



Government of Gujarat



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“TECHNOLOGY SCROLL”

FOSTERING BIOTECH BUSINESS

VOLUME I

AGRICULTURE BIOTECHNOLOGY

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About this Compilation

Technology Scroll, is an initiative of Gujarat State Biotechnology Mission, under aegis of Government of Gujarat. The compilation has been done by GSBTM team. For more information on the matters / technologies, please refer to the contact details provided.

Editorial Note

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AGRICULTURE & ALLIED AREAS ▶▶



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Narendra Modi
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Message of Hon'ble Chief Minister of Gujarat

Technology scroll

Relevance of science & technology lies in its ability to contribute to socio-economic welfare of human society. The state of Gujarat is aware and abreast of the expanding vistas of modern technologies and its potential to facilitate socio-economic development and therefore, state has identified Biotechnology, as Growth Engine for future progress. Gujarat has firm belief that Biotechnology will not only fuel the development of diverse sectors and related industries but has proven potential for wealth creation as well.

Conversion of technological innovations into business enterprise and wealth creation, thereby, is the need, reflection and measure of a knowledge based economy. Business translation in knowledge economy is a function of opportunities created by new technologies and the entrepreneurship skills. The globally demonstrated entrepreneurship spirit of Gujarat has always been there to explore the new areas of business including those emanating from sunrise technologies such as Biotechnology.

In this regard, the Technology Scroll, brought out by Gujarat State Biotechnology Mission, is a logical, timely and right step forward. This scroll would encourage and facilitate entrepreneurs to venture into the business arena of this emerging science. It is hoped that it would be instrumental in stimulating biotechnology based entrepreneurship in Gujarat.

I am sure that the purpose and spirit with which Technology scroll has been prepared, shall be realized to the fullest and for the benefit of all. I extend my heartiest congratulations and Best wishes, to Gujarat state Biotechnology mission, for their laudable efforts in developing this exclusive compilation.

(Narendra Modi)



CHIEF SECRETARY
GOVERNMENT OF GUJARAT

Gujarat is among the most industrialized States in the country. The State has achieved impressive growth in chemical, manufacturing, mining and textile sectors. The State is now moving towards rapid development of knowledge industries, focusing on information and bio-technologies. The State Biotechnology Mission has prepared a Technology Scroll which lists technologies globally available for business entrepreneurs. The scroll illustrates opportunities for investment in the bio-technology application and would be of immense help to entrepreneurs in identifying potential for investment. This is a commendable effort of the Gujarat State Bio-technology Mission and I hope that the compilation would be found useful by bio-technology entrepreneurs.


(S.G. Mankad)

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सत्यमेव जयते

RAJ KUMAR, I.A.S.
Secretary

Government of Gujarat
Department of Science & Technology

Message of Secretary, Science & technology

Technology Scroll

Biotechnology, undoubtedly, is the growth engine of the future. With its cutting edge technology innovation and vast applications in multiple sector it stands to offer cost effective solutions to society. Knowledge harnessing for socio-economic development is a function of research and entrepreneurship. While application based research is the need of hour, availing the opportunities through developed work is equally significant and logically desirable.

This inventory of potential business opportunities in Biotechnology sector would not only facilitate start ups, new entrepreneurs and existing players but shall also encourage higher level of business activity in Biotechnology in the state. The technology scroll shall enable increased interaction among the stakeholders and facilitate business relationship. The benefits of this compilation to industry, commerce, academia or researchers are alike.

I convey my sincere wishes and heartiest congratulations to Gujarat State Biotechnology Mission for coming up with this novel idea and trust that all would find this endeavor as initiative for catalyzing Biotechnology entrepreneurship in the State.

Raj Kumar

Foreword

On behalf of Gujarat State Biotechnology Mission, Department of Science & technology, I am delighted to bring to you the first version of Technology Scroll

Having identified, Biotechnology, as Growth engine for next few decades and also as singular most potential tool for socio-economic development-- Government of Gujarat, is committed to facilitate the process of transformation of traditional economy and catalyze the growth of Biotechnology in the state. As world wide trends underline, the role of Biotechnology, in the convergence of several old economy industries- Gujarat, with its strong background of traditional industries -- looks towards this emerging science with hope and vision.

The initiative of preparation of Technology Scroll is in line with, the strategy of Government of Gujarat, to move towards economy which is driven by modern technologies. The objectives of this compilation is to

- Facilitate the convergence of traditional industries of Gujarat, towards use and adoption of Biotechnology,
- Encourage the knowledge and innovation based entrepreneurship in the state,
- Enable the techno-economic benefits of newly available technologies,
- Facilitate global networking of knowledge and technologies for business translation,
- Encouraging Biotechnology business,

Gujarat has traditional strengths in Pharmaceuticals, chemicals, agriculture, animal husbandry, food processing sectors. The inherent strength of infrastructure, natural resource, intellectual capital and financially stable economy, provide ideal foundation for leveraging these strengths -- to converge towards and diversify-- into niche biotechnology segments.

While Global entrepreneurs have been major value wealth creators in Biotechnology business, it is the wide base of techno-based entrepreneurship, which stands to provide, the critically needed impetus. Globally proven entrepreneurship spirit of Gujarat, needs the opportunities with business potentials. And Technology Scroll prepared, just aims to do that.

It is compilation of Technology Database of approximately 600 Technologies developed and available globally. While 520 technologies are from different countries, mostly USA and Europe, around 80 technologies are the ones developed by research and academic institutes in India. The compilation covers a total of 9 Biotechnology Sectors, namely, agriculture, environment, Pharmaceuticals and healthcare, Animal Biotechnology; Bioinformatics; Food Biotechnology; Molecular Biotechnology; Nano Biotechnology Industrial Biotechnology To facilitate the stakeholders, Technology scroll has been brought out in sector specific volumes. To cater to the need and business interest of wide spectrum of product and process-- encompassed by these 9 sectors of biotechnology-- the compilation covers, around 170 Sub-sectors. 78 technologies from Agriculture & allied areas, 71 technologies from Industrial biotechnology, 197 technologies from Pharmaceutical & healthcare, 103 technologies from Animal Biotechnology; Bioinformatics; Food Biotechnology; Molecular Biotechnology; Nano Biotechnology and 41 technologies from environment biotechnology, provide the rich substratum for future business venture and entrepreneurship.

Preparation of technology Scroll has its genesis in GSBTM, commitment to come up with products and outputs that facilitate Biotechnology foresight, entrepreneurship, business, investment and wealth creation.

As we aim to step into knowledge and technology driven era, I encourage and invite the Gujarati and other entrepreneurs alike to explore the business horizons of Biotechnology and second our efforts in elevating Gujarat to global Bio-Map.

I am sure that in the maiden effort of this nature, some lacunae are bound to creep in, which provide the scope for further improvement. It will be our constant endeavor to update the content of this compilation at regular interval. I invite and welcome your inputs and feedback.

Shri Akshay K Saxena, IFS
Mission Director

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(From left) HDPC Chairman Deepak Parekh, Tata Sons Chairman N Chandrababu Naidu

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Fostering Biotech Business

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Graphics & Design: Samalson Designs

GSBTM 2006

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