



सत्यमेव जयते

GOVERNMENT OF GUJARAT

# Biotechnology Sector Profile



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**GUJARAT** 10-13 Jan  
**2017**

Connecting India to the World | **8<sup>th</sup> Global Summit**

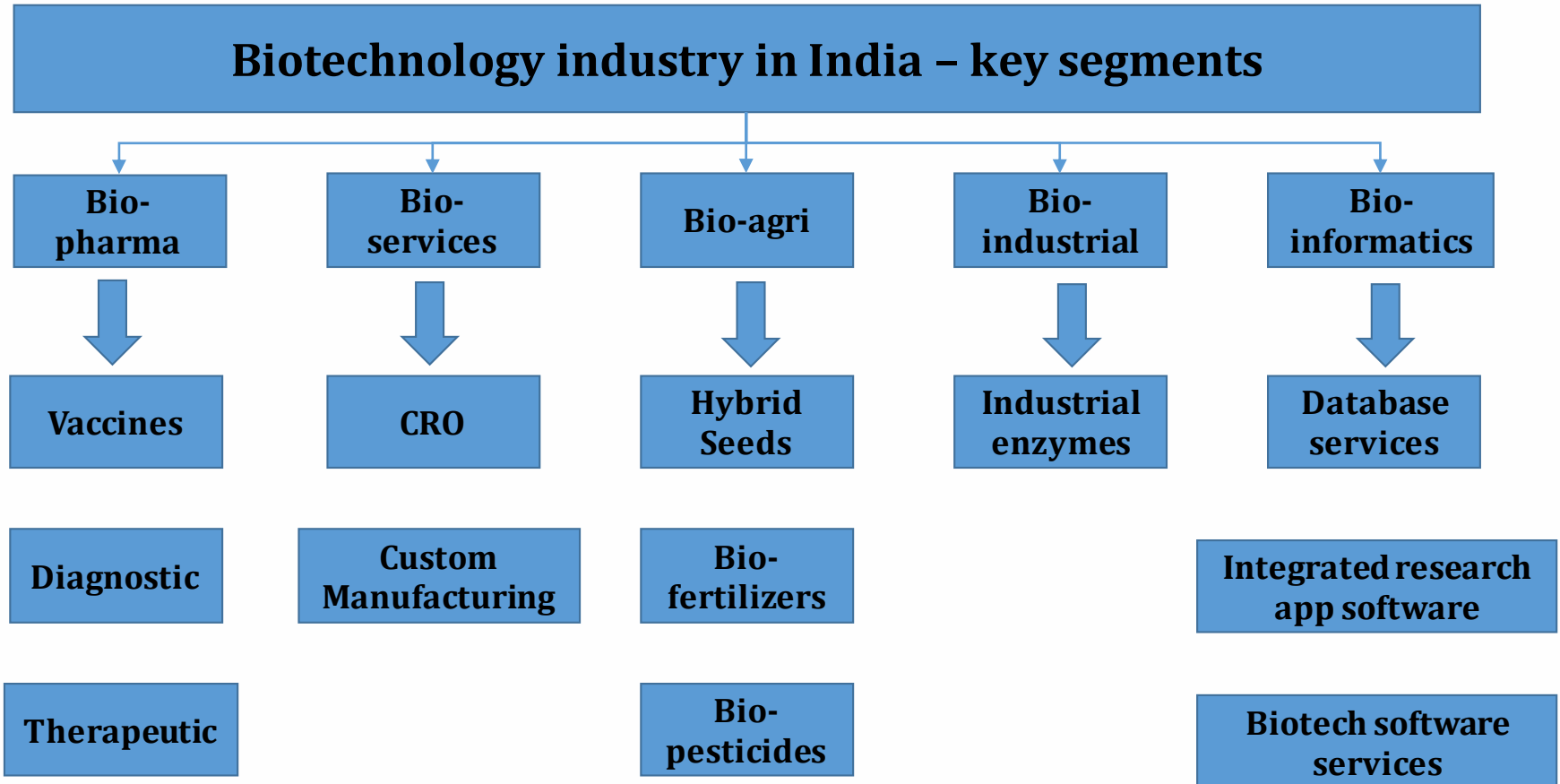


GOVERNMENT OF GUJARAT

# India Scenario



# Key Biotech segments in India

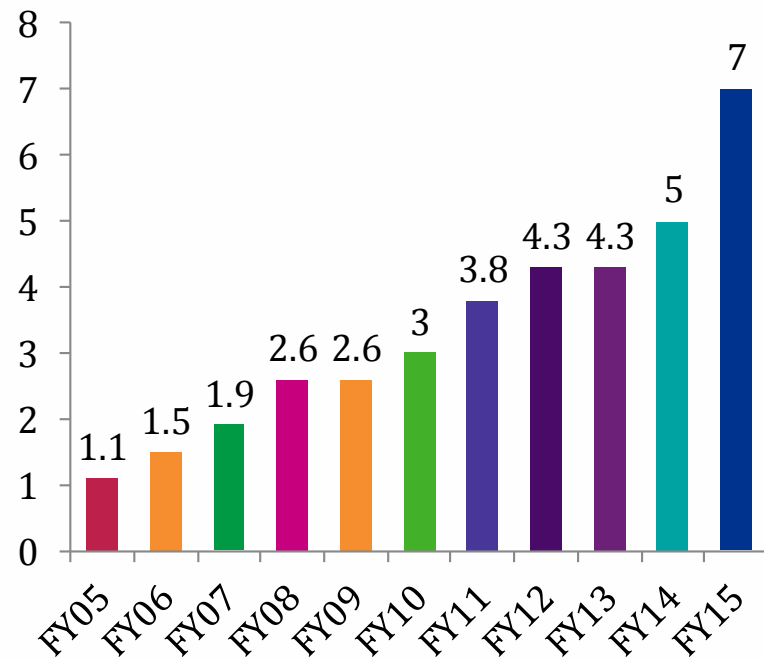


# India ranks among the top 12 bio-economies worldwide and is third largest in the Asia-Pacific



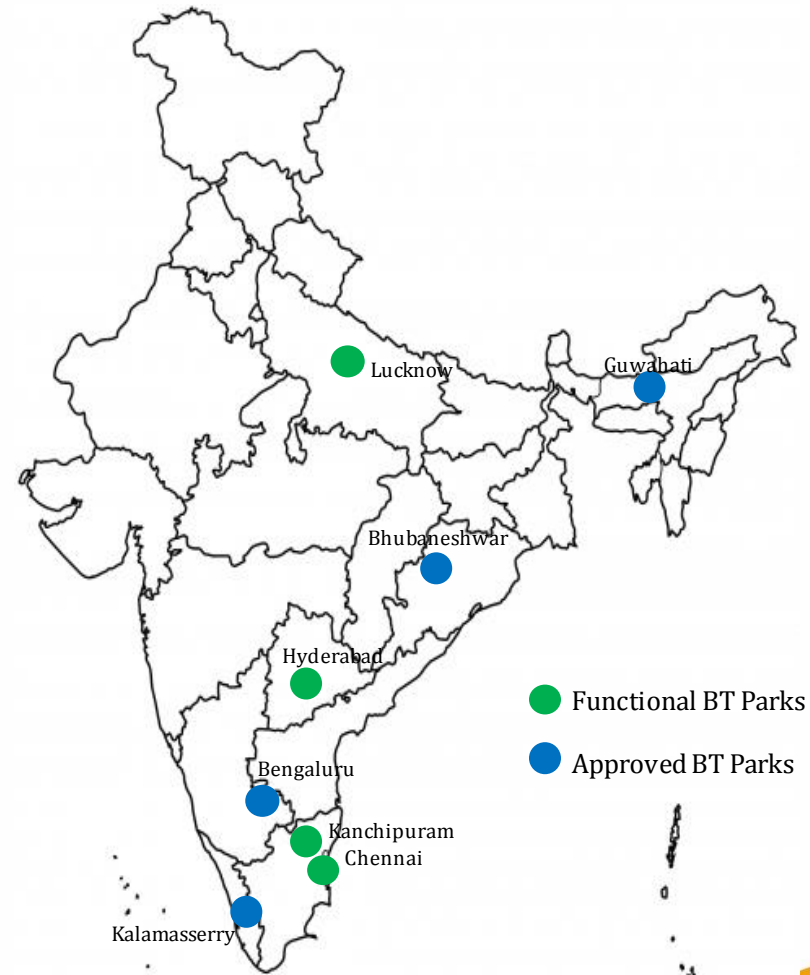
- Indian biotech industry market reached USD 7 billion in FY15, indicating a 10 year CAGR of over 20%
- Robust industry growth attributed to fast-developing clinical capabilities, and growth of clinical trials, contract research and manufacturing activities
- Industry size is expected to increase in size to USD 11.6 billion by 2017, also driven by a range of factors such as intensive R&D activities and strong government initiatives
- India is the world's largest cultivator of Vaccines and Bt Cotton

## Indian Biotechnology Market Size (USD billion)



# Robust growth of the biotechnology industry is enabled by strong infrastructure creation

- Government of India aims to set up 3-5 bio-clusters with technology incubators, technology parks, innovation centres and entrepreneurship development units
- Biotechnology infrastructure is witnessing a shift from traditional clusters to specialized industrial infrastructure such as biotech or science parks
- Following Biotech Parks have been established and are fully operational
  - Lucknow, Uttar Pradesh
  - Hyderabad BT Park, Andhra Pradesh
  - TICEL Bio Park, Chennai
  - The Golden Jubilee Biotech Park for Women, Kanchipuram, Tamil Nadu

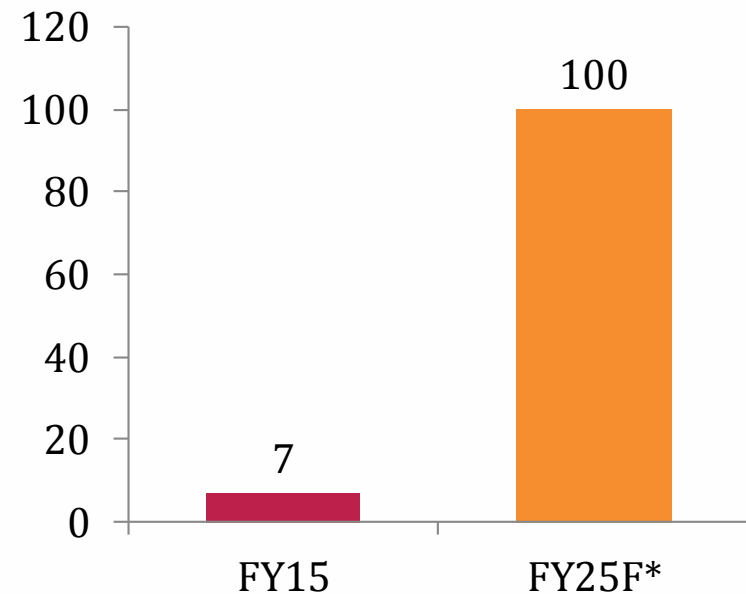


# Biotechnology industry in India is poised to reach USD 100 billion by the year 2025



- By FY25, India's biotech industry is estimated to increase to USD 100 billion from USD 7 billion in FY15
- Key growth drivers of the industry:
  - Cost effective manufacturing (outsourcing to India results in cost arbitrage of up to 50%)
  - Establishment of industry oriented organization - Biotechnology Industry Research Assistance Council (BIRAC) to support Startups and SMEs
  - Growing talent pool of skilled scientists and engineers, especially in bioinformatics and biological sciences
  - Fast developing clinical capabilities, contract research and manufacturing activities

Indian Biotechnology Industry Market Size (USD Billion)



# Gujarat: A rapidly developing Biotechnology Hub of India

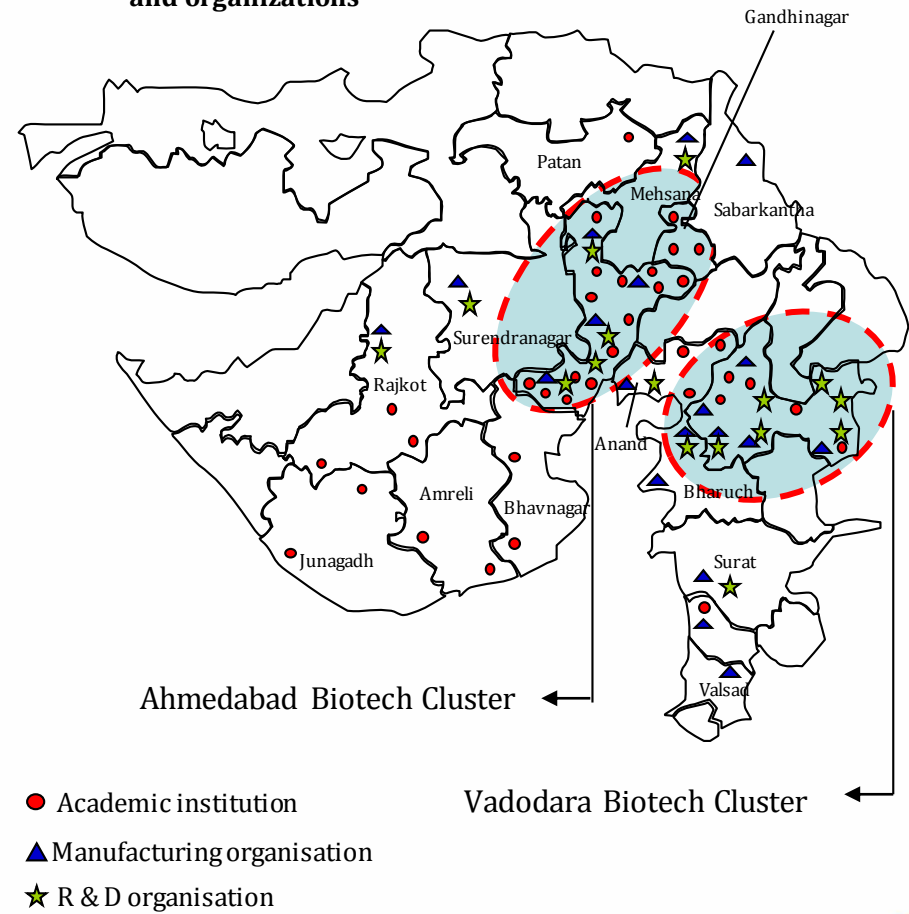




## With a turnover of USD 615 million (FY 14), Gujarat is amongst India's top 5 biotech destinations

- Out of the total 1797 DSIR (Department of Scientific & Industrial Research, GoI) recognized biotech companies in India, more than 10% are in Gujarat
- 50% of the biotech companies in Gujarat are located in and around Ahmedabad followed by 20% companies in Vadodara region making them the major clusters of biotechnology industries.
- Presence of a large number of international and domestic biotechnology companies, supplemented by biotech parks, prominent academic institutions and clinical research organizations

### Biotechnology in Gujarat – Presence of key clusters and organizations








# Gujarat Biotechnology Industry: some of the successful players



| Company                           | Project Location  | Logo |
|-----------------------------------|---|------|
| Anil Bioplus Ltd.                 | <ul style="list-style-type: none"> <li>Halol, Panchmahal</li> </ul>   |      |
| Human Biosciences India Ltd.      | <ul style="list-style-type: none"> <li>Bavala, Ahmedabad</li> </ul>   |      |
| Concord Biotech Ltd.              | <ul style="list-style-type: none"> <li>Bavala, Ahmedabad</li> <li>Vadodara</li> <li>Ahmedabad City</li> </ul> |      |
| Chiron Behring Vaccines Pvt. Ltd. | <ul style="list-style-type: none"> <li>Ankleshwar, Bharuch</li> </ul>   |      |
| Swati Spentose Pvt. Ltd.          | <ul style="list-style-type: none"> <li>Valsad</li> </ul>  |      |

# Gujarat Biotechnology Industry: some of the successful players



| Company                    | Project Location  | Logo  |
|----------------------------|---|---|
| Greendiam Exim Pvt. Ltd.   | <ul style="list-style-type: none"> <li>• Bavala, Ahmedabad</li> </ul>   |  |
| Cadila Pharmaceutical Ltd. | <ul style="list-style-type: none"> <li>• Dholaka, Ahmedabad</li> <li>• Dholaka, Ahmedabad</li> <li>• Detroj, Ahmedabad</li> </ul> |  |
| Hester Biosciences Ltd.    | <ul style="list-style-type: none"> <li>• Kadi, Mansa</li> <li>• Kadi, Mansa</li> </ul>  |  |

# Gujarat Biotechnology Industry: strengths of Gujarat across segments (1/2)



## Agriculture Biotechnology

- Gujarat has sizeable agrarian economy with major percentage of land under cultivation in central Gujarat
- Gujarat has been one of the early adopters of Bt cotton in the country that commenced in 2002. and had about 26.91 lakh hectares of land under BT cotton cultivation as per March 2014

### Major Players

- Bayer Cropscience Ltd.
- Excel Cropcare Ltd.
- Gujarat life sciences
- Gujarat State Fertiliser Corporation

## Pharmaceutical and healthcare biotechnology

- Gujarat's pharmaceutical sector accounts for around 45% of the total pharmaceutical output in the country
- The State has around 3260 registered units with total investments of USD 1.6 billion

### Major Players

- Zydus Cadila
- Sun Pharma
- Concord
- Cadila Pharma
- Intas

## Industrial Biotechnology

- Gujarat being home to the chemical industry, has developed strengths in the industrial enzymes segment and has been able to leverage its manufacturing strength in industrial biotechnology

### Major Players

- Maps (India) Ltd.
- Anil Biochem Ltd.
- Americos Industries Inc.
- Zytex Biotech

# Gujarat Biotechnology Industry: strengths of Gujarat across segments (2/2)



## Environmental Biotechnology

- Gujarat has varied climate with diverse ecosystem
- The state is already a leader in solar and wind power generation, the state is also planning to co-harness the biomass potential in Gujarat on the same lines

### Major Players

- Abellon Clean Energy
- Altret Green Fuel Ltd.
- BND Energy Pvt. Ltd.
- ONGC TERI Biotech Ltd.

## Bio-informatics

- Gujarat is poised with intact strength and stride out to enhance the Bio-IT fusion technology sector
- There are eight universities in Gujarat offering graduate and post graduate courses in Bioinformatics

### Major Players

- IBIO Analysis Pvt. Ltd.
- La Chandra Bio Science Pvt. Ltd.

## Bio-services

- Gujarat is home to 40% Clinical Research Organizations (CROs) in the country
- Its well established healthcare sector, strong infrastructure and relatively low real estate costs has lured many global and local CROs

### Major Players

- Accutest Research Labs.
- AmpliGene India Biotech Pvt. Ltd.
- Astron Research Ltd.

# Gujarat Biotechnology Industry: enabling infrastructure development



## Biotech Park, Savli, Vadodara

- Developed by Gujarat State Biotechnology Mission (GSBTM) and GIDC
- The Park endeavours to address the biotech industry's need for specialized infrastructure
- Phase I of 100 acres consisting of 38 acres of SEZ area, 62 acres of Non SEZ area is now well developed with basic infrastructure.
- An area of ~17.5 acres is earmarked for Biotech Incubator and Common Equipment Library facilities and various laboratories.





# Gujarat Biotechnology Industry: Gujarat State Biotechnology Mission



**GSBTM:** Established in April 2004 as an Autonomous Nodal Agency under the aegis of Department of Science & Technology, Gujarat



# State Government's initiatives to promote growth of biotechnology industry



|                                     |  |
|-------------------------------------|--|
| Savli Bio-incubator                 | <ul style="list-style-type: none"><li>• Bio-incubator at the Biotech Park, Savli supports and facilitates laboratory and office spaces to scientists, researchers, start-ups and potential entrepreneurs</li><li>• Entrepreneur Support Cell formed by GSBTM also provides holding to biotech units/companies and facilitation for availing various subsidies, incentives, benefits etc., from various government departments/agencies</li></ul> |
| Technology Facilitation Cell (TFC)  | <ul style="list-style-type: none"><li>• Reports &amp; Compliation: Bio-Business Guides for Businesses, Status of Genetic Disorders in Gujarat, Drup Report etc.</li><li>• Databases: Marine Patent Database, Genome Resource database of Gujarat, Company Database, Technology Database, Technology available for commercialization, transfers, partnership, bio-suppliers database</li></ul>  |
| Bio-technopreneur Programme         | <ul style="list-style-type: none"><li>• Ten -moth long weekend based 'Structured Capacity Building Programme' for Professionals to help them spin-off biotech enterprises</li><li>• Also, includes short-term awareness programmes for viz. creating awareness regarding biotech business opportunities and support systems in different sectors of biotechnology</li></ul>  |
| Gujarat Biotech Venture Fund (GBVF) | <ul style="list-style-type: none"><li>• Reports &amp; Compliation: Bio-Business Guides for Businesses, Status of Genetic Disorders in Gujarat, Drup Report etc.</li><li>• Databases: Marine Patent Database, Genome Resource database of Gujarat, Company Database, Technology Database, Technology available for commercialization, transfers, partnership, bio-suppliers database</li></ul>  |



# Robust educational infrastructure for biotechnology in Gujarat



- 25 universities offering 30 different courses in biotechnology in Gujarat
- Subjects like Microbiology, Biochemistry, Biotechnology, Environmental Sciences, Genetics, Bioinformatics, Aquatic Biology, Marine Biology, Agriculture Biotechnology, Medical Laboratory Technology, Biomedical Engineering etc. are offered
- Around 175 faculties are active in biotechnology research with an outcome of around 3000 publications and 30 patents



# Gujarat's biotechnology education infrastructure – major universities and institutes



|                     |  |  |
|---------------------|--|--|
| Agro Biotech        | <ul style="list-style-type: none"> <li>• Anand Agriculture University, Anand</li> <li>• CP College of Agriculture, Sardar Krushinagar</li> <li>• National Research Centre in Medicinal and Aromatic plants</li> </ul>            | <ul style="list-style-type: none"> <li>• Navsari Agricultural University, Navsari</li> <li>• Genome Research Centre, Vadodara</li> <li>• National Research Centre for Groundnut</li> <li>• Junagadh Agricultural University</li> </ul> |
| Biotech Engineering | <ul style="list-style-type: none"> <li>• Department of Microbiology and Biotechnology, MSU Baroda</li> <li>• Department of Biotechnology, North Gujarat University</li> </ul>  | <ul style="list-style-type: none"> <li>• Department of Biochemistry, MSU Baroda</li> <li>• Department of Food and Nutrition, MSU Baroda</li> </ul>   |
| Environment Biotech | <ul style="list-style-type: none"> <li>• Deptt. of Bioscience, S.P. University</li> <li>• National Institute of Occupational Health</li> <li>• Department of Microbiology, MSU Baroda</li> </ul>                                 | <ul style="list-style-type: none"> <li>• Deptt. of Microbiology, Gujarat University</li> <li>• Deptt. of Life Science, Bhavnagar University</li> </ul>   |
| Bio-informatics     | <ul style="list-style-type: none"> <li>• MSc Bioinformatics, Gujarat University</li> <li>• Sardar Patel University, Vallabh Vidhyanagar</li> <li>• MS University of Baroda</li> <li>• Bhavnagar University, Bhavnagar</li> </ul> | <ul style="list-style-type: none"> <li>• Saurashtra University, Rajkot</li> <li>• Indian Institute of Advanced Research, Gandhinagar</li> <li>• Bioinformatics Institute of India, Ahmedabad Study Centre</li> </ul>                   |

# State Government's initiatives for promoting Research & Development (1/2)



## Gujarat Genomics Initiative (GGI)



- A collaborative initiative between state agencies for undertaking genomic research in Gujarat
- Activities include undertaking research in molecular biology, DNA based species identification, developing molecular markets for key floral and faunal species and providing services to industries, academia
- Website: [www.gujaratgenomics.in](http://www.gujaratgenomics.in)

## Marine Bio-Resource Center (MBRC)



- Collaborative initiative with forest department and state Ayurveda university
- Focuses biotechnology application in conservation of Marine flora, fauna and microbial bio diversity
- Activities include DNA based species identification for important marine microbes, phyto-plankton and other important flora group
- Website: [www.mbrc.res.in](http://www.mbrc.res.in)

## Biodiversity Gene Bank (BioGene)



- A collaborative initiative with state forest department for using biotechnology application for biodiversity conservation and management
- Activities include DNA banking, in-vitro banking, cryo-banking, seed banking, bio-prospecting research and application-based research
- Website: [www.biogene.in](http://www.biogene.in)

# State Government's initiatives for promoting Research & Development (2/2)



## The Virtual Institute of Bioinformatics (BITVirtual)



- A collaborative and multi-institutional project for developing research and skills in field of bio-informatics in Gujarat
- Activities include providing state of art centralized bio-informatics facilities, for research and imparting degree programs in Bioinformatics
- Website: [www.bitvirtual.org](http://www.bitvirtual.org)

## Shivrath Centre for Excellence in Clinical Research



- Developed under Public-Private Partnership for generating skilled human resources for contract research organization
- Activities include specific skill development and educational programs
- Website: [www.shivrath.com](http://www.shivrath.com)

## Genetic Diagnostic Centre



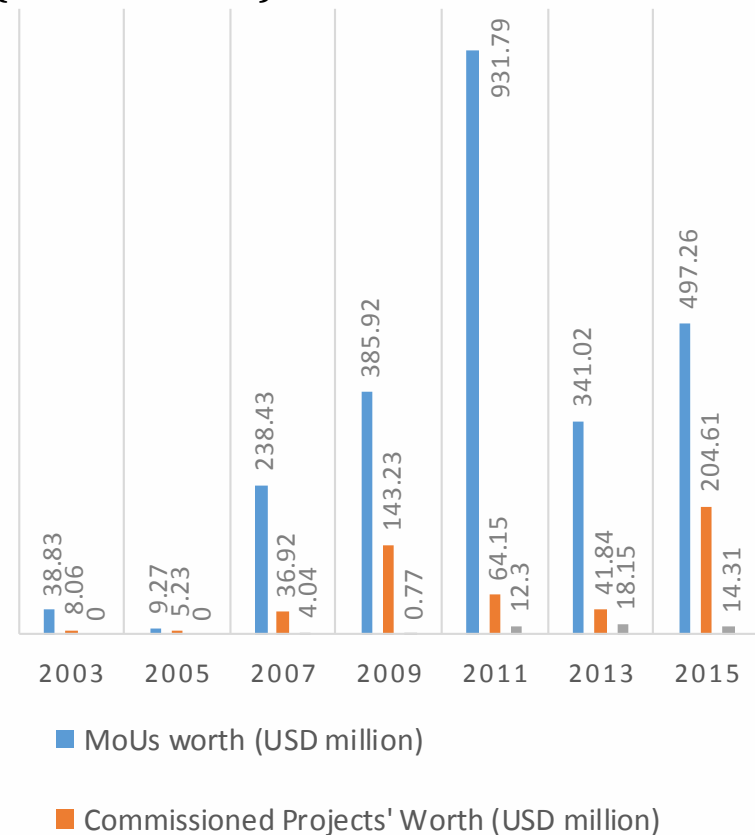
- A collaborative initiative with Gujarat University and its zoology department for extending molecular and genetic diagnostic services to society
- Activities include research, awareness and services in areas of genetic disorders

# The State has attracted over 160 biotechnology companies in the last ten years



- The different summits of Vibrant Gujarat has seen MoUs of 208 large, medium and small domestic as well as foreign companies
- Year 2015 saw a large number of MoUs worth USD 497.26 million
- Out of the 219 projects proposed by the investors till Vibrant Gujarat Summit 2015, 94 are commissioned, 40 are under implementation and 41 are in the preliminary stage

**MoUs worth during Vibrant Gujarat Summits (in USD million)**





# Business Opportunities in Gujarat



## Agriculture Biotechnology

- Tissue culture
- Biofertiliser and Biopesticides
- Biofuel
- Transgenic crops and GM crops
- Organic food

## Environmental Biotechnology

- Biofuel
- Bioremediation services
- Effluent treatment / solid waste management

## Pharma & Healthcare Biotech

- Biopharmaceuticals
- Vaccines
- Monoclonal antibodies
- Stem cell

## Bio-informatics

- Bioinformatics software development
- Molecular Modeling
- Analysis of online biological databases

## Industrial Biotechnology

- Industrial enzymes
- Yeast-based products
- Specialty chemicals
- Organic amino acid

## Bio-Services

- Contract research (pre-clinical and Clinical)
- Bioremediation
- Quality certification / validation facilities

## For Additional Information Connect Us @



| Organisation   | Description   |
|--|---|
| <p><b>Department of Science and Technology</b></p> <p>Secretary<br/>Phone: +91 79 23259999<br/>Email: <a href="mailto:secdst@gujarat.gov.in">secdst@gujarat.gov.in</a><br/><a href="https://dst.gujarat.gov.in/">https://dst.gujarat.gov.in/</a></p>     | <ul style="list-style-type: none"><li>• The Department of Science &amp; Technology looks after the growth and development of new &amp; emerging technology areas in the State</li><li>• It is also responsible for the formulation and implementation of key policies in such areas in the State of Gujarat</li></ul>   |
| <p><b>Gujarat State Biotechnology Mission</b></p> <p>Mission Director<br/>Phone: +91 79 23252197<br/>Email: <a href="mailto:mdbtm@gujarat.gov.in">mdbtm@gujarat.gov.in</a><br/><a href="https://btm.gujarat.gov.in/">https://btm.gujarat.gov.in/</a></p> | <ul style="list-style-type: none"><li>• Under the aegis of Department of Science and Technology, the mission acts as the facilitator for the development of biotechnology sector in the State</li><li>• The mission is responsible for the promotion of biotechnology sector by encouraging entrepreneurship, strengthening organizational collaborations and business partnerships</li></ul> |





# THANK YOU

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