MINISTRY OF SCIENCE AND TECHNOLOGY

DEMAND NO. 87

Department of Biotechnology

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

(In crores of Rupees)

	Major Head	Actual 2009-2010			Budget 2010-2011			Revised 2010-2011			Budget 2011-2012		
		Plan	Non-Plan	Total	Plan	Non-Plan	Total	Plan	Non-Plan	Total	Plan	Non-Plan	Total
	Revenue	882.78	23.78	906.56	1200.00	22.00	1222.00	1200.00	22.00	1222.00	1400.00	26.92	1426.92
	Capital	...	...	...	...	...	...	...	...	...	...	...	...
	Total	**882.78**	**23.78**	**906.56**	**1200.00**	**22.00**	**1222.00**	**1200.00**	**22.00**	**1222.00**	**1400.00**	**26.92**	**1426.92**
1. Secretariat- Economic Services	3451	...	11.78	11.78	...	10.00	10.00	...	10.00	10.00	...	14.67	14.67
Other Scientific Research													
2. Autonomous R&D Institutions	3425	235.63	2.00	237.63	328.10	2.00	330.10	328.10	2.00	330.10	376.10	2.25	378.35
3. Assistance to Other Scientific Bodies													
3.01 Human Resource Development	3425	38.33	...	38.33	54.00	...	54.00	56.00	...	56.00	63.00	...	63.00
3.02 Bioinformatics	3425	27.36	...	27.36	19.00	...	19.00	22.00	...	22.00	27.00	...	27.00
3.03 Research and Development	3425	363.91	...	363.91	394.40	...	394.40	389.40	...	389.40	418.90	...	418.90
3.04 Biotechnology for Societal Development	3425	10.09	...	10.09	13.00	...	13.00	13.00	...	13.00	15.00	...	15.00
3.05 Grand Challenge Programmes	3425	37.90	...	37.90	54.00	...	54.00	54.00	...	54.00	59.00	...	59.00
3.06 Programmes for Promotion of Excellence and Innovation	3425	42.83	...	42.83	42.50	...	42.50	42.50	...	42.50	54.00	...	54.00
3.07 Biotech Facilities	3425	20.00	...	20.00	27.00	...	27.00	27.00	...	27.00	36.00	...	36.00
Total- Assistance to Other Scientific Bodies		*540.42*	*...*	*540.42*	*603.90*	*...*	*603.90*	*603.90*	*...*	*603.90*	*672.90*	*...*	*672.90*
4. I&M Sector													
4.01 Assistance for Technology Incubators, Pilot Projects, Biotechnology Parks and Biotech Development Fund	3425	2.53	...	2.53	5.00	...	5.00	5.00	...	5.00	20.00	...	20.00
4.02 Public Private Partnership	3425	90.00	...	90.00	118.00	...	118.00	118.00	...	118.00	158.00	...	158.00
Total- I&M Sector		*92.53*	*...*	*92.53*	*123.00*	*...*	*123.00*	*123.00*	*...*	*123.00*	*178.00*	*...*	*178.00*
5. International Cooperation	3425	14.20	...	14.20	25.00	...	25.00	25.00	...	25.00	33.00	...	33.00
6. International Centre for Genetic Engineering and Biotechnology	3425	...	10.00	10.00	...	10.00	10.00	...	10.00	10.00	...	10.00	10.00
7. Provision for projects/schemes for the benefit of the North Eastern Areas and Sikkim													
7.01 Human Resource Development	2552	...	...	...	6.00	...	6.00	6.00	...	6.00	7.00	...	7.00
7.02 Programme for Promotion of Excellence and Innovation	2552	...	...	...	9.50	...	9.50	9.50	...	9.50	6.00	...	6.00

(In crores of Rupees)

	Major Head	Actual 2009-2010 Plan	Actual 2009-2010 Non-Plan	Actual 2009-2010 Total	Budget 2010-2011 Plan	Budget 2010-2011 Non-Plan	Budget 2010-2011 Total	Revised 2010-2011 Plan	Revised 2010-2011 Non-Plan	Revised 2010-2011 Total	Budget 2011-2012 Plan	Budget 2011-2012 Non-Plan	Budget 2011-2012 Total
7.03 Biotech Facilities	2552	...	...	...	3.00	...	3.00	3.00	...	3.00	4.00	...	4.00
7.04 Bioinformatics	2552	...	...	...	6.00	...	6.00	6.00	...	6.00	3.00	...	3.00
7.05 Research and Development	2552	...	...	...	62.50	...	62.50	62.50	...	62.50	81.10	...	81.10
7.06 Grand Challenge Programme	2552	...	...	...	14.00	...	14.00	14.00	...	14.00	6.00	...	6.00
7.07 Biotechnology for Societal Development	2552	...	...	...	2.00	...	2.00	2.00	...	2.00	5.00	...	5.00
7.08 Support to Autonomous R&D Institutions	2552	...	...	...	15.00	...	15.00	15.00	...	15.00	23.90	...	23.90
7.09 I&M Sector	2552	...	...	...	2.00	...	2.00	2.00	...	2.00	2.00	...	2.00
7.10 International Cooperation	2552	...	...	...	...	...	...	...	...	...	2.00	...	2.00
Total- Provision for projects/schemes for the benefit of the North Eastern Areas and Sikkim		*...*	*...*	*...*	*120.00*	*...*	*120.00*	*120.00*	*...*	*120.00*	*140.00*	*...*	*140.00*
Grand Total		***882.78***	***23.78***	***906.56***	***1200.00***	***22.00***	***1222.00***	***1200.00***	***22.00***	***1222.00***	***1400.00***	***26.92***	***1426.92***

	Head of Dev	Budget Support	IEBR	Total	Budget Support	IEBR	Total	Budget Support	IEBR	Total	Budget Support	IEBR	Total
C. Plan Outlay													
1. Other Scientific Research	13425	882.78	...	882.78	1080.00	...	1080.00	1080.00	...	1080.00	1260.00	...	1260.00
2. North Eastern Areas	22552	...	...	...	120.00	...	120.00	120.00	...	120.00	140.00	...	140.00
Total		**882.78**	**...**	**882.78**	**1200.00**	**...**	**1200.00**	**1200.00**	**...**	**1200.00**	**1400.00**	**...**	**1400.00**

1. **Secretariat - Economic Services:** Provides for Expenditure on the Secretariat of the Department of Biotechnology (DBT).

2. **AUTONOMOUS R&D INSTITUTIONS:** Under the administrative control of the Department, there are 14 autonomous institutions for which assistance is being given. The institution are as follows:-

1. National Institute of Immunology (NII), New Delhi

2. National Centre for Cell Science, Pune

3. Centre for DNA Fingerprinting and Diagnostics (CDFD), Hyderabad

4. National Brain Research Centre (NBRC), Manesar

5. National Institute for Plant Genome Research, New Delhi

6. Institute of Bioresources and Sustainable Development (IBSD), Imphal

7. Institute of Life Sciences, Bhubaneswar

8. Translational Health Science and Technology Institute, Faridabad

9. Rajiv Gandhi Centre for Biotechnology (RGCB), Thiruvananthapuram

10.UNESCO Regional Centre for Education and Training in Biotechnology, Faridabad

11.National Agri-Food Biotechnology Institute and Bioprocesing Unit, Mohali

12.Institute of Stem Cell Research and Regenerative Medicine, Bengaluru

13.National Institute of Biomedical Genomics (NIBMG), Kalyani, West Bengal

14.National Institute of Animal Biotechnology, Hyderabad

3.01. **Human Resource Development:** Besides continuation of ongoing programmes, 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 twenty Star under graduate colleges in biotechnologies/ life sciences will be in place. Few teacher and technician training programmes will be

taken up. 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.

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 and special fellowships and programmes in computational biology.

3.03. **Research & Development:** Besides the ongoing programmes, following areas will be taken up. In agriculture biotechnology, a network of inter-disciplinary programme on molecular characterization of genes, 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 inter-disciplinary 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 strengthened.

In animal biotechnology, multi-centric programmes on animal nutrition and development of vaccine and diagnostic validation services 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 continued. An institute of seri biotechnology will be setup. New projects 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 strengthening of 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. Programmes on affordable health care, nano-medicine projects in cancer, a new bio-energy centre are some other priorities.

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:

a. 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.

b. Details of Tribal Sub-Plan and Special Component Plan

Resourced 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.

c.Details Regarding Women Component Plan

The programmes include several field based extension, demonstration and training projects on proven and field tested technologies for women. Some examples include: value added floriculture; processing of horticulture produce; cultivation and processing of medicinal and aromatic plants; production and application of vermicompost, biopesticides and biofertilisers; high value mushroom cultivation, aquaculture, poultry and rabbit rearing for wool extraction and transfer of modern agriculture practices. In health sector, projects will be implemented for awareness and counselling on genetic disorders and creating awareness on nutrition including traditional food and healthcare.

3.05. **Grand Challenge Programmes:** Grand Challenge Programmes approved in the areas of vaccine development, second phase of microbial prospecting, bio-design, accelerated molecular breeding, medical devices and genomics will be continued. A national platform for crop molecular breeding for breeding crops by design in collaboration with ICAR will be setup and biodesign of medical products with IITs will be taken up.

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 centers in four identified categories each with thematic focus; academic-industry relationship; biotechnology innovation will be supported. Molecular Medicine Centers and Cancer-Nanoscience centre will be started. Technology Management System will be strengthened.

3.07. **Biotech Facilities:** Besides continuation of support to some existing facilities, new animal house facilities with GMP for testing candidate vaccines and biotherapeutics, facilities for testing

and validation of GM plants will be taken up. Remodeling and upgradation of existing life science departments / universities will be expanded.

4.01. **Assistance for Technology Incubators, Pilot Projects, Biotechnology Parks and Biotech Development Fund:** The proposals considered are to set up Biotechnology park at Guwahati; Nano Biosym Technology Park, Himachal Pradesh; Marine Biotech Incubation at Ahmedabad and Biotechnology Parks in Kerala, Karnataka, Orissa and Rajasthan. Seed money for some of these parks have been given for making techno-economic feasibility reports depending upon these reports at least 2-3 parks will be funded for establishment. To catalyze and synergize R&D innovation, efforts will be made to develop strategies for locating the new institutions in 4 technology clusters namely, Agri-Food Technology Cluster, Mohali, Punjab; Health Science Biotechnology Cluster, Faridabad, Haryana; Animal Science and Biotechnology; and Marine Science and Technology Cluster. Appropriate investment should be made for design, architecture and constructs of these clusters with common facilities for the institutions to be located in consultation with other participating partners.

4.02. **Public-Private Partnership:** The Small Business Innovation Research Initiative (SBIRI) scheme will be modified and expanded based on the review conducted by IIM, Bengaluru and the suggestions from various sources. The projects which have been initiated during the previous years would be monitored for directive progress and development of product and processes. The SBIRI online system will be monitored for its effectiveness. Emphasis would be on innovation and validation and scaling up of the proof of concepts obtained in various projects supported under this scheme. Some new ideas and concepts in different areas of biotechnology would be generated. The agriculture sector will be strengthened further. New entrepreneurs will be encouraged. Funding of projects to the eligible private firms andcompanies in collaboration with institutions or independently would be continued. It is proposed to set up Biotechnology Industry Research Assistance Conglomerate Council (BIRAC) as an independent autonomous organization. Under BIPP, so far 7 rounds have been announced. Project will be generated through advertisement for funding about 23 projects under BIPP schemes covering areas of futuristic research, infrastructure development and clinical field trials.

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 Finland, Canada, Germany, Norway, U.K., Netherland and other developing countries. The Indo-Swiss programme in biotechnology will be continued with new thrust on climate change.

6. **International Centre for Genetic Engineering and Biotechnology (ICGEB):** The support of DBT 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. **Provision for projects/schemes for the benefit of the North Eastern Areas and Sikkim:** Lump sum 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 public sector institutions and universities and private sector. Projects funded already will be continued and more programmes on human resource development; augmenting facilities in veterinary / agriculture colleges; and major joint projects in partnership with universities/institutions in rest of India will be initiated.