MINISTRY OF SCIENCE AND TECHNOLOGY

DEMAND NO. 85

Department of Biotechnology

A. The Budget allocations, net of recoveries, are given below:

(In crores of Rupees)

Major Head		Budget 2008-2009			Revised 2008-2009			Budget 2009-2010		
		Plan	Non-Plan	Total	Plan	Non-Plan	Total	Plan	Non-Plan	Total
Revenue		900.00	19.00	919.00	879.00	22.50	901.50	900.00	24.00	924.00
Capital		...	...	...	...	...	...	...	...	...
Total		**900.00**	**19.00**	**919.00**	**879.00**	**22.50**	**901.50**	**900.00**	**24.00**	**924.00**
1. Secretariat - Economic Services	3451	...	7.25	7.25	...	10.64	10.64	...	12.00	12.00
Other Scientific Research										
2. Autonomous R&D Institutions	3425	235.00	1.75	236.75	243.57	1.86	245.43	200.00	2.00	202.00
3. *Assistance to Other Scientific Bodies*										
3.01 Human Resource Development	3425	30.00	...	30.00	32.10	...	32.10	35.00	...	35.00
3.02 Bioinfomatics	3425	20.00	...	20.00	20.03	...	20.03	15.00	...	15.00
3.03 Research and Development	3425	315.00	...	315.00	288.90	...	288.90	340.00	...	340.00
3.04 Biotechnology for Societal Development	3425	10.00	...	10.00	9.50	...	9.50	10.00	...	10.00
3.05 Grand Challenge Programmes	3425	45.00	...	45.00	45.00	...	45.00	40.00	...	40.00
3.06 Programme for Promotion of Excellence and Innovation	3425	45.00	...	45.00	45.00	...	45.00	45.00	...	45.00
3.07 Biotech Facilities	3425	25.00	...	25.00	25.00	...	25.00	20.00	...	20.00
Total		*490.00*	*...*	*490.00*	*465.53*	*...*	*465.53*	*505.00*	*...*	*505.00*
4. *I&M Sector*										
4.01 Assistance for Technology Incubators, Pilot Projects, Biotechnology Parks and Biotech Development Fund	3425	10.00	...	10.00	7.00	...	7.00	5.00	...	5.00
4.02 Public Private Partnership	3425	60.00	...	60.00	60.00	...	60.00	90.00	...	90.00
Total		*70.00*	*...*	*70.00*	*67.00*	*...*	*67.00*	*95.00*	*...*	*95.00*
5. International Cooperation	3425	15.00	...	15.00	15.00	...	15.00	10.00	...	10.00
6. International Centre for Genetic Engineering and Biotechnology	3425	...	10.00	10.00	...	10.00	10.00	...	10.00	10.00
7. Lumpsum provision for projects/ schemes for the benefit of North Eastern Region and Sikkim	2552	90.00	...	90.00	87.90	...	87.90	90.00	...	90.00
Grand Total		***900.00***	***19.00***	***919.00***	***879.00***	***22.50***	***901.50***	***900.00***	***24.00***	***924.00***

C. Plan Outlay	Head of Dev	Budget Support	IEBR	Total	Budget Support	IEBR	Total	Budget Support	IEBR	Total
1. Other Scientific Research	13425	810.00	...	810.00	791.10	...	791.10	810.00	...	810.00
2. North Eastern Areas	22552	90.00	...	90.00	87.90	...	87.90	90.00	...	90.00
Total		**900.00**	**...**	**900.00**	**879.00**	**...**	**879.00**	**900.00**	**...**	**900.00**

1. **Secretariat - Economic Service**: Provides for Expenditure on the Secretariat of the Department.

2. **Autonomous R&D Institutions:** Under the administrative control of the Department, there are 12 autonomous institutions; the institution-wise activities are given below:

(a) **National Institute of Immunology (NII), New Delhi:**

Besides, continuation of major on-going areas of interest, initial works on Incubator laboratory facility is being taken up in the second campus of the Institute to develop Campus II at Faridabad and to build minimum essential staff quarters in Dwarka, New Delhi and construction of additional research scholar home/guest house in the main campus. An innovation foundation through public private partnerships for public goods and for genetically defined MACAQUE primate animal strain facility shall be undertaken.

(b) **National Centre for Cell Science, Pune:**

Besides continuation of existing R&D programmes and services, it is proposed to launch two major programmes namely Diabetes and Identification of anti-viral compounds with potential for development of microbicides to prevent HIV infection and transmission. Network programmes on systems Biology of Global Regulatory Networks: Unraveling Sequence Features in Promoters that Dictate Tissue-Specificity of Gene Expression shall be initiated. It is also proposed to establish centers for cell and tissue engineering and immuno-thereupatics.

(c) **Centre for DNA Fingerprinting and Diagnostics (CDFD), Hyderabad:**

It is proposed to improvise methodologies for high throughput DNA fingerprinting and new diagnostics tools development. New activities such as National Facility for Training in DNA Profiling (NFTDP), Disaster Victim Identification Cell (DVIC), Secretariat for DNA Profiling Advisory Board and Creation of National DNA Database, Quality control and accreditation, and Other DNA profiling services will be initiated.

(d) **National Brain Research Centre (NBRC), Manesar:**

The on-going research activities would be continued and the following new activities will be initiated namely, evaluation of the pharmacological potential of traditional medicinal preparations used in the treatment of dementia including Alzheimer's disease and proteasomal dysfunction and Parkinson's disease and identification of the modulators of ubiquitin proteosome system. The neural stem cell research programme comprising of both basic and translational components including understanding the basic biology of *neural stem cells* and the use of stem cells to treat disorders relating to the nervous system will be initiated. Beside the core grant, Clinical Research Centre for Brain Disorders and Brain Machine Interface, and network programme on genetics and pathogenesis of neurological and psychiatric disorders will be priorities.

(e) **National Institute for Plant Genome Research, New Delhi**:

Research programmes on transgenics, genomics, genome diversity are undertaken. In addition, transgenic testing and evaluation facility will be established.

(f) **Institute of Bioresources and Sustainable Development (IBSD), Imphal:**

The following areas of research shall be continued on Medicinal and Horticultural Plant Bioresources Programme; Microbial Resources Programme; Aquatic bioresources programme; Insect bioresources programme and Bioinformatics. It is also proposed to establish a Genome Club for regular interaction between bio-entrepreneurs, graduate students and researchers on biodiversity conservation and bioresources management.

(g) **Institute of Life Sciences, Bhubaneswar:**

This undertakes vertical translational activities such as Development of DNA chip based diagnostics, nanomedicine alongwith establishment of National Repository of C.elegans, a model genome for all fundamental biological studies.

(h) **Translational Health Science and Technology Institute Faridabad:**

New autonomous institution to facilitate development, optimization and evaluation of technologies for public health and individual health as an independent interdisciplinary centre where basic scientists, physician scientists, technologists and chemical-epidemiologists would work together. The key feature of this institute would be a dynamic inter-relationship of health, science and technology sectors and with small and medium biotech industry, pursuing grand challenges in public health to produce affordable technologies through group excellence. The two main components of the institute would be (a) Health Science Technology (HST) centre which bridges engineering, biomedical, biological and physical scientists (b) Translational centre which does preclinical and clinical product development in partnership with other stakeholders and industry.

(i) **Rajiv Gandhi Centre for Biotechnology (RGCB), Trivandrum:**

The institute shall carry out and promote advanced research in frontier areas of biotechnology such as Translational Cancer Research, Human Genetics, Protein Engineering, Molecular Reproduction, Molecular Microbiology, Cancer Research, Neurobiology & Plant Molecular Biology.

(j) **UNESCO Regional Centre for Education and Training in Biotechnology, Faridabad**

The institute aims at producing human resource through education and training in a milieu of research and development for application of biotechnology for sustainable development towards building a strong biotech industry through regional and international co-operation with emphasis on novel interdisciplinary education and training programmes, currently not available in the country. It will serve as a region hub of biotechnology expertise in South Asian Association of Regional Co–operation (SAARC) region, Asia and promote South-South & South-North co-operation.

(k) **National Agri-Food Biotechnology Institute and Bioprocesing Unit, Mohali**

The institute is dedicated to promoting translational research in the area of Agri-Food processing and fostering entrepreneurship. The cluster will comprise of the following constituents:

- National Agri-Food Biotechnology Institute (NABI)
- Bio-Processing Unit (BPU)
- Agri-Food Biotech Park & Incubator

The Agri-Food Biotechnology Cluster will be a unique facility with an inter-disciplinary approach reinforced by the synergy and co-location of various institutions and forward linkages with prospective entrepreneurship. It will link biotechnology of crops with that of food and nutrition while facilitating bench to market progression of products and services and act as a catalyst of innovation in state of Punjab as well as the entire region.

(l) **Institute of Stem Cell Research and Regenerating Medicine, Bangalore**

This institute shall work on integrated basic research in stem cell biology with pre-clinical and clinical research for the development of multidisciplinary, interactive groups of scientists and clinicians besides training & education and partnership with industry.

3. **ASSISTANCE TO OTHER SCIENTIFIC BODIES:**

3.01. **Human Resource Development:**

An exercise to formulate model undergraduate and postgraduate curricula in life sciences and in translational science keeping in view, future needs, new PG teaching programmes in the areas of food and nutrition biology, clinical pharmacology, bioenterprise management, bio-financing and regulatory efforts shall be initiated. M.D/Ph.D programmes will be supported in some medical colleges/institutions. At least Ten Star undergraduate colleges in biotechnologies/ life sciences will be in place. Few teacher and technician training centers will be setup. The existing programmes like Ph.D., Post-doctoral Fellowships and others will be scaled up. Besides continuing and expanding the fellowship, need based new fellowships to promote innovation will be instituted.

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3.02. **Bioinformatics:**

Support to ongoing activities shall be continued. The other activities includes network projects on application of Biotechnology in Rice Genome Research; consortium projects involving experimentalist and the theoreticians for computation biology useful in application to major areas like Agriculture, Medical and Environment; global partnership projects in Bioinformatics; human resource development in bioinformatics to strengthened to special fellowships and programmes in computational biology; and establishment of Centre of Bioinformatics.

3.03. **Research and Development:**

Besides the ongoing programmes, following areas will be taken up. In agriculture biotechnology, a network of interdisciplinary programme on molecular characterization of genes involved in apomixes, fine mapping of crops , transgenic for pest and disease resistance, drought etc., will be supported alongwith development of RNAi technology applications. State Agriculture University will be supported to start interdisciplinary translational research centers. A major programme on nutritional quality improvement of vegetable crops with special emphasis of underutilized crop. R&D projects in the area of plant development, host pathogens interaction, chemicals from plant cultures, apomixis, transformation systems and genetic events. SOL genome initiative would be strengthened and continued. A network programme on biotechnology for improvement of conservation and utilization of forest resources will be taken up. New Programmes on wheat genome sequencing, cancer genomics, etc. will be taken up.

In animal biotechnology, multi-centric programmes on animal nutrition and development of buffalo pox in animal biotechnology will be initiated. In aquaculture, functional genomics of native freshwater and brackish water species and frontline demonstrations to prove techno-economic viability of aquaculture of non-traditional species for diversification in aquaculture are priorities.

Under National Bioresources Board, new programmes on bioprospecting of bioresources for gene and molecules and centres of bioprospecting for screening characterization and validation will be initiated. An institute of seri biotechnology will be setup. New programmes on basic and translational research programmes in nano- science and nano-biotechnology for potential application in agriculture, medicine and environment will be initiated.

In medical biotechnology, new programmes include pathogen biology, host genetics, vector biology, drug development for HIV, tuberculosis, malaria. Specilised virus research centres to address viral biology, pathogenesis, biomarkers etc. will be established. A nation wide network of centres are proposed for development of simple low cost diagnostics for infectious and others diseases. 5-6 clinical research centers, biobanks, biomedical research and schools, transgenic animal facility are certain infrastructure proposals for vaccine and diagnostics development. Development of novel platform technologies for vaccines delivery systems will be established. Besides continuation of genetic counseling centres, new facilities. R&D programmes in genomics of diseases, pathogens shall be taken up. The department will participate in international initiative on human cancer genome project- the cancer genome atlas. Stem cell and bioengineering programmes and R&D projects in network mode for clinical trials, biodesign and development will be undertaken.

New initiatives in environmental biotechnology include multi-institutional networks for biodegradation of xenobiotics, bioremediation, biodiversity conservation and bio-polymers. In food and nutritional science technology, multi-institutional network R&D programmes would be generated for understanding the role of nutrition in chronic diseases like cardiovascular diseases. Major programmes would be initiated on fortification of foods specially to address the incidence of malnutrition in school going children. R&D based re-entry grant scheme in collaboration with Welcome Trust will be implemented for overseas scientists returning to India.

3.04. **Biotechnology for Societal Development:**

The scheme covers three sub-schemes namely rural area plan, SC/ST special component plan and women component plan. The details of activities under each sub-component are given below:

Rural Component of the Programme

Proven and field tested technologies shall be demonstrated to help the target population in their skill development, employment and income generation in the field of agriculture, sericulture, production and manufacture of biopesticides and biofertilisers, awareness programmes on health and nutrition diet. Rural bioresource complexes established in five states shall be continued.

Details of Tribal Sub-Plan and Special Component Plan

Resource based programme will be implemented for employment generation, skill development and awareness. Self help groups will be supported for cultivation and marketing of medicinal and aromatic plants, fodder cultivation, animal rearing, promotion of handicrafts, piggery, food processing, aquaculture and dairy, health care and nutritional interventions.

The Details Regarding Women Component Plan

The programmes include several field based extension, demonstration and training projects on proven and field tested technologies for women.

3.05. **Grand Challenge Programmes**

Interdisciplinary grant challenge projects as suggested by the working group of the steering committee in the areas of national importance where biotechnology interventions can bring about significant value addition, cost effectiveness and competitiveness in product and process diversity will be taken up. It will be implemented through special management, administrative and organization streamlined for time bound results.

3.06 **Programmes for Promotion of Excellence and Innovation:**

Besides, continuation of support to existing centres, more centres of excellence and programmes support in priority areas for promotion of innovation in biotechnology across disciplines will be supported as per the guidelines envisaged. Few translational centers especially designed for technology development in Health, Agriculture and Food sectors with effective industry linkages will be established. Molecular Medicine Centers will be started at least in two medical colleges. Technology Management System for biotechnology with national and local centers will be established for technology transfer, licensing and IPR management.

3.07 **Biotech facilities:**

Besides continuation of support to some existing facilities, new animal house facilities with GMP for testing candidate vaccines and biotherapeutics, DNA and stem cell banking facilities, depositories of biological materials, facilities for testing and validation of GM plants, drugs and pharmaceuticals will be taken up. Remodeling and up gradation of existing life science departments and department of food science and nutrition in few universities, institutions and medical colleges will be supported.

4. **I & M SECTOR:**

4.01 **Biotech Parks and Incubators:**

Existing biotechnology parks shall be made operational with collaboration with the state governments. The Lucknow biotechnology parks will be augmented. The proposal to establish agri-food park in the agri-food cluster in Punjab will be supported which would house start-up companies. Regional Biotech Innovation Clusters in different areas likes stem cell biology, bioengineering, vaccines & diagnostics, agribiotechnology will be promoted with active participation of industry.

4.02 **Public-Private partnership:**

SMALL BUSINESS INNOVATION RESEARCH INITIATIVE (SBIRI):

The Small Business Innovation Research Initiative (SBIRI) programme will be expanded. To support this activity and other public private partnerships, Biotechnology Industry Research Assistance Centre (BIRAC) shall be established in project mode. A new programme Biotechnology Industry Partnership Programme (BIPP) for innovation in futuristic technologies and national priorities shall be launched.

5. **International Cooperation:**

The broad areas of collaboration would be human resource development, agriculture and food, medical and healthcare, molecular biology, bioinformatics and computational biology, industrial collaboration. Focus would be on strengthening the capabilities of the country in the area of systems biology, stem cell research and vaccines and diagnostics.

Besides ongoing programmes, new projects will be undertaken with Canada, Germany, Norway and other developing countries. The Indo-Swiss programme in biotechnology will be continued with new thrust.

6. **International Centre for Genetic Engineering and Biotechnology (ICGEB), New Delhi:**

The DBT's support to ICGEB, New Delhi will continue during the next five years. During the year, ICGEB continued its activity on basic as well as applied research in the field of human health and agriculture biotechnology.

7. **Lumpsum provision for North Eastern Region and Sikkim:**

Lumpsum provision has been kept for projects / schemes for the benefit of North Eastern Region and Sikkim for human resource development, biotechnology infrastructure and R&D in priority areas of North East in collaboration and partnership with other area public sector institutions and universities and private sector.