

1.0 PREAMBLE

Biotechnology is defined as the application of scientific and engineering principles for the processing of materials by biological agents to provide goods and services. It can be classified into different fields such as medical biotechnology, ecological biotechnology, bioprocess, pharmaceutical, industrial biotechnology and farming biotechnology, etc. Biotechnology seems to take the sudden biological new revolution. The importance of Biotechnology has been recognized world over. Developed countries took initiative and invested in generating knowledge, have taken lead in the development of Biotechnology.

However, U.P. has not been able to apply biotechnology for its development, though significant expertise in terms of R&D institutions, human resource and agricultural diversity exists. Agriculture sector in U.P. has made significant expertise in terms of R&D institutions and human resource. It is first amongst States in the production of wheat (288 metric ton, 36.58% of total production in the country) and ranked second in the production of sugarcane with 1126.34 lakh metric tons i.e. 48% of total production in the country in the year 2010-2011. Similarly, other productions of the State in 2010-2011 are fruits (10.79 ton/hectare), potato (151.75 lakh metric ton i.e. 40-45% of total production in the country) and milk (210.31 lakh metric ton). Food production yield of the State is higher than that of the international yield.

The State used in the year 2010 about 21.67 lakh metric ton of total fertilizers. In spite of such large consumption the productivity of the crops is still low. There is large gap between potential and actual yields of most of the crops. The use of organic fertilizer will lead to improvement of soil health and enhance food security as well as the nutritional security of the crops within the State.

The State has not been able to do much in the health, dairy and food sectors, in spite of available resources. Through application of tissue culture, productivity of horticulture, floriculture and agriculture can be enhanced and made economically beneficial. With the application of Biotechnology, it would be possible to enhance the productivity as well as management of food, utilizing unused and waste into value added food, milk and induct health care through nutraceuticals and pharmaceuticals.

Lucknow offers a multidisciplinary blend of excellent facilities and expertise in the area of biotechnology. Around 3000 highly qualified scientists are working in four CSIR laboratories and four ICAR laboratories within the city and many of them have earned national and international recognition. These institutes have excellent expertise and infrastructure in the area of biomedical sciences and drug development, toxicology and environment protection, production of pest resistant plants, high yielding crop and fruit

varieties. Realizing the great potential of U.P., Lucknow has been declared as The Biotechnology City of India during the 89th session of the Indian Science Congress in January 3, 2002.

A Biotechnology Park with the sponsorship of Department of Biotechnology, Govt. of India and in collaboration with Department of Science and Technology, U. P. Govt., CSIR and other agencies has been setup at Kursi Road, Jankipuram, Lucknow on 8 acres of land provided by the Department of Science and Technology, U.P. Govt. In order to provide forward linkages to the farmers, a Biotech Networking Facility Center is under establishment by Council of Science & Technology, U.P. on an agriculture farm of about 26 acres, provided by U.P. State Institute of Rural Development, at Bakshi Ka Talab, Lucknow.

To harness the benefits of biotechnology for the prosperity of the State, the Govt. of U.P. has chartered a Biotech Policy in 2004. The Uttar Pradesh government proposes to redraft the Biotech Policy and introduce new developments in the field of Biotechnology that would create an investor-friendly environment. The proposed changes are required in view of various new initiatives being undertaken by the government. The State would encourage growth of R&D, development of manpower and resources in key areas like bioinformatics, plant and animal biotechnology by networking with the existing institutions, universities and medical institutes. It would also set up Centers for Excellence in different thrust areas of biotechnology. The State would develop institutional mechanism to carry the fruits of Biotech R&D being pursued at research institutions and technology incubators of the Biotech Park to farmers for employment generation through tissue culture and macro propagation. It would provide better quality and high yielding variety of crops and plants to the farmers.

Considering Biotechnology as an Industry

Biotechnology should be treated as an industry as it can be commercially exploited to create new jobs and economic wealth in the State would thus be eligible for all incentives provided in the UP Industrial Policy 2012, to which other industries are eligible.

2.0 NEED FOR A UP BIOTECH POLICY

The specific features and key drivers of biotech industry for the formulation of the Policy is based are as follows:-

The Biotechnology Industries are research driven, capital intensive, power intensive and have multi-sector linkages. Biotechnology industries are Research & Development oriented manufacturing based and/or Bio-service providing. Biotechnology, have interface with multiple sectors, such as agriculture, healthcare, environment, aquaculture,

animal husbandry, etc. The Biotechnology Industries have multiple client selections, characterized by inventors, existing entrepreneurs endeavouring in biotechnology field and established business estates specializing in Biotechnology and its progress will help in the overall development of the State.

3.0 VISION

Uttar Pradesh to be developed into a prosperous State by employing biotechnology research & application to enhance the health and agriculture sectors, management of crops, bringing prosperity to farmers, generating employment in rural/urban areas, food & health for all and clean environment.

4.0 MISSION

- To develop knowledge based economy
- To assure benefit of biotechnology to all the sections of the society
- To promote entrepreneurship in biotechnology based industries

5.0 DEFINITIONS

5.1 Definition of Biotechnology Unit/Industry:

Biotechnology Unit means a unit engaged in manufacture of Biotechnology products as given below.

5.2 Definition of a Biotechnology Product:

Biotechnology Product would include a product, which use or are derived by using (a) living systems, (b) enzymes, (c) Bio-catalysts and any of the following processes: Genetic Engineering/ Gene Engineering, Cell Engineering/ Cell Culture, Bio process engineering, Protein Engineering, Tissue Engineering, Microbiology, Biochemistry, Bio-informatics, Genomics, Biotransformation, Molecular breeding, Bio-diagnostics, Vaccine Technology, Embryo Manipulations (subject to legal and ethical regulations), Pharmaco-genomics, Proteomics, Allo-transplantation/Xeno-Transplantation, Bio-Chips, Gene Therapy or Other Frontier Technologies and services, as defined by the State Government from time to time.

6.0 OBJECTIVES

- 6.1 To establish an excellent position of Uttar Pradesh in the field of biotechnology by attracting Corporate Funding for harnessing existing R&D Capabilities and Commercialization of Technology.

- 6.2 To enable the farmers to increase their crop productivity and per capita income by production of high-yielding, draught-resistant, pest-resistant seeds for agriculture and horticulture crops, soil salinity treatment and the use of organic farming to enhance food security for all the people of Uttar Pradesh.
- 6.3 To undertake extensive extension educational programs to create awareness among the masses about biotechnology, its entrepreneurial and job opportunities for all round sustainable development.
- 6.4 To attract biotechnology based industrial investment by providing special incentives to the biotech industry and related sectors in order to generate large scale employment in the urban and rural areas of Uttar Pradesh.
- 6.5 To develop adequate institutional and related infrastructure, promotion of research & development and establishment of Centers of Excellence in frontier areas of Biotechnology, with specifically focusing on human resource development.
- 6.6 To develop and conserve bio-resources for sustainable commercial use and the use of renewable energy by promoting the use of bio-fuels and other bio-energy.
- 6.7 To address issues such as Intellectual Property Rights, Bio-safety, Bio-surveillance and Bio-ethics.
- 6.8 To develop and promote cheaper and effective technologies for treatment of waste from fruit and vegetable processing, pollution management and safe drinking water, treatment of urban waste and industrial effluents.

7.0 THRUST ACTIVITIES

With the knowledge generated in the area of biotechnology globally, in past two decades or so, the improved varieties of plants/crops/animals could be developed with desired traits, on routine basis, through the application of these innovative ideas. In order to improve upon a given specific trait of relevance, the techniques have to be worked out and standardized within the State.

Keeping in view the State's priorities, strengths and resource abundance and within the identified thrust areas, following key activities have been identified for promotion under this policy framework. U. P. is the fifth largest state in India, with the burgeoning population of ~199,581,477 crores in 2011 and the current food production has to be increased manifolds to enhance food security for masses. The proposed activities would be increasing land productivity by enriching crop-specific, species-specific microbial

communities, developing transgenic crops, resistance to biotic & abiotic stress, having high nutritional value, use of bio-fertilizers/bio-pesticides, weed control, early maturity and storage technology, phyto-remediation and bio-monitoring, bio-fuels and bio-energy.

The State would focus on wheat, rice, pulses, potatoes, sugarcane, mango, papaya, banana, amla, jatropha & vegetables, etc. In U.P. fishing area is over 4.32 lakh hectares producing ~3.93 lakh MT fishes in 2009-10 of more than 176 varieties of fishes, these include rohu, hilsa, mahseer, mangur, snow-trout and mirror carp. The proposed activities in this area would be feed improvement, disease diagnostics development, conservation of diversity, cryopreservation of embryos, development of other organisms such as freshwater prawns, pila, unio, etc.

In view of broad agricultural base, where 65% of the total population is dependent upon agriculture. Therefore, U. P. has an opportunity to provide leadership in plant transformation technology and development of industrially useful crop plants. The key activities would be plant tissue culture, horticulture, floriculture, forest trees, genetic diversity and development of medicinal and aromatic plants

Uttar Pradesh supports approximately 16% of India's total livestock population. The proposed activities in animal biotechnology would be increasing the production, availability and shelf life of animal produce, feed, fodder, development of nutritionally rich, high protein fish, prawns, and alternative nutrition sources, improving the health of productive animal through biotechnology based disease control mechanism and tools, embryo transfer technology, superior germplasm, genetic resource conservation, etc.

The activities that will be taken up in Pharma and Healthcare would be development of diagnostic kits and facilities, therapeutics and monoclonals, using new molecules, technologies such as stem cell, genetic diagnostics, disease control, feed improvement /nutrition, production of value added products, development of bio-products, genetic resource conservation, etc. The proposed activities in environment biotechnology would be conservation of species, bio-fermentation technology, biogas production, bio-fuel, leather biotechnology, bioremediation, etc.

Based on the above proposed activities the State has identified the following thrust areas in Biotechnology:-

- Agriculture & related sectors (e.g. Field crops, Horticulture crops, Forestry, Dairy including Cattle, Poultry, Fisheries, etc)
- Pharma & Healthcare
- Bioinformatics i.e. storing, retrieving and analyzing biological data
- Environment and Bioremediation

- Bio-energy and renewable energy
- Industrial Biotechnology
- Distinguished research in all areas of Biotechnology and related areas.

8.0 ACTION PLAN

The policy objectives would be addressed through specific action plan which are in spirit and conformity with the key strategies identified.

8.1 Developing Biotechnology Infrastructure

8.1.1 Promotion of Biotech Parks/Clusters/Estates

State Government, through collaborative partnerships and provisions of incentives/concessions, proposes to encourage and facilitate the private sectors, in developing necessary biotechnology infrastructure such as Biotech Parks/Clusters/Estates and other supporting infrastructure for research, training, testing, etc.

State's varied regional characteristics such as geographic location, agro-climatic conditions, distribution of industries, academic institutes, research centre, etc would provide comparative advantage to a particular biotech sector. In view of such comparative advantages the State Government proposes to encourage the development of dedicated biotech parks/clusters in the form of biotechnology zones/estates in various parts of the State. Some of the sector specific Biotech Parks/clusters proposed that will be established in any one of the places are as follows:

- Industrial Biotech Park in Ghaziabad/Moradabad/Noida area
- Food Biotech Park in Allahabad/Etawah/Varanasi/Gorakhpur area
- Agri-Biotech Park in Raibareilly/Sitapur/Ballia area
- Environmental Biotech Park in Kanpur/Jhansi/Agra/Mathura area.

8.1.2 Bio-Centers for Rural Development

18 Bio-Centers, in each division on available land of UPSIDC industrial estates/Rural Development/Horticulture Departments or any other available land would be setup. One of the Lucknow division bio-center is under establishment at Bakshi Ka Talab in an area of 26 acres.

The Bio-Centers will have facilities related to plant tissue culture, bio-fertilizers, biodiesel, medicinal/herbal/aromatic plants, aquaculture, post harvest technology, renewable energy/bio-fuel driven facility for running pump sets and small agricultural gadgets such as expeller & esterification facility for processing non-edible oil seeds and also adequate facilities for training & demonstration and to maintain & provide database services to users/entrepreneurs.

The centers will also have Biotechnology Information Centers for rural development and awareness. These bio-centers would be setup in assistance/guidance of CST, U.P., Lucknow.

8.1.3 Establishing Centers of Excellence (COE) for R&D

Government of U.P. has established for example three Centre of Excellence (COE) to promote R&D, innovation and transfer of technology at prominent Universities and Institutes, in the areas of:-

1. Agri-biotechnology at Sardar Vallabhbhai Patel University of Agriculture & Technology, Meerut
2. Nanotechnology at Aligarh Muslim University, Aligarh
3. Diagnostics of prevalent disease of the State i.e. Japanese encephalitis at Sanjay Gandhi Post Graduate Institute of Medical Sciences, Lucknow.

The State Government will encourage establishment of more Center of Excellence across U.P. in the identified thrust areas of biotechnology. The proposed Centers of Excellence will be in the area of Pharmacognosy, medicinal and herbal plants, bioinformatics, genomics, diagnostics of prevalent diseases such as tuberculosis, malaria, gene therapy, etc in various Universities and Colleges/Institutes across the State.

8.2 Human Resource Development

All over the State, there is abundant talent and human resource in upcoming new areas like plant genomics, agri-biotech, bio-pharma, industrial biotechnology, human diseases, toxicology, development of bio-markers, Bioinformatics, Nano-biotechnology, drug delivery, diagnostics, bio-sensors, etc.

To achieve a better and skilled human resource:

- An Advance Centre for Research Application and Training in biotechnology and bioinformatics will be setup. This center will provide training to farmers, youth and women in agri-Biotechnology and popularization of tissue culture

plants, bio-fertilizers and bio-pesticides for adoption in rural areas. This will be assisted by CST, UP Lucknow, in any Institute or University of the State utilizing their existing facilities.

- The Post Doctoral and Doctoral training in the area of pharma and agri-biotechnology would be created. It may also run M. Sc/M. Tech/Diploma and certificate courses like finishing school to make candidates job ready. This may be assisted by CST, UP Lucknow, in any Institute or University of the State utilizing their existing facilities.

8.3 Facilitating Biotechnology Research and Innovation

8.3.1 Biotechnology Research

- The State Government proposes to promote and develop biotechnology research, on national and international partnership basis and facilitate the adaptation of research into usable, beneficial technologies, products and processes.
- The State Government proposes to strengthen Industry–University/Institutes partnerships by promoting/encouraging collaborative research and providing innovation support.
- The U.P. Government proposes to encourage biotechnology research in private sector by facilitating the availability of incentives for this purpose.

8.3.2 Collaborative Research

To encourage biotechnology research in private sector, the State Government proposes to play a catalyst role in bringing them together. Emerging technologies such as recombinant technology or recombinant products, refinement & modifications, nano-biotechnology, gene technology, pharmacogenomic, pharmacokinetics, new drug delivery mechanism would provide Indian biotech units a major opportunity to become partners in value creation.

8.3.3 Financial Assistance

To encourage the Universities/Institutes to make every effort for applied and solution based research, the State government on case to case basis may consider providing support to University/Industry for industry funded research.

8.3.4 IPR (Intellectual Property Rights)

Government of U.P. would promote IPR enforcement through sharing of best practices, guidelines and framework across U.P. to safeguard innovation.

9.0 INCENTIVES & CONCESSIONS WITH REGARD TO BIOTECHNOLOGY BASED INDUSTRIAL/COMMERCIAL DEVELOPMENT

Liberal incentives would be provided to biotech industries in the forms of exemptions and concessions from payment of entry tax on material for construction and equipment, on stamp duty and registration charges for specified period of time, exemption of electricity tax on captive power generation sets. The State would make provision of cluster development Fund/Venture Capital to help R&D in research institutions and industries and setting up of joint ventures.

The financial intensives and concessions proposed in the U.P. Industrial Policy 2012 in various sectors such as relaxation in stamp duty, registration fee, trade tax, entry fee, marketing and development charges, interest free loan, land acquisition tax, etc will also be extended to the Biotech Industries/Units in the Biotech Parks/Clusters/Estates.

Similarly the simplified regulations as proposed in the U.P. Industrial Policy 2012 in various sectors such as simplified labour law, pollution controls, export encouragement, etc will also be extended to the Biotech Industries/Units in the Biotech Parks/Clusters/Estates.

In addition, the Agro-Biotech industries will be designated as agriculture industries would be entitled to get the advantage of the benefits available under UP Food Processing Policy and Bio-informatics units would be allowed to have FSI norms at par with IT Industries, as provided in IT Policy of UP.

Besides these other special incentives are also proposed by the State Government that will also be provided to the Biotech Industries/Units and they are as follows:-

9.1 Relaxation in Zonal Regulations

- Biotechnology units established in Biotech Parks/Biotech Industrial Areas/Clusters shall be given exemption for Floor Area Ratio (FAR) to the extent of 50% to the prevailing norms and the aforesaid limit may be considered to be given to the extent of 25% to the units in other areas that lie in the identified districts of Poorvanchal and Bundelkhand.

9.2 Relaxation of Taxes on Biotechnology Based Products

- The units engaged on dissemination of Biotechnology based techniques and products like seeds, bio-fertilizers, improved genetics materials, etc. to farmers shall be given incentives on capital investment and for promotion of their products.

9.3 Assistance to Cluster Development

The Government of Uttar Pradesh would encourage setting of cluster for Biotech industries with private participation.

Cluster will be recognized having critical mass of a minimum of 6 units.

- The Government, with an aim to empower the clusters, would provide financial assistance in the form of waiving off part of interest on the loan drawn from the banks.
- The financial assistance to waive off part of interest for clusters development in the identified districts of Poorvanchal and Bundelkhand would be 75% of the loan drawn from the banks, while in other districts it would be 50% while no assistance will be provided to biotech industries/clusters in the NCR region.

The assistance would be provided for taking up activities like technology up-gradation among member units, with the assistance from R&D Institution/University, product design, quality improvement, common branding and marketing facilities, development of common facilities such as raw material or product warehouse, testing laboratory, tool room facilities, skill development facilities/programs for workers and supervisors, capacity building and productivity improvement, etc.

9.4 Relaxation on Mega Projects

A special package of incentives would be offered to mega projects. A project having an investment of Rs. 250 crores or more would be considered as mega project.

- Such projects where an investment of Rs. 250 crores or more, as verified by the bank, in setting up new unit and also such units which employ more than 250 persons technically qualified in area of biotechnology, of which 75% are persons are from the State, will be declared as Mega Projects.

- Such project would be given assistance upto 50% of the cost of Effluent Treatment Plants, maximum of Rs. 100 lakhs per Mega Projects lying in the identified districts of Poorvanchal and Bundelkhand.

9.5 Encouragement to the Commercialization of R&D Findings

- There exists ample risk in converting fruitful pilot level R&D findings for their commercialization, which are expensive as well.
- State Government would be paying adequate attention to provide financial support to such units having adequate production, marketing and distribution networks as to develop series of beneficial new projects in innovation cycle.

9.6 Patent Registration & Product Registration

- The State Government would provide financial assistance to Biotechnology industrial units/individuals, for patent tracking and patent registration.
- Assistance would be provided for meeting the expenses incurred for obtaining patent registration.
- Assistance would be provided at the rate of 50% (maximum of Rs. 5 lakhs) of necessary expenditure incurred for obtaining the Patent/IPR. This assistance will be given only once per product/process per institution/individual.

9.7 ISO Certification

Quality up-gradation is a must for every industry to survive. Financial assistance to biotechnology based industrial units for ISO Certification will be provided.

- The State Government would provide financial assistance to Biotechnology Units for quality certification and for obtaining ISO 9000/14000 and for various other schemes like GMP, HACCP, TPM, JIT etc.
- The assistance would be offered for reimbursement of the expenditure incurred towards the cost of acquiring equipments required for testing and R&D, quality up-gradation, acquisition of quality marks, consultancy fee to firms etc.
- Financial assistance will be of 50% of the total expenditure upto maximum limit of Rs. 2.00 lacs.

9.8 Encouragement to Centers of Excellence

- Assistance would be provided to Agro-Biotech Industries/Universities/Institutes for setting up Centre of Excellence.
- The State Government would support projects for development of Centre of Excellence. The financial assistance would be provided up to a maximum of Rs. 1.0 crores in the first year, for equipments & running cost and in the subsequent years running cost will be provided for a period of 5 years, and afterwards that University/Institute will be running the Center on their own.

9.9 Participation in trade fairs, exhibition

- The State Government would provide financial assistance to Biotechnology industries/units, for market promotion and development, or participation in national/international trade fairs and seminars/conferences.
- For participation in international fairs, State Government would offer subsidy of 50% of the total cost, up to a maximum of Rs. 2.00 lakh, per industrial units per year. Assistance would be provided for attending seminar held abroad for i.e. 50% of the participation fees per industrial units per year. The assistance may be disbursed only after relevant certificate produced by the participants.

10.0 COMMITTEES

For facilitating quick implementation of Biotechnology initiatives and policies, various committees would be constituted by State Government to facilitate the scheme implementation and regulatory aspect of development of Biotechnology in the State.

10.1 Regulatory Committees

- The Department of Infrastructure & Industrial Development, U.P. has constituted committees of districts/divisions level Udyog Bandhus headed by the district magistrate/divisional commissioner in the State would facilitate the scheme implementation and regulatory aspect of Biotechnology Unit of the State.
- The “Fast Track Grievance Redressal Cell”, has been established by the Director General of Police office under the subordination of a Inspector General of Police and will be strengthened further so that they can help in providing a peaceful, safe and high quality environment. Their services would also be extended to the Bio-Agri/Bio-Pharma/Bio-Industries Sectors as well.

- To strengthen the safety of industrialists and businessmen, a committee at district level under the chairmanship of district magistrate “Industrialist/businessman Safety Forum” has been constituted and this would also be extending their support to Biotechnology industrialists and businessmen.

10.2 Biotechnology Development Cell

The State will constitute a Biotechnology Development Cell (BDC), at Council of Science & Technology, UP for providing technical guidance and support. The committee will consist of representatives from concerned departments and experts from different areas of Biotechnology. The matter referred by the regulatory committees and others will be taken up by the Biotechnology Development Cell from time to time.

Biotechnology Development Cell will operate with the following mandate:

- To promote, support and facilitate the overall development of Biotechnology in the State.
- To facilitate the infrastructure development, research, innovation and human resource development,
- To facilitate regional, national and international networking for promotion of biotechnology,
- To facilitate the development of data bank and resource centers.
- To facilitate creation of scientific awareness, socio-ethical acceptance, adoption and application of biotechnology.
- To oversee the implementation of the Policy and also help in removal of bottlenecks.

11.0 NODAL AGENCY

For the implementation of the action plan it is proposed that Council of Science & Technology, U.P. will act as a nodal agency. The Council of Science & Technology, U.P. has to be strengthened significantly both in terms of infrastructure and manpower.