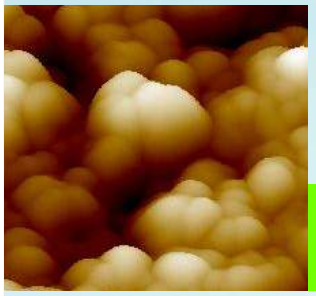
PUNJAB

A Leading Destination For Biotechnology and Nanotechnology

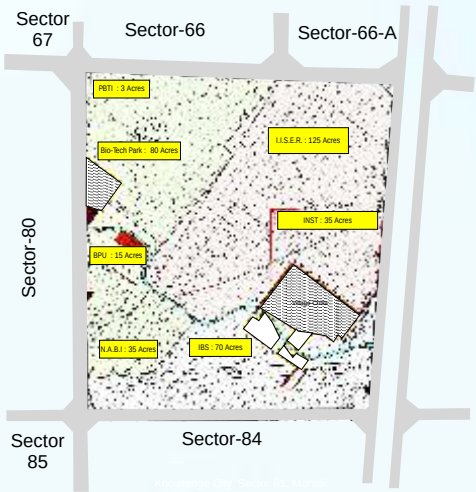


Punjab : A Leading Destination For Biotechnology and Nanotechnology

Punjab has led the country's economy in its endeavours for growth specially in the area of agriculture. It has an average growth rate of 10%, which is amongst the highest in the country. The State called 'Food Basket of India', was the forerunner in bringing the 'Green Revolution' and has been contributing 40-60% of rice and 60-70% of wheat to the central pool for more than two decades. Punjab is also making its mark in the global business scenario with major players from around the world setting up ventures here, especially in agri-business. In order to promote knowledge intensive sectors like Biotechnology & Nanotechnology for further growth in agriculture and agri-processing, the State Govt. has taken major initiatives for creating world-class infrastructure to support R&D as well as industrial growth in these areas.

Mega Projects for Infrastructure Development in Biotechnology & Nanotechnology

The first state-of-the-art institutional cluster is being set up in Punjab with an investment to the tune of Rs. 2000 crore. This cluster, aptly named as 'Knowledge City', is being developed on about 400 acre land in Mohali, one of the most serene and modern urban areas. The institutes / facilities coming up in the Knowledge City include an Agri-Food Biotechnology Cluster, Institute of Nano Science & Technology, Indian Institute of Science Education & Research and Indian School of Business.



Knowledge City, Sector 81, Mohali

Agri-Food Biotechnology Cluster

India's first Agri-Food Biotechnology Cluster is being set up in Mohali, Punjab. It comprises National Agri-food Biotechnology Institute (NABI), Bioprocessing Unit (BPU), Biotechnology Park and Incubator. The setting up of NABI and BPU by Department of Biotechnology, Govt. of India at a cost of Rs. 380 crore has been approved by the Union Cabinet. The salient features of various components of the cluster are as below:

1. National Agri-Food Biotechnology Institute (NABI)

The Institute will focus on agriculture and agri-processing for value addition using biotechnological innovations and will be set up on 35 acres of land. It will be an institute dedicated to translation and would increase the competitiveness of agri-food industrial sector through innovation and R&D support. The institute will also be involved in training world class human resource in food science & technology and nutritional science.

2. Bioprocessing Unit (BPU)

The Bioprocessing Unit would facilitate the scale-up and process optimization of new technologies to link the R&D system with a production facility.

DBT, GOI has already arranged temporary premises in Mohali for operationalising NABI and BPU in 2009.

3. Biotechnology Park

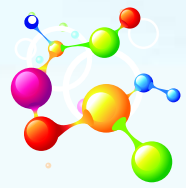
The Biotechnology Park would be set up in public-private partnership. The State Govt. has allocated 80 acres of land for the Park. DBT-GoI has got the feasibility study done for the Park through M/s Ernst & Young. The State Govt. has authorized Department of Biotechnology, Govt. of India to start the process for identifying private sponsor through bidding process

for development of the Park. The Park would provide:

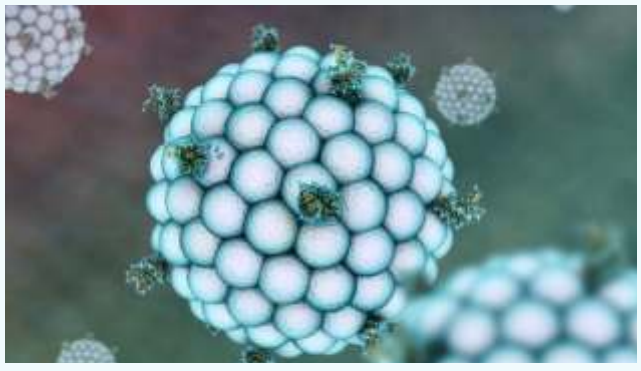
- Anchor Tenant Facility for large & medium scale companies for high-end research & development projects.
- Built-to-Suit Sites for small-scale industry for R&D and processing.
- Multi-Tenanted Facilities for research & development by start-up companies.
- A Service Arcade that would provide common facilities and utilities to the industry.
- Special Economic Zone in about 25 acre area of the Park.

4. Bio Technology Incubator

Punjab Biotechnology Incubator (PBTI) has been jointly setup by Govt. of Punjab and Govt. of India to serve the Agri Food Biotechnology cluster. PBTI has setup a state-of-the-art Quality Testing and Certification Facility as one of its service facilities in the transit premises at Mohali. This world class facilities is well-equipped and is operating as per International Standards to cater to the quality testing needs of Agri-Biotech and allied sectors. The facility is already serving Agri based sectors including dairy, fruits & vegetables, cereals, honey, malt, animal feeds, feeding stuffs etc.



Institute of Nano Science & Technology



In view of the pro-active role being played by Punjab Govt. for promotion of Science & Technology, Union Cabinet has approved the setting-up of Institute of Nano Science & Technology in Knowledge City, Mohali at a cost of Rs. 142 crore. This institute is one of the 3 state-of-the-art institutes planned under National Nano Science & Technology Mission for creating an eco-system to make India a global hub for research & development in Nanotechnology.

The institute envisages to focus on basic research, human resource development, transfer of discoveries and intellectual knowledge in the area of nanotechnology to industry partners for rapid application and commercialization of technologies for economic growth. The DST has made arrangements for immediate operationalisation of the institute in temporary premises in Mohali in 2009.

Indian Institute of Science Education & Research

Indian Institute of Science Education & Research (IISER) is being set up in the Knowledge City at a cost of Rs. 500 crore. One of the important objective of this institute is to make education and careers in basic sciences more attractive by providing opportunities in integrative teaching and learning of sciences and breaking the barriers of traditional disciplines. The institute has already started functioning in a transit campus at Chandigarh and offers integrated 5-year M.S. programme as well as Ph.D. programme. When fully developed, the institute will have 2000 students and 300 faculty members.

Indian School of Business

A World Class Business School would be setup in Knowledge City, Mohali in public private partnership for providing innovative linkages to the institutes in the cluster.

The institutional cluster at Knowledge City is envisaged to provide active interaction between scientists, engineers & entrepreneurs for commercialization of technologies, better job opportunities and economies of scale.

Biotechnology Policy

The State Govt. notified its IT-BT Policy in 2003 as part of the Industrial Policy under which special incentives are being given to promote the growth of biotech industry;

- Minimum floor rates of Sales Tax.
- No restriction on movement of capital equipment.
- No octroi on biotech items.
- Availability of power at industrial (and not commercial) power tariff.
- Exemption from Electricity Duty.
- Uninterrupted power supply.
- Captive power generation exempted from electricity duty.
- Exemption from Land and Building Tax.
- Exemption from NOC/Consent from Pollution Control Board.
- Self Certification of Factories Act, Employment Exchange (Notification of Vacancies Act), Payment of Wages Act, Workmen Compensation Act, Contract Labour (Regulation and Abolition) Act, Minimum Wages Act, Employees State Insurance Act.
- Permission to operate in three shifts.
- Exemption from Stamp duty & Registration fee.
- Exemption from land & building tax.
- Facilitation for regulatory approvals through single window service agency.

Existing Institutional Network and Human Resource

The State also has fairly large network of institutions and universities implementing strong biotechnology / nanotechnology research programmes:

Punjab Agricultural University (PAU)

PAU is the premier agriculture institution and has a School of Agricultural Biotechnology which is undertaking about 25 path-breaking research projects on various aspects of plant biotechnology including projects on rice & sugarcane transgenics. It has also developed micro-propagation protocols for various cash crops based on which 10 commercial tissue culture units have been set up in the State. The school offers B.Sc., M.Sc. & Ph.D. Biotechnology programmes. The university also offers Master's and Doctoral programmes in the areas of Biochemistry, Microbiology, Plant Breeding & Genetics. A state-of-the-art Electron Microscopy and Nanotechnology laboratory has also been set up in the university.

National Institute of Pharmaceutical Education & Research (NIPER)

NIPER has the distinction of being first national level institute in India in Pharmaceutical Sciences. The institute has internationally recognized expertise in drug target identification and validation and its success has led to the setting up of 6 more similar institutes in the country. The institute also has a dedicated Centre for Pharmaceutical Nanotechnology. The Institute offers 2 years M.Tech Course in Pharmaceutical Technology (Biotechnology) and M.S. (Pharm) in Biotechnology.

Guru Nanak Dev University (GNDU)

The university has strong research programmes in the areas of Human Genetics, Medical Biotechnology and Nanotechnology. It is the only university in Punjab at present that is offering postgraduate course in Nanotechnology. Besides, the university also offers Master's & doctorate programmes in Biotechnology, Bioinformatics, Microbiology, Fermentation & Microbial Technology, Human Genetics and Molecular Biology & Biochemistry.

Thapar University (TU)

The university has set up a Centre of Relevance in Excellence (CORE) in Agro & Industrial Biotechnology. It is offering B.Tech, M.Sc. & Ph.D. programmes in Biotechnology along with elective course for UG students in Nano Materials & Nanotechology.

Guru Angad Dev Veterinary & Animal Sciences University (GADVASU)

The University has recently established Department of Animal Biotechnology in College of Veterinary Sciences. The College offers B.V.Sc., M.V.Sc. and doctoral programmes in various disciplines of Veterinary Sciences.

Punjabi University

The University has Department of Biotechnology which offers M.Sc. Biotechnology, Microbial & Food Technology and Postgraduate Diploma in Bioinformatics apart from Doctoral Programmes.

The above institutes along with Punjab Technical University produce about 800 graduates, 400 postgraduates and 200 doctorates in core areas of Biological Sciences every year.

Biotechnology Programmes for Women & Rural Development

Consistent efforts have been made by Punjab State Council for Science & Technology to promote grass root biotechnological innovations relevant to socio-economic developmental needs of the rural areas of Punjab. A number of projects have been undertaken over the years to empower masses especially rural women & youth such as pioneering programme for promotion of neem based biopesticide involving low cost technology for preparation of neem kernel powder; cultivation and value addition of medicinal & aromatic plants including the setting up of processing & extraction units; promotion of biofertilizers; solid waste management through vermicomposting; pleurotus cultivation; natural vinegar production; ornamental fish culture; spirulina cultivation; genetic literacy programme focused on genetic disorders; capacity building on biosafety issues etc. with the support of Govt. of India and other national / international agencies.

New Initiatives in Agriculture / Horticulture

Diversification of Agriculture

To diversify the cropping pattern, contract farming of crops such as Hyola, Barley, Maize and Basmati Rice is being promoted through assured buy-back. – Punjab Agro Industries Corporation.

Promotion of Agro-industries

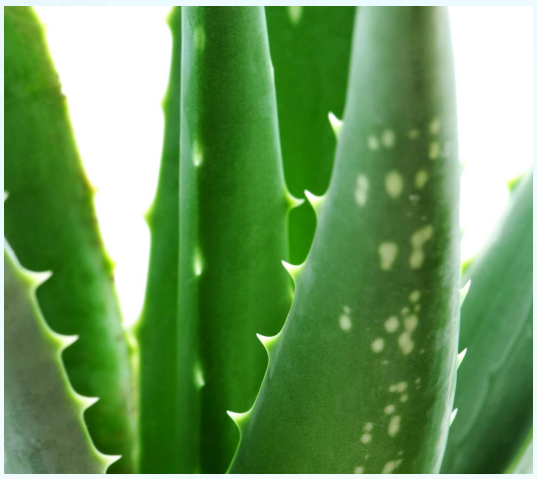
Special incentives are being given to agro-industries besides participation in equity. Till date, 44 projects have been promoted in agro-processing sector with investment of Rs. 705 crore with some of the major national and international companies such as PepsiCo, Voltas, Ranbaxy etc. and leading technology suppliers viz. Sandvik Process Systems (Italy), IMV (France), Fletcher (New Zealand), AG Seeds (Australia) etc. – Punjab Agro Industries Corporation.

Setting up of Post-harvest handling & processing infrastructure

Two multi purpose juicing plants have been set up having average daily capacity of 400 MT fruits & vegetables. Nine specialized high humidity cold stores, precooling-cum-cold storage centers with mobile pre-cooler and refrigerator vans have been

New Initiatives in Agriculture / Horticulture

introduced, a Food Park for primary processing has been set up with facilities of waxing, grading, high humidity cold storage and refrigerator transport. Further, a perishable cargo complex has been set up at international airport, Amritsar. Furthermore, 2 state-of-the-art multi fruit & vegetable processing units have been set up with an investment of Rs. 84 crore. – Punjab Agro Industries Corporation and Council for Value Added Horticulture in Punjab.



Further, a Viticulture Council has been set up which is supplying the root stock of improved varieties as well as the technical assistance for promoting grapes cultivation for table and processing purposes. – Council for Citrus & Agri Juicing in Punjab and Viticulture Council of Punjab.

Promotion of Organic Farming

Organic Farming is being promoted through assured buy-back arrangement. A model organic farm has been developed. - Organic Farming Council of Punjab.

National Horticulture Mission

Under National Horticulture Mission, cluster area approach has been adopted for promoting cultivation of fruits, flowers, spices, aromatic plants and vegetable seed production in various districts. Further, to ensure uninterrupted supply of disease-free planting material, an attractive subsidy is being provided for establishment of model nurseries and assistance is being provided for strengthening of existing tissue culture units. The subsidies are also being provided for promotion of floriculture. – Department of Horticulture.

Promotion of citrus cultivation and viticulture

A Citrus Council has been specifically set up to enable the State to usher in ‘Orange Revolution’. The Council has already brought 3000 acres under citrus plantation. Mechanical washing, waxing, grading lines and nurseries for citrus have been set up.

Net house cultivation

Cultivation of pesticide free vegetables in low cost net houses is being promoted in a big way. – The Punjab State Farmers’ Commission.

The mega projects of science & technology especially in the areas of Biotechnology, Nanotechnology & Applied Sciences with an investment to the tune of Rs. 2000 crore make Punjab the preferred destination for industrial investments in these areas.

Punjab State Council for Science & Technology

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