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Department of Industries

Notification

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BIOTECHNOLOGY POLICY FOR GOA

1. INTRODUCTION

Biotechnology has established itself as an engine of economic growth globally. With its outstanding contribution in the fields of agriculture, human and animal healthcare, environment management and processing industry. It is widely acclaimed as the technology of the 21st century, the impact of which is expected to be far greater than that of the trailblazing achievements of information technology in the last few decades.

The turnover of the Indian biotechnology industry crossed US $ 1 billion in 2005 and it is expected to reach US $ 5 .billion by 2010. Such phenomenal growth in biotechnology in the country will result in substantial generation of employment covering a wide spectrum of knowledge level and skills and levels of knowledge and providing excellent entrepreneurial opportunities.

Recognizing the potential of this sunrise sector, the Government of Goa is keen to facilitate accelerated development of biotechnology utilizing the natural,*scientific, human and other resources in the State and the region by providing the required policy support keeping in view the unique requirements of the sector.

2. GOA STATE AS A BIOTECHNOLOGY DESTINATION

Goa with an area of 3702 square kilometers is the smallest State in the Indian Union. However, in recent years, it has stayed within the top three positions with respect to key indicator's of economic growth and quality of'life such as education, health, infrastructure, literacy and connectivity by road, rail, air and sea.

The State has a well developed industrial infrastructure. The banking industry also is quite active in the State. The major sectors of economic activity in the State, namely agriculture, forestry, fisheries, food processing and drugs and Pharmaceuticals offer immense scope for expansion and growth through more biotechnology interventions, both by enhancing production and value addition. Biotechnology can also ensure sustainable utilization of the vast and varied biodiversity in the State. The State has education and research related to biotechnology.

The State has evolved an Industrial Policy in 2003, and recently an IT policy to provide the framework for accelerated development of these highly knowledge based industry. The formulation of a well thought out Biotechnology policy will make the State an attractive destination for investment in biotechnology granting the strengths it already has.

3. MISSION

The Mission of the biotechnology policy is to ensure accelerated growth in all areas of this sunrise sector as education, research and economic sectors covering healthcare, agriculture, industry, services, environment management and employment generation so as to bring the State to a position of pre-eminence which it has been occupying in other sectors of social and economic growth. Therefore, the policy document identifies the factors required to ensure such growth and enumerates the steps to be taken by all the stakeholders including the Government in its various departments related to biotechnology such as Education, Agriculture, Health, Science and Technology, Environment and Industry; Institutions of higher learning such as the universities and research institutions, the industry, institutions of local self and Government at village level, farmers and the regulatory agencies. Appropriate allocation would be made in the State's budget for this purpose. It would also develop mechanisms for active collaboration with the Central Government so as to gain from the Schemes and policies of the Center in relation to financial support, development of trade and other commercial networks, training and regulatory assistance. Public-private partnership would play an increasing role in promoting the growth of the sector.

4. OBJECTIVES

The biotech policy aims at integrating the existing achievements in research and industry and strengthening and expanding the existing base so as to bring the State to pre-eminent position in biotechnology development., Thus the objectives of the policy are:

(i) To prioritize the thrust areas for basic and applied research and technology development.

(ii) To promote innovations in R & D by providing financial and infrastructural support and by encouraging public-private partnership for R & D by allowing a synergistic exchange of expertise and resources.

{Hi) To provide quality infrastructure and an enabling environment for sustained growth and international competitiveness by effective networking among industries, universities and premier research institutions with the State, other parts of the country as well as in other countries.

(IV) TO develop human resources in various areas of biotechnology through enhanced financial support for higher education and research in universities in relevant areas of biotechnology.

(v) To generate employment, particularly for the highly skilled and specialized manpower.

{vi) To set up a venture capital fund to promote innovations of commercial importance in academic industry.

(vii) To encourage creation and protection of intellectual property and to ensure effective implementation of the IPR regime.

(viii) To provide financial support and incentives to industry to encourage local investment and to attract investment from other States and abroad.

(ix) To provide an institutional framework comprising the Government, academia, subject specialists, venture capitalists, industry and industry associations and to evolve a well defined structural & legal framework to achieve the above objectives.

5. FACTORS PROMOTING BIOTECHNO-LOGY DEVELOPMENT

Biotechnology is the commer-cialization of cell biology. A knowledge intensive area, it requires a high level of coordination among various disciplines such as life sciences, chemical and design engineering and information technology. The interest in the potential of biotechnology has been enormous as it touches the three basic needs of mankind namely food, health and environment. Its benefits manifest in agriculture, health care', environment management and process industries.

Development of sophisticated products in biotechnology such as recombinant vaccines and therapeutics for healthcare and transgenic crops such as Bt Cotton for agriculture involves huge capital investments and long gestation period compared with existing technologies, particularly because of the stringent standards for the facilities for production, safety requirements and the time taken to obtain the regulatory clearances. While on the one hand, the gestation period for putting a new biotech product in the market is well over ten years, new developments take place at such a rapid pace that many products and processes are rendered obsolete even during the development

stage. Some of the countries with relatively small resources have succeeded in tackling these problems by concentrating in niche areas in which they have the strength and expertise, For example, Cuba has become a leader in the field of vaccines and South Korea in the field of molecular biotechnology and stem cell for health care. Acquisition and management of intellectual property for technology transfer is also complex in biotechnology as the application of even a single product would often involve the use of mjpre than one patent. With increasing awareness of the products, increasing innovations in processes and growing experience in their evaluation, the gestation period for bring a new product into the market could come down considerably.

It has been well established through the experience of countries well advanced in biotechnology that the following factors contributed to the growth in the sector.

(i) A strong base for higher education, research and development.

(ii) Effective IPR protection.

(iii) A well defined regulatory framework.

(iv) Specialized infrastructure and supporting services.

(v) Manpower with specialized skills, (vi)

A well developed entrepreneur base, (vii)

Public private partnership.

(viii) Availability of capital, especially, venture capital for early stage development.

(ix) Regional and international co-operation resulting in strategic alliances.

(x) Capacity building.

(xi) Public awareness and support.

(xii) Good market access.

6. PRIORITY AREAS

Keeping in view the strengths and advantages of the State, the Biotechnology Policy will concentrate on the development of the following sectors:

(a) *Agriculture*

* Mass propagation of locally important horticulture and medicinal plant species
* Mushroom cultivation
* Bio fertilizers and bio pesticides
* Organic farming
* Transgenic crops

(b) *Healthcare*

* Vaccines
* Therapeutics
* Diagnostics
* Drug delivery systems
* Isolation of bio active molecules from native herbs
* Contract research and manufacturing
* Animal healthcare products

(c) *Industrial biotechnology*

* Fermentation of beverages, bakery and dairy products
* Probiotics
* Nutraceuticals and health food supplements
* Bioenergy

(d) *Environmental biotechnology*

* Bioremediation
* Phytoremediation
* Biowaste conversion ajtid management

(e) *Bioresources utilization*

* Inventorisation, mapping, molecular characterization and bioprospecting

(f) *Bioinformatics*

* Genomics, proteomics, drug designing, data mining etc.

(g) *Bioservices*

* Contract research
* Contract manufacturing
* Bioinstrumentation

(h) *Marine biotechnology*

* Isolation and cultivation of elite marine organisms for value added products.

7. BRIEF DESCRIPTION OF **THE PRIORITY** AREAS IS GIVEN BELOW:—

(a) *Agriculture biotechnology*

Biotechnology intervention is imperative to make modern agriculture competitive and remunerative in the face of challenges such as declining availability of arable land; low and stagnant productivity of crops; production losses due to biotic (insects and other pests, weeds) and abiotic (drought, salinity and alkalinity of soil) stresses; post-harvest crop damage in storage and transportation and declining availability of water

as an agricultural input. The following areas will be encouraged.

(i) Development of economically viable horticulture plants by clonal propagation.

(ii) Improvement of floriculture using micro--propagation and macro propagation.

(Hi) Setting up of regional hardening facilities *tot* tissue culture plantlets in multiple locations to promote entrepreneurship and involvement at grass root level.

(iv) Development of molecular markers particularly for identification of elite plant varieties having attributes such as disease resistance.

(v) Organic farming using biotech inputs such as biofertilisers and biopesticides for rural and economic development, given the higher value realization of such products in the domestic and international markets.

(vi) Sourcing efficient technologies for mass cultivation of horticulture species and medicinal plants of economic importance and providing financial support and incentives.

(vii) Establishments of gene-banks and germplasm collections for maintenance and propagation of superior quality crops and plants of special value

(viii) Development of transgenic crops based on need assessment exercise to identify priority crops and traits.

(Jb) *Healthcare biotechnology*

Medical biotechnology would be maximally utilized to develop affordable tools for prevention, detection and treatment of such diseases, particularly those which affect women, children and the poor. The priority areas would include:

(i) Supporting basic and applied research in molecular and cellular biology, pharmaco-genomics, proteomics, nano technology, system biology, stem cell biology, RNA interference, host response molecular farming and new platform • technologies.

(ii) Development of products such as vaccines, therapeutic antibodies, herbal and other plant based medicines, nucleic acids, recombinant therapeutics, drug and vaccine delivery systems and new anti microbial agents.

(iii) Screening of native herbs for identification of bioactive molecules and extracts known in traditional systems for value added therapeutic products, their characterization and safety assessment in *vitro and in vivo.*

(iv) Development of immunodiagnostics as well as molecular diagnostic kits for diseases and genetically inherited disorders. Local production of reagents required for the diagnostic kits will be supported.

(v) Contract research and manufacturing.

(c) *Industrial biotechnology*

The priority areas in industrial biotechnology would include food processing of food derived from plants, animals and fish; improved processes for fermentation of beverages including wines (in which the State has already a long tradition), bakery and dairy products, development nutraceuticals, health food supplements, functional foods for holistic heath and probiotics for therapeutic purposes. Conversion of renewable resources available in the State into value added products such as fine and bulk chemicals, Pharmaceuticals, biocolorants, solvents, bioplastics, vitamins, food additives as well as development of biotech tools for evaluating food safety such as rapid diagnostic kits for detection of food borne pathogens, detection 6f GM foods etc. will be other areas of focus.

The State is advantageously placed to harness alternative sources/technologies of energy such as biomethanatipn, bioethanol and biogas due to experience and expertise in fermentation and availability of fermentation based industries.

(d) *Environmental biotechnology*

A major thrust would be given for the development of the following environmental biotechnologies:

(i) During the last century, around 7% of the land area in the State was leased out for mining of iron ore. This activity had impacted terrestrial and marine ecology by accumulation of heavy meals in several organisms. Development of cost effective bioremediation techniques as such as phytoremediation for eco restoration of the degraded habitats would be pursued.

(ii) Development of microbes of oil spill removal, bioleaching of ores, biomining and biohydrometallurgy.

(iii) Agricultural, industrial and municipal waste management.

(iv) Vermicomposting for organic waste management.

(e) *Bioresource utilization*

The State is endowed with a rich biodiversity. The animal, microbial, marine and plant resources are large and diverse and offer great opportunity for use of biotechnological interventions for their conservation and conversion to commercially useful products and processes in a sustainable manner. The following activities aimed at mapping of bioresources and their sustainable utilization would be strengthened.

(i) Inventorisation and mapping of the unique bioresources in the State, including mangroves, forest, marine and estuarine fresh water resources. This will be done with the help of research institutions, universities, under-graduate colleges, schools, NGOs and private companies.

(ii) Molecular characterization and bio--prospecting of flora and fauna from these resources for development of novel therapeutic leads as well as other natural compounds for industrial use. The rich traditional knowledge base among the rural and tribal people on the use of biodiversity (including medicinal uses of plants) would be harnessed for bio-prospecting.

(f) Bioinformatics

Considering the potential of bioinformatics in reducing cost and time of development of new products such as drugs, vaccines and diagnostics; in bioprospecting, conservation and management of resources, evaluation of products, processes and raw materials, management of complex databases etc., the State Government will promote this area by catalyzing close interactions through institutional/programme or tie ups among experts in life sciences and information technology. The Government have already identified this as a thrust area in its IT Policy and is committed to strengthening infrastructure for high performance computing facilities, broad band connectivity, virtual reality centers etc.

(g) Bioservices

Considering the expertise and infrastructure in the State, there is immense scope for contract research and manufacturing particularly in the areas of fermentation, marine biotechnology, data handling, data mining, drug discovery, bioinformatics, chemoinformatics, etc.

(h) Marine biotechnology

The State has a coastline extending over 100 km. and sea fishing is an important economic activity in the coastal region. Apart from this, the State has over 250 km. of inland waterways rich in marine and estuarine wealth, such as a variety of important fish, prawns and microorganisms. Use of biotechnology can achieve disease resistance, enhanced productivity, fertility and reproductive growth, exploration of marine organisms for novel genes and gene products, biopolymers, novel enzymes, therapeutic products, pollution monitoring etc. The priority areas would include:

(i) Development of better methods for culture of commercially important marine and estuarine species.

(ii) Development of scientific methods of cultivation for higher yields and better quality.

(iii) Diagnostics for bacterial and viral diseases.

(iv) Identification and cultivation of commercially important flora and fauna such as sea weeds, shell fish and mollusks for production of value added products.

(i) *Research and Development*

(i) Government of Goa will offer specific grants for setting up or upgrading R & D facilities in universities, research institutions and industrial research labs in the area of biotechnology.

(ii) The existing universities/institutions already active in research will be provided adequate support for the pursuit of excellence in agri-biotech, marine biotech and healthcare, environment and food processing. These centres will be designated as Centres of Excellence.

(iii) The State Government will encourage universities and institutions to build an active network with national and international institutes of repute.

(iv) The State Government will promote setting up of autonomous institutes with private participation for achieving excellence in specialized areas.

(v) Core facilities in specialized areas of genomics, proteomics and bioinformatics would be set up to facilitate research in the latest trends in biotechnology.

(vi) The Government will encourage universities and health related institutes to take up contract research for industry and public agencies.

(vii) To promote public private partnership and to ensure better coordination among different R & D organizations, the Government will extend support to research institutes entering into partnerships with private companies for development and transfer of technology so that the fruits of research could reach the society faster.

8. INFRASTRUCTURE

(i) The State Government will provide quality infrastructure for incubation of technologies and promotion of biotech industries by setting up one or more biotechnology parks, including a marine biotechnology park. The parks would provide specialised equipment, common facilities to the entrepreneurs for undertaking production, research and scale up in a cost effective manner. Technical and financial consultancy and managerial support will also be made available in the biotech parks.

(ii) The Government may take an equity stake in such projects jointly promoted with private partners by providing funds directly or in lieu of land allotted for the projects.

(Hi) The Biotech parks will promote closer interaction of the units housed in them with research institutions and universities in the State, and help in commercialization of the technologies developed in the institutions.

(iv) A proposal was mooted for setting up a Goa University Biosciences Centre (GUBC) jointly by the post graduate departments dealing in life sciences including marine biotechnology, microbiology, botany, zoology and marine sciences. The Government would consider integrating the facilities proposed in GBSU with the biotechnology park to maximize the benefits by pooling the strengths of the faculties and promoting industry academia interaction.

(v) The parks will facilitate all statutory and regulatory approvals and sourcing of. venture capital funds..

(vi) The State Government would consider providing special incentives to women entrepreneurs.

9. HUMAN RESOURCE DEVELOPMENT

The life science and biotechnology sector is characterized by dynamic changes by flow of new ideas and concepts in development of new tools for research. Human resource is the key to development in this knowledge driven industry. The Government of Goa will facilitate a study to assess the requirement of specialized manpower at the higher levels for teaching, research and manning production in industries in the area of biotechnology and will continuously strive for upgradation of the requisite skills.

A number of postgraduate and undergraduate courses in the area of biotechnology and allied sciences have been introduced in various universities in the State. Some of the institutes and Goa Universities are also offering doctoral programmes. The major institutes are:

1. Goa University
2. National Institute of Oceanography
3. Goa Medical College
4. Goa College of Pharmacy

The following initiatives are proposed to keep pace with the increasing demand for skilled manpower in the public and private sectors.

(i) Introduction of additional courses at the graduate and post graduate levels.

{ii) Upgradation of the existing infrastructure and improving the course content, in consultation with DBT, Government of India.

(iii) Enabling research institutes, colleges, universities, NGOs and private organizations to undertake training courses for technicians.

(iv) Introduction of specialized short term courses in business management and entrepreneurship development for the biotech industry.

(v) Introduction of specialized courses on bio--safety, bio-ethics, Intellectual Property Rights

(IPR) to enhance competitiveness of biotechnology industry.

10. INTELLECTUAL PROPERTY

Success of biotech industry as in other knowledge based industries depends on protection of the intellectual property resulting from innovation. The Government of Goa will extend financial support to industry and research institutes for protection of IPR for filing and maintaining patents.

A patent information centre will be set up with access to relevant databases. This centre will be converted to a state level IPR center in due course.

11. BIOSAFETY

The increasing possibilities for exploiting Genetically Modified Organisms (GMOs) and products derived from them for commercial purposes have also led to considerable concern about biosafety. The State Government would facilitate setting up of a adequate institutional mechanisms for implementation as well as monitoring of GMO development and applications as' per the National Biosafety guidelines.

12. SOCIAL AND RURAL DEVELOPMENT

The Government of Goa will promote simple, low cost agricultural biotechnologies to generate of rural employment. The following initiatives are proposed.

(i) Activities such as mushroom cultivation, hardening facilities for plant tissue culture, vermi-composting and organic farming will be promoted for generation of employment and to add value to farm produce.

(ii) Financial support will be provided in collaboration with NABARD for such projects.

(Hi) The Government will encourage setting up of medicinal plant extraction units. Support will be given to farmers for cultivating medicinal plants and tissue culture raised plants under contract with medicinal plant extraction units and tissue culture units.

(iv) NGOs and private institutes will be encouraged to conduct training programmes for farmers to educate them on the benefits of agri-biotechnology.

13. INCENTIVES AND FINANCIAL SUPPORT

Apart from the natural and locational advantages offered by the State for setting up biotechnology industries, in view of the various incentives provided by ether States in the country to attract Indian and global companies and entrepreneurs for investment in the biotechnology sector, the Government of Goa also proposes to match such incentives so that potential investors in Goa are not placed at a disadvantage.

The State also recognizes the importance of both short term and long term incentives required for the growth of the biotechnology industry which can result in substantial returns to the State economy by the creation of wealth as well as generation of employment.

To be eligible for these incentives, a biotechnology unit would mean a company engaged in any of the following activities:

(i) Research and development and/or manufacture of living organisms and/or products or processes based on materials derived from specific living systems.

(ii) Bioinformatics, genomics and proteomics.

(Hi) Clinical trials using living organisms or products thereof.

(iv) Manufacture of equipment, instruments and devices specifically used for biotechnology.

These incentives are summarized below:

Establishment of SEZ

Government shall declare biotechnology parks as Special Economic Zones, which would enable rapid growth of the industries located in them.

Business incubation

The Government will assist incubation of technology based startups for innovate biotech products and services

Awareness programs and entrepreneurs meets

The Government will organize, support and participate in events organized by leading corporations and agencies of the Government and reputed biotechnology promotional organizations such as Biotech Consortium Indian Limited (BCIL),

Confederation of Indian Industries (CII) and Goa Chamber of Commerce and Industry to promote awareness on the prospects and potential of biotechnology industries in generation of income, employment and entrepreneurship development.

Skill databases

The Government will encourage and assist Goa University and other educational organizations to create an online alumini database as well as a specialist citizen database. These databases will enable the biotechnology units in the State to locate skilled manpower.

Capital Investment Subsidy

All new biotech units in the State will be eligible for capital investment subsidy at the rate of 15% subject to maximum limit of Rs.15 lakhs.

Interest subsidy

All new biotech SSIs will be eligible for an interest subsidy of 30% of the interest paid on term loans or working capital loans to nationalized banks or approved financial institutions, subject to a limit of 1.5% of the turnover or Rs. 5 lakhs, whichever is lower.

Employment subsidy

Employment incentive to unit @ Rs. 15,000/- per employee per annum. Maximum amount of Rs. 75.00 lakhs per year in one unit (for a period of two years starting from the date of operation). Additional special Iincentive of 5% for commissioning of operations before December, 2006.

Exemption from entry tax

Biotech units will be exempted from entry tax on all capital goods and raw materials for the first 5 years of project implementation.

Reimbursement of stamp duty

All registered biotechnology units that purchase or lease land and/or building in a notified biotechnology park or Industrial Estates under the Goa Industrial Development Corporation (GIDC) will be reimbursed the entire amount of stamp duty paid by the unit. The reimbursement will be made after the unit starts its commercial operation. This will be a one time incentive.

Higher FAR for buildings BT units

Buildings located in notified biotech parks will be permitted an FAR of 150.

Availability of quality power

The Government will ensure a reliable power supply to biotechnology units located in notified biotechnology parks. It will provide out of turn new connections to such units. The distribution system will be modernized to ensure reliability and quality of power in the biotechnology parks. Biotechnology companies shall be exempt from the purview" of statutory power cuts. Independent power production and captive power generation will be encouraged to ensure uninterrupted power supply to the units located in biotechnology parks.

Incentives to promote research activities

The Government will provide grants and other benefits to units that wish to undertake activities relating to research in cutting edge technologies particularly in the areas of vaccines, diagnostics, therapeutics, transgenic plants and bioremediation.

Awards for outstanding contribution •

Registered units that have completed five years of operation in the State will be considered for a grant of one outstanding contribution award of Rs. 10 lakhs each year in each of the categories of health care, agriculture, process industries, marine biotechnology, etc.

Reimbursement of certification charges

A one time reimbursement of certification charges for ISO 9000 etc. upto Rs. 5 lakhs will be provided to biotechnology units.

Allocation of land

Government would establish biotechnology parks at suitable locations and make the land available to biotechnology units desirous of locating their facilities in the parks at suitable rates based on the final cost to the Government including cost of development, if any, and the market rates. In industrial estates, the land will be allocated as per extant policy for outright purchase/lease.

Venture capital fund

To promote innovative biotech ventures in the State, Government of Goa, will endeavour to set up a Biotechnology Venture Fund to provide finan-

cial support to such projects, particularly at the early and start up stages.

14. INSTITUTIONAL FRAMEWORK

The Government will Constitute a High Powered Coordination Committee to ensure expeditious clearance of biotechnology projects with the following members:

1. Hon'ble Chief Minister Government of Goa	Chairman
2. Hon'ble Minister for Industries	Vice-
3. Secretary, Industries	Chairman
4. Principal Chief Engineer, PWD	Member
5. Member Secretary, Goa State Pollution Control Board	Member
6. Director, Science, Technology and Environment	Member
7. Managing Director, Goa Industrial Development Corporation	Member
8. Chief Inspector-Factories and Boilers	Member
9. Director of Industries, Trade & Commerce	Member Secretary.

The High Powered Coordination Committee shall:

(a) meet at such times and places and shall adopt such procedures to transact its business as may be prescribed;

(Jb) examine the proposals brought before it, for setting up biotech units; and

(c) communicate decisions to the entrepreneurs and the departments or the authorities concerned within the prescribed time limit of 30 days.

Every department or authority concerned, shall issue the required clearances after processing the application as required under the applicable law within the specified time limit and in case of failure to issue the required clearances within the specified time limit, such clearances shall be deemed to have been issued and the entrepreneurs may proceed with the implementation of the project.

The State Government may also constitute a State Level Implementation Committee (SLIC), under the Chairmanship of Industries Minister.

(1) To foster public-private partnership, the State Government will set up a special Biotechnology Development Fund with an initial corpus of Rs. 50 crores, with private collaboration and with the objective of funding various ventures. The fund can be further augmented by subscription from Indian and overseas individuals, institutions and companies. The SLIC will be responsible for effective utilization of the Biotech Development Fund and will act as a think tank and key advisor on diverse policy related issues.

(2) It will identify key biotechnology areas for investments in research and technology development as is necessary for the State. The Committee will also be responsible for reassessment of priority areas for growth from time to time.

It will promote research in the emerging and nascent technologies by inviting proposals from different institutions and industries and "providing financial assistance.

The SLIC will help the State in creating greater public awareness issues arising which impinge on aspects of culture, morality, ethics, economics etc.

The SLIC will setup a Core Technical Group for evaluation of the projects to be set up in the biotech parks and for disbursement of incentives.

By order and in the name of Governor of Goa.

Hanumant *T. Toraskar,* Under Secretary (Industries).

Porvorim, 9th October, 2006.

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