

Tamil Nadu BIOTECHNOLOGY POLICY

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(vi Bioinformatics and Genomics Centre (BGC))
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A. INTRODUCTION

1. Tamil Nadu has emerged as a front ranking State in attracting investments. The growth in knowledge-based industries in the State in recent years has been phenomenal. The export of software from the State which was *only* Rs.37 crores in 1995-96 has reached Rs.1,914 crores in 1999-2000. In order to consolidate these gains and carry the State forward in the path of economic development, the Government of Tamil Nadu has decided to focus on another knowledge-based industry, i.e. Biotechnology.

2. There is growing realisation world over that Biotechnology along with Information Technology is going to be the major thrust area in the new millennium. With the announcement of the Human Genome sequence and the progress made in genetic engineering in the last two

decades, Biotechnology as an industrial activity is set to increase exponentially in the future.

A High Level Committee under the Chairmanship of the eminent scientist Dr. M.S. Swaminathan was constituted to give recommendations for a Biotechnology Policy for the economic development of Tamil Nadu. The Report of the above Committee has been received. On the basis of this Report and further examination of all related aspects, the Government of Tamil Nadu has decided to announce a Biotechnology Policy.

B. BACKGROUND

3. Tamil Nadu is rich in bioresources. The variety of geographical terrains in the State provides tremendous biodiversity rarely seen in any other single State. The forest, agricultural and plant resource base of the State are both large and diverse and represent great market opportunity for biotechnology products. There are more than 5,000 species of flowering plants and the forest cover in the State spreads over 22,500 sq.kms. The State also has one of the largest coastlines in the country which again presents opportunities for Marine Biotechnology. The State is also fortunate to have a pool of experts in various areas of Biotechnology with experience in commercialisation of Biotech products. Tamil Nadu is thus well-placed in terms of human resources to exploit the opportunities in Biotechnology.

4. Industrial activity so far in the area of Biotechnology has been largely in first generation Biotechnology like fermentation of antibiotics. A number of Tissue Culture Units to produce food and ornamental plants have also been set up by leading industrial houses in Tamil Nadu. Thus, Tamil Nadu has the potential to create a critical mass of industrial *activity* in Biotechnology, graduating from the current first and second generation Biotechnology projects to modern Biotechnology products involving recombinant, DNA- based products and Bioinformatics. In line with the developed world, the Government would strive to focus on modern processes in the area of agriculture, industry, medical and veterinary sciences and environment, together with focus on traditional Biotechnology products, especially in the area of industrial and food enzymes where there are a number of opportunities to tropicalise products which are already used in the western world. These are likely to provide good commercial opportunities in the short-term and need to be included in any co-ordinated steps taken by the State in Biotechnology

C. OPPORTUNITY AREAS FOR TAMIL NADU

Tamil Nadu needs to pursue opportunities in all the four segments of

Biotechnology:

- Medical/Human & Animal Healthcare.
- Agriculture-food.
- Environment.
- Industrial Products.

Though medical and Agriculture-food areas *are* more relevant from the international market point of view, in the Indian context (and particularly Tamil Nadus context, where textiles and leather are major industry sectors), environment and industrial products are also likely to present immense opportunities in the short term -both for traditional and modern Biotechnology products.

i) Medical

Tamil Nadu would present an attractive market for Medical Biotechnology products as it accounts for about 11% of the pharmaceutical market in the country. Apart from penicillin manufacturing and a reasonably large number of loan licence formulation units, investment in this sector within the State has been low. Hence Biotechnology presents an ideal opportunity for the State to reverse this trend.

Innovative efforts to collaborate with strong institutes within the State will be encouraged. For example, collaborative effort with the TB Research Centre, Chennai, to develop an effective vaccine, will be highlighted. The vast collection of clinical specimens and the work going on at this Institute as well as several others would be showcased for further research and product development.

A few other areas of focus under the Medical Biotechnology will be .

- Diagnostics
- Vaccines (Hep C, Malaria, etc.)
- Therapeutics (Interferon, Insulin, etc.)
- Veterinary Drugs (including vaccines).

ii) Agriculture-Food

Opportunities to work with the germ plasm database available with institutions, like Tamil Nadu Agricultural University (TNAU) and M.S. Swaminathan Research Foundation (MSSRF) will be focus areas. Agriculture-food products like rice, coconut, sugarcane and tea, which have a strong presence within the State will be targetted for Biotechnology research.

A few other important areas of focus in the Agriculture-food sector are :

- Bipesticides and Biofertilizers
- Natural products in Healthcare (from Medicinal Plants)
- Animal Feeds / Supplements from Agricultural Products
- Flavours / Fine Chemicals / Amino Acids / Nutrient Supplements from animal waste.
- Transgenics (improved biotic and abiotic stresses agronomic and nutritive qualitative characteristics)
- Diagnostics -Disease Markets.

iii) Environment

The focus on Environmental Biotechnology products within the State will be in important sectors like leather and textiles. Collaborations with reputed institutes like Central Leather Research Institute (CLRI) will be encouraged to develop appropriate products.

A few key areas of focus will be :

- Methods / Apparatus / Techniques for Biosensors.
- Microbial strain development of Cultures for waste management
- -Bioremediation.
- -Effluents and waste water:
- -Creation of value
- -added catalog of germ plasms including microbial germ plasms.
- iv) Industrial Products A few key areas of focus will be :
- Food and Industrial enzymes (Papain, Phytase, Lipase, Enzyme Cocktails, etc.).
- Classical Fermentation Products (antibiotics, immuno modulators, etc.) for yield improvements.
- Bioenergy.
- Surface and additives.
- Biopolymers.

To sum up, there are a number of opportunities in the above segments of Biotechnology, which can be commercially exploited to create new jobs and economic wealth in the State. Many of the opportunities are based on the bioresources available within Tamil Nadu. The Government will take steps to create appropriate mechanisms and implementation structures as stated below to derive benefit from these opportunities.