial components”

The above said project has been sanctioned by Department of Science & Technology, Government of India in February, 2012 for Central Tool Room (CTR), Ludhiana at a total cost of Rs. 102.64 lacs with duration of the project as 2 years.

PSCST would act as nodal coordinator for this project. The project aims to demonstrate plasma nitriding systems facility at Central Tool Room, Ludhiana for surface hardening of industrial components to improve the wear & tear resistance. This technology is environment friendly as compared to conventional surface hardening technologies such as liquid nitriding, gas nitriding and chrome plating. This technology would provide service to 500 industries in the State of Punjab. The demonstration unit is likely to be installed by December, 2012.

SOCIO-ECONOMIC DEVELOPMENT

1. Mohali Biotechnology Park

PSCST is coordinating the setting up of Mohali Biotechnology Park in Knowledge City, Mohali. It is a joint project of Department of Science & Technology (DSTE), Govt. of Punjab and Department of Biotechnology (DBT) Govt. of India being developed through public-private partnership for promotion of biotech industry in the State. The Section 25 (non-profit) Company (named Mohali Biotechnology Park) incorporated jointly by DSTE-GOP and DBT-GOI to oversee development of the Park has held its first Board meeting, opened its bank account and obtained Permanent and Tax Deduction & Collection Account numbers. Further, DSTE-GOP has transferred 74.55 acres land to the Company which would further lease out 69.55 acre to the selected developer as per the terms of Project Development Agreement to be signed in near future. Also as per the decision of Council of Ministers, it would work out modalities for providing 1 acre land to PBTI for quality testing & certification laboratories and 4 acres to DBT-GOI for Biotechnology Incubator. Presently, Mohali Biotechnology Park is being serviced by PSCST.

2. Initiation of Studies on Biofertilizers, Biopesticides and Medicinal & Aromatic Plants for Punjab by Tariff Commission, Govt. of India.

The Tariff Commission functioning under the aegis of Ministry of Commerce & Industry, Govt. of India is an expert body to make recommendations on tariff and tariff related issues for trade of goods & services in view of India's larger economic interests and international commitments. The Commission has on its roll experts in the field of science & technology, cost accounting, economics & statistics and undertakes studies on specifically identified issues. The Chairman, Tariff Commission had urged Govt. of Punjab to utilise the expertise of Tariff Commission for carrying out need based studies. Accordingly, the matter was pursued and the Tariff Commission has agreed to take up 3 studies in the areas relevant to the State. The Council developed the detailed concept notes including background, relevance and scope of work for these studies and would be providing technical support to Tariff Commission wherever required. These include one study each on 'Comparative performance of biofertilizers and biopesticides with their chemical counterparts in terms of usage, efficiency and cost effectiveness'. The scope includes data compilation on country status in terms of state-wise usage, identification of states having highest usage & reasons thereof, status & scope of their usage in Punjab, mode of availability to end-users, quality control mechanism in the country in general and state of Punjab in particular. The study would also include comparative assessment of biofertilizers & biopesticides with chemical counterparts in terms of cost economics & environmental cost and would indicate the gap areas & recommendations.

The scope of third study 'Economics of utilization of bioresources (medical & aromatic plants) in the State of Punjab' includes data compilation on medicinal & aromatic plants (MAPs) being cultivated, area under their cultivation, source of planting material, availability / adoption of appropriate agri-technologies, status of processing of MAPs, cost economics, market potential, quality control mechanism, research & development and other initiatives. The studies have been initiated by the Tariff Commission at their own cost and are scheduled for completion during 2012-13.

3. Project on 'Scale up, demonstration & promotion of technology for production of natural vinegar and non-alcoholic self carbonated beverages'

A project has been undertaken in collaboration with Department of Microbiology, Punjab Agricultural University for promoting production of natural vinegar and Non-Alcoholic Naturally Carbonated (NANC) beverages from local bioresources. The project has been funded by Department of Science & Technology, Govt. of India and the activities taken up under it include:

- **R&D Studies**

The primary fermentation using *Saccharomyces cerevisiae* strain 35 followed by secondary fermentation with *Acetobacter aceti* NRRL 746 under batch conditions (50L scale) yielded average vinegar (with acidity 4.5-4.8% w/v) recovery of 70-80% in 22-28 days. The efforts are being made to achieve reduction in fermentation time by optimizing agitation rate during primary fermentation (using indigenously developed 'Tullu pump' reactor), recycling of vinegar batches (replacement of 2/3rd volume of produced vinegar with ethanol) and immobilized cell culture i.e. semi-continuous culture using cells adsorbed on wood shavings.

Further, out of various yeast isolates studied for production of NANC beverage, strain 84 – *Clavispora lusitaniae* EF221824 has yielded the best results in terms of carbonation level (1.5 bar) and ethanol content (0.7% v/v) especially with 3 commonly available varieties of amla. The fermentation parameters for NANC beverage production from carrot and amla juice blend as well as the shelf life studies are in progress.

- **Demonstration units:**

As presently there are no manufacturing units for natural vinegar and NANC beverage production in Punjab, as per project mandate, PSCST is setting up two demonstration units, one at Talwara (within the processing facility set up by the Council in collaboration with Unati Cooperative Society) and the other at Science Technology Entrepreneurs' Park, Thapar University, Patiala. The natural vinegar production (at 50 L batch scale) from sugarcane has been initiated at Talwara. Further, experimental studies have also been taken up for production of vinegar from a by-product of the processing unit i.e. amla candy syrup and the results are very encouraging. The technical personnel of STEP, Patiala have been trained and they will be organizing workshops on both the technologies for prospective entrepreneurs in near future .

- **Awareness and Training Programmes:**

Five awareness programmes and two training workshops on said technologies were organized for members of primary agricultural cooperative societies, farmers and women SHGs of districts Moga, Fatehgarh Sahib, Jalandhar, Bathinda and Ludhiana.



Hands-on training on natural vinegar in laboratory in progress

4. Project titled 'Field Demonstration of Cultivation & Processing of selected Aromatic Crops in Dhar Block of District Gurdaspur, Punjab'.

Dhar block of district Gurdaspur falling in Kandi area of Punjab is primarily rainfed, has small land holdings, undulating topography and problems of soil erosion, lack of soil moisture, low fertility, frequent attack of stray animals on cultivated land because of natural pastures having been infested with Lantana weed. Hence, the returns from agriculture are meagre. The per capital income of Gurdaspur is, in fact, the lowest of all the districts of the State. In view of this, farmers of Dhar block had urged Ministry of Science & Technology, Govt. of India to suggest S&T interventions for socio-economic development of the area. Thus, Department of Biotechnology, Govt. of India planned to initiate an end-to-end demonstration project in farmers' field to demonstrate the feasibility of cultivation of selected aromatic crops in this block.

As PSCST had the experience of successfully implementing DBT supported project for promoting cultivation & processing of medicinal & aromatic plants in Talwara block of Kandi area, DBT invited Council to take up the said project in collaboration with Kelkar's Scientific Research Centre (KSRC), Mumbai. KSRC has standardized protocols for cultivation and post-harvest processing of various aromatic crops and have demonstrated the same in various parts of the country. DBT-GOI provided project formulation budget and has also sanctioned the project at a total cost of Rs.143.83 lacs (budget allocation to PSCST : Rs. 85.61 lacs) for 4 years duration. The project involves standardization of agro technologies under local conditions for five aromatic crops viz. Lemon grass (*Cymbopogon flexuosus*), Citronella (*Cymbopogon winterianus*), Palmarosa (*Cymbopogon martini*), Patchouli (*Pogostemon cablin*) and Geranium (*Pelargonium graveolens*); demonstration on 50 acres at farmers' fields, capacity building of farmers, setting up two distillation units for value addition through extraction of essential oil and arranging marketing tie-ups for its buy-back through Unati and Keva Biotech, the industrial arm of Kelkar group.

5. Production and Promotion of Neem based Biopesticide as Environment Friendly Biodegradable Alternative to Chemical Pesticides

Under the Neem Project supported by Ministry of Chemicals & Fertilizers, Govt. of India for promotion of neem biopesticide, bioefficacy studies have been carried out in collaboration with PAU for

evaluating the effect of Neem Kernel Aqueous Extract (NKAE) on pests of key crops of the state viz. wheat, mustard, cauliflower, pea, cotton, paddy, okra, cabbage / cauliflower & chilli. In view of the promising results against wheat and mustard aphid (*Rhopalosiphum maidis*, *Lipaphis erysimi*), one season field trial data has been generated as per protocol of Central Insecticide Board to facilitate registration of NKAE for use against these pests. The trials were conducted at farmers' fields at 9 locations covering 5 districts: Amritsar, Ludhiana, Fazalika, Bathinda & Mansa for wheat aphid and 7 locations covering 5 districts viz. Amritsar, Mansa, Fazalika, Ludhiana, and Patiala for mustard aphid using different concentrations of NKAE along with recommended controls. The pooled analysis of experiments have shown significant reduction in the mean number of both wheat and mustard aphids at 5% NKAE treatment after 3 and 7 days of spray, suggesting NKAE @ 5 % can be effectively used for management of aphid in wheat and mustard as component of IPM. Further the experiments revealed positive effects on crop yield and no adverse effect of NKAE on *Coccinella septumpunctata*, the natural predator indicating its safe nature.

6. Promotion and Pilot Production of Low Cost Sanitary Napkins using Cotton Knitwear Waste in Punjab

In an attempt to promote healthy menstrual practice among rural women, Department of Science & Technology, Govt. of India has got a prototype developed for production of low cost sanitary napkins from cotton knitwear waste through Lady Irwin College, Delhi. The quality attributes of napkins have been found to be at par with major brands of sanitary napkins available in Indian markets. DST-GOI has initiated an All India Coordinated Project to set up pilot scale manufacturing units for field testing of this prototype in different parts of the country and involved Punjab State Council for Science & Technology as nodal agency for Punjab and has sanctioned budget of Rs. 11,73,178/- to the Council for this project of 2 years duration. The Council is implementing the project in collaboration with Department of Clothing & Textiles, PAU. An orientation workshop for all the participating organizations was organized by DST-GOI wherein issues regarding sourcing of machinery, raw material and marketing strategies for effective outreach were thrashed. The pilot unit under the project is being set up at Ludhiana for operationalisation by a women SHG, the members of which have been provided hands-on training. Standard Operating Procedures (SOPs) to be followed by all the units for manufacturing & packaging of napkins under this All-India Coordinated project are being developed by Lady Irwin College.

7. Prevalence of genetic disorders, existing genetic literacy and its augmentation among SC population of Punjab – New project sanctioned by DST, GOI.

Genetic disorders (congenital malformations / birth defects) are the anomalies that result in early infant mortality / varying degrees of disability. About 8 million children worldwide are born every year with serious birth defects. In India too, more than half a million infants having congenital malformations are born every year. Based on a pilot genetic literacy project having been taken up earlier by PSCST, DST, GOI has sanctioned a new project to the Council to study the prevalence and spectrum of genetic disorders among SC population in the state, assess the existing genetic literacy level among them, sensitize them about the causes & possible scientific interventions for prevention of genetic disorders

and evaluate the impact thereof. As Amloh block of district Fatehgarh Sahib has high SC population (> 50%), the project is to be implemented in four villages of this block. The project has been sanctioned by DST, GOI under 'Special Component Plan' for SC population. The total project cost is Rs.10,35,320 and project duration is 2 years.

8. Promotion of Cultivation & Value Addition through Post Harvest Processing of Bioresources in Shivalik belt.

PSCST, in collaboration with, Unati Cooperative Marketing-cum-Processing Society Ltd., Talwara had taken up a DBT-GOI supported project for promoting cultivation & value addition through post harvest processing of bioresources (medicinal, aromatic & horticultural crops) in Shivalik belt. DBT, GOI supported the project for the period 2004-07. Subsequently, with vigorous efforts, the processing unit set up under the project was made self-sustainable and a 3 years' agreement was signed with Unati for its operationalization which has been renewed this year for a period of ten years.

During the last year, the local bioresources processed at the unit included 340 MT of *Emblica officinalis* (190 MT wild, 150 MT varietal); 85 MT *Momordica charantia* and 6 MT *Tinospora cordifolia* that generated about 2400 man days' work for local community especially women. The products generated are finding better in-roads into market each day. Further, lemongrass cultivation & processing is being promoted under the project. This year, 950 kg lemongrass oil could be extracted by the farmers for which marketing was provided through Unati.

INTELLECTUAL PROPERTY RIGHTS

Patent Information Centre (PIC), Punjab has been set up at Punjab State Council for Science & Technology with the primary objective of taking IPR issues to the grassroot R & D workers and innovators, especially in the academics and industry by raising awareness, capacity building and facilitating IPR filing in order to prepare the state for facing global trade challenges in the changing WTO regime. It has been providing patent search and filing facilities at the door step of innovators, researchers, R & D establishments and entrepreneurs, organizing patent awareness workshops & faculty training camps for ITIs & Polytechnics. The Centre has been instrumental in introducing IPRs as a compulsory subject in the curriculum of vocational training in Punjab, besides making efforts to introduce it in certain areas of higher education. The Centre has so far organized 40 one day patent awareness workshops & 57 faculty training camps for ITIs & Polytechnics. The Centre has also conducted more than 250 patent searches and filed 29 patents applications (out of which 7 have been granted). PIC has also set up 7 IPR cells and 16 IPR clubs in various university and engineering colleges of the state. Further, Intellectual Property Facilitation Centre (IPFC) for Micro, Small and Medium Enterprises of Punjab has been also set up in PIC, PSCST.

The following activities were taken up by PIC during 2011-2012:

1. Strengthening of 7 IPRs Cells in Universities
2. Patents Filed : 3
3. Patent Applications Forwarded to TIFAC for Filing : 6
4. Patent Searches Conducted: 36
5. Women Scientist Trained : 3
6. Number of Summer IPR trainings imparted to students: 5
7. Patent Awareness Workshops: 2
8. IPRs Awareness Camps for Faculty of ITIs: 6
9. Strengthening of Student IPR Clubs: 16
10. Celebration of World IP Day, 2011
11. Special Lectures on IPRs: 1
12. Exhibition on IPRs: 1

IPFC, Punjab undertook following activities during 2011-2012:

1. Workshops: 1
2. Patents filed: 4
3. Designs filed: 4

➤ **Strengthening of IPRs Cells:**

PIC-PSCST provided financial assistance amounting to Rs.20,000/- for strengthening and carrying out various activities of the following 7 IPR Cells:

- Guru Nanak Dev University, Amritsar
- Punjab Agricultural University, Ludhiana
- Punjabi University, Patiala
- Panjab University, Chandigarh
- Lovely Professional University, Phagwara
- Baba Farid University of Health Sciences, Faridkot

- Punjab Technical University, Jalandhar

These cells act as liaison office between researchers of the University and PIC and facilitate submission of IPR applications. The cells are also instrumental in creating IPR awareness at the university level.

- **Filing of Patents:**

Three patent applications forwarded by PIC, PSCST to TIFAC, New Delhi have been filed in Indian Patent Office, New Delhi as per the following details:

S. No.	Inventor	Applicant	Application No.	Title
1.	Sh. Gurmeet Singh	Govt. Senior Secondary School, Mehtan	541/DEL/2012	Device for verification of Pythagoras Theoram.
2.	Prof. V. R. Sinha & Sh. Damanjeet Singh	Panjab University, Chandigarh	3877/DEL/2012	RP-HPLC stability indicating assay method for the analysis of beta-1 specific adrenoceptor antagonist and use of this method for characterization of its degradation products an establishment of degradation pathways.
3.	Dr. Renu Chadha, Anupam Saini, Poonam Arora, P Venugopalan, Dharamvir Singh Jain	Punjab University	833/DEL/2012	Novel cocrystal of oxcarbazepine with succinic acid.

➤ **Patent applications forwarded to TIFAC for Filing**

PIC forwarded 6 patent applications to TIFAC for filing of patents after requisite patent search for the following institutions:

- Khalsa College , Patiala: 1
- Punjab University: 4
- Rayat-Bahra Institute of Engineering and Bio-Technology, Sahauran: 1

➤ **Patent Searches**

PIC conducted 36 patent searches as given below for the following institutions:

- Panjab University, Chandigarh: 5
- Punjabi University, Patiala :5
- Guru Nanak Dev University, Amritsar: 3
- GNDEC, Ludhiana:3
- Chitkara University, Rajpura : 2
- LPU, Phagwara :2
- IMTECH, Chandigarh : 1

- ASBASJSM College of Pharmacy, Bela: 1
- Mehr Chand Polytechnic College, Jalandhar : 1
- PEC, Chandigarh: 1
- Eklavya School, Jalandhar :1
- GSS School, Patiala:1
- BFUHS, Faridkot: 1
- DAVIET, Jalandhar :1
- Thapar Univ., Patiala:1
- Rayat & Bahra Institute of Eng. & Biotech., Sahauran: 1
- CC, PSCST: 3
- Individual: 3

Total : 36

With this the total number of searches conducted by PIC had increased to 252.

- **Women Scientist Training:**

TIFAC, DST, GOI, New Delhi had deputed three women scientist trainees in council's office in June, 2010 for one year for training on IPRs issues and patent searches under Women Scientist Scholarship Scheme. The women scientists have successfully completed their training (May, 2011). Three technology scan project reports have been prepared as under:-

- Patent analysis of eco-friendly technologies for Waste Management and analysis of patented technologies donated to "Eco-Patent commons"—prepared by Ms. Anu Bala: A detailed assessment of patenting activities in the field of eco-friendly technologies for Waste Management was undertaken using the on line 'Thomson Innovation' database. The study indicates that maximum patents are filed in the field of recycling of waste materials and waste water treatment. Toshiba Corporation, Japan is the key International market player having maximum patents on Waste Management. CSIR has filed about 60% of Indian patent applications related to waste management. Further, analysis of patents donated to "Eco Patents commons-a project of World Business Council for sustainable Development has been undertaken. 28 patents related to waste management have been donated by various companies like IBM, Sony, Xerox etc. for free use (without paying any royalty) to reduce waste generation and better waste management.
- "Patent Analysis of Herbal Compositions Used for the Treatment of Cancer, Diabetes and Asthma" – prepared by Ms. Deepika Chabba: The report deals with patent literature study on 'Herbal Compositions used for the treatment of Cancer, Diabetes and Asthma' in World and India. The study highlights that China is filing the maximum number of patent applications for herbal medicines whereas Council of Scientific and Industrial Research is top assignee having maximum patents in India. *Scutellaria baicalensis*, *Paeonia japonica*, *glycyrrhiza glabra*, *Panax ginseng* and *zingiber officinale* are the major herbs used for treatment of Cancer, Diabetes and Asthma.

- Patent Scenario of Biosensor Technology - prepared by Ms. Navneet Kaur: The project report provides an overview of the patenting activities related to different types of biosensors categorized according to transducer element. It reports that maximum patents have been filed for Electrochemical and Optical Biosensors. “I Sens Inc., Korea” is the leading market player for electrochemical biosensors whereas “Koninkl Philips Electronics NV” has maximum patents for Optical Biosensors. United States and European Nations are filing maximum patents on Biosensors.

➤ **Summer trainings on IPRs imparted to Post graduate Students**

Six weeks IPR training was provided to Five students from University Institute of Engineering & Technology, Panjab University, Chandigarh (2 students); Lovely professional University, Phagwara (2 students) and ILS Law College, Pune (1 student) in various issues related to IPRs. Students were trained in conducting patent searches & preparing preliminary technology scan reports. Two reports on “Biofertilizers” and “Bofuels” were collectively prepared by the trainees.

- **Patent Awareness Workshops**

Two Patent awareness workshops were organized by Patent Information Centre. The details are as under:

- **Patent Awareness Workshop at Abhipur**

A one day Patent Awareness Workshop was organized on 14th December, 2011 by PIC-PSCST at Indo Global College of Engineering, Abhipur. 120 participants from various academic & technical institutes of the area such as Indo Global College of Engineering, Abhipur and Rayat & Bahra Institute of Management, Kharar participated in the workshop.

The various objectives of the workshop were briefly explained by Scientist (PIC), PSCST. Dr. Balwinder Singh Sooch, Ass. Professor & IP Expert, Department of Biotechnology, Punjabi University, Patiala delivered the keynote address and spoke on ‘Introduction to IPRs and Some Case Studies’. In the technical sessions, lectures on ‘Patenting System in India’, ‘Patenting in Chemical Invention & Role of PFC, TIFAC’, ‘Design Registration in India’, and ‘Role and facilities provided by Patent Information Centre, PSCST’ were delivered followed by discussions and doubt removal session.



Patent Awareness Workshop at Indo Global College of Engineering (IGCE), Abhipur



A view of Participants at IGCE, Abhipur

▪ **Patent Awareness Workshop at Patiala**

One day Patent Awareness Workshop was organized at General Shivdev Singh Diwan Gurbachan Singh (GSSDGS) Khalsa College Patiala on 27th January, 2012. 100 participants from various academic & technical institutes of the area participated in the workshop, which was inaugurated by Dr. Gurmohan Singh Walia, Director, Directorate of Education SGPC, Sri Amritsar who stressed upon the importance of legal protection provided by IPR regime in today's knowledge based society. Prof. Davinder Singh, Nodal Officer (IPR Cell), Punjabi University, Patiala highlighted the efforts done by IPR Cell, Punjabi University, Patiala. The various objectives of the workshop were briefly explained by SSO & Incharge (PIC), PSCST. Sh. T.Chandrasekhar, Director, Patent Facilitation Centre, TIFAC, DST, New Delhi delivered the keynote address and spoke on 'Introduction to IPRs and Some Case Studies'. In the technical sessions, lectures on various IPR issues like 'Patenting system in India', 'Patenting in Biotechnology' etc were delivered by experts. With this the total number of Workshops organized by PIC increased to 40.



Shri T. Chandrasekhar, Director, PFC, TIFAC, DST, New Delhi delivering the keynote address on "Introduction to IPRs and Some Case studies"



Dr. Gurmohan Singh Walia, Director, Directorate of Education SGPC, Sri Amritsar delivering the inaugural Address

➤ **Faculty Training Camps on IPR for Faculty of ITIs**

PIC, PSCST in collaboration with Department of Technical Education, Govt. of Punjab organized six intellectual property rights training camps for the faculty of Govt. Industrial Training Institutes (ITIs) to make them aware about various aspects of Patents, Copyrights, Trademarks, Designs & Geographical Indications. The details are as under:

Sr. No.	Name of the Institution	Date	No. of Participants
1.	Govt. Industrial Training Institute (W), Nabha	27 th Sept, 2011 (Forenoon)	81
2.	Govt. Industrial Training Institute (W), Dhuri	27 th Sept, 2011 (Afternoon)	48
3.	Govt. Industrial Training Institute (W), Morinda	30 th Sept, 2011 (Forenoon)	46
4.	Govt. Industrial Training Institute (W), Kharar	30 th Sept, 2011 (Afternoon)	48
5.	Govt. Industrial Training Institute, Malerkotla	3 rd Oct, 2011 (Forenoon)	90
6.	Govt. Industrial Training Institute (W), Ahmedgarh	3 rd Oct, 2011 (Afternoon)	35

With this the total number of camps organized by PIC increased to 57.



Faculty Training Camps in progress at Nabha, Ahmedgarh, Morinda and Malerkotla

Student IPR Clubs

The Patent Information Centre set up/renewed 16 Student IPR clubs in following institution of Punjab:

1. Panjab University, Chandigarh
2. Panjabi University, Patiala
3. Lovely Professional University (LPU), Phagwara, Jalandhar
4. Thapar University, Patiala
5. Dr. B R Ambedkar National Institute of Technology, Jalandhar
6. Guru Nanak Dev Engineering College, Ludhiana
7. Chitkara Institute of Engineering & Technology, Rajpura
8. Punjab Agricultural University, Ludhiana
9. Guru Nanak Dev University, Amritsar
10. Rayat & Bahra Institute of Engineering & Bio-Technology, Sahauran
11. Rajiv Gandhi National Law University, Patiala
12. Baba Farid University of Health Sciences, Faridkot
13. Beant college of Engineering & Technology, Gurdaspur
14. JC DAV College, Dasuya
15. DAV Institute of Engineering & Technology, Jalandhar
16. Amar Shaheed Baba Ajit Singh Jujhar Singh Memorial College of Pharmacy, Bela

The main objective of setting up student IPRs clubs is to promote respect for IPRs and to inculcate a strong creative and innovative temper among students to enhance their skills and competence to manage IPRs. PIC, Punjab provided financial assistance of ` 5000/- to each host institution for carrying out various activities of the club.

➤ **World Intellectual Property Day Celebrations, 2011**

PIC, PSCST celebrated World IP Day, 2011 on/around 26th April, 2011 through 16 Student IPR clubs set up in universities (8), engineering institutes/colleges (6), and other academic institutions (2) of the region by organizing various events like special lectures, students talks, quiz (written & team), essay and declamation competitions. The theme for the World IP Day 2011 celebration was “**Designing the Future**”.

A summary of activities taken up by student IPR Clubs to celebrate the event are as under:

- **Amar Shaheed Baba Ajit Singh Jujhar Singh Memorial (ASBASJSM) College of Pharmacy, Bela:** An IPR essay writing competition on the topic “IPR legislation & Regulation-Mandate for Pharma Industry” was held in ASBASJSM college of Pharmacy, Bela on 29th April, 2011. 68 students of B. Pharma and M. Pharma participated in the event. Cash prizes were distributed to winners.
- **Guru Nanak Dev Engineering College (GNDEC), Ludhiana:** GNDEC Student IPR Club organized expert lectures on IPRs. An IPR quiz competition was also conducted on 29th April 2011. 130 students from different streams of engineering participated in the event.
- **Beant College of Engg. & Technology, Gurdaspur:** BCET, Gurdaspur organized a brain storming meeting on “Patent & Designs” on 16 May, 2011. A total of 150 students from Mechanical Engg., Computer Science & Engineering and Electronics & Communication Engineering participated. The discussions were followed by a written quiz contest for students.
- **Jagdish Chandra DAV College, Dasuya:** An Expert lecture on IPRs was organized at J. C. DAV College, Dasuya on 17th May 2011 for students of various streams of sciences like Biotech, Zoology etc. 53 students attended the lecture. Dr. R. P. S. Bedi, Dean, delivered a lecture on IPRs. An on the spot IPR quiz was also conducted.
- **Rayat & Bahra Institute of Engineering & Biotechnology, Sahauran:** Student IPR Club, R&B Institute of Engineering & Biotechnology organized an IPRs awareness seminar on 22nd February, 2012 for students of various engineering streams and faculty members. Scientist (PIC) delivered a lecture on “overview of IPRs and facilities provided by PIC, PSCST.” Students were apprised about different forms of IPRs and legislation in India.
- **Rajiv Gandhi National University of Law (RGNUL), Patiala:** Student IPR Club, RGNUL, Patiala organized IPR awareness workshop on 11 February, 2012 to sensitize students on various IP issues and drafting of Patent Applications.
- **Dr. BR Ambedkar National Institute of Technology, Jalandhar:** Student IPR Club, NIT, Jalandhar organized a seminar on IPRs on 2^{8th} February, 2012 to create awareness on various Intellectual Property Rights. Expert lecture was followed by student seminars and discussions on different forms of IPRs. An on-the-spot IPR quiz was also conducted.
- **DAV Institute of Engineering & Technology, Jalandhar:** Student IPR club, DAVIET, Jalandhar was inaugurated on 20th September 2011. 76 Student participants from various streams of engineering registered with the IPR club. Scientist, PIC, PSCST delivered the keynote address on ‘Introduction to IPRs and Some Case Studies’. An IPR quiz for the student participants was also organized.

 <p>Dr. G. D. Gupta, Director, ASBASJSM college of Pharmacy, Bela & Ms. Divya Kaushik, Scientist (PIC) giving prize to the winners of Essay writing Competition.</p>	 <p>A view of the participants during Expert Lecture at GNDEC, Ludhiana.</p>
 <p>Dr. Deepak, Asst. Prof. & Nodal Officer, Student IPR Club, J. C. DAV College, Dasuya addressing the participants.</p>	 <p>Mr. Dial Chand, Principal, BCET, Gurdaspur addressing the participants during World IP Day Celebration '11.</p>
 <p>Scientist (PIC) delivering lecture on IPRs at Rayat & Bahra Institute of Engineering & Biotechnology, Sahauran</p>	 <p>Nodal Officer, Student IPR Club, NIT, Jalandhar addressing the participants during IPR seminar at NIT, Jalandhar</p>

- Exhibition stall on IPRs**

PSCST participated in “Destination Punjab Fair” organized by Confederation of Indian Industry (CII) at Amritsar from 7th October to 10th October, 2011 and put up an exhibition stall. The major objective of the fair was to project “Brand Punjab” for creating linkages for SMEs and creating networking opportunities across key sectors with special focus on agricultural & food sector. Visitors from various MSMEs were informed about IPR filing facilitation services of IPFC for MSMEs of Punjab. More than 40 specific queries related to services provided by PSCST were responded. Literature on IPRs was also distributed to the visitors.



PIC staff responding to Queries of Visitors

- **Special Lectures:**

Executive Director, PSCST delivered key note address and spoke on “Overview of Intellectual Property Rights & Bioethics in Academia, Industry & Research” in a National Seminar organized by SUS College of Research & Technology, Tangori on 29th February, 2012.

- **Trainings:**

Scientist (PIC) attended a five days training programme on “Technology Diplomacy” at Jaipur organized by Consumer Unity & Trust Society, Jaipur from 14th November to 18th November 2011. The training programme was aimed to provide an overview of basic principles of Technology diplomacy, technology sourcing & assessment, acquisition, negotiations for technology transfer and Role of IPRs in Technology Transfer.

Activities carried out by the IPFC during the year 2011-2012:

- **Facilitations in IPRs filling:** The following IPR filings were facilitated by IPFC, Punjab from April, 2011 to March, 2012:

Filing /registration	Number	Name & Place
Patents	1	Sh. Ram Avtar Khemka, Ludhiana.
	1	Mr. Abhinav Bhardwaj, Chandigarh
	1	Sh. Kamal Sharma, Hoshiarpur
	1	Sh. Jeet Pal Mittal, Sangrur.
Design	1	Sh. Jagtar Singh Chand, Madho Agro Industry, Moga.
	3	Mr. Bali Ram, Dirba Mandi, Sangrur.

- **Preliminary Patent Searches conducted: 4**

- **IPR Sensitization Workshops for MSMEs at Moga**

An awareness / sensitization workshop on Intellectual Property Rights for MSMEs was organized on 19th May 2011 by IPFC for Micro, Small and Medium Enterprises at Moga in collaboration with District Industries Centre, Moga and Moga Agro Industries Association. 73 participants from Agricultural Implements Industry, Rice shellers, Plastic Industry, Construction Industry, officials from District Industries Department, Punjab, etc. participated in the workshop. Incharge (PIC) delivered a lecture on “Types of IPRs and Case studies specific to MSMEs” and informed the participants about

IPRs filing facilitation provided by IPFC. Mr. Vikas Asawat, IPR Expert & Patent Attorney spoke about the various IP filing procedures. Brochure of the centre and IPR literature were also distributed to the participants.



Sh. Satbir Singh, GM, DIC, Moga delivering the Inaugural address at Moga



SSO (Env.) & Incharge (PIC) answering MSME Specific IPR queries during the workshop Moga

Science Communication & Popularization

1. Celebration of National Science Day - 2012

In order to popularize science, focus attention on science and its developments and to internalize a scientific way of thinking amongst children, students and general public, the National Science Day is celebrated each year on or around 28th February. This Day is celebrated as a mark of respect to the great Indian scientist and noble laureate Dr. C.V. Raman who announced “Raman Effect” on 28th February. PSCST celebrates this day under the aegis of NCSTC, DST, Govt. of India and Govt. of Punjab as it is a joint project. PSCST organizes and supports scientific activities like science exhibitions, lectures, seminars, slide shows, debates, training workshops, and competitions etc. at school, college, and university levels under the program every year in the State since 1990.

NCSTC, DST, GOI sanctioned Rs.4.87 lacs for celebration of NSD-2012 on the focal theme: ‘**Cleaner Energy Options and Nuclear Safety**’. 103 organizations of the State, involving around 1,00,000 students, teachers and general public carried out activities such as science exhibitions, lectures, slide shows, seminars, debates, training workshops, competitions etc. as detailed in **Annexure- IV**.

To discover scientific talent and encourage students to think on broader aspects of science and technology, the Council also organizes a **State Level Science Essay Writing Competition** for the children of Punjab every year. This activity is a part of various activities taken up under National Science Day Celebrations. Students in the age group of 12-16 years are eligible to participate.

The competition at district level was organized in English & Punjabi on the following topics:

1. History of Science and Technology
2. Understanding the importance of Science and Technology for society
3. Technology Ethics
4. Carbon Sequestration Technologies

The State Level Science Essay Writing Competition 2011-2012 was organized on 6th February, 2012. The 1st, 2nd and 3rd position winners at the district level organized through District Science Supervisors, participated at State Level Competition. Selected entries from district level (in English and Punjabi) were adjudged by eminent academicians. Students were invited at State Level for interviews. Dr. Jagtar Singh Dhiman, PAU, Ludhiana; Dr. Nirmal Singh Jaura, PAU, Ludhiana; Prof. H.S. Bhatti, Punjabi University, Patiala and Prof. Parminder Singh, GNDU, Amritsar interviewed the students.

The best four entries in both languages were chosen for prizes. Cheques worth Rs. 1500/-; 1000/-; 500/- and 200/- and certificates were given to 1st, 2nd, 3rd and consolation prize winners respectively. The list of prize winners at the State Level Competition is at **Annexure – V**.

2. National Children’s Science Congress- 2011

The National Children’s Science Congress (NCSC) is a nationwide activity being organized every year since 1993. The project was formulated by NCSTC-Network, which is a registered Society of Govt. and Non-Govt. organizations. NCSTC, DST, Govt. of India and DST, Govt. of Punjab supports the CSC in Punjab for which PSCST is the nodal agency.

Children's Science Congress is organized at District, State and National levels. The broad aims of NCSC are –

- To provide an opportunity for children to pursue their natural curiosity and quench their thirst for creativity;
- To provide an opportunity for children to relate the learning of science to the environment around them;
- To encourage children throughout the country to know their immediate social and physical environment and its problems, and, to attempt to find feasible solutions to them; and
- To stimulate scientific temper among children through the use of internalization of the 'method of science' i.e. observation, collection of data, experimentation, analysis, reaching conclusions, documenting and presenting reports.

The theme for the Congress during the year 2011 was- "Land Resources: Use for Prosperity, Save for Posterity". An amount of Rs. 8,80,000/- was sanctioned by NCSTC,DST,GOI for CSC-2011.

Children's Science Congress-2011 was initiated by PSCST by the formation of state organizing committee and district organizing committees in all the districts of Punjab. A two day orientation training workshop for District Science Supervisors and Teachers was organized on 26th and 27th July, 2011. The Master Resource persons for this program were: Dr. P.L. Garg, Dr. Avtar Singh Dhindsa, Dr. Balwinder Singh Sookh, Ms. Shruti Shukla, Sh. Sarjit Talwar, Mrs. Sunita Rani and Dr. Rajeev Sharma. The basic aim of the orientation workshop was to share the guidelines of properly organizing the event at the District level for qualitative and quantitative improvement of projects. Presentations on the focal theme, evaluation criteria and preparation of project reports were given by the resource persons. Many doubts of the participants were cleared and copies of activity guide in English and Punjabi along with the CDs of presentations, and relevant resource material was distributed amongst the participants. The following measures for improvement of projects, especially at the district level were suggested:

- Compulsory participation of District Coordinators in this programme.
- Formation of District Organizing Committees in all districts. Each committee may consist of district coordinator, district academic coordinator, evaluators and resource persons.
- Regular interaction and orientation of DOCs by the state academic coordinator
- Special attention to be paid to the low performing districts.
- Only the relevant & potential projects should reach at the state level.
- To develop a regular Monitoring System at district level
- State coordinators to identify 5-10 master resource persons from the state.
- Provisional selection of projects at the state level with scope for improvement before being sent to the national level.

District level Children's Science Congress was organized by PSCST with the help of District Science Supervisors in all districts during September – November 2011. The district academic coordinators and evaluators were specially oriented to improve the quality and quantity of CSC projects at district level.

The state level CSC-11 was organized in association with Khalsa College, Amritsar from 29th November 2011 to 1st Dec. 2011 at Khalsa College, Amritsar. On first two days, project presentations were made by the children. Activity corners were also organized for the participants on this occasion, which included: *Science behind Miracles* (RP- Sh. Jatinder Bhatnagar from Gwalior); *Low Cost Teaching Aids* (RP- Sh. Naresh Kumar Kohli); *Low Cost Physics Teaching Aids* (RP- Mrs. Harinder Kaur); *Mathematics and Geometry Module* (RP- Sh. Gurmit Singh), *Social Insects* (RP- Sh. Parminder Tangri) and *Micro-biology* (RP- Ms. Preeti Thakur). The prize distribution function was organized on 1st Dec. 2011.



The Chief Guest on the occasion was Dr.R.S.Khandpur, DG, Pushpa Gujral Science City, Kapurthala, and the Guest-of Honour was Dr. Daljeet Singh, Principal, Khalsa College, Amritsar. Certificates and prizes to the winners were distributed. In all, 99 projects were presented at the state level which included 51 from the senior category and 48 from junior category representing all the 20 districts of the state. A total of 106 teachers and 495 students participated

at the state level CSC 11. 16 projects were selected from the state for participation at the National level CSC-11 (**Annexure- VI**).

The National Level Children Science Congress was held at Jaipur National University, Jaipur 27th to 31st Dec.'2011 in which child scientist from the selected sixteen teams from Punjab presented their projects. One project from the State was selected among the best twenty five projects at the National Level winning grades of A+ while all other projects secured grades between of A and B+

3. Celebration of National Technology Day- 2011

PSCST has been celebrating National Technology Day (NTD) with catalytic support from NCSTC, DST, GOI and Govt. of Punjab since the year 2000. This day is celebrated on 11th May every year all over India as it was on this day in 1998 that India had exploded its experimental nuclear device, launched the missile "Trishul" and tested the first flight of the indigenous two seater air craft "Hans-3", marking a new era in indigenous technological advancement. PSCST celebrates NTD by involving professional and technical institutes like Engineering Colleges, Research Organizations, ITIs, schools and voluntary organizations of the State in a series of activities to highlight the emerging technologies in different sectors. Activities such as slide shows, model making, exhibitions, fairs, seminars and field trips to industrial plants etc. are taken up by the participating organizations.

For NTD 2011, GOP sanctioned Rs.4.00 lacs. 29 organizations (technical institutes, NGOs and Government organizations) were provided funds for taking up various activities like seminars/ lectures on technologies, quiz competitions, visits to PGSC, industries & technical institutes and hands-on-activities etc., as detailed in **Annexure- VII**.

4. Incentives to young scientists of Punjab

PSCST has been implementing the scheme for providing incentives to young scientists of Punjab in the form of *financial assistance for travel* to attend national/international seminars/symposia/training programmes and *students project programme* for partial assistance to the final year M.Sc/M.Phil/M.Tech/MBBS/M.Pharma students to frame projects relevant to the location specific problems of the state since 1997-98.

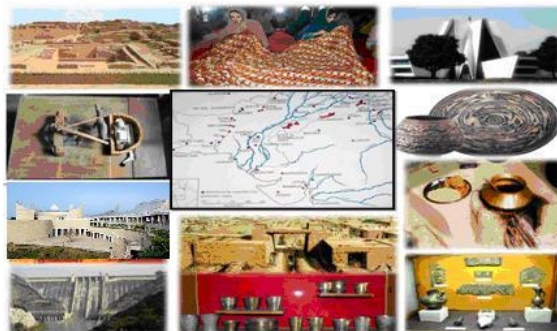
In the year 2011-2012 a total of 46 applications were received under the student project program out of which 7 applications were approved by the advisory committee for a grant of Rs. 10,000 each. This committee was chaired by Dr. R.S. Khandpur (Director General, PGSC), other members being Professor K.K. Bhasin (Dept. of Chemistry, PU), Dr. Jagdeep Singh (Subject expert -Biology and Coordinator, IISER), Dr. Sandeep Sehajpal (Asst. Professor, Department of Physics, PU) and Dr. Neelam Gulati Sharma (Addl. Director –POS, PSCST). Under the Travel Grant Scheme, a total of 30 applications were received during 2011-12 out of which thirteen applications were approved for a grant of Rs.10, 000 each by the committee. The list of successful applicants under the two schemes is placed at **Annexure - VIII**.

5. History of Science & Technology in Punjab

PSCST is compiling the *History of Science & Technology in Punjab* with support from SSTP,DST, Govt. of India under a two year research project. The document will attempt to present a concise account of development of science in the region of Punjab, which witnessed the emergence of the one of the earliest glorious civilization of Indus Valley in the Bronze Age (about 3000 BCE).

For the purpose of compilation of the History of S&T in Punjab, a detailed survey of literature from various libraries & museums, collection of relevant material from books, monographs, research papers, district gazettes and other primary and secondary sources has been conducted. Visit to historical sites in and around Punjab, archaeological museums, galleries, cultural museums and places of ancient technology have been undertaken.

A draft document has already been prepared to depict developments in S&T in various sectors such as agriculture, water management & irrigation, environment, industry, architecture, medicine, education, traditional technologies, art, scriptures, spirituality & religion, eminent scientists, institutes etc. (given separately in Part A). Special emphasis has been laid on the development of agriculture as Punjab is a predominantly agricultural state. The traditional technologies developed in the region have been summarized. The Part B of the document presents the history of S&T during different eras beginning from dawn of modern civilization (Indus valley civilization), Aryan civilization, Rule of various kingdoms (Budhist & Greek period, Mauryan dynasty, Gupta period), Persian and Mughal rules, Sikh kingdom, British era and post-independence period.. The concluding chapter of the document depicts the current S&T scenario, problems arising out



of unplanned development and future scientific and R&D requirements and needs and vision for sustainable growth.

The documentation of history of science in Punjab is a serious attempt by PSCST to create interest in the public understanding of science and understanding the cultural patterns as well as development and advancement of technology step by step in the region.

Short Term Training Courses/ Workshops

1. District Level Workshops on Micro-organisms

PSCST organized two three day training workshops on “**Microorganisms: Let us Observe and Learn**” in collaboration with Department of Biotechnology and BRSI Unit of Punjabi University, Patiala at Punjabi University, Patiala from 12th to 14th September, 2011 and Department of Botany, Panjab University, Chandigarh from 14th to 16th November, 2011. These workshops were catalyzed and supported by NCSTC, DST, GOI, New Delhi. These workshops were attended by 63 school teachers of biology stream from different schools of Patiala and Chandigarh.

The objective of these 3-day workshops was to provide exposure to school teachers about various aspects and techniques of Microbiology through expert lectures, practical investigations and hands-on-training on different microbial techniques. The 3-day workshops included technical sessions including practical investigations and Hands-on-trainings.

1st Workshop at Punjabi University, Patiala

The workshop was inaugurated at Senate Hall of Punjabi University, Patiala on 12th September, 2011 by Dr. Jaspal Singh, Vice-Chancellor of the University. The workshop was attended by 34 school teachers from different schools of District Patiala. The 3-day workshop was designed to provide exposure to school teachers about various aspects and techniques of Microbiology. The 3-day workshop included seven technical sessions including practical investigations and Hands-on-training. The technical sessions focused on: Introduction to Microbial World, Basic Techniques in Microbiology, Microbial Biosensors, Microorganisms and Human Body, Industrial Use of Microbes, Microbiology in Dairy, Fruits & vegetables processing, Bio-fertilizers and Hands on Training on Isolation and culturing of Micro-organisms, Preparation of culture media and slides of different types of algae. The Resource Persons for the workshop were: Prof. Aruna Bhatia, Dean Life Sciences, Dr. R.S. Singh, Convener and Head Department of Biotechnology, Prof. Neelam Verma, Department of Biotechnology, Prof. Praveen P. Balgir, Department of Biotechnology, Dr. Balwinder Singh Sooch, Department of Biotechnology, Dr. Minni Singh, Dr. Gaganpreet Kaur and Dr. Ranjita Bhari, Department of Biotechnology, J.I.S Khattar, Department of Botany and Dr. D.P. Singh, Department of Botany. The workshop was coordinated by Dr. Balwinder Singh Sooch.



2nd Workshop at Panjab University, Chandigarh

The workshop at Chandigarh was conducted in the Department of Botany, PU, Chandigarh from 14th Nov, 2011. The three day workshop included information about microbiology and micro-organisms, use of microbiology in bioremediation, clearing of pollutants, vaccine production and for the sustainability of



agriculture; benefits of microbes in cleaning our environment from pollutants/carcinogens, use of bio-fuels, in food bio-processing, pro-biotics, vitamins, hormones, enzyme, etc. Technical sessions were conducted on: 'Microbial World: Fungi an Overview' by Prof. I.B. Prashar; 'Microbial World' by Prof. Prince Sharma; 'Microbial World' by Prof. Parveen Rishi and "Phycology: An Overview" by Prof. A.S. Ahluwalia. The participants were given hands-on-training on

culturing techniques and different types of sterilisation: steam, dry and through membrane filtration. They were taken to Central Instrumentation Scientific Lab, PU, Chandigarh where Transmission (TEM) and Scanning (SEM) Electron Microscope along with Ultramicrotomy apparatus used for cutting the sample and mass spectrometer were illustrated to the participants. The mounting of the sample to be used in SEM and TEM was also demonstrated.

Feed Back

To analyze the effectiveness of the workshops, a feedback Performa was filled by all the participants. Nearly all the participants (98%) were satisfied with the content, resource persons and design of the workshop. 85% participants felt satisfied with the exposure provided to them about various equipments, techniques, investigations used in Microbiology. 76% participants suggested conducting similar type of workshops in future on the topics like biotechnology, genetics, Misconception and Myths etc. 85% participants expressed a deep concern about the data in the NCERT books which was outdated and needs to be updated.

2. Workshop on Science Communication through Digital Media

PSCST was sanctioned three workshops on "Science Communication through Digital Media" by NCSTC, DST, GOI. Two of these workshops were organized at Punjabi University, Patiala and PAU, Ludhiana in 2010-11, which have already been reported in the previous Annual Report. The third and last workshop under the series was organized in association with the School of Communication Studies, Panjab University from August 22 to 25, 2011. Technical sessions on the first two days included talks on: '*Importance of Science in Society*' (by Dr. Neelam Gulati Sharma, AD, PSCST), '*Effective Science Writing*' (by Mr. Hasan Jawaid Khan, editor of the monthly magazine, 'Science Reporter'), '*The Roads and Bridges of Science*' (by Prof. Sanjay Wadwalkar, School of Communication Studies, PU), '*Making waves through radio waves*' (by Sarvapriya Nirmohi, AIR), '*Communicating health to the common man*' (by Amar Chandel, Associate Editor, The Tribune), and '*Activity – Radio Programme*' (by Mr. Jayanth N.Pethkar, School of Communication Studies, PU). The third day of the workshop was based on the broad theme of '*Communication on the Digital Highway.*' Mr. Roopinder Singh, Head, Internet Edition, The Tribune,

talked on '*Developing Web Content on Science*'. The second technical session comprised '*Science and Communication: Lasting linkages*' which was chaired by Dr. Archana R.Singh. Mr. Jayanth N.Pethkar, SCS, PU emphasised on the theme '*Interactive Script Writing and use of video*' by explaining the basics of script writing citing various examples. He also made participants write a TV script. Sh. Jasraj Bhatti, creative head, Mad Arts explained how animation can be used to tell the science story and make it interesting. In his activity session he showed his award winning film 'nanhi chidiya' based on the social evil 'Female Foeticide' that prevails in the society due to lack of science communication. Mr Daljit Ami, film maker and documentarian explained the theme '*Cinematic Depiction of Science*' by showing his first documentary. K K Rattu, director, Doordarshan Kendra, Chandigarh highlighted the theme *Telling the science story on TV*. The training programme concluded with a valedictory function on August 25, 2011.

3. **2nd Advisory Committee Meeting on “Vigyan Evam Vikas Sanchar Kendras (VVSK)”**

In order to facilitate the optimum utilization of resources developed under science communication efforts and establish innovative practices of science resource sharing between the society and other scientific knowledge generation agencies in the country an on-going pilot programme has been operated by NCSTC,DST,Gol. It aims to establish a chain of dissemination nodal points (VVSK) through out the country that can be operated with the help of agencies like village panchayats, welfare wings of govt./autonomous bodies/armed-paramilitary forces, and science based voluntary organizations. PSCST has also established the first Vigyan Evam Vikas Sanchar Kendra at MAS Senior Secondary School, Jiwanwala (Faridkot) in the heart of rural Punjab, which will cater to a cluster of villages for promoting scientific literacy in the rural areas.

PSCST hosted the 2nd Advisory Committee Meeting on establishment of Vigyan Evam Vikas Sanchar Kendras at Chandigarh on 6th and 7th July 2011. The meeting was attended by about 30 participants from all over the Country. The inaugural remarks were made by Dr. B.P. Singh, Head of NCSTC,DST,GOI and welcome address was delivered by Prof. Pranav Desai, Centre for Studies in Science Policy, - Jawaharlal Nehru University, N. Delhi, who is also the Chairman of the advisory Committee. Dr. Pamposh Kumar, Scientist NCSTC and Member Secretary of VVSK made a detailed presentation on 'Communities of Learning-Role of VVSKs'. The next sessions included Panel discussions by the experts such as Prof. P. Desai, Er. Anuj Sinha, Sh. G.S. Rautela, DG-NCSTC and Maj. Gen. SK Sanan, DG-Inst. of Engineers, Kolkata. During the next sessions, new proposals were presented before the advisory committee by the PIs. The progress of already established VVSKs was also reviewed by the committee. The concluding remarks on day 2 were given by Dr. B.P. Singh. Other experts who attended the meeting included Prof. Pramod K. Verma, DG, M P Council of Science & Technology and Dr AP Mishra, Scientist, NCSTC. On day 3, a trip to the VVSK of Punjab at MAS Sen. Sec. School, Jiwanwala, Distt. Faridkot was undertaken by Dr. Pamposh Kumar and Dr. AP Mishra along with Dr. K.S. Bath, PSO-PSCST, who also coordinated the program. They reviewed the progress of work taken up by VVSK and fully appreciated the efforts of the school and centre in taking up science communication activities for the benefit of rural masses.

4. **Master Resource Person's Training Programme for Northern Zone on "Transit of Venus-2012"**



PSCST organized a "Master Resource Person's Training Program for Northern Zone" on "Transit of Venus-2012" in collaboration with Department of Physics, Panjab University, Chandigarh on 9th and 10th April, 2012. This workshop was catalyzed and supported by NCSTC and Vigyan Prasar, DST, GOI. The training program was attended by 44 participants from Punjab (10), Haryana (5), Uttrakhand (5), Uttar Pradesh (12), New Delhi (4), Jammu & Kashmir (4) and Chandigarh (4).

This training program was designed to train the Master Resource Persons' on the occurrence of the rare celestial event on 'Transit of Venus' on June 6, 2012.

Six technical sessions were conducted during the programme:

- First Technical Session: "The Solar System" by Prof. Sandeep Sehajpal
- Second Technical Session: "Solar Parallax and distance of the Earth from the Sun" by Sh. Biman Basu
- Third Technical Session: "Transits of Venus: The Expeditions" by Dr. V.B.Kamble
- Fourth Technical Session: Night Sky Watching- through naked eye/telescope by Abhimanyu & Paramveer, Research Scholars
- Fifth Technical Session: Observing the transit and use of telescope by Dr. V.B Kamble
- Sixth Technical Session: Demonstration of the hands-on-activity kit for "Venus and its Transit" by Mrs. Ujjwala Tirkey, and Dr. V.B. Kamble.

Information regarding the availability of resource material on the website of Vigyan Prasar, in the form of posters, CDs and the books that could be used by the master resource persons for training others, was given to the participants by Sh. B.K. Tyagi.

OUTREACH PROGRAMMES

- **PSCST as Regional Centre for Expertise on Education for Sustainable Development**

Punjab State Council for Science & Technology had taken the lead in setting up the Regional Centre for Expertise (RCE) network on Education for Sustainable Development (ESD) for the region. Council had submitted proposal for the same to Global RCE Service Centre at United Nations University-Institute of Advanced Studies (UNU-IAS), Japan. In this regard, a stakeholders and partner agencies workshop was organized in the Council wherein RCE related issues and programmes were discussed in detail. UNU-IAS has accepted the proposal of PSCST after extensive review by the Ubuntu Committee of Peers set up by UNESCO and has acknowledged the Council as RCE Chandigarh. Council has received certificate for the same. Further, the RCE Chandigarh is the 100th member of the Global RCE network.

An RCE is a network of existing formal, non-formal and informal education organisations, mobilized to deliver ESD to local and regional communities. A worldwide network of RCEs constitutes the Global Learning Space for Sustainable Development. RCEs aspire to achieve the goals of the UN Decade of Education for Sustainable Development (DESD, 2005–14), by translating its global objectives into the context of the local communities in which they operate. This group meets regularly to discuss issues, and looks for common grounds and issues to focus and work upon. The major thrusts of RCE are:

- Improve access to quality basic education
- Reorient existing education programmes to address sustainable development
- Develop public understanding and awareness about ESD
- Provide training programmes for all sectors of private and civil society.

- **Activities of Punjab ENVIS Centre**

The Environmental Management Capacity Building-Environmental Information System (EMCB-ENVIS) Node on 'State Environment Issues' at Punjab State Council for Science & Technology, Chandigarh was established in December, 2002 under the World Bank Assisted Project ([EMCBTAP-ENVIS](#)) of the Ministry of Environment and Forests, Govt. of India to identify and highlight the state environment and related issues. The Node was upgraded to ENVIS Centre in January, 2005. Since then, the Punjab ENVIS Centre is working on the subject 'Status of Environment & Related Issues'.

The Centre is collecting, collating and disseminating information on 'Status of Environment and Related Issues' through publications such as books, booklets, Newsletters, posters for public awareness. The Centre has a bilingual (English & Punjabi) website "www.punenvis.nic.in". A database covering all major aspects of environmental issues of Punjab has been created and uploaded on website. A quarterly newsletter is also published by the Centre for wide dissemination. The website has a total of 2,22,886 home page hits, 70,846 visitors and 6,971 return visitors. The Centre also compiles environment related news items and events. It establishes linkages with information users and providers from among government, academia, general public, NGOs etc. The Centre also has a dynamic query response service.

The Centre carried out the following activities during the year 2011-2012:

- I. Publications:** 2 books, 4 Newsletters and 3 posters.

- II. **Website Updation:** Regular updation of the website as per following details:
 - **Database (Static):** 136 tables (New tables & Updated tables) uploaded on the website on Agriculture, Air, Climate, Demography, Water & Solid Waste.
 - **New links or text information added:** In Agriculture and News link
 - **News Items and Events:** 720 news items & regular updation of events.
 - **Publications Uploaded:** 3 Newsletters & one Book.
 - **Website Statistics:.** The website was visited by 4,215 visitors and total return visitors were 297. Total number of pages viewed were were 7,702 (April 2010 to March 2011). Web pages frequently visited by the visitors include database, agriculture, solid waste, news and maps.
- III. **Query /Referral Service provided:** 25
- IV. **Designing & Development of New Template of Website by NIC:** Regular inputs and follow with NIC and ENVIS Sectt.. for the designing & development of new template of ENVIS Center's website through meetings via email/telephonically/personal visit.
- V. **ISBEID Database:** Collected, collated & uploaded following information on the ISBEID software with State wise information from 1999 to 2009 (ten years information) and District wise information from 2006-2009 (four years information).
- VI. **Data Collection (through public contact):** One Round Table Conference, one Brainstorming workshop and via field visits/telephonic/email.
- VII. **Inspection by Joint Director, MoEF:** Ms. Madhumita, Joint Director, MoEF visited the Centre for inspection on 18th October, 2011 and appreciated the activities of the Centre.
- VIII. **Coordination of NASA's Cloudsat Education Network Programme (CEN)**

Details

I. **Publications:**

- **Newsletters:** The Centre brought out Newsletters on Bio-fertilizers (Vol. 8, No. 4), Clean Development Mechanism (Vol. 9, No. 1), Community Reserves: Punjab (Vol. 9, No. 2) and Intensive Agriculture (Vol.9, No. 3 & 4)
- **Poster:** The Centre developed a Poster on ' Let's save our native cow breeds':
- The Centre collaborated & provided information and inputs in the development of Module on 'Technology Awareness for Teachers' by Punjab School Education Board.

II. **Website Updation:** Regular updation of the website as per following details:

- **New links or information:**
 - Addition of text in 'Eco-Friendly Technologies' link regarding Agricultural eco-friendly technologies.
 - New sub-categories created under News link on 'Demography',,, 'Disaster' & 'Solid Waste'.
- **News Items and Events:** Compilation of News items from various Newspapers within the State and regular uploading on the website:

- 720 news items uploaded (April 2011 to March 2012):
 - 636 News Items (April 2011 to Dec. 2011)
 - 84 News Items (Jan. 2012 to March 2012)
 - Updation of Events (Quaterly)
- **Publications Uploaded :**
 - Newsletters on:
 - Biofertilizers
 - Clean Development Mechanism.
 - Community Reserves: Punjab
 - Guidebook on 'Energy Education for Students' in Punjabi.
- **Website Statistics:** WebStat Software (web tracking s/w) was renewed for Centre's website up to Jan. 2013 and the information (on the visitors profile, website traffic and pages navigated) provided by the software was compiled. The details of the website statistics are as under:

Traffic Pattern	May 2005 – till date	Apr.2011 - Mar. 2012
Total Pages viewed	2,22,886	7,702
Total Visitors	70,846	4,215
Total Return Visitors	6,971	297
Frequently Visited Pages	Database, Air, Agriculture, News	Database(Water & Air), Agriculture, Solid Waste, News & Maps

- **Query Response/ Referral Service:** Provided 25 Query Response/ Referral Service . Region wise and sector wise details are as under:

Region Wise	Sector Wise
Punjab : 60 %	NGO's : 16%
Chandigarh : 16%	Univ./Colleges/ Schools : 36%
Other States : 16%	Government Organizations : 28%
International : 8%	R & D Bodies : 4%
	Others : 16%

- **Designing & Development of New Template of Website:** As per Ministry, NIC is designing & developing a common template for all the ENVIS Centers in the country. The Centre provided assistance by regular inputs and follow to NIC and ENVIS Sectt. in

the designing & development of new template of ENVIS Center's website. To discuss the new design template of website and to provide inputs the Center's staff held a meeting with NIC & ENVIS Sectt. officials on 4th Jan., 2011 at New Delhi.

- **ISBEID Database:** Collected, collated & uploaded following information on the ISBEID software:
 - **State wise information from 1999 to 2009** (ten years information)
 - **District wise information from 2006-2009** (four years information).

The month-wise brief report on the number of entries made on the seventeen modules is as under:

Brief Report		
Month	No. of Modules Used	No. of Entries Made
April-11	3	2172
May-11	2	1207
June-11	7	1027
July-11	3	574
August-11	4	1432
September-11	4	269
October-11	1	180
November-11	2	2256
December-11	1	2492
January-12	2	292
February-12	1	340
March-12	1	216
Total	31	12457

- **Brain Storming Workshop on identification of Biodiversity Rich Areas in Punjab:** The Centre organized a 'Brain Storming Workshop on 'identification of Biodiversity Rich Areas in Punjab' with PSCST and with technical support of UNESCO on March 21, 2012 at Chandigarh. The main objective was to identify Biological rich sites in the State. 50 participants from various national & international organizations and line departments of Govt. of Punjab, Universities, Colleges, Schools and NGOs actively took part in the brainstorming,. Various eminent experts and other participations were: Dr. Ram Boojh, Programme Specialist, Ecological Sciences, UNESCO, Dr. V.B. Mathur, Dean, Wildlife Institute of India; Dr. D.K. Sadana, Principal Scientist, NBAGR, Karnal; Prof. M.S. Johal, fisheries expert; Dr. A.K. Jain, Sr. Animal Breeder, GADVASU , and Ms. Gitanjali, Project Officer WWF-India. During the deliberations, various biodiversity rich areas in the state were identified and recommended for conservation which may further be proposed to be declared as Biodiversity Heritage Sites or Biosphere Reserves.



Dr. Neelima Jerath , Executive Director during the Inaugral Session in the Workshop



Participants during the deliberations in the Workshop

- The Centre collected & collated the primary & secondary information on “Status of Solid Waste Management in Punjab” from formal & informal sector through field visits, survey via questionnaires and telephonically.



Solid Waste Management : Informal Sector

- Data collection for ENVIS website, ISBEID & Newsletters was made through field visits to Govt. Offices & Agencies.
- Inspection by Joint Director, MoEF :** Ms. Madhumita, Joint Director, MoEF visited the Centre for inspection on 18th October, 2011. The Centre organised a meeting and presented the major activities undertaken by the Centre during April 2010 to Sept. 2011. Ms. Madhumita appreciated the activities of the Centre and proposed that the Centre can be a modal to other nearby Centers for providing training. The status, problems, and requirements related to infrastructure, personnel and website of the Centre were discussed and proposed.



- **Celebration of World Wetlands Day -2012**

February 2nd of every year is observed as World Wetlands Day (WWD). It marks the date of the signing of the Convention on Wetlands on 2 February 1971, in the Iranian city of Ramsar. For the year 2012, the theme of World Wetlands Day was '*Wetland and Tourism*'. The Council published advertisements in newspapers to make the public aware of importance of wetlands. Council developed and distributed Planner-2012, highlighting important birds, conservation programmes, awareness programmes in Punjab on the occasion of WWD. An Eco-Game 'Snakes & Ladders' based on Wetland conservation was also designed as well as printed on 10'x10' flex on which students could actually stand and learn do's and don'ts for wetland conservation in an interesting way. Council took special initiative to celebrate World Wetlands Day at four important wetlands of Punjab - Harike, Ropar, Kanjli, Nangal involving local NGOs, schools and community.

The programme at **Harike** was organized involving WWF-India, Department of Forests & Wildlife and an NGO Lok Kalyan Samiti. Prof. N. Satyamurthy, Director, IISER (Mohali) was the Chief Guest at the occasion. Council's planner-2012, highlighting wetland conservation activities was released by the Chief Guest. Various wetland experts addressed the gathering of students, NGOs and community for motivating them to protect the wetland and biodiversity and participate in promoting eco-tourism. The students showing excellence in the poster making & speech competitions were given prizes.



Director IISER -Chief Guest releasing Wetland Planner-2012

The programme at **Ropar** was organized in collaboration with DSS Ropar. The Chief Guest of the function was District Forest Officer, Ropar. The participants were from schools, NGOs and general public. The activities like expert lectures on wetlands & ecotourism, poster making competitions, visit to Ropar Wetland area were taken up.

The programme at **Nangal** was organized in collaboration with NGO Jagriti. Chief Guest of the program was Sh. G.K.Singh, IAS, DC, Ropar. Activities like bird census at Nangal wetland, poster making competitions, environment games, exhibition on birds and a visit to interpretation centre were taken up. Lectures on promotion of eco-tourism, wetland biodiversity and migratory birds were delivered by the experts. Students took keen interest in the environment game developed by the Council and learnt the consequences of their actions particularly on wetlands through the game.

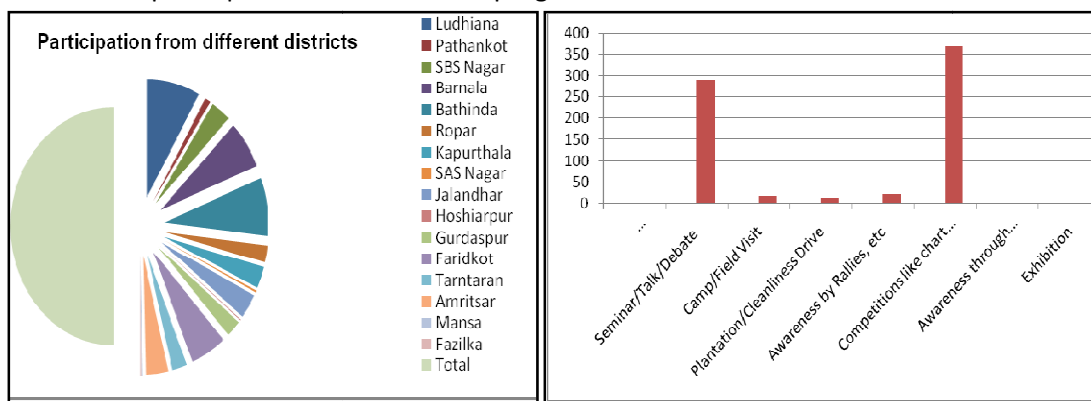


Students playing Eco-game 'Snakes & Ladders'

The programme at **Kanjli** was organized in collaboration with NGO Pahal. The participants were from schools, NGOs and general public. Expert lectures highlighted issues like protection of Kanjli

wetland and participation of community in wetland management and eco-tourism were delivered. Other activities taken up were: poster making competitions, visit to Kanjli Wetland area etc.

The Council also motivated NGOs and District Science Supervisors, (DSSs) of all districts to make efforts to enhance participation of NGC and other schools of their district in the celebration of World Wetlands Day-2012 and look at the value of local wetlands from the perspectives of eco-tourism. Active participation from 16 districts was observed. A total of 388 schools and NGOs participated in WWD-2012. District wise participation and number of programmes conducted is illustrated as under:



• Celebration of World Environment Day-2011

The theme of World Environment Day 2011 was *'Forests: Nature at Your Service'* marking the International Year of Forests. It was intended to increase awareness about the importance of forests as an integral part of the sustainable development of the planet and about the economic, socio-cultural, and environmental benefits that forests provide. Deforestation and forest degradation contribute up to one-fifth of greenhouse gas emissions, a major cause of global warming.

PSCST motivated Govt. agencies, educational institutions and NGOs to celebrate the World Wetlands Day all over Punjab. Advertisement was also released on the occasion in leading local dailies in English and Punjabi to inculcate awareness among general public. As a result, this day was celebrated with huge participation of school students and NGOs in the State. Various programs were organized by PSCST, Schools and NGOs on the occasion.

Programs organized by PSCST

PSCST in collaboration with St. Stephen's, "Nature Glory Eco Club" and Jeevan Mukat Nishulak Vidhyalaya (JMNV), an NGO celebrated World Environment Day, 2011. During the celebration, sanitation and cleanliness drive was held in the Jagatpura village by community participation of students & teachers of Jeevan Mukti Nishulak Vidhalaya at Jagatpura and St. Stephens School.

Programs organized by other agencies

In all 8 NGOs and 22 schools celebrated the day and submitted reports. Various activities/ programmes organized all over the state on the occasion are as follows:

S.No.	Activity/programme	No. of activities/ programmes
1.	Plantation of native species of trees and shrubs/ Distribution of saplings	9
2.	Awareness workshops/ seminars/ lectures/ meetings	30
3.	Competitions (debates, poster making, essay writing, poetry recitation, etc)	5
4.	Cleanliness drive	2
5.	Rally	2
	Total	48

- **Celebration of International Day for Preservation of Ozone Layer-2011**

World Ozone Day, 16th September was designated by the United Nations General Assembly as the International Day for the Preservation of the Ozone Layer. It was on this day in 1987 that the Montreal Protocol was signed by a number of countries concerned about the depletion of the Earth's protective ozone layer. This day serves as a reminder to decision-makers and the general public of the need to protect this valuable shield that safeguards the earth.

PSCST requested all the District Education Officers (S) in the State to celebrate Ozone day by involving schools covered under National Green Corps (NGC) Programme. Organisations actively taking up environmental activities under National Environment Awareness Campaign were also requested in this regard. A total of 56 schools celebrated the day. Various activities/ programmes organized all over the state on the occasion of celebration of International Day for Preservation of Ozone Layer, 2011 were as follows:

S.No.	Activity/programme	No. of activities/ programmes
1.	Plantation of native species of trees and shrubs/ Distribution of saplings	5
2.	Awareness workshops/ seminars/ lectures/ meetings	56
3.	Competitions (debates, poster making, essay writing, poetry recitation, etc)	30
Total		91

- **Implementation of National Green Corps Programme**

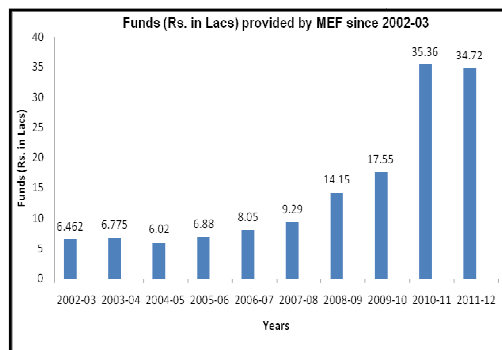
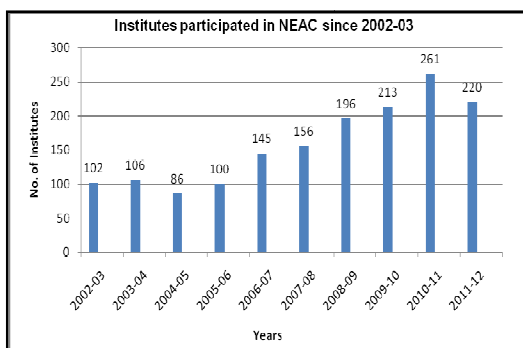
The National Green Corps (NGC) is a national program across India conceptualized and initiated by the Ministry of Environment and Forests (MoEF), Government of India. PSCST is the nodal agency in Punjab for promotion, co-ordination and implementation of environmental activities in the State. From the state, 5000 schools are participating in this programme. These schools have constituted eco-clubs of 30-50 students which take up environment awareness activities under the guidance of eco-club Incharge Teachers. MoEF, GOI is providing financial assistance for 5000 eco-clubs @ Rs. 2500/- per Eco-Club to conduct activities for environmental awareness leading to action programmes. Financial assistance @ Rs. 25,000/- per district is also being provided for strengthening the implementation and monitoring at district level.

NGC schools in the state organized 13,355 different activities like seminars/lectures, competitions, plantation, cleanliness drives, water conservation, etc. involving 72, 0572 students during the year 2011-12. PSCST had organized meetings and discussions with District Science Supervisors and assessed the progress of activities under NGC programme in the schools of Punjab and motivated NGC schools from Punjab to participate in Green Olympiad organized by TERI and Paryavaran Mitra Programme. A two days State level Paryavaran Mitra Master Trainers Training programme was organized during 1-2 December 2011 at Chandigarh. Around 60 Master Trainers from 18 districts participated in the training programme. PSCST is also facilitating the program *The Gobar Times Green Schools Programme* (GTGSP) for Centre for Science and Education (CSE) in the State. Two Schools of Punjab namely BCM Senior Secondary School, Ludhiana and DRV DAV Centenary Public School, Phillaur have won top honors at the national level under this program. These schools have also implemented the Green Schools' Programme (GSP) to bring about positive change in the schools environment in terms of practices followed to improve the quality/usage/sustainability of Land, Air, Water, Energy and Waste Resources.

In order to make NGC activities more broadbased, initiatives are being taken by PSCST in collaboration with State Institute of Science Education (SISE) and Punjab School Education Board (PSEB) to include Education for Sustainable Development (ESD) activities in the ambit of NGC programme. Realizing the need of inculcating the concept of sustainable development among children through education, a training module on ESD for Master Trainers is being developed by the Council in consultation with SISE, PSEB and other stakeholders and with inputs from DSSs & teachers. In this regard PSCST organized a workshop on ESD, inviting District Science Supervisors, Assistant District Science Supervisors and 70 Master Trainers from various districts to discuss and take their feedback on this training manual.

- **Implementation of National Environment Awareness Campaign 2011-12**

Ministry of Environment & Forests, Govt. of India selected Punjab State Council for Science & Technology as Regional Resource Agency (RRA) for implementation of NEAC in Punjab and Chandigarh during 2011-12. The growth of NEAC in Punjab since the year 2002-03 is presented below:



NEAC theme for the year 2011-12 was '*Forests for Sustainable Livelihood*'. Council, as RRA invited proposals from various institutions on the proforma of MEF, GOI that was circulated and also uploaded on PSCST Website. MoEF had increased the limit of funds to the participating organizations after realizing their contribution towards raising awareness in communities on issues related to environment. Council organized a guidance workshop on proposal formulation on 07.09.2011 in GGS Khalsa College, Chandigarh for providing guidance to interested institutions for formulation of proposals on the specified theme to participate in the NEAC programme. 101 participants representing NGOs, Schools and Govt. Departments attended the workshop.

Council received a total of 225 proposals, which were reviewed and summaries prepared as per guidelines of the Ministry. These were presented before the Regional Committee during the meeting of northern region held at Chandigarh from 17 October to 21 October 2011. Centre for Environment Education (CEE) deputed by Ministry scrutinized the proposals received by RRAs. The Ministry approved proposals of 220 agencies amounting to Rs. 34.72 lac. These included 143 proposals from schools, 19 from colleges & universities, 48 from NGOs and 10 from Govt. Departments. For effective implementation of NEAC programme, PSCST organized a second guidance workshop for institutions whose proposals were approved by the Ministry on 11.01.12. Representatives of 72 different Non Government Organizations (NGOs), Schools and other educational institutions from Punjab and Chandigarh participated in the workshop.

BIOTECHNOLOGY OUTREACH

Biotechnology being a sun-rise area, various outreach programmes are organized by the Council from time to time to keep the stakeholders informed about its applications relevant to the state. The programmes organized during 2011-2012 were:

- **18th Popular Biotechnology Lecture Series**

PSCST has been organizing 'Popular Biotechnology Lecture Series' every year with the support of DBT-GOI to keep the students and teachers abreast of advancements in this field. The 18th Popular Biotechnology Lecture Series was organized at Khalsa College, Amritsar on 17th February, 2012 on the theme 'Biotechnological Advancements in Food Processing'. It comprised three lectures viz. 'Biopreservation – an environment friendly approach to improve safety & shelf-life of foods' by Dr Gurvinder Singh Kocher, Microbiologist, Department of Microbiology, PAU; 'Functional foods & nutraceuticals' by Dr. S.K. Sharma, Sr. Scientist, Central Institute of Post Harvest Engineering & Technology, Ludhiana and 'Enzymes in food Industry' by Dr. Alkesh, SSO (BT), PSCST. The lectures were

followed by elaborate question- answer session. The programme was attended by more than 300 students and teachers from various educational institutions.



- **Awareness programmes & training workshops on natural vinegar & beverage production from bioresources.**

Under the project 'Scale up, demonstration & promotion of technology for production of natural vinegar and non-alcoholic naturally carbonated (NANC) beverages' supported by DST, GOI, seven awareness programmes (detailed below) were organized in various districts of Punjab to make self help groups, rural & SC women, farmers & cooperative society members aware about potential benefits on natural vinegar & NANC beverages as compared to their synthetic counterparts available in the market. The lectures covering technical know-how and potential of these technologies as an enterprise were delivered. Further, for those participants who showed keen interest in starting enterprise based on these technologies, two hands-on training workshops were organized, start-up cultures given and handholding provided wherever required. The programmes were organized in collaboration with Punjab Agricultural University, PAMETI, Punjab Institute of Cooperative Training and Krishi Vigyan Kendras.

Collaborating Organization	Village / District covered	Date	No. of participants
Awareness programmes			
Department of Extension Education, PAU	Sheikh Daulat, Jagraon	30.5.2011	80
Punjab Agricultural Management & Extension Training Institute	Saholi, Nabha, Patiala	12.10.2011	65
Punjab Institute of Cooperative Training	Distt. Ropar, SAS Nagar & Fatehgarh Sahib	28.12.11	25
Agriculture Cooperative Staff Training Institute	Distt. Jalandhar, Kapurthala & Hoshiarpur	9.1.2012	25
KVK, Fatehgarh Sahib	Village Balari Kalan, Distt. Fatehgarh Sahib	21.2.2012	26
KVK, Moga	Distt. Moga	28.2.2012	30
KVK, Bathinda	Distt. Bathinda	6.3.2012	35

Hands-on training workshops			
Departments of Extension Education and Microbiology, PAU	Distt. Ludhiana, Jalandhar, Bathinda, Sangrur	13-14.6.2011	26
- do -	Distt. Patiala & Ludhiana	8-9.11.2011	25

- **On-farm contact programmes and demonstrations on aromatic crops in Dhar block, Gurdaspur.**

In view of the potential of kandi area for cultivation of medical & aromatic plants, the Council organized five on-farm contact programmes in villages Roug, Harar, Dung, Hardusaran, Sarti, Dunera & Palah of Dhar block, District Gurdaspur to promote cultivation of aromatic grasses under Field Demonstration Project for Dhar Block supported by Department of Biotechnology, Govt. of India. During these programmes, potential of cultivation of aromatic grasses viz. lemongrass, palmarosa & citronella as compared conventional crops in the rainfed regions of the area were discussed with the farmers and demonstrations for land preparation, use of farm inputs, nursery raising & cultivation of these crops were given. About 130 farmers participated in these programmes.

- **On-farm demonstrations on production & application of neem biopesticide**

Two training-cum-demonstration programmes for promotion of neem biopesticide were organized in collaboration with Organic Farming Council of Punjab - at village Ryona Ucha, Fatehgarh Sahib on 2.6.2011 for about 70 organic farmers and at village Sajli, Sangrur on 7.6.2011 for about 30 organic farmers. During these programmes, technical know-how for production and application of neem kernel powder was provided.

- **Participation of PSCST in International Trade Fare (IITF, 2011), New Delhi**

The Council participated in Punjab Pavilion at India International Trade Fair (IITF) from 14- 27th November, 2011 on theme "*The Magic of gifted Hands*" at Pragati Maidan, New Delhi. The activities of Council w.r.t. Geographical Indicators (Phulkari), Biotechnology based programme for women & rural development, cupola furnace and resource efficient bricks were showcased. The Council has taken up a pilot project with Deptt. of Forests, GOP, involving an NGO (Sai Dharam Singh Grover Foundation) for utilizing water hyacinth for making handicrafts items. These handicrafts were also displayed and were appreciated by the Chief Guest and other visitors.

- **Participation of PSCST in 'Destination Punjab Fair'**

The Council participated in 'Destination Punjab Fair' organized by Confederation of Indian Industry (CII) at Amritsar from 7 – 10.10.2011. The major objective of the fair was to project "Brand Punjab" for creating linkages for SMEs and creating networking opportunities across key sectors with special focus on agriculture & food sector. Various value added amla products being produced at the Processing Unit set up by the council at Talwara were exhibited which attracted many visitors. Visitors

from various MSMEs were also guided about Intellectual Property Rights filing facilitation services of Intellectual Property Facilitation Cell set up at Council for MSMEs of Punjab. More than 80 specific queries related to these services were responded. Literature on IPRs and Resource Efficient Bricks were also distributed to the visitors.

Publications and Resource Material

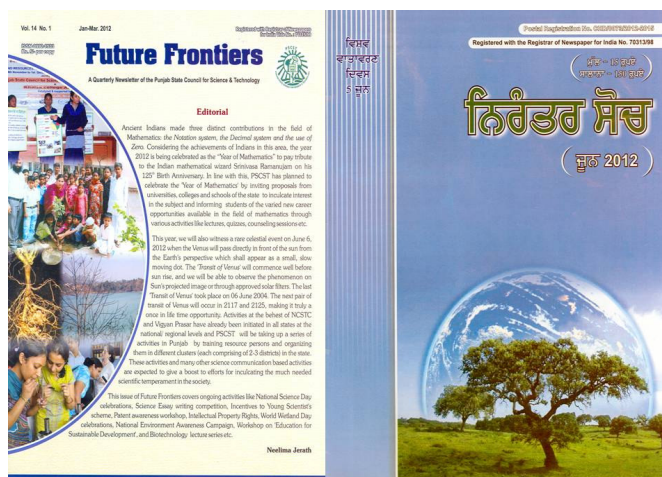
Popularization of Science

1. Printing of Punjabi Science Magazine 'Nirantar Soach'

The Council is bringing out a monthly science magazine 'Nirantar Soach' in Punjabi since 1996 with the objective of popularizing science and making general public aware about environmental problems which need their attention. It is also making sincere efforts to spread scientific culture in the educational institutions of the state. The magazine also provides in depth information about human health and management of agriculture related problems. It translates the difficult scientific notions into placid statements which could be easily followed and understood by those who are without formal training in science. Twelve issues of the magazine were brought out during the year.

2. Printing of Newsletter 'Future Frontiers'

The Council has been regularly bringing out its quarterly newsletter since January, 1993. The objectives of this newsletter are to provide information to Govt., Non-Govt. and associated departments regarding the activities being taken up by the Council. It also publishes scientific news and articles which are of interest to general public. This magazine has been widely appreciated throughout the country.


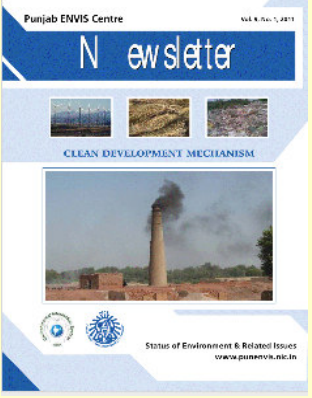




Other POS publications: PSCST has brought out the following publications during the period under report:

- A Summary Book containing the summaries of projects presented at **State Level Children's Science Congress-2011**

ENVIS

- **Newsletters:** The following issues of Newsletters were prepared :
 - Bio-fertilizers (Vol. 8, No. 4)
 - Clean Development Mechanism (Vol. 9, No. 1)
 - Community Reserves: Punjab (Vol. 9, No. 2)
 - Intensive Agriculture (Vol.9, No. 3 & 4)

	
<p align="center">Biofertilizers (Vol. 8, No. 4)</p>	<p align="center">Clean Development Mechanism (Vol. 9, No. 1)</p>
	
<p align="center">Community Reserves: Punjab (Vol. 9, No. 2)</p>	<p align="center">Intensive Agriculture (Vol. 9, No. 3 & 4)</p>

- **Status Reports on Solid Waste & its Management in Punjab:** The Punjab Pollution Control Board sanctioned a Project on “Status of Solid Waste & its Management in Punjab”. Punjab ENVIS Centre collected, collated and prepared three scientific reports on the following:

- Biomedical waste management,
- Municipal solid waste management and
- Plastic waste management & inventorization of recycling units in Punjab.

The study was conducted from July 2010 to September 2011. The reports were prepared by collecting data/information through questionnaires, interactions with stakeholder agencies as well as active workers of informal sector like rag pickers and kabariwalas. The reports were submitted to Punjab Pollution Control Board.

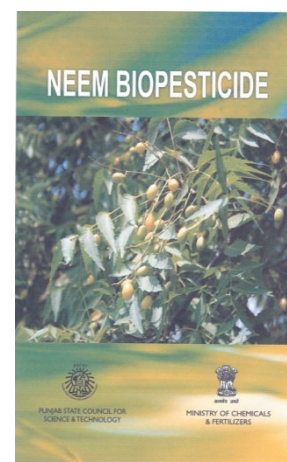
- **Poster:** Developed on ‘Let’s save our native cow breeds’:



Biotechnology

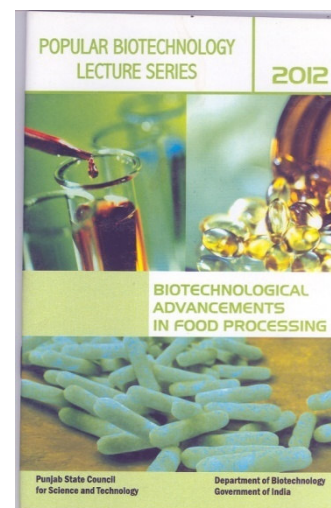
1. Neem Booklet

Under Neem Project supported by Ministry of Chemicals & Fertilizers, Govt. of India and Regional Network for Pesticides for Asia & the Pacific (RENAPAP) of UNIDO, technology for preparation and application of neem kernel powder as a biopesticide is being promoted by the Council. A booklet covering this complete technological know-how authored by Dapinder K. Bakshi, J.K. Arora & Ajay Dewan has been published in English & Punjabi for effective outreach.



2. Booklet titled 'Biotechnological Advancements in Food Processing'

As a large producer and exporter of agri-food produce, the Indian food industry contributes substantially to the country's economy. The modern biotechnological tools have played a significant role in bringing innovation in food processing sector to ensure quality and safety of the final produce. The last decade has witnessed entry of foods fortified with nutritional and disease-preventing qualities in the market providing wide variety of growth opportunities for potential investors in this segment. Bio-catalysis emerged as another rapidly advancing area which provided significant advantages in terms of high specificity, efficiency, energy conservation and hence proved of immense value to the food industry. The bio-preservation technologies for long-term storage of foods were also researched extensively. To enable the students & teachers of life science disciplines to comprehend these developments, a booklet titled '*Biotechnological Advancements in Food Processing*' has been published by the Council (Eds. Dapinder K. Bakshi & J.K. Arora). This booklet is a compilation of three lectures covered during Popular Biotechnology Lecture Series organized by PSCST and provides detailed account of bio-preservation & bio-catalysis techniques as well as the mechanism of action, potential and regulatory norms for functional foods.



Personnel of Punjab State Council for Science & Technology (During 2011-2012)

Executive Director – Dr. (Mrs) Neelima Jerath

Scientists/Officers:

Popularisation of Science	Dr. Surjit Singh Dhillon, Consultant (Retired on 31.12.11) Dr (Mrs) Neelam Gulati Sharma, Additional Director Dr. Kulbir Singh Bath, Principal Scientific Officer
Biotechnology	Dr.(Mrs) Jatinder Kaur Arora, Additional Director Dr. Dapinder Kaur Bakshi, Principal Scientific Officer Dr. Alkesh, Senior Scientific Officer
Environment	Dr. Satnam Singh Ladhar, Joint Director Dr. S.K. Saxena, Principal Scientific Officer Mr. Gurharminder Singh, Scientist (PIC) & SSO (Env.)
Consultancy Cell	Er. M.S. Jaggi, Director (CC)- Retired on 31.10.11 Er. S.K.Jain, Addl. Director (CC) - (taken on deputation) Er. Pritpal Singh, Senior Engineer (taken on deputation) Er. Pardeep Kumar, Principal Scientific Officer Er. Krishan Kant, Process Engineer Mr. Ranjit Singh, Astt. Process Engineer Mr. Maganbir Singh, Astt. Process Engineer Mr. Abhishek Chauhan, Astt. Process Engineer Ms. Bhanu Kiran, Astt. Process Engineer
Water Regime Management	Dr. K.P. Singh, Director (Part time).
Administration	Mr. Bharat Bhushan Sehgal, Administrative Officer Mr. Ashok Kumar, Secretary to ED/PSCST
Finance & Accounts	Mr. Avdesh Kaushik, Manager (Finance & Accounts) Mr. Harish Raj Rai, Asstt. Manager (F&A)
PIC	Mrs. Divya Kaushik, Scientist PIC

Project Staff:

<u>Project Officers/ Associates</u> Ms. Ravleen, SPO Ms. Nitu Gupta Ms. Shivani Khosla Ms. Rupali Ms. Preeti Thakur Ms. Preeti Arora Ms. Mandakini Thakur Mr. Ajay Diwan <u>Assistant Engineers</u> Mr. Mandeep Singh Ms. Khushboo Gupta <u>Trainees (PIC)/ Library</u> Ms. Rajwinder Kaur	<u>Typists/ Computer Assistants</u> Ms. Kiranjit Kaur, Clerk Ms. Ishween Kaur, Steno-typist <u>Field Assstants:</u> Sh. Parkash Gharti Sh. Rakesh Kumar Sh. Lakhwinder Singh Sh. Jaspal Sh. Vinod Kumar, Peon
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The following joined the Council during the Year:

Sh. B.B. Sehgal
Ms. Mandakini Thakur
Ms. Preeti Thakur
Sh. Ajay Dewan
Ms. Bhanu Kiran

The following left the Council during the year:

Dr. Surjit Singh Dhillon: retired
Er. M.S. Jaggi: retired
Dr. K.P. Singh: retired
Sh. Malkiat Singh: resigned
Ms. Rajinder Kaur: relieved

Supporting Staff:

Mr. B. S. Bajwa, Private Secretary Mrs. Shashi Thapar, Private Secretary Mr. V. K. Puri, Private Secretary Mr. Rakesh Grover, JAE Mr. Sham Sunder, Private Secretary Mr. Harjit Singh, Personal Assistant (sent on deputation) Mr. B. R. Pahwa, Personal Assistant Mr. Sham Lal, Personal Assistant Mrs. Neelam Sharma, Librarian Mr. Vikas Sharma, Sr. Asstt. (Accounts) Mr. Sandeep Gupta, Technician Mrs. Jasbir Kaur, Receptionist Mrs Renu Sehgal, Senior Scale Stenographer Mr. Kishore Kumar, Senior Assistant Mrs. Isha Sharma, Senior Assistant Mr. Dinesh Kumar, Junior Assistant Mr. Malkiat Singh-System Supervisor Ms. Rajinder Kaur, Jr. Draftswoman Mr. Kulwinder Kumar, Clerk Mrs. Parveen Lata, Steno-typist	Mr. Krishan Chand, Driver Mr. Gurdeep Singh, Driver Mr. Darshan Singh, Driver Mr. Ram Janam Yadav, Driver Mr. Ram Yadav, Peon Mr. Didar Singh, Peon Mr. Surjit Singh, Peon Mr. Vijay Kumar, Peon Mr. Guman Bahadur, Peon Mr. Faquir Singh, Peon Mr. Shiv Kumar, Chowkidar Mr. Rishi Raj, Sweeper Mr. Satbir, Sweeper
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List of training programmes / workshops/ seminars organized by PSCST during 2011-12

Name of Workshop	Sponsorer	Dates	Place	Target Group	No of Attendees
POS					
Celebration of National Science Day 2012	NCSTC,DST,GOI And GOP	Feb- Sept. 12	Punjab	Students, teachers, NGOs	> 1,00,000
Celebration of National Technology Day 2011	-do-	May-Dec.11	Punjab	Technical Students	>15,000
State level Essay writing compt.	-do-	6.2.12	Chandigarh	School students	65
Orientation workshop for CSC 2011	-do-	26-27.7.11	Chandigarh	Teachers and DSS	68
District level CSC-2011	-do-	Aug-Nov.11	All districts of Punjab	Students	5000
State level CSC 2011	-do-	29.11.11-1.12.11	Amritsar	Students	601
District level workshop on micro-organisms	NCSTC, DST, GOI	12-14.9.11 14-16.11.11	Patiala Chandigarh	School biology teachers	63
Workshop on science communication on digital media	-do-	22-25.8.11	Chandigarh	School science teachers	32
2 nd advisory committee meeting on VVSK	-do-	6-7.7.11	Chandigarh	Pls of VVSK different states	30
MRP training program for NZ on Transit of Venus	-do-	9-10.4.12	Chandigarh	Teachers from NZ	44
Guidance workshops on NEAC	MOEF,GOI	7.9.11 11.1.11	Chandigarh	Teachers/ NGOs	101 135
Activites under NGC schools in the state (17063) different activities) during the year 2011-12	MOEF,GOI	Apr. 11 – Mar.12	All over state	Students	7,46,741
Environment					
Celebration of important environment related days- World Wetlands day (2 Feb), International Biodiversity Day (May 22), World Environment Day (June 05) & Ozone Preservation Day (Sept. 16)	-do-	5.6.10 2.2.11 16.9.10	Mohali PGSC, Kapurthala Jalandhar	Teachers, students, NGOs	>5000
Training of Master Trainers, DSSs and selected teachers under Paryavaran Mitra Program in collaboration with CEE	-do-	1-2.12.11	Chandigarh	DSS, Teachers	
ESD workshop on preparation of book titled 'My Carbon: Footprint Vs Handprint'	-do-	24.2.11	Chandigarh	-do-	
Brain storming workshop on Identification of Biodiversity rich areas in Punjab	-do-	21.3.11	Chandigarh	UNESCO experts, Scientists from International & National Orgs.	50
Biotechnology					
Public contact programme on cultivation of aromatic crops	DBT, GOI	15-18.3.12	Villages Roug, Hardusaran, Sarti, Dunera, Palah	Farmers	35
Awareness Programmes on natural vinegar & beverage production	DST, GOI	6.3.12	Distt. Bathinda	SC/ST farm workers	35
-do-	DST, GOI	28.2.12	Distt. Moga	SC/ST farm worker	30
-do-	DST, GOI	21.2.12	Village Balari Kalan, Distt. Fatehgarh Sahib	SC/ST farm workers	26
18th Popular Biotechnology	DBT, GOI	17.2.12	Khalsa College	Students &	300

Lecture Series			Amritsar	faculty of life science colleges	
Awareness Programmes on natural vinegar & beverage production	DST, GOI	9.1.12	Distt. Jalandhar, Kapurthala & Hoshiarpur	SHGs, cooperative societies & rural women	25
-do-	DST, GOI	28.12.11	Distt. Ropar, SAS Nagar, Fatehgarh Sahib	SHGs, cooperative societies & rural women	25
On-farm contact programme on aromatic crops	DBT, GOI	22.11.11	Village Roug, Gurdaspur	Farmers	50
Awareness Programmes on natural vinegar & beverage production	DST, GOI	8-9.11.11	Distt. Patiala & Ludhiana	Farmers & rural women	25
-do-	DST, GOI	12.10.11	Saholi Nabha, Patiala	Farmers & rural women	65
Practical demonstration on setting palmarosa nursery at farmer's field	DBT, GOI	2.9.11	Village Harar, Gurdaspur	Farmers	10
Demonstration of palmarosa & lemongrass cultivation on farmer's fields	DBT, GOI	22.7.11	Village Roug, Gurdaspur	Farmers	15
Training workshops on natural vinegar & beverage production	DST, GOI	13-14.6.11	Distt. Ludhiana, Jalandhar, Bathinda, Sangrur	Farmers & rural women	26
Training-cum-demonstration programme on neem biopesticide	DST, GOI	7.6.11	Village Sajli, Sangrur	Organic farmers	25-30
-do-	DST, GOI	2.6.11	Village Ryona Ucha, Fatehgarh Sahib	Organic farmers	70
Awareness Programmes on natural vinegar & beverage production	DST, GOI	30.5.11	Sheikh Daulat, Jagraon	Farmers & rural women	80
On-farm contact programme on cultivation of aromatic crops	DBT, GOI	16.2.11	Village Dung, Gurdaspur	Farmers	6
IPR					
Patent awareness workshops	TIFAC,DST,GOI	5.10.10 11.11.10 17.12.10 16.3.11 23.3.11	Gurdaspur Dasuya Faridkot Jalandhar Phagwara	Students & Faculty of Colleges and Universities	134 94 120 110 400
IPRs Faculty Training Camps	TIFAC and DTE, Govt. of Punjab	4.10.10 9.12.10 9.12.10 13.12.10 17.12.10	Gurdaspur Nabha Rajpura Kotkapura Faridkot	faculty of Govt. Industrial Training Institutes (ITIs)	246 64 66 51 49
Training Program on IPRs by MSME, Ludhiana	TIFAC	2.2.11	Ludhiana	Cluster Dev. Executives & GMs of DICs	53
Workshop on IPR sensitization for MSMEs	-do-	29.5.10 18.6.10	Patiala Jalandhar Mandi Gobindgarh Sangrur	Industry officials	150 40 26 100
IPR issues meeting	-do-	12.10.10	Mohali	-do-	12
Sensitization Workshop on benefits of using Resource Efficient Bricks"	UNDP-GEF	25.08.11	Hotel Parkview Chandigarh	Architects and Builders of the region.	50
Interactive Meet on use of Resource Efficient Bricks	UNDP-GEF	25.08.11	NITTTR, Chandigarh.	Govt. Officers of Punjab & Haryana and Faculty of Technical Institutions and	40

				Technical Education Departments	
Workshop on firing, feeding & operating practices .	Nawan Shahar Brick Kiln Association	22-11-11	Rahon, Nawanshahr	Brick Kiln Owners and their workforce	40
Stakeholders Consultation Meeting for 1 MW Tail End Grid Connected Solar Photo Voltaic Power Plant at Village Phulokhari, Distt. Bathinda.	PEDA	23.05.11	Village Phulokhari, District Bathinda.	All stakeholders	47

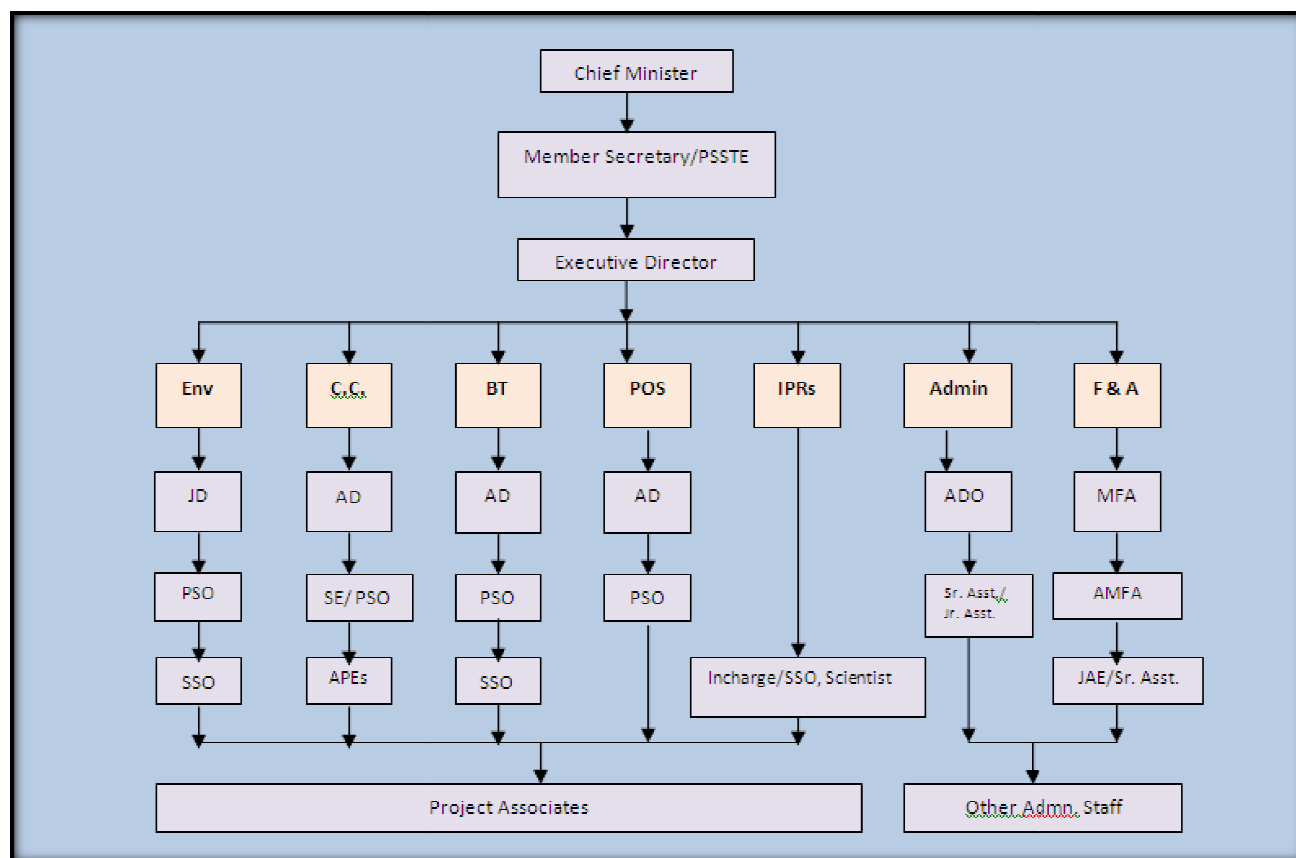
List of Conferences/Meetings attended by the Scientists / Engineers of the Council during the year 2011-12

<i>Name of Conference / Meeting</i>	<i>Organised by/ Venue</i>	<i>Date</i>	<i>Attended by</i>
Stakeholders Consultation and Launch of the United Nations Decade on Biodiversity (UNDB) for Asia and Pacific	MoEF at New Delhi	23.5.11	Dr. Neelima Jerath, ED
State S&T Councils/Departments Interaction Meeting	DST,GOI at New Delhi	11-12. 7.11	-do-
International Training Program in Education for Sustainable Development-2011 First National Workshop	CCE at Ahmedabad	14-15.7.11	-do-
Team Leader- International Seminar/Networking Conference	University of St. Andrews, Scotland, UK	21-25.8.11	-do-
Consultative Meet-Planning of IEC Activities on Environment	MGSIPA, Chandigarh	8.9.11	-do-
Principal Participant-International Training Program in Education for Sustainable Development	SIDA, Sweden	12-30.9.11	-do-
Seminar on Information, Communication and Technology in Education for sustainable development-The road ahead	TERI, Chandigarh	4,11.11	-do-
CII-Sustainable Solutions (Session on Valuing & Securing Biodiversity)	MoEF/NBA at Delhi	25.11.11	-do-
Round Table Conference on Sustainable Agricultural Mechanization in Asia	UNAPCAEM & FAO at Bangkok, Thailand	8th -9th December, 2011	-do-
International Training Program in Education for Sustainable Development	CEE, Ahmedabad	11-12.12.11	-do-
Chief Guest-Prakart Utsav	MCM DAV College, Chandigarh	21.1.12	-do-
7 th National Meet of State Biodiversity Boards	NBA, Chennai	27-28.1.11	-do-
Lecture in the National Seminar on Intellectual Property Rights & Bioethics in Academia, Industry & Research	SUS College of Res. & Technology, Tangori, Mohali	29.2.12	-do-
Workshop on Draft National Water Policy 2012	CRRID, Chandigarh	2.3.12	-do-
Completed Online Certificate course on the RTI Act, 2005 administered by Centre for Good Governance and Ministry of Personnel Public Grievances & Pensions, GOI	Online	23.2.12 to 8.3.12	Dr. Neelima Jerath,,Dr. Neelam Gulati Sharma,Dr. Satnam Singh, Dr. Saxena
Indo UK Scientific Seminar/Workshop - Team Member	University of St. Andrews, Scotland, UK	21-25.8.2011	Dr. Jatinder Kaur Arora, Addl. Director (Biotechnology)
Meetings of State Expert Appraisal Committee	PPCB, Patiala	8.4.11, 1.6.11, 11.6.11, 12.8.11, 7.9.11, 20.10.11, 24.11.11, 20.1.12, 27.2.12, 27.3.12	-do-
Project formulation Mtg. reg. cultivation of aromatic crops in Kandi Area of Punjab	DBT-GOI, New Delhi	16.5.2011	Dr. Jatinder Kaur Arora, AD (BT) & Dr. Alkesh , SSO (BT)
Mtg. of Board of Directors of Mohali Biotechnology Park	DBT-GOI, New Delhi	16.6.2011	Dr. Jatinder Kaur Arora, Addl. Director (Biotechnology)
Bio International Convention 2011 and Bio Mission as part of Indian delegation led by Secretary, DBT-GOI.	Washington, DC USA	27-30 June, 2011	-do-
Orientation workshop for Sanitary Napkin project.	DST-GOI, INSA, New Delhi.	5.9.2011	Dr. Jatinder Kaur Arora, AD (BT) & Dr. Alkesh , SSO (BT)

Seminar on "Bio-Energy"	IIT-Ropar	21.10.2011	Dr. Jatinder Kaur Arora, Addl. Director (Biotechnology)
Meeting of Institutional Ethics Committee of IISER	IISER, Mohali.	15.12.2011	-do-
Meeting reg. RFD as Nodal Officer of PSCST	MGSIPAP, Chandigarh	18.1.2012	-do-
Meeting of Committee reg. grant of NOC for trials of Genetically Modified Crops in Punjab - as Member.	Camp Office, -PAU, Mohali	1.2.2012	-do-
Foundation Day Lecture of NABI	Mohali	18.2.2012	Dr. Jatinder Kaur Arora, AD (BT) & Dr. Alkesh, SSO (BT)
State Level Sensitization Workshop-cum-Stakeholder's Consultation – As Chairperson of Technical Session.	Central Soil & Water Conservation Research & Training Institute.	28.2.2012	Dr. Jatinder Kaur Arora, AD (BT)
Workshop on "Commercialization of Biotechnology" i.	Biotech Consortium India Ltd., New Delhi.	12.3.2012	Dr. Jatinder Kaur Arora, AD (BT) & Dr. Alkesh, SSO (BT)
Completed Online Certificate course on the RTI Act, 2005 administered by Centre for Good Governance and Ministry of Personnel Public Grievances & Pensions, GOI	Online	9.3.12 to 23.3.12	Dr. Jatinder Kaur Arora, AD (BT)
Resource person in the International Conference on "Quality Concerns in Education: Issues and Challenges" on	Shivalik Institute of Education & Research, Mohali,	30th September - 1st November, 2011.	Dr. N.G. Sharma, AD-POS
Chief Guest - 'Inter Institutional Science fair on Science, Society and Globalization'	M.M. Modi College, Patiala	20th October, 2011	-do-
Guest of Honour -Valedictory Session of Inter College Competition	Guru Nanak Dev College of Education Majatri (Mohali)	23.02.2012	-do-
Indian Ceramics-2012 Exhibition	University Exhibition Centre, Ahmedabad	21 & 22-03-12	Er. S.K. Jain Er. Pritpal Singh
Training programme on Technology Diplomacy	DST GOI & CUTS International, Jaipur	14/11/11 to 16/11/11	Er. Pritpal Singh, SE
Workshop on Energy Efficiency in commercial buildings	Bureau of Energy Efficiency in Piccadilly Hotel, Chandigarh.	21-11-2011	Er. S.K. Jain Mr. Abhishek Chauhan Mr Mandeep Singh
Workshop on 'Support to the National water Mission under National Action Plan for Climate Change'	Central Water Commission, New Delhi	27.6.12	Dr.S.S. Ladhar JD (Env.)
National Workshop on ESD	New Delhi	13-16.7.11	-Do-
Interactive workshop of RRAs for effective implementation of NEAC 11-12	New Delhi	30.8.11	-Do-
Stakeholders workshop on CTC	New Delhi	22-23.9.11	-Do-
Training program by CEE on 'Education for Sustainable Development in formal education 2011 Asia Program'	Ahmedabad	10-21.12.11	-Do-
Coordinator for 2nd Advisory Committee meeting of Establishment of Science Communication Centres (VVSs) at Chandigarh	Chandigarh	6-8 July 11	Dr. K.S. Bath PSO (POS)
Resource person for orientation meeting and State level CSC 2011 in Punjab & UT Chandigarh	Chandigarh	July and Nov.11	-do-
Judge for selection of projects at National Level INSPIRE Awards 2011 at Pragati Maidan	New Delhi	14-16.8.11	-do-
Meeting at DST, GOI regarding release of grants for POS projects	New Delhi	19.12.11	-do-
Training workshop on Right to Information	MGSIPA, Chd	28.6.2011	Dr. D.K. Bakshi, PSO (BT)

Workshop on Incidence of Cancer in Punjab	PPCB, Patiala	12.9.2011	- do -
Represented PSCST at 'Destination Punjab Fair' being organized by CII	Amritsar	7-10.10.2011	- do -
AMI – ASM Workshop on Scientific Writing & Publishing	Panjab University	3.11.2011	- do -
52nd Annual Conference of AMI: International Conference on Microbial Biotechnology for Sustainable Development	Panjab University	3 – 6.11.2011	- do -
Attended BIOCORE stakeholders meeting on biorefineries organized by TERI	Amritsar	29.11.2011	- do -
Attended the meeting on establishment of biotechnology network in Punjab organized by PAU	PAU	10.1.2012	- do -
International Conference on "Frontiers in Nanoscience, Nanotechnology and their Applications (NanoSciTech-2012)"	PU, Chandigarh	February 15-18, 2012	<i>Dr D K Bakshi & Dr Alkesh</i>
Sensitization Workshop-cum-Stakeholder's Consultation organized by Indian Association of Soil & Water Conservation, Chandigarh	Chandigarh	28.2.2012	<i>Dr Alkesh, SSO-BT</i>
Chaired Session on "Identifying gaps in research areas where technology development is required in Shivalik region" in the State Level Sensitization Workshop-cum-Stakeholder's Consultation organized by Indian Association of Soil & Water Conservation, Dehradun.	Central Soil & Water Conservation Research & Trg. Inst., Sector 27-A, Chandigarh	28.2.2012	-do-
United Nation's Group Training Course on "Regional Development by Sustainable use of Biodiversity"	Japan	2nd October 2011 to 3rd November 2011	<i>Sh. Gurharminder Singh, SSO-Env. and Incharge, PIC</i>
Round Table Conference on Sustainable Agricultural Mechanization in Asia	UNAPCAEM & FAO at Bangkok, Thailand	8th -9th December, 2011	-do-
National Consultation cum Workshop on People's Biodiversity Registers	Bengaluru	22nd to 23rd December, 2012	-do-
Training Program on 'Technology Diplomacy'	Jaipur	14-18.11.2011	<i>Ms. Divya Scientist (PIC)</i>
National Children's Science Congress -2012	Jaipur	27-31.12.2012	<i>Ms. Nitu and Ms. Preeti, Project Associates</i>

ORGANISATIONAL STRUCTURE OF THE COUNCIL



List of Members of the Executive Committee

1. Chief Secretary, Govt. Of Punjab, Chandigarh	Chairman
2. Secretary, Deptt. Of Science & Technology, GOI (or his representative)	Ex-officio Member
3. Secretary, GOP, Deptt. Of Science, Technology And Environment, Punjab, Chandigarh	Member Secretary
4. Secretary, GOP, Deptt. Of Agriculture, Punjab, Chandigarh (or his representative)	Ex-officio Member
5. Secretary, GOP, Deptt. Of Industry and Commerce, Punjab, Chandigarh (or his representative)	Ex-officio Member
6. Secretary, GOP, Deptt. Of Technical Education, Punjab, Chandigarh (or his representative)	Ex-officio Member
7. Special/Additional/Joint Secretary, Deptt. Of Science And Technology and Environment, GOP, Chandigarh.	Ex-officio Member
8. Executive Director, Punjab State Council for Science And Technology, Chandigarh.	Ex-officio Member
9. Executive Director, Punjab Energy Development Agency, Plot No. 1, sector-33/D, Chandigarh.	Ex-officio Member
10. Director, Central Scientific Instrument Organization, Sector-30, Chandigarh.	Member
11. Director, Thapar Institute of Engineering and Technology, Patiala.	Member
12. Director Research, Punjab Agriculture University, Ludhiana	Member
13. Air Marshal, K.S. Bhatia (Retd.), House No. 2433, Phase-10, Mohali	Member
14. Dr. Ram Boojh, Programme Specialist (Ecology and Earth Science) UNESCO Office, B-5/29, Safderjung Enclave, New Delhi	Member
15. Advisor, Deptt. Of Biotechnology, Ministry of Science and Technology, GOI, New Delhi (or his representative)	Member
16. Advisor/Director, Ministry of Environment and Forest, Regional Office, Sector-31, Chandigarh (or his representative)	Member

List of Members of the Punjab State Council for Science & Technology

- | | |
|---|----------------|
| 1. Chief Minister, Punjab | President |
| 2. Minister for Power, Punjab | |
| 3. Minister for Industries, Punjab | |
| 4. Minister for Agriculture, Punjab | |
| 5. Minister for Technical Education, Punjab | |
| 6. Minister for Local Govt., Punjab | |
| 7. Minister for Labour, Punjab | |
| 8. Minister of State for Science, Tech. & Env., Punjab | Vice-President |
| 9. Vice Chancellor, Punjab Agricultural University, Ludhiana. | |
| 10. Vice Chancellor, Punjab Technical University, Jalandhar | |
| 11. Vice Chancellor, Baba Farid University of Health Sciences, Faridkot | |
| 12. Vice Chancellor, Punjabi University, Patiala | |
| 13. Vice Chancellor, Guru Nanak Dev University, Amritsar | |
| 14. Vice Chancellor, Panjab University, Chandigarh | |
| 15. Chief Secretary to Govt. of Punjab. | |
| 16. Secretary to Govt. of Punjab, Deptt. of Science, Technology & Env. | |
| 17. Secretary to Govt. of Punjab, Department of Finance | |
| 18. Secretary to Govt. of Punjab, Department of Planning | |
| 19. Secretary to Govt. of Punjab, Department of Housing and Urban Dev | |
| 20. Secretary to Govt. of Punjab, Department of Health & Family Welfare | |
| 21. Secretary to Govt. of Punjab, Department of Technical Education | |
| 22. Secretary to Govt. of Punjab, Department of Industries & Commerce | |
| 23. Secretary to Govt. of Punjab, Department of Power | |
| 24. Secretary to Govt. of Punjab, Department of Local Government | |
| 25. Secretary to Govt. of Punjab, Department of Education | |
| 26. Secretary to Govt. of Punjab, Department of Agriculture | |
| 27. Secretary to Govt. of Punjab, Department of Animal Husbandry | |

Members other than Ex-officio members :-

28. Executive Director, Punjab State Council for Science & Technology, Chandigarh
29. Advisor, Department of Biotechnology, Block 2nd, CGO Complex, 7th-8th Floor, Lodhi Road, New Delhi
30. Director, National Institute of Pharmaceutical Education & Research, Sector 67, Mohali
35. Director, Institute of Microbial Technology, Sector 39-A, Chandigarh
36. Dr. Harjit Singh, Former Dean and Prof. Emeritus, Department of Chemistry, Guru Nanak Dev University, Amritsar
37. Advisor, Department of Science & Technology, Government of India, Technology Bhavan, New Mehrauli Road, New Delhi
38. Dr. J.K. Sharma, Former Head of the Department, Thapar College, R&D, Patiala Kothi No. 267, Sector 4, Panchkula
39. Director, Thapar Corporate R&D & Thapar Institute of Engineering & Technology, Patiala
40. Dr. R.S. Verma (Retd.), (Specialist in Solar Energy), Dean, College of Agricultural Engineering, Punjab Agricultural University, Ludhiana.
41. Dr. K.K. Raina, (Specialist in Physics), Dean, Research, Thapar Institute of Engineering & Technology, Patiala.
42. Dr. Satish Bhatia, (Specialization in Biochemistry), Chief, Clinical Research and Development, Ranbaxy Research Laboratory, Gurgaon, Res: Tower No. 1, Apartment No. 303, Malibu, Sohna Road, Gurgaon.
43. Dr. R.S. Khandpur, Director General, Pushpa Gujral Science City, SCO: 60-61, 3rd Floor, Sector 34-A, Chandigarh
44. Dr. R.P. Singh, (Specialisation in Mechanical Engineering), Principal, Guru Nanak Engineering College, Ludhiana.
45. Dr. P.K. Bajpai, (Specialisation in Chemical Engineering), Deputy Director, Thapar Institute of Engg. & Technology, Patiala.
46. Er. J. R. Abrol (Retd.), (Specialisation in Electrical Designs), 155-A, Agar Nagar, Ludhiana
47. Dr. P.K. Bansal, (Specialisation in Electronics), Principal, Giani Zail Singh College of Engg. & Technology, Bathinda.
48. Dr. G.S. Wander, Professor & Chief Cardiologist, Hero DMC Heart Institute, DMC & Hospital, Tagore Nagar, Ludhiana, Res : 95-B, Kitchlu Nagar, Ludhiana

ANNEXURE-IV

Detail of organizations and activities taken up under National Science Day-2012

S.NO.	Name & Address of organization	Activities
1.	A.S. College, Samrala Road, Khanna, Distt. Ludhiana.	<ul style="list-style-type: none"> • Popular Science Slide Show (Environment & Biodiversity) • Popular lecture (Space Science)
2.	GSSDGS Khalsa College, Badunagar Road, Patiala	<ul style="list-style-type: none"> • Debate • Poster Competitions • Popular Science slide shows
3.	Department of Zoology, Khalsa College, Amritsar.	<ul style="list-style-type: none"> • Popular Lectures in S&T • Debates/Competitions • Poster Competition • Other projects aimed at S&T popularization and nurturing of scientific temper.
4.	Maharishi Dayanand College of Education, Abohar	<ul style="list-style-type: none"> • Thematic S&T Exhibition • Popular Lecture • Seminar and Symposium • Popular Science slide shows
5.	Guru Teg Bhadur Khalsa Institute of Engineering and Technology, Chhapianwali, Malout	<ul style="list-style-type: none"> • One day seminar and slide show
6.	Govt. Senior Secondary School (Boys), Rahon, Distt. SBS Nagar	<ul style="list-style-type: none"> • Quiz • Essay Writing • Speech • Chart Making • Model Making
7.	Principal S.B.M.D. Govt. Senior Secondary School (Boys), Longowal, Distt. Sangrur, Punjab	<ul style="list-style-type: none"> • Popular lectures • Debate/Competitions • Rally
8.	Post Graduate Govt. College, Sector-11, Chandigarh	<ul style="list-style-type: none"> • Lecture in S&T • Inter college Science Quiz • Inter college Poster Making
9.	The SDSG Foundation, Mohan Nagar, Derabassi	<ul style="list-style-type: none"> • Popular lecture in S&T • Debate/Competition • Other projects aimed at S&T popularization and nurturing of scientific temper.
10.	Lyallpur Khalsa Collegiate Senior Secondary School, Jalandhar	<ul style="list-style-type: none"> • Popular S&T exhibition • Popular lecture in S&T • Debates/Competitions
11.	St. Stephen's School, Togan, Distt. Mohali, Punjab.	<ul style="list-style-type: none"> • Popular S&T exhibition • Popular lecture in S&T • Popular Science slide shows
12.	Pushpa Gujral Science City, Kapurthala	<ul style="list-style-type: none"> • Popular Science exhibition • Popular lecture by Dr. Ashok Sahni • Popular Science shows • Declamation Contest
13.	Mata Gujri College, Fatehgarh Sahib	<ul style="list-style-type: none"> • Model Making • Lectures • Debate • Quiz
14.	Deptt. of Applied Sciences, Chitkara University, Village Jhansla, Tehsil Rajpura, Distt. Patiala-	<ul style="list-style-type: none"> • Popular lectures in S&T • Debates/Competitions
15.	Progressive Youth Forum, Research Training and Development Centre, V.P.O. Ghagga, Tehsil Patran, Distt. Patiala	<ul style="list-style-type: none"> • Seminar
16.	S.J.S. Govt. High School, Chamba Kalan, Distt. Tarn Taran	<ul style="list-style-type: none"> • Popular Science Slide shows • Debates/Competitions

17.	Entrepreneurship Training & Rural development Initiatives (ETRDI), Sector 79, Mohali.	<ul style="list-style-type: none"> Lectures in S&T (3) Science Slide Shows(2) Debates/Competitions (2)
18.	Bharat Gyan Vigyan Samiti, Majitha Road, Amritsar	<ul style="list-style-type: none"> Exhibition Poster Making Competition
19.	Institute of Ecology & Environment, Pathankot	<ul style="list-style-type: none"> Model Making Popular S&T Exhibitions Other projects
20.	Bharat Jan Gyan Vigyan Jatha (BJGVJ), 139-E, Kitchlu Nagar, Ludhiana	<ul style="list-style-type: none"> Popular S&T Exhibition Popular Lectures in S&T Popular Science Slide Shows Debates/Competitions BJGVJ Type Activity
21.	Adesh Institute of Engineering & Technology, Faridkot	<ul style="list-style-type: none"> Popular Science Lecture Demonstrations Mock Parliament, Seminars and Symposia
22.	Shastri Model School, Phase-1, S.A.S. Nagar (Mohali)	<ul style="list-style-type: none"> Visit to PGSC Popular Lectures in S&T Development of low cost Scientific toys Popular Science Slide show Popular S&T Exhibition
23.	Govt. Middle School, Sher Khan Wala, Distt. Mansa	<ul style="list-style-type: none"> Popular S&T Exhibition Popular Lectures in S&T Debate & Competitions Development of low cost Scientific toys
24.	Govt. Sen. Sec. School, V.P.O. Boha, Distt. Mansa	<ul style="list-style-type: none"> Popular lectures in S&T Debates/Competitions
25.	Shanti Devi Arya Mahila College, Dinanagar, Gurdaspur	<ul style="list-style-type: none"> Inter-College Quiz Competition Seminar/Lecture Training Programme Model Making
26.	Department of Applied Sciences, Giani Zail Singh College of Engineering & Technology, Dabwali Road, Bathinda	<ul style="list-style-type: none"> Invited Lecture Popular Science Slide Show Debate, Extempore, Speech and Poster making Competition
27.	Baba Farid College of Engineering & Technology, Village Deon, Muktsar Road, Bathinda	<ul style="list-style-type: none"> Popular lectures in S&T Popular Science Slide Show Debates/Competitions Other projects
28.	Navjivan Educational Society, V.P.O. Khamera, Tehsil- Anandpur Sahib, Ropar	<ul style="list-style-type: none"> Workshop Popular lecture in S&T Competitions
29	National Progressive Society, Vill. Nangran, P.O. Bhallan, Tehsil – Nangal, Distt. Ropar	<ul style="list-style-type: none"> Popular lecture in S&T Competition
30	Jagriti Sabhiachark and Sports Club, Vill. Surewal/Sehjowal, Tehsil Nangal, Distt. Ropar	<ul style="list-style-type: none"> Popular lecture in S&T Competition Workshop
31	Guru Nanak Dev Educational society, Vill. Palasi, P.O. Bhanam, Tehsil-Nangal, Distt. Ropar	<ul style="list-style-type: none"> Competition Workshop
32	Rashtraya Sewa Samiti Educational Trust, Vill. Attari, P.O. Gardley, Tehsil Anandpur Sahib, Distt. Ropar	<ul style="list-style-type: none"> Popular S&T Exhibition Popular lecture in S&T Competitions
33	Shri Guru Teg Bhadur Youth Club, Vill. Burj, P.O. Jhinjri, Tehsil Anandpur Sahib, Distt. Ropar	<ul style="list-style-type: none"> Popular S&T Exhibition Popular lecture in S&T Competitions
34	Ek Noor Kalan Club, Vill. Gag, P.O. Jindwari Tehsil – Nangal, Distt. Ropar	<ul style="list-style-type: none"> Popular S&T Exhibition Popular lecture in S&T Competitions
35	New Educational And Sports Society, Vill. Surewal/Sehjowal, Tehsil Nangal, Distt. Ropar	<ul style="list-style-type: none"> Popular S&T Exhibition Popular lecture in S&T Workshop
36	Shiva Public School, V.P.O. Bhanan, Tehsil Nangal,	<ul style="list-style-type: none"> Popular S&T Exhibition Popular lecture in S&T

	Distt. Ropar	<ul style="list-style-type: none"> • Competitions • Awareness Rally
37	Jiwan Jyoti Jagriti Educational & Welfare Society, V.P.O. Thalu, Tehsil Nangal, Distt. Ropar	<ul style="list-style-type: none"> • Popular S&T Exhibition • Popular lecture in S&T • Competitions
38	Adarsh Educational & Sports Society, Vill-Taraf Majri, P.O. Bhallan, Tehsil Nangal, Distt. Ropar	<ul style="list-style-type: none"> • Popular lecture in S&T • Competition • Workshop
39	D.A.V. Senior Secondary School, Vill.-Surewal/Sehjewal, P.O. Sukhsal, Tehsil-Nangal, Distt. Ropar.	<ul style="list-style-type: none"> • Popular lecture in S&T • Competition
40	Baba Jujhar Singh Sports Educational Development Society, Vill-Samundria, P.O. Khera Kamlot, Tehsil Anandpur Sahib, Distt. Ropar	<ul style="list-style-type: none"> • Popular S&T Exhibition • Popular lecture in S&T • Competition
41	New Public School, Vill. Gag, P.O. Jindwari, Tehsil Nangal, Distt. Ropar	<ul style="list-style-type: none"> • Popular S&T Exhibition • Popular lecture in S&T • Competition • Awareness Rally
42	Baba Gurditta Public School, Vill.-Dumewal, Tehsil-Anandpur Sahib, Distt. Ropar	<ul style="list-style-type: none"> • Popular S&T Exhibition • Popular lecture in S&T • Competition
43	Baba Gurditta Educational Society, Vill.-Dumewal, Tehsil-Anandpur Sahib, Distt. Ropar	<ul style="list-style-type: none"> • Competition • Workshop
44	Government Middle School, Village Balauli, P.O. Kotla Power House, Distt. Ropar	<ul style="list-style-type: none"> • Visit of School Students to Science City, Kapurthala.
45	Mohali Welfare Society for Health, Education & Research, Sector-65 (Phase-XI), S.A.S. Nagar	<ul style="list-style-type: none"> • Popular lecture in S&T • Poster Competition • Plantation
46	MCM DAV College for Women, Sector 36-A, Chandigarh	<ul style="list-style-type: none"> • Popular lecture in S&T • Popular Science Slide Shows
47	S.D. Sarvhitkari Vidya Mandir (Sr. Sec. School), Talwara 144216, Distt. Hoshiarpur	<ul style="list-style-type: none"> • Popular S&T Exhibition • Debates/Competitions
48	Rayat & Bahra College of Education, Sahauran, Tehsil Kharar, Distt. Mohali	<ul style="list-style-type: none"> • Power-point presentation • Debate • Extension Lecture • Poster Making • Slogan Writing
49	Friends' Library, Nagran Chowk, Nabha-147201, Distt. Patiala	<ul style="list-style-type: none"> • Lecture • Seminar • Paper Reading Contest • Model Making
50	Punjab School Education Board, Phase-8, Mohali (SAS Nagar)	<ul style="list-style-type: none"> • Popular lecture in S&T • Debates/Competitions
51	Society For Women Empowerment & Rural Advancement (SWERA), Sector 35-C, Chandigarh.	<ul style="list-style-type: none"> • Training & Orientation Workshop • Debates/Competitions • Development of low cost Scientific Toys
52	Social And Economic Development Centre, V.P.O. Kotla Power House, Anandpur Sahib, Distt. Ropar	<ul style="list-style-type: none"> • Popular lecture in S&T • Popular Science Slide Shows • Quiz/Debates/Essay Competitions
53	Khalsa College For Women, Amritsar	<ul style="list-style-type: none"> • Popular lecture in S&T • Popular Science Slide Shows
54	Shri Guru Nanak Dev Educational & Welfare Society, Vill. Pachrandia, P.O. Jhaj, Tehsil Anandpur Sahib, Distt. Ropar,	<ul style="list-style-type: none"> • Popular lecture in S&T • Competition • Workshop
55	Govt. High School, Samlah, PO-Via Kotlapower House, Tehsil Anandpur Sahib, Ropar	<ul style="list-style-type: none"> • Debates/Competitions • Other Projects
56	People's Forum, H.O. Bargari, Faridkot	<ul style="list-style-type: none"> • Debate • Lecture
57	The Indian Rural Dev. & Social Welfare Society, V.P.O. Hariyou Khurd, Tehsil Patran, Distt. Patiala	<ul style="list-style-type: none"> • Popular lecture in S&T • Debates/Competition

		<ul style="list-style-type: none"> • Other Projects
58	Major Ajaib Singh Sr. Sec. School, Jiwanwala, Faridkot	<ul style="list-style-type: none"> • Thematic S&T Exhibition • Popular Lecture, demonstrations • Popular Science Slide show • Village/Block Level Debates/Quiz/Essay Competitions • Internet based activities
59	Om Prakash Bansal Modern School, Mandi Gobindgarh, Distt. Fatehgarh Sahib, Punjab.	<ul style="list-style-type: none"> • Popular lecture in S&T • Debate/Paper Reading Contest
60	The Rural & Women Welfare Society, Village Bhattian, Khanna (Ludhiana), Punjab.	<ul style="list-style-type: none"> • Popular lecture in S&T • Debates/Competitions • Other projects
61	Baba Banda Singh Bahadur Engineering College, Fatehgarh Sahib,	<ul style="list-style-type: none"> • Popular lecture in S&T • Popular S&T Exhibitions • Debates/Competitions • Popular Science Slide shows • Other projects
62	Gian Jyoti Public School, Phase-2, S.A.S. Nagar, Mohali	<ul style="list-style-type: none"> • Popular S&T Exhibitions • Competitions (Quiz) • Debates
63	DCM Public Sr. Sec. School, Kotkapura (Faridkot), Punjab	<ul style="list-style-type: none"> • Lecture by eminent Professor • Other Activities
64	Department of Physics, SGGGS College, Sector-26, Chandigarh.	<ul style="list-style-type: none"> • Debates & Competitions (Quiz Competition)
65	Department of Physics, Panjab University, Chandigarh.	<ul style="list-style-type: none"> • Two days workshop • A public lecture by the director, DRDO
66	Department of Chemistry & Centre of Advanced Studies in Chemistry, PU, Chandigarh	<ul style="list-style-type: none"> • Debates/Competitions • Exhibition & Model Making
67	Dr B R Ambedkar National Institute of Technology, G T Road Bye Pass, Jalandhar	<ul style="list-style-type: none"> • Popular lecture in S&T
68	Khalsa College, Amritsar	<ul style="list-style-type: none"> • Seminar • Competition
69	DAV Public School, Bhupendra Road, Patiala	<ul style="list-style-type: none"> • Declamation • Chart/Poster Making Competition
70	Rayat International School, Railmajra, Distt S.B.S. Nagar, Punjab.	<ul style="list-style-type: none"> • Popular S&T Exhibitions • Lectures in S&T • Competition • Scientific toys
71	PEC University of Technology, Chandigarh	<ul style="list-style-type: none"> • Science Quiz • The Energy Idea Competition
72	Subject Expert State Institute of Science Education, Chandigarh.	<ul style="list-style-type: none"> • Slide shows • Quiz Competition
73	State Institute of Education, Punjab, Chandigarh.	<ul style="list-style-type: none"> • Awareness • Action
74	Guru Nanak Dev University, Amritsar.	<ul style="list-style-type: none"> • 15th Punjab Science Congress
75	DAV Institute of Engg. & Technology, Kabir Nagar, Jalandhar,	<ul style="list-style-type: none"> • Expert Talk • Competition on Scientific Computing • Science Quiz
76	Indo Global College of Engineering , Abhipur, Distt. SAS Nagar,	<ul style="list-style-type: none"> • Lecture on Non Conventional Energy Generation.
77	School of Communication Studies, Panjab University, Chandigarh	<ul style="list-style-type: none"> • National Seminar aimed at understanding new media technologies for its use in mass communication.
78	Satguru Ram Singh Govt. Polytechnic College for Girls, Rishi Nagar, Ludhiana	<ul style="list-style-type: none"> • Popular lecture in S&T • Popular S&T Exhibitions
79	Bharat Gyan Vigyan Samiti, Punjab & Chandigarh, DOC Patiala.	<ul style="list-style-type: none"> • Competition (Poster Making, Quiz/Debate) • Training Seminar
80	Bharat Gyan Vigyan Samithi, Kotkapoor, Faridkot	<ul style="list-style-type: none"> • 2 Days Workshop • Awareness Campaign (Seminars, Exhibitions, Competitions)
81	Punjab State Council for Science & Technology, Chandigarh.	<ul style="list-style-type: none"> • District Level Essay Competition. • State Level Essay Competition
82	Govt. High School, Dhab Khushhal Joian, Distt. Ferozepur	Visit to PGSC Kapurthala

83	JRC Model Govt. Primary School, Machaki Mal Singh, Distt. Faridkot.	<ul style="list-style-type: none"> • Exhibition • Drawing & painting competition • Excursion
84	Chitkara College of Education for Women, Chitkara University, Rajpura.	<ul style="list-style-type: none"> • Organization of expert talk and various intra college competitions on the eve o World Water Day, March 22, 2012.
85	Govt. Middle School, Saloh, Distt.S.B.S. Nagar	<ul style="list-style-type: none"> • Popular Lectures • Poster making comp. • Dev. Of Low cost scientific toys. • Quiz competition

ANNEXURE-V

List of winners of the State Level Science Essay Competition – 2011

English	
Ist Prize	Sukhdeep Kaur, Dasmesh Public School, Faridkot.
2nd Prize	Bahaar Pathania d/o St. Francis School, 31-Cantonment, Amritsar.
3rd Prize	Simran Dhanoa, Shivalik Public School, Nawanshahar (SBS Nagar)
Consolation Prize	Karamvir Kaur, Baba Farid Sr. Sec. School, Deon, Bathinda.
Punjabi	
Ist Prize	Lovepreet Kaur, Govt. High School, Cheema Jodhpur, District Barnala.
2nd Prize	Amandeep Kaur d/o Hardip Singh, Govt. Sr. Sec. School, Goindwal Sahib, Taran Taran.
3rd Prize	Anu, Govt. Sr.Sec. School, Kala Sanghiya, District Kapurthala.
Consolation prize	Manpreet Kaur, Govt. Sr. Sec. School, Lodimajra, Ropar.

Annexure -VI

Selected Participants for National Level Children's Science Congress – 2011

Sl. No	Name of the Group Leader and Group members	School	Guide Teacher	Project Title
01	(i) Shivanshu (ii) Puneet Kaur (iii) Hanisha Goyal (iv) Sutej Bains (v) Gunsheel	Delhi Public School , Ludhiana	Mrs Nidhi Jain, Mrs. Hampreet Sidana	Hidden Hunger
02	(i)Balpreet Singh Dhindsa (ii)Vikas Singla (iii)Jatinder Sharma (iv)Dilpreet Singh (v)Ramandeep Bhasin	Springdales Public Sen.Sec School Sangrur	Chander Parkash	An innovative technique for soil sampling and measurement of Its Carbon Sink capacity for better yield
03	(i) Garima Bansal (ii) Himanshu Singh Matharu (iii) Manmeet Kaur Baxi (iv) Prabhav Kumar Gaur (v) Sonalika Sharma	Our Lady of Fatima Convent Senior Secondary School, Patiala	Dr. Vandan Ralhan, Mrs. Lipi Mathur	Organic Gardening: A natural therapy of Soil
04	(i)Diksha Bhardwaj (ii)Jagdeep Singh (iii)Karanpreet Singh (iv)Sumandeep Kaur (v)Rajbir Kaur	Guru Amar Dass Adarsh Institute Goindwal Sahib (Tarn Taran)	Santosh Kumar	To save our land by proper arrangement of sewage.
05	(i) Harsh Banaal (ii)Manav (iii) Rohin Devgan (iv) Manjot Singh (v) Mohit Chawala	Shri Ram Ashram Senior Sec School, Amritsar	Surinderbir Kaur	Pollution in Water sources
06	(i) Shamsher Singh (ii) Kanwaljeet kaur (iii) Vishali Bhardwaj (iv) Sukhjinder Singh (v) Mehakjeet Kaur	Sri Guru Nanak Dev Sen. Sec School Jaurian Kalan, Gurdaspur	Arti Bala	Over use of fertilisers in the vegetable field
07	(i)Harpreet Kaur (ii)Shweta Sharma (iii)Komal Sharma (iv)Rajwinder Kaur (v)Kulwinder Singh	Govt. High School, Das Grain, Ropar	Foran Chand	Ways to improve Organic Matter of Soil
08	(i)Mandeep Kaur (ii)Gagandeep Singh (iii)Sunil Kumar (iv)Gurpreet Singh (v)Sukhjeet Singh	Govt High School Koharwala, Faridkot	Satpal Singh	Rain Water Harvesting
09	(i) Guneet Sharma (ii) Mehakpreet Kaur (iii) Parish Aggarwal (iv) Vani Batra (v) Yashika Goyal	Our Lady of Fatima Convent Senior Secondary School, Patiala	Mrs. Lipi Mathur, Mrs. Vandana	Miniature Fern: A Natural Wonder
10	(i)Varinder Singh (ii)Amritpal Kaur (iii)Harsimran Kaur (iv)Abhipreet Kaur (v)Navpreet Kaur	Guru Amar Dass Senior Secondary School, Goindwal Sahib	Sh. Santosh Kumar	To make the farmers aware about the bad effects of chemical fertilizers

11	(i)Shaurya Gulati (ii)Sonakshi (iii)Muskaan (iv)Uday Singh (v)Anant Simran	Vivek High School, Sec-70, Mohali	Ajinder Kaur	Lend a hand to save the land – Eradicate Parthenium
12	(i) Amrinder Kaur (ii)Gagandeep Kaur (iii)Amarjeet Kaur (iv) Manpreet Kaur (v)Lakhveer Kaur	Shri Guru Gobind Singh Public Sen. Sec. School, Jindra	Puneet Sharma	Burning of Parali Husk
13	(i) Nitin Kumar (ii) Shubham Mehta (iii) Isha Passi (iv) Rajbir Kaur (v) Amit Kalia	Ch.Balbir Singh Public School Hoshiarpur	Mrs. Manjit Kaur	To know the vertical distribution of soil layers of your locality.
14	(i) Manjot Kaur (ii)Paramjit Kaur (iii) Supreet Kaur (iv) Sukhmeet Singh (v)Vikramjit Singh	Shri Guru Harkishan Public School Hoshiarpur	Mrs. Monika Nayyar	Effect of pesticide on Land
15	(i) Sonali (ii) Jasleen Kaur (iii) Jaswant Kaur (iv) Dilreet Kaur (v) Ankita	JNJDAV Sen. Sec. School, Giddarbaha, Muktsar	Mrs. Manu	Effects of brick kilns on land
16	(i) Diya Singla (ii) Shrishti Chaudhary (iii)Souravpreet Singh (iv)Namandeep Sheoran (v)Inayat Brar	The Millennium School Sussant City-1 Kot Shamir Bathinda	Barminderpal Sekhon , Navpreet Kaur	Status of Water Quality and its impact on soil properties

Annexure-VII

Details of organizations and activities taken up under National Technology Day 2011

S.No	Name & address of the organization	Activities undertaken
1.	Adesh Institute of Engg. & Tech., Faridkot	Popular Lectures by 2 eminent scientists Mock Parliament, Seminar and Symposia for Students
2.	Layallpur Khalsa Collegiate Sr. Sec. School, Jalandhar.	Trip to Verka Milk Plant, Jalandhar Trip to Nanotechnology & Pharmaceutical Deptt. of GNDU, Amritsar.
3.	National Institute of Pharmaceutical Education & Research, Mohali	Sponsoring visit of school students to NIPER, Lecture on Nano Technology, Poster Competition
4.	Govt. Primary School, Machaki Mal Singh, Distt. Faridkot-151209	Excursion Trip to Science City
5.	Govt. Primary School, Saranwali, PO Wara Bhai, Distt. Ferozepur.	Visit to PGSC
6.	Rayat & Bahra College of Education, Sahauran, Mohali.	Seminar on Integration of Technology in Education
7.	Punjab School Edu. Board, Mohali.	Distribution of Awareness material, Seminar on Basic concepts of Technology, Visit to Technology Hubs
8.	MAS Sr. Sec. School, Jiwan Wala, Distt. Faridkot.	Slide Show, model making, industrial visit and trip to science city, Robotic activities
9.	SISE, Punjab, SCO 66-67, Sector 17-A, Chandigarh	Visit of 40 students, teachers of Govt. High School, Nai Wala to Standard Automobile Workshop, Handiaya and water treatment plant, Barnala
10.	Friends Library, Nagran Chowk, Nabha, Distt. Patiala.	Paper reading Contest, Quiz Visit to PGSC
11.	Social and Economic Dev. Centre, VPO Kotla Power House, Anandpur Sahib, Distt. Ropar	Visit to Industry and PGSC
12.	Indo Global College of Engg. Indo Global Education City, Distt. SAS Nagar, Mohali (Pb.)	Special Talk on Sensor and Biomedical Engg. and declamation Contest, Trip to PGSC
13.	Association for Social & Rural Advancement (ASRA) Vill. & PO Dher, Distt. Ropar	One day Technology Fair
14.	Saraswati Model School Parbhandhak Committee, Vill. Sahota, PO Jhinjri, Distt. Ropar.	Visit to PGSC
15.	Shri Durga Mehila Mandal, Vill. & PO Dher, Distt. Ropar	Excursion to Telephone Exchange, Water Treatment Plant, Railway Control Room, Thermal Power House, IIT Ropar.
16.	Beant College of Engineering & Technology, Gurdaspur -143521	Slide show, Visit to Milk Plant, Gurdaspur Visit to Sugar Mill, Punriar
17.	Sri Guru Gobind Singh College, Sector 26, Chandigarh-160019	Excursion trip to IMTECH/NIPER/STEP for Biotech and Microbial students Lecture on developing technology
18.	DCM Public Sr. Sec. School, Kotkapura, Distt. Faridkot.	Excursion to Milk Plant and Rie Mill & visit to PGSC Lecture on Technology day, Chart making competition
19.	Peoples Forum, VPO Bargari, Distt. Faridkot.	Tour to HMT Pinjore of 55 students and teachers
20.	Shaheed Bhagat Singh College of Engineering & Technology, Ferozepur-152004	Quiz and expert talk
21.	Akrita-Krit Society, Mohali.	Talk on integrated farming and organic farming by expert for 50 farmers Visit to organic farm in Fatehgarh Sahib Distt.
22.	Social Work and Rural Development Centre, Nurpur Bedi, Distt. Ropar.	Visit to PGSC
23.	Govt. Industrial Training Institute, Jalandhar Road, Hoshiarpur	Visit to Bhakhra Dam
24.	Govt. Middle School, Baloli, Tehsil Anandpur Sahib, Distt. Ropar	Visit of 65 students to PGSC
25.	Gurukul Vidyapeeth Group of Institutes, Chandigarh	Presentation on Climate Change Vulnerability Analysis tools and technologies, Climate change Impact and Vulnerability, Influence on water resources, Mitigation Technologies
26.	Department of Zoology, Punjabi University, Patiala	Excursion tour to institute of Himalayan Bio resource Technology (CSIR)
27.	Pushpa Gujral Science City, Kapurthala	Film shows, video programmes, slide shows Developing innovative projects working models, gadgets and their

		exhibition. Special talks and demonstrations on selected themes
28.	Rayat International School, Raimajra, Near Ropar, Distt. SBS Nagar	Celebration of Technology Day
29.	District Science Supervisor, Ropar	Lecture on Technology

Annexure-VIII

The list of approved applications under Travel Grant Scheme (2011-12)

Sl. No.	Name and Address of the applicant	Details of Conference
1.	Ms. Gurmeet Kaur, Associate Professor University College of Engineering, Punjabi University, Patiala	International Conference on Information and Electronics Engineering at Bangkok, Thailand from May 28-29, 2011
2.	Dr. Gurpreet Kaur, Asst. Plant Breeder Dept. of Plant Breeding & Genetics, PAU, Ludhiana	13th International Rapeseed Congress, Prague Congress Centre, Prague, Czech Republic from June 5th - 9th, 2011
3.	Dr. Charu Arora Chugh, Department of Chemistry, Lovely Professional University, Phagwara, Punjab.	5th International Congress of Chemistry and Environment from 27th to 29th May 2011 at Port Dickson, Malaysia
4.	Dr. Neena Singla, Deptt. of Zoology, PAU, Ludhiana	Oral presentation of paper in 8 th European Vertebrate Pest Mngt. Conf. in Berlin, Germany (26-30 Sept. 2011)
5.	Dr. Rakesh Kumar Garg, Deptt. of Forensic Sciences, Punjabi University, Patiala	Chairing a session in the 19 th Triennial meeting of Int. Assoc. of Forensic Sciences at Portugal (12-17 Sept. 2011)
6.	Prateek Bhanot, RA Thapar University, Patiala	Oral presentation in 1 st Global Communication on Science & Information Engineering at London, UK (25-27 July 2011)
7.	Ms. Rekha Rani, JRF Material Research Lab, School of Physics and Material Science, Thapar University, Patiala	ICE-2011 (International Conference on Electroceramics) University of New South Wales, Sydney (Australia) from 12.12.11 to 16.12.11
8.	Ms. Renu Rani, Research Scholar School of Physics and Material Science, Thapar University, Patiala	ICE-2011 (International Conference on Electroceramics) University of New South Wales, Sydney (Australia) from 12.12.11 to 16.12.11
9.	Sh. Jaswinder Singh (Assistant Professor) Department of Zoology, Khalsa College, Amritsar	2 nd International Conference on Solid Waste Management (ICON SWM-2011) at Jadavpur U/niversity, Kolkata from 9 th - 11 th November, 2011
10.	Dr. Ashok Kumar (Assistant Professor) Department of Sports Sciences, Punjabi University Patiala	5 th Aasia-Pacific Conference on Exercise & Sport Science (APCESS) at Shanghai University of Sport (SUS), Shanghai, China from 2 nd -4 th November, 2011
11.	Ms. Ranjit Kaur, Associate Professor, University College of Engineering, Punjabi University, Patiala	International Conference on Circuits, Systems, Electronics, Control & Signal Processing (Csecs-2011), Montreux, Switzerland from December 29-31, 2011
12.	Er. Nirmal Singh Kalsi, Associate Professor (Mechanical Engineering), Beant College of Engineering and Technology, Gurdaspur	20 th International Symposium On Processing And Fabrication Of Advanced Materials (Pfam Xx), at Department of Mechanical Engineering, The Hong Kong Polytechnic University Hong Kong, China from December 15-18, 2011
13.	Ms. Savita Mahi, Lecturer, Sant Baba Bhag Singh Institute of Engineering and Technology, Vill. Khiala, P.O. Padhiana, Distt. Jalandhar	IJAS International Conference for Academic Disciplines at Ryerson University, Toronto, Canada from May 21 to 24 May, 2012

The list of approved applications under Student Project Program (2011-12)

Sl. No.	Name and Address of the applicant	Topic of the project
1.	Isha Babbar, Deptt. Of Zoology GNDU, Amritsar	"Induction of the chromosomal aberrations in mice after treatment with the aromatic amines"
2.	Ravinder Kaur, Deptt. of Zoology, GNDU, Amritsar	"Micronucleus essay as a marker of genotoxicity of Basic violet-1"
3.	Gaurav Chauhan, ISF College of Pharmacy, Moga	"Development of novel nano-herbal based antiretroviral (ARV) microbicidal formulation"
4.	Akshdeep Sandhar Shivalik College of Pharmacy, Nangal Dist. Ropar, Punjab	"Exploring novel acid catalyst for the multicomponent one pot synthesis of 1,5-benzodiazepines as CNS active agents"
5.	Prabjot Kaur Shivalik College of Pharmacy, Nangal Dist. Ropar, Punjab	"Comparative Report for the Synthesis of 1,4-Dihydropyridines as Important Medicinal Compound by Conventional, Microwave, Ultrasonication and Solvent free Techniques"
6.	Tarun Gandhi I.S.F College of Pharmacy, Moga/Quality Assurance Department	"Development of stability-indicating HPLC method for determination of Nitric Oxide releasing paracetamol derivatives."
7.	Sapna Malik Shivalik College of Pharmacy, Nangal Dist. Ropar, Punjab	"Targeting nitrogen mustard across brain by chemical drug delivery system as potential brain antitumour agent"

Annexure-IX

PUNJAB STATE COUNCIL FOR SCIENCE & TECHNOLOGY
MGSIPA COMPLEX, SECTOR-26, CHANDIGARH

UNAUDITED TENTATIVE RECEIPT AND PAYMENT ACCOUNT FOR THE YEAR ENDING 31st MARCH 2012

<u>Payments</u>	<u>Schedule</u>	<u>01.04.2011 To 31.03.2012</u>	<u>01.04.2010 To 31.03.2011</u>	-	<u>Receipts</u>	<u>Schedule</u>	<u>01.04.2011 To 31.03.2012</u>	<u>01.04.2010 To 31.03.2011</u>
Employee Cost	VII	32,244,769.00	22,462,453.00		<u>Grant-in-aid</u> Technical Secretariat			
Administrative & Other Expenses	VIII	1,826,712.89	2,288,403.20		Government of India		10,950,000.00	9,550,000.00
					<u>Government of Punjab</u>			
Expenses on Projects/Grants					Technical Secretariat for PSCST		11,320,000.00	8,650,000.00
					Strengthening of Staff-Setting up of Env. Wing		5,630,000.00	4,320,000.00
							27,900,000.00	22,520,000.00
Previous year Expenses			-					
Depreciation on Fixed Assets	IV	742,200.59	856,621.26		Project Receipts	IX	2,415,332.00	1,050,000.00
Transferred to Technical Fund			-		Interest Received	X	2,188,665.56	1,798,342.66
Surplus / (Deficit) For The Year		(2,066,198.92)	(104,666.80)		Other Receipts	XI	243,486.00	134,468.00
Total		32,747,483.56	25,502,810.66		Total		32,747,483.56	25,502,810.66

PUNJAB STATE COUNCIL FOR SCIENCE & TECHNOLOGY
MGSIPA COMPLEX, 26-C, CHANDIGARH
Unaudited Tentative BALANCE SHEET AS AT 31.03.2012

Liabilities	Schedule	As At 31.03.2012	As At 31.03.2011		Assets	Schedule	As At 31.03.2012	As At 31.03.2011
<u>Capital Fund</u>					Fixed Assets	IV	5,774,077.61	6,265,187.16
Opening Balance		22,494,692.34	22,599,359.14					
					Investments			-
Add/Less: Surplus/Deficit transferred from Receipt and payment account during the year.		(2,066,198.92)	(104,666.80)					
		20,428,493.42	22,494,692.34		<u>Current Assets, Loans & Advances :</u>			
Technical Service Fund		3,500,000.00	3,500,000.00		Current Assets	V	43,254,256.05	46,325,247.38
					Loans & Advances	VI	5,603,347.00	3,314,087.00
<u>Current Liabilities:</u>								
Grant-in-Aid for Projects/Schemes	I	29,513,358.24	29,501,547.20					
Sundry Creditors	II	38,075.00	36,482.00					
Other liabilities	III	1,151,754.00	371,800.00					
Total		54,631,680.66	55,904,521.54		Total		54,631,680.66	55,904,521.54