R F D

RESULTS-FRAMEWORK DOCUMENT

for

Department of Science & Technology

(2009-2010)

Results – Framework Document (RFD)

The Department of Science & Technology

The Department of Science and Technology, Government of India established in 1971 has been playing the role of a catalyst and the main policy body for the promotion and development of the Indian research and development sector. In order to participate more effectively in developmental and promotional roles for the Science, Technology and Innovation sector, DST has opted to create a Science and Engineering Research Board to manage the funding functions for Research and Development through an Act of Parliament. SERB will play a major role in funding the down stream end of R&D sector in the future. A new policy on Science, Technology and Innovation is at the stage of formulation. The draft policy is expected to be delivered for national consultation by March 2010.

Over the previous six plan periods, the Department has emerged as the major Extra Mural Research funding body with a National share of about 45-50% of EMR support to researchers. The Department undertook an internal review of the main functions played so far and made a conscious effort to undergo voluntarily a fundamental change in the role during the eleventh plan period. During the eleventh plan period, DST has mounted several land mark initiatives with a proactive rather than reactive mind set and emphasized the promotional and developmental roles while creating new structures for continued support to functions of R&D funding.

Recognizing that knowledge creation activity is likely to emerge as the next major contributor to wealth creation in the world, the need to strengthen the research and development sector and link it more effectively to developmental processes has been considered important. Eleventh plan programmes of DST have been developed with three fundamental paradigms different from the earlier plan periods. They focused on balance between a) funding, developmental and promotional roles, b) proactive and reactive functions, and c) connecting discovery science to solutions of socially relevant problems. Directional changes in the programmes of DST were accomplished during the eleventh plan period by readjusting priorities of schemes managed by DST.

Schemes under Research and Development have been further strengthened through new programmes like Innovation in Science Pursuit for Inspired Research (INSPIRE), Nano Mission, Cognitive Science and Mega Facilities. Research and Development in Autonomous institutions nurtured by DST, a greater linking between inputs and outputs has been made through a rationalized budget planning exercise.

Technology Development Programmes (TDP) has been fortified with changed paradigms and focusing on convergent solutions rather than technology demonstration alone. Under TDP, programmes for Water Technology, Security Technology, Solar Energy Research Initiative, modified Drug and Pharma Research Programme with altered parameters for promoting research on neglected diseases were initiated. Grater emphasis has been laid for technologies for convergent solutions from technology Development programmes.

Schemes under science for socio economic development have been further strengthened by clearly articulating the societal and public good value of science and technology and promoting innovations more aggressively than the past.

The need to attract talent to study of science and to careers with research has been felt globally. DST has mounted a flagship programme, Innovation in Science Pursuit for Inspired Research (INSPIRE) during the eleventh plan period. INSPIRE is expected to emerge as an important national initiative within the developmental and promotional roles of DST in the long term horizon. Many new initiatives have been undertaken to enable rejuvenation of research in the university sector. Fund for Infrastructure Strengthening of Science and Technology (FIST) has been redesigned. Special packages have been developed and delivered for Science and Technology sector in the North East Region and Jammu and Kashmir. A research incentive grant system for University sector based on performance "Promotion of University Research and Scientific Excellence" (PURSE) and "Consolidation of University Research, Innovation and Excellence" (CURIE) for women only universities have been developed proactively and launched.

Research and Development in the 15 Autonomous Institutes (AI) nurtured by DST yielded during the last five years 7266 publications with an aggregate of Impact factors @ 18165, 212 patent applications, 619 PhDs, 296 Masters Degrees and 126 technologies as outputs since 2004. Eminence indicators of AIs or DST supported institutions have been reviewed. Total of number of scientists with H Index above 25 are 26 and fellows of the various science academies of science are 64.

Knowledge Applications through Technology Development Programmes have focused on convergent solutions to problems of water scarcity, energy and home land security, affordable health care, climate change and environmental security. A Pan-IIT Solar Energy Research Initiative as well as Science Bridge with UK and Indian scientists on Solar PV have been launched. Water Technology Mission is being launched under the directives of Supreme Court. Security Technology Initiative has been mounted. National Mission for Sustaining Himalayan Ecosystem and National Mission on Strategic Knowledge for Climate Change have been domiciled in the Ministry of Science and Technology. These represent a significant directional change of the Technology Development Programmes. International cooperation programmes were focused on three objectives namely technology diplomacy, technology synergy and technology acquisition. Greater emphasis was accorded for technology cooperation than the mobility of scientists during the eleventh plan period.

Knowledge extensions to Society and Stake holders were refocused for their objectives and methods. Focus on development of an eco system for Innovation, GIS technologies for planning and development, awakening of youth in science, R&D for societal applications in rural sector and stepped synergy with socio economic ministries in science and technology by playing a link function.

The Vision

To enable India becoming a global knowledge power by promoting basic research, development of cutting edge technologies and innovation for globally competitive and inclusive growth to power technology-led economic progress of the society.

The Mission

To strengthen the R&D base of the country through funding, development and utilization of technologies, building entrepreneurship and innovation, fostering international S & T cooperation, popularization and demonstration, generating S&T database, mounting mission mode initiatives, attracting talent to science and rejuvenating research in university and promotion of public-private partnerships.

Objectives & Functions

1. Formulation of policies relating to Science and Technology

The Department plays an important role in the formulation of Science and Technology Policy (STP) of the country. In the changing context of the scientific enterprise of the country, the need to revisit and reformulate the Science and Technology Policy enunciated last in 2003 and include also innovations has been recognized. In the address to the joint session of the Parliament, the President of India has announced a "Decade of Innovations". The Department of Science and Technology in close collaboration with other stakeholders and sister departments is undertaking to spearhead the reformulation of Science, Technology and Innovation (STI) Policy in 2010. Apart from the STI policy, the department of science and technology is engaged in the formulation of other enabling policies for the research and development sector of India.

2. Strengthening Basic research and Expanding R&D base – Human Capacity

2.1 Science & Engineering Research Council (SERC): SERC has been a flagship of DST and the major EMR research funding body of the country. The SERC has emerged as the single largest support system engaged in promoting basic research in all areas of science and engineering and has achieved significant success in furthering the growth of research in new inter-disciplinary areas in science and engineering.

2.2 Science and Engineering Research Board (SERB): A Bill for the establishment of Science and Engineering Research Board has been passed by the Parliament. This autonomous body with functional autonomy will perform the functions & tasks of funding research and partner DST in the development as well as promotional roles. The formation of SERB represents a landmark.

2.3 Innovation in Science Pursuit for Inspired Research (INSPIRE): It is a major programme for attraction of talent to study of science and careers with research with a budget outlay of Rs.1980 crores for the XI plan period. The programme is expected to link the Science & Technology Ministry with about 1.5 million young people in the age group of 10-32 years and involves mentorship, scholarship support and exciting interactions with global leaders in science.

2.4 Research Fellowships: Several prestigious fellowships were offered to enhance the quality and quantity of Indian research. The JC Bose Fellowship has been instituted to recognize active scientists and engineers for their outstanding performance and contributions. Ramanujan Fellowships are awarded to brilliant scientists and engineers from all over the world to take up scientific research positions in Indian universities and scientific institutions. The fellowship aims at attracting scientists and engineers willing to return to India with a view to undertaking advanced research. Ramanna Fellowship aims at offering continued core support to researchers who have performed well in their ongoing basic research projects of SERC. Swarnajayanti

Fellowships are offered to outstanding young indian scientists for internationally competitive research.

2.5 Mentoring Programme: It targets a large number of researchers whose proposals are rejected by the Department. Since the rejection rate hovers around 40%, this program would make significant impact in elevating the research base of the country.

3. Strengthening Basic research and Expanding R&D base – Institutional Capacity

3.1 Fund for Infrastructure Strengthening of Science and Technology (FIST): This is a major program for providing research infrastructure. Promotion of University Research and Scientific Excellence (PURSE): The Department, under infrastructure strengthening programmes, has mounted an initiative to provide incentive grant system for universities based on the evidence of scientific publications during the period 1996-2006. Consolidation of University Research for Innovation and Excellence (CURIE): In 2009, the Department of Science and Technology launched a special initiative, namely, Consolidation of University Research for Innovation and Excellence (CURIE) to improve the R & D infrastructure of 'Women Universities'. Regional special packages for building research infrastructure have also been mounted.

3.2 Sophisticated Analytical Instrument Facilities (SAIF): DST is providing the facilities of sophisticated analytical instruments to the research workers in general and specially from the institutions which do not have such instruments through its Sophisticated Analytical Instrument Facilities (SAIF) programme so that non-availability of these instruments at their institutes may not come in way of the scientists in pursuing R&D activities requiring such facilities and they are able to keep pace with developments taking place globally. Facilities providing sophisticated analytical instruments and other related services to the researchers are functioning under the SAIF programme at various academic and R&D institutions in the country.

4. Implementing Technology Development Programs (TDP)

TDP has been redesigned to adapt to implementation of convergent technology solutions to socially significant problems. Areas of focus have been selected based on the social good priorities.

4.1 Drugs & Pharmaceuticals Research Programme (DPRT): DPRP aims to synergise the strengths of publicly funded R&D institutions and Indian Pharmaceutical Industry in developing drugs in areas of national relevance. It also focuses to create an enabling infrastructure, mechanisms and linkages to facilitate new drug development. In all the program aims to enhance the nation's self-reliance in drugs and pharmaceuticals sector especially in areas critical to national health requirement.

4.2 National Mission on Nano Science & Technology (Nano Mission): Nano Mission is an umbrella programme for capacity building which envisages the overall development of Nanoscience and nanotechnology in the country and to tap some of its applied potential for nation's development. To catalyze Applications and Technology Development Programmes leading to products and devices, the Mission proposes to promote activities like application-oriented R&D Projects, Nano Applications and Technology Development Centres, Nano-Technology Business Incubators etc. including Public Private Partnership (PPP) ventures. An Institute of Nano Science and Technology (INST) has been approved at Mohali as part of the Knowledge City and co-located with IISER-Mohali. The necessary procedural steps to set up this Institute are being taken. INST-Mohali would focus on agri and bio-nanotechnologies.

4.3 Water Technology Initiative: It focuses on creation of data bases, assessment and evaluation of technologies for safe drinking water for decentralized applications. Various systems and solutions available for providing safe drinking water for domestic applications are being assessed and evaluated under different social contexts.

4.4 Solar Energy Research Initiative: A national initiative has been mounted by developing a knowledge network among the elite institutions in the country. This initiative is focused on developing national core competence in developing indigenous research led cost-parity of solar energy options with fossil fuel based energy systems within the next two plan periods.

4.5 Security Technology Initiative: A nationally coordinated initiative on S&T inputs to Security Technology has been commissioned with Indian Institute of Science as the implementing agency. A coordinated research initiative on development of front detection devices, data analysis and processing systems, image reconstruction and device development and configuring security solutions for different security requirements has been mounted.

4.6 S&T inputs to climate change science and adaptation: DST has been entrusted with the responsibility to coordinate two National Missions on Climate Change under the National Action Plan on Climate Change (NAPCC). Both the missions, National Mission for Sustaining the Himalayan Ecosystem; and National Mission on Strategic Knowledge for Climate Change involve a coordinated effort among various stake holders and knowledge institutions.

4.7 Cognition Science Initiative and Innovation Clusters: DST has launched a Cognition Science Initiative and has implemented two major nationally coordinated programmes on language learning and neural network, in addition to extending support to about 20 individual research proposals. An Innovation Cluster is also being established under Public-Private Partnership.

5. Societal interventions of S&T Strengthening

5.1 Autonomous Institutions: Some of the autonomous institutes of the Department have direct linkages with the society. Significant impact has been made in the biomedical field.

5.2 Science & Technology for Women: Women Scientist Scheme is aimed to provide an opportunity to women scientists having break in their career due to family reasons to pursue research in frontier areas of science. It also aimed to promote research, development and adaptation of technology, improve the working conditions and opportunities for gainful employment of women especially in rural areas.

5.3 Tribal Sub Plan (TSP): Aimed to promote research, development & adaptation of S&T for improving quality of life of tribal groups.

5.4 S & T application for weaker section (STAWS): Focussed to promote research, development and adaptation of science and technology for improving quality of life of weaker section.

5.5 Technology Interventions for addressing Societal Needs (TISN): Programmes like Technology Interventions for Elderly (TIE), S&T Interventions Involving Jawahar Navodaya Vidyalayas (JNVs) and Scheme for Young Scientists and Professionals (SYSP) are addred under TISN.

5.6 National Science & Technology Entrepreneurship Development Board (NSTEDB): Aimed to promote and develop high quality entrepreneurship amongst S&T manpower and to promote self-employment by utilising S&T infrastructure.

5.7 Science and Technology based services: The use of Geospatial Technology products for planning, coordination and development has been actively promoted among various states and other stake holders. Knowledge service through SoI, NATMO, NABL, VP, TIFAC has been reinforced.

5.8 Science popularization: Science popularization activities and programmes have embraced in addition to awareness to awakening among the youth as well. New tools and mechanisms have been explored for science popularization which includes science express and PPP models.

6. S&T co-operation / Partnerships and Alliances

International S&T collaboration focused on the objectives viz. technology diplomacy, technology synergy and technology acquisition. These collaboration programs help in sharing the information and generate new knowledge, sharing of expertise to maintain pace, progress and growth of S&T. DST has signed S&T cooperation with 80 countries so far.

National coordination among State Councils ensures the active participation of state governments in the S&T developmental process.

6.1 Bilateral R&D projects: These projects involving industrial partners from countries like Canada, Israel, Russia, Germany, France etc. received greater impetus. Joint Research and strategic initiatives have also been taken with EU, Australia, Hungary, Switzerland etc.

6.2 Joint Research Fund: The Department also developed institutional framework and funding mechanism such as Indo-Swiss Joint Research Fund, ASEAN Technology Fund, Indo-US endowment fund, New Africa initiative etc. during past two years.

6.3 Promotion of Fellowships: International S&T cooperation led to several significant fellowships namely, Lindau Nobel Laureates Meeting, India-MPG Fellowships, Indo-Swiss Research Fellowship, DST-ICTP Fellowships, Research Training Fellowships for Developing Countries Scientists RTF-DCS Program, ILTP Fellowship, STIOs projects with Indian peers etc.

6.4 Mega Facilities for Basic Research: In several areas like nuclear physics, high energy physics, astronomy and astrophysics etc., the scale of experimental research has become so sophisticated and gigantic that it takes thousands of institutions from all across the world to pool their intellectual and financial resources to carry out those investigations.

6.5 State Science and Technology Councils: National coordination and consultation meeting with State S&T councils have been convened twice during the first half of the eleventh plan period. There is a need to review selectively some state S&T councils and step up the level of engagement and funding through specially designed mechanisms and programmes.

PERFORMANCE OBLIGATIONS OF THE DEPARTMENT OF SCIENCE & TECHNOLOGY FOR THE YEAR 2009-10

Objective	Description	Weight	Success Indicator		* Target / Criteria value				
			Description	Relative Weight	Excellent	Very Good	Good	Fair	Poor
					100%	90%	80%	70%	60%
Objective 1	**Leading the formulation of Science, Technology and Innovation policy and other enabling policies for the R&D sector**	16%	Date of finalization of First draft of National Science, Technology and Innovation policy for national consultations and discussions among the Stake holders	8%	Prior to 20 March 2010	20 March 2010	25 March 2010	31 March 2010-	-
			Date of cabinet approval of National Data Sharing and Access policy	8%	Prior to 20 March 2010	20 March 2010	25 March 2010	31 March 2010-	-
Objective 2	**Strengthening Basic research and Expanding R&D base** **-Human Capacity**	20%	Base line data compilation for mean process time optimization for Extra Mural Research Funding as measured by mean time taken for decision from submission	3%	Feb 2010	3 March 2010	17 March 2010	31 March 2010	Beyond March 2010
			Number of INSPIRE Awards released Number of INSPIRE Internships covered through winter camps Percentage of funds earmarked for Scholarships for Higher Education and INSPIRE Fellowships released during the quarter	4% 4% 4%	>40,000 5,000 100	>30000 4,000 90	>20000 3,000 80	>10000 2,000 70	>5000 1000 60
			Month for Establishment of new mechanism for promoting basic research	3%	March 21, 2010	March 23, 2010	March 25, 2010	March 27, 2010	March 31, 2010
			Ratio of the number of proposals	2%	>1.5	1.3-1.4	1.2-1.3	1.2-1.1	1

			received for R&D during the quarter relative to the quarterly receipt of the base year(2006-07)						
Objective 3	**Strengthening Basic research and Expanding R&D base -Institutional Capacity**	14%	Percentage utilization of balance in earmarked competitive Grants for strengthening S&T through institutional infrastructure during the quarter as of 31 March 2010	7%	100%	97-99%	94-96%	91-93	Less than 90%
			Development and pro-active promotional programmes for strengthening institutional capacities as measured by the percentage of balance funds earmarked for the financial year 2009-10 as of 31 March 2010	7%	100%	97-99%	94-96%	91-93	Less than 90%
Objective 4	**Implementing Technology Development Programs**	22%	No. of technologies identified for development and demonstration	3%	30	25	20	15	10
			No. of technologies assisted for application and absorption	3%	10	8	5	4	3
			Percentage of balance in earmarked funds utilized for Drug and Pharma Research Programme during the quarter	4%	100%	97-99%	94-96%	91-93	Less than 90%
			Number convergent technology solutions for water challenges identified and selected	4%	10	9	8	7	6
			Finalization of Detailed Project Report for indigenous Solar Energy Research Initiative	3%	Feb 20, 2010	March 10, 2010	March 15, 2010	March 20, 2010	March 25, 2010
			Preparation of road map for Security Technology Initiative	1%	March 21, 2010	March 23, 2010	March 25, 2010	March 27, 2010	March 31, 2010

			Approval for National Centre for Nano Science & Technology at Bangalore under Nano Mission	2%	March 21, 2010	March 23, 2010	March 25, 2010	March 27, 2010	March 31, 2010
			PhD students trained in the area of nano science and technology in the country under Nano mission	1%	More than 30	25-29	20-24	15-19	Less than 15
			Implementing new thrust area: Cognitive Science	1%	10	8	6	4	2
Objective 5	**Societal interventions of S&T**	16%	Number of Technology Entrepreneurs Assisted	4%	25	20	15	10	5
			Number of Micro Enterprises assisted.	3%	500	400	350	300	250
			Support to Women for gender parity in S&T	5%	30	25	20	15	10
			Projects supported for S&T inputs for development of Weaker Sections for equity	4%	10	8	6	5	4
Objective 6	**S&T co-operation / Partnerships and Alliances**	12%	Signing agreements, MOUs and protocols for S&T cooperation and partnerships	3%	>10	8	6	4	<3
			Development and synergy of National knowledge networks for S&T cooperation	3%	6	5	4	3	2
			Exchange S&T professionals for International cooperation	3%	>250	>220	>200	>180	>160
			Developing State S & T councils mechanism for S&T outreach	3%	>1	0.8-0.99	0.6-79	0.4-0.59	0.2-0.39

* For period from 1st January to 31st March, 2010.

Actions required to achieve:

Objective 1: Formulation of National Science, Technology and innovation policy and other enabling policies for R&D sector

Actions	Description	Weight	Success Indicator		Target / Criteria value				
			Description	Relative Weight	Excellent	Very Good	Good	Fair	Poor
					100%	90%	80%	70%	60%
Action 1	Preparation of first draft of the National Science and Technology policy framework document for national consultation	50%	Date of finalization of the first draft	50%	Prior to 20 March 2010	20 March 2010	25 March 2010	31 March 2010	-
Action 2	Obtaining Cabinet Approval for the National Data Sharing and Access Policy	50%	Date of obtaining cabinet approval after due processes	50%	Prior to 20 March 2010	20 March 2010	25 March 2010	31 March 2010	-

Actions required to achieve:
Objective 2: Strengthening Basic research and Expanding R&D base: Human Capacity

Actions	Description	Weight	Success Indicator		Target / Criteria value				
			Description	Relative Weight	Excellent	Very Good	Good	Fair	Poor
					100%	90%	80%	70%	60%
Action 1	Optimized process Time of funding for Extra Mural Research projects in basic research as measured by time taken for sanction from submission in months	15%	Definition of base line data and completion of process design for mean time	15%	15 March 2010	22 March 2010	29 March 2010	31 March 2010	-

			optimization						
Action 2	Implementation of INSPIRE for attraction of talent to science	60%							
	▪ Number of INSPIRE Awards released		Number of students covered as an indicator of penetration of INSPIRE	20%	40000	30000	20000	10000	5000
	▪ Number of INSPIRE Internships covered through winter camps		Realization of quantitative targets for number of youth attracted to summer/winter camps	20%	5000	4000	3000	2000	1000
	▪ Percentage of funds earmarked for Scholarships for Higher Education and INSPIRE Fellowships released during the quarter		Realization of earmarked funds utilized as an indicator of target achieved as an indicator of implementation efficiency	20%	100%	90%	80%	70%	60%
Action 3	Month for Establishment of new mechanism for promoting basic research	15%	Time target for establishment of Science and Engineering	15%	March 21, 2010	March 23, 2010	March 25, 2010	March 27, 2010	March 31, 2010

			Research Board, a new mechanism for supporting basic research						
Action 4	Strengthening and expanding of Basic Research through competitive Grant support to Extra Mural Research in the Science and Technology sector in the country	10%	Size of the competitive research grant released during the quarter relative to that in the base year 2006-07	10%	>1.5	1.3-1.4	1.2-1.3	1.2-1.1	1

Actions required to achieve:

Objective 3: Strengthening Basic research and Expanding R&D base: Institutional Capacity

Actions	**Description**	**Weight**	**Success Indicator**		**Target / Criteria value**				
			Description	**Relative Weight**	**Excellent**	**Very Good**	**Good**	**Fair**	**Poor**
					100%	**90%**	**80%**	**70%**	**60%**
Action 1	Fund for Infrastructure strengthening S&T (FIST) for capacity building during the quarter	50%	Level of Utilization of competitive Grants earmarked by 31 March 2010	50%	Grater than 99.5%	98.5-99.4%	97.5-98.4	96.5-97.4	Less than 96.5%
Action 2	Development and pro-active promotional programmes for strengthening institutional capacities as measured by funds invested during the quarter	50%							

	▪ Promotion of University Research and Scientific Excellence		Date of completion of release of Research Incentive grant provided for performing universities	25%	100% Before 31 March 2010	99-100% by 31 March 2010	97-99% By 31 March 2010	95-97% by 31 March 2010	Less than 95% by 2010
	▪ Consolidation of University Research, Innovation and Excellence for women universities		Date of completion fo release of R&D Development fund earmarked for women universities	15%	100% Before 31 March 2010	99-100% by 31 March 2010	97-99% By 31 March 2010	95-97% by 31 March 2010	Less than 95% by 2010
	▪ Special packages for regions o NER o J&K		Date of completion fo release of R&D Development fund earmarked under special packages	10%	100% Before 31 March 2010	99-100% by 31 March 2010	97-99% By 31 March 2010	95-97% by 31 March 2010	Less than 95% by 2010

Actions required to achieve:

Objective 4: Implementing Technology Development Programs

Actions	Description	Weight	Success Indicator		Target / Criteria value				
			Description	Relative Weight	Excellent	Very Good	Good	Fair	Poor
					100%	90%	80%	70%	60%
Action 1	No. of technologies	13%	Number of	13%	30	25	20	15	10

	identified for development and demonstration		technologies selected for demonstration						
Action 2	No. of technologies assisted for application and absorption	15%	Number of technologies applied and promoted	15%	10	8	5	4	3
Action 3	Percentage of earmarked funds utilized for Drug and Pharma Research Programme during the quarter	18%	Achievement of time targets for Earmarked fund utilization	18%	15	12	10	8	5
Action 4	Number convergent technology solutions for water challenges identified and selected	18%	Convergent technology solutions for water challenges found out	18%	10 and above	8 and 9	6 and 7	.4 and 5	Less than 3
Action 5	Finalization of Detailed Project Report for indigenous Solar Energy Research Initiative	13%	Achieving time target for finalization of DPR for Solar Energy Research Initiative	13%	Feb 20, 2010	March 10, 2010	March 15, 2010	March 20, 2010	March 25, 2010
Action 6	Preparation of road map for Security Technology Initiative	5%	Achieving time target for preparation of the road map for Security technology initiative	5%	March 21, 2010	March 23, 2010	March 25, 2010	March 27, 2010	March 31, 2010
Action 7	Approval for National	5%	Achieving time	5%	March	March	March	March	March

	Centre for Nano Science & Technology (NCNST) at Bangalore under Nano Mission		target for approval of NCNST		21, 2010	23, 2010	25, 2010	27, 2010	31, 2010
	PhD students trained in the area of nano science and technology in the country under nano mission	8%	Quantitative number of PhD outputs	8%	More than 30	25-29	20-24	15-19	Less than 15
Action 8	Implementing new thrust area: Cognitive Science	5%	Number of projects supported	5%	10	8	6	4	2

Actions required to achieve:

Objective 5: Societal interventions of S&T

Actions	Description	Weight	Success Indicator		Target / Criteria value				
			Description	Relative Weight	Excellent	Very Good	Good	Fair	Poor
					100%	90%	80%	70%	60%
Action 1	Assisting Technology Entrepreneurs	30%	Number of entrepreneurs assisted	30%	25	20	15	10	5
Action 2	Assisting Micro Enterprises	15%	Number of micro enterprises assisted	15%	500	400	350	300	250
Action 3	Support to Women for gender parity in S&T	30%	Number of projects supported	30%	30	25	20	15	10
Action 4	Projects supported for S&T inputs for development of Weaker Sections for equity	25%	Number of projects supported	25%	10	8	6	5	4

Actions required to achieve:

Objective 6: S&T co-operation / Partnerships and Alliances

Actions	Description	Weight	Success Indicator		Target / Criteria value				
			Description	Relative Weight	Excellent	Very Good	Good	Fair	Poor
					100%	90%	80%	70%	60%
Action 1	Signing agreements, MoUs and protocols for S&T cooperation and partnerships	25%	Number of agreements signed	25%	>10	8	6	4	<3
Action 2	Development and synergy of National knowledge networks for S&T cooperation	25%	Number of networks developed and synergized	25%	6	5	4	3	2
Action 3	Exchange S&T professionals for International cooperation	25%	Number of exchange visits facilitated	25%	>50	40-49	30-39	20-29	10-19
Action 4	Developing State S & T councils mechanism for S&T outreach	25%	Ratio of Programmatic fund released to State S & T councils as a percentage of core grants sanctioned for manpower	25%	>1	0.8-0.99	0.6-0.79	0.4-0.59	0.2-0.39

Trend Value for Success Indicators

Objective	Actions	Success Indicator	Unit	**Actual Value for FY 07/08**	**Actual Value for FY 08/09**	Target Value for FY 09/10	**Projected Value for FY 10/11**	**Projected Value for FY 11/12**
Objective 1 Leading the formulation of Science, Technology and Innovation policy and other enabling policies for the R&D sector	**Action 1** Formulation of Science, Technology Policy	Early enunciation of National STI policy after due processes	Time line	-	-	First draft	Enunciation of National STI policy	Implementation of stated policy
	Action 2 Obtaining Cabinet Approval for the National Data Sharing and Access Policy	Date of obtaining cabinet approval after due processes	Time line	-	-	March 20, 2010	Classification of data and drafting of bill for Data sharing and Accessibility	Implementation of stated policy
Objective 2 Strengthening Basic research and Expanding R&D base -Human Capacity	**Action 1** Optimized process Time of funding for Extra Mural Research projects in basic research as measured by time taken for sanction from submission in months	Progressive improvement in mean-time taken for sanction from date of submission	Time Taken for evaluation and sanction of support	7 months	7 months	5 months	5 months	41/2 months
	Action 2 Implementation of INSPIRE for							

	attraction of talent to science ▪ Number of INSPIRE Awards released	Realization number of students covered as an indicator of penetration of the programme	Number of students covered	*0.00	*0.00	50,000	1,50,000	2,00,000
	▪ Number of INSPIRE Internships covered through winter camps	INSPIRE Realization of quantitative targets for number of youth attracted to summer/winter camps	Number of students covered	*0.00	500	15,000	40,000	50,000
	• Percentage of funds earmarked for Scholarships for Higher Education and INSPIRE Fellowships released during the year	Realization of earmarked funds utilized as an indicator of target achieved as an indicator of implementation efficiency	Timely Utilization of Competitive Grants.	*0.00	100%	100%	100%	100%
	Action 3 Month for Establishment of new mechanism for promoting basic research	Time target for establishment of Science and Engineering Research Board, a new mechanism for supporting basic research	Target Month for Establishment	*0.00	*0.00	March 2010	Action completed	Action Completed

	Action 4 Strengthening and expanding of Basic Research through competitive Grant support to Extra Mural Research in the Science and Technology sector in the country	Size of the Competitive Grant released for basic research through Extra Mural Research mechanism relative to the base year 2006-07	Ratio	1.2	1.4	1.6	1.7	1.8
Objective 3 Strengthening Basic research and Expanding R&D base - Institutional Capacity	**Action 1** Fund for Infrastructure strengthening S&T (FIST) for capacity building during the year	Timely Utilization of competitive Grant earmarked	Timely Utilization of Competitive Grants.	100%	100%	100%	100%	100%

	Action 2 Development and pro-active promotional programmes for strengthening institutional capacities as measured by % age utilization funds invested during the year							
	▪ Promotion of University Research and Scientific Excellence	Research Incentive grant provided for performing universities	Percentage of competitive grants Utilized	100%	100%	100%	100%	100%
	▪ Consolidation of University Research, Innovation and Excellence for women universities	R&D Development in women universities	Percentage of competitive grants Utilized	100%	100%	100%	100%	100%
	▪ Special packages for regions o NER o J&K	Regional balancing of R&D intensity	Percentage of competitive grants Utilized	*0.00	*0.00	100%	100%	100%
Objective 4 Implementing Technology	**Action 1** No. of technologies identified for	Number of technologies identified for	Number of Technologies	80	90	110	120	140

Development Programs	development and demonstration	demonstration						
	Action 2 No. of technologies assisted for application and absorption	Number of technologies applied and promoted	Number of Technologies	20	25	30	35	40
	Action 3 Percentage of earmarked funds utilized for Drug Pharma Research Fund during the Year.	Utilization of Drugs and Pharma Research Fund	Timely Utilization of Competitive Grants	100%	100%	100%	100%	100%
	Action 4 Number convergent technology solutions for water challenges identified and selected	Convergent technology solutions for water challenges found out	Number of Solutions	*0.00	*0.00	10	10	5
	Action 5 Promoting Solar Energy Research Initiative and delivering technology solutions for power generation for diesel power parity through a PAN IIT network	Establishment of a test bed for solar energy research and training of research professionals in solar energy generation	Timely Establishment of a test bed for demonstrating cost parity with diesel and delivery of targets stipulated in the DPR			Finalization of DPR for test bed and the overall project	Establishment of a knowledge network with about 35 IIT faculties and 150 students for solar energy research	Establishment of the test bed and demonstration of cost parity of solar energy generation with diesel power
	Action 6 Capacity Building for	Development of cost effective	Timely implementation of the road			Finalization of road map	Initiation of research in at least three	Development of at least three products each for

	security technology in public funded research system	hardware and soft products for security technology	map finalized				technology lead areas	hardware and soft ware products for devices and techniques detection and image processing
	Action 7 Establishment of National Centre for Nano Science & Technology (NCNST) at Bangalore under Nano Mission. PhD students trained in the area of nano science and technology in the country under nano mission	Quality and quantum of R&D outputs from the National Center for Science and Technology under nano mission No. of students	Timely Delivery of quality and quantitative targets finalized at the approval stage of the project			Approval for establishment 120	Recruitment of personnel and establishment of the center 130	Creation of facilities and infrastructure research in nano science and technology 150
	Action 8 Implementing new thrust area: Cognitive Sciences	Number of proposals supported	Number	*	*	10	40	50
Objective 5 Societal interventions of S&T	**Action 1** Assisting Technology Entrepreneurs	Number of entrepreneurs assisted	No. of Entrepreneurs	75	80	90	100	120
	Action 2 Assisting Micro Enterprises	Number of micro enterprises assisted	No. of Entrepreneurs	2000	2000	2100	2200	2500
	Action 3 Support to Women for gender parity in	Number of projects supported	Numbers	80	100	120	140	160

	S&T							
	Action 4 Projects supported for S&T inputs for development of Weaker Sections for equity	Number of projects supported	Numbers	30	35	40	50	55
Objective 6 Signing agreements, MoUs and protocols for S&T cooperation and partnerships	**Action 1** Signing agreements, MoUs and protocols for S&T cooperation and partnerships	Number of agreements signed	Numbers	30	35	40	40	45
	Action 2 Development and synergy of National knowledge networks for S&T cooperation	Number of networks developed and synergized	Numbers	18	20	22	24	24
	Action 3 Exchange S&T professionals for International cooperation	Number of exchange visits facilitated	Numbers	800	900	1000	1100	1200
	Action 4 Developing State S & T councils mechanism for S&T outreach	Ratio of Programmatic fund released to State S & T councils as a percentage of core grants sanctioned for manpower	Ratio	0.6	0.7	1.0	1.1	1.2

*New Programme

SECTION 4:
Description and Definition of Success Indicators and Proposed Measurement Methodology

The Department of Science & Technology is the largest funding body of Extra-Mural Research in the country with nearly 50% National share. The department has established a system for watching and monitoring the S&T outputs indicators originating from the non-strategic R&D sector in the country. Globally S&T output indicators are being used and competitive rating indices are employed for assessing global competitiveness of Nations. Currently, Scientific publications in scholarly peer reviewed and valued journals, indices like impact factors of journals in which the papers appear, number of citations of papers, average citation per paper are used. Currently based on Global Research Report of Thomson Reuters, India is emerging as an important player in the scholarship driven science (*Figure 1*) in spite of relatively low levels of Gross Expenditure on Research and Development relative to other countries. Based on some data bases on scientific publications,. India ranks currently 10th based on quantum and within top 20 on the basis of citations per paper. Assessing Technology competitiveness of Nations is more complex. Factors like percentage share of products exported based on advanced technologies and share of GDP growth attributable to technologies are being used. Competitiveness indicators for innovations are computed through an integrated approach to the levels of risk financing for innovations and support to early stage innovations through both development and policy. The Department of Science and Technology has been traditionally focused on supporting basic research through Extra Mural Research Grants with relatively moderate levels of budget support per scientist. Therefore, National outcome of the efforts of DST at the present time is best measured through improvements of the relative ranking of India with respect to the quantum of publications in peer valued journals. While India ranked 15th as per data of 2003, the country is currently ranked at 10th and is likely to move to 9th by 2010. Parameters of relative assessment and measurement of India in technology and innovation competitiveness will need to be fine tuned to suit the social context and stage of the economic development of the country. DST proposes to undertake studies relating to assessment and measurement of global competitiveness. The department is only one of the major players in strengthening the R&D system of India and the cumulative results are the outcome of the effort of many departments. However, the department will undertake to establish a watch system for monitoring the output to input ratios as well as growth processes of the country in the R&D sector and devise and formulate policies which would indirectly influence the global competitiveness of the India in the R&D sector.

The department has mounted major national initiative for attraction of talent to study of science and careers with research under New Scheme called INSPIRE with an expected long term outcome based on near term actions. Total of 21 success indicators for covering the five overall objectives have been selected with a blend of 17 non-financial and 4 financial targets. Wherever

more than two types of outputs and external actions (like peer review, recommendations Expert committees for decision making etc) are involved, for convenience, measurement of performance and success of actions is linked to financial delivery.

Performance indictors for non-linear processes in Science, Technology and Innovation require some process innovations based on global bench marks. Performance improvement through enhanced system efficiencies of a department like DST with a mandate to expand the R&D base in the country can be assessed by the measuring the expansion of the stake holder base as evidenced from the number of R&D proposals received for funding referenced to a base year, which has been selected as the last year of the tenth plan namely 2006-07. Specified and number based quantitative targets have been selected wherever appropriate. For improving state-center cooperation in S&T, a new parameter like ratio of programmatic fund to core fund has been designed for measuring S&T outreach.

Some of the parameters used are based on increasing the efficiency and effectiveness of the department like speedy and transparent decision making. As the largest R&D funding body, improved process efficiency is measured by measuring the mean process time taken for sanctioning project funds. Scientifically a normal distribution of the percentage of projects cleared for funding as in *Figure 2* is expected. Mean time for processing will be measured by the full width at the half height of the normal Boltzman distribution of the process time consumed as shown in Figure. An attempt will be made to shorten the time taken for fund sanction from the date of submission of the proposal to sanction of funds from 9 months to 5 months. This would be better than the best global bench mark at this time. Strengthening of the institutional capacities and scientific excellence based on measurement of global bench marks like H-index for institutions to provide research incentive grants and special packages for North East and J&K regions are based on transparent parameters. Transparent decision logic is embedded in financial targets wherever feasible.

The award of research grants is a competitive process and is spread over the year, it is planned to spread this uniformly over the year and make full utilization of resources in making investment for developing the country's knowledge and technology base.

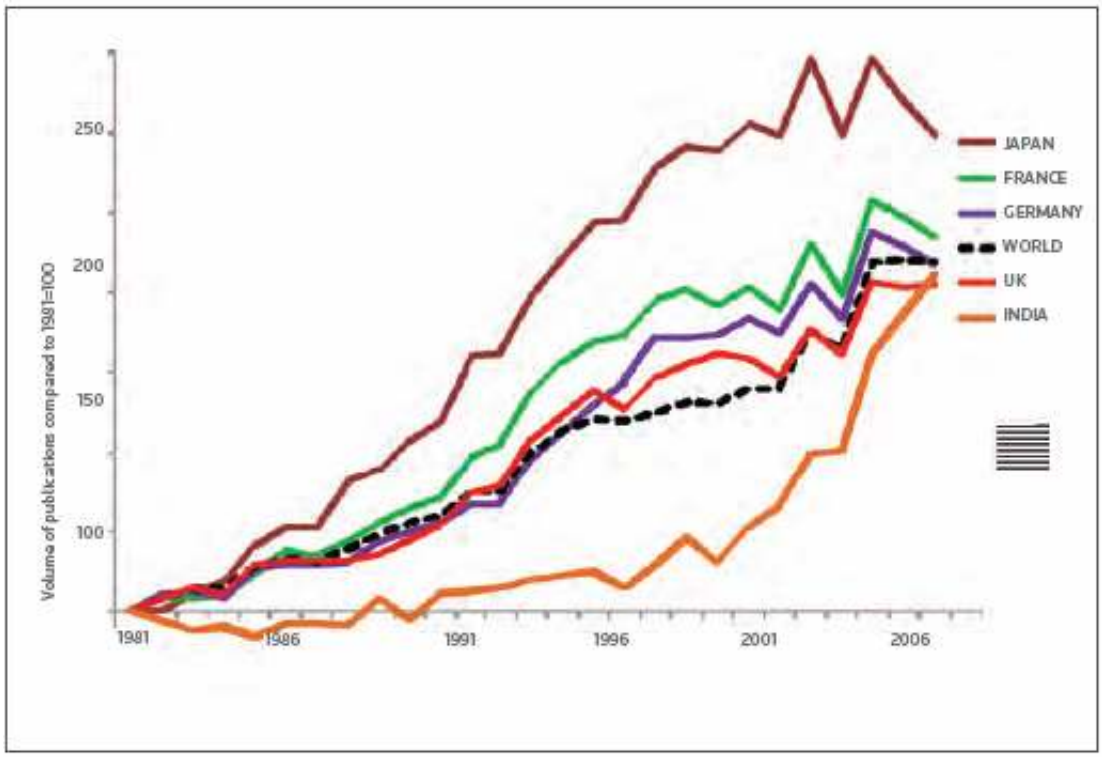

Figure 1 - India's recent year-by-year growth has begun to increase sharply compared to well-established European and Asian research nations in the G8 (Source: Global Research Report: Thomson Reuters)

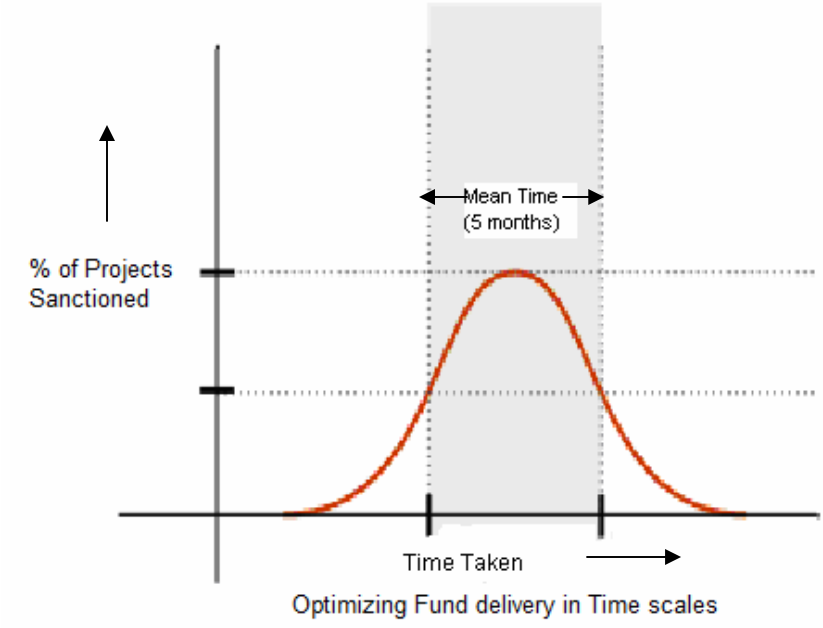

Figure - 2

SECTION 5:

Specific Performance Requirements from other Departments

Department	Relevant Success Indicator	What do you need?	Why do you need it?	How much you need?	What happens if you do not get it?
State Science & Technology Department	Number of Students covered across the country under INSPIRE and SHE	Partnership in implementation	They have presence at the implementation levels and are linked to the State mechanism	Their partnerships would enhance the effectiveness of the Programme	We will have to identify alternate mechanisms
State Department of Education	Number of Students covered across the country under INSPIRE and SHE	Partnership in implementation	They are the controlling department for and would help in identification of students to be supported	Their partnership would increase the reach and spread of the Programme	Their support is vital and critical
Ministry of Human Resource Development	Number of Students covered across the country	Partnership in implementation	They are the controlling department for and would help	Their partnership would increase the reach and spread of the Programme	Their support is vital and critical

Results-Framework Document (RFD) for Department of Science & Technology Jan. 2010 to March 2010

	under INSPIRE and SHE		in identification of students to be supported		
Ministry of External Affairs	Number of International MoUs agreements and protocols signed	Partnership in implementation	They are the main Ministry for external relations and our agreements are within the frame work of country cooperation	For enhancing Technology Diplomacy with relevant Nations their support is required	The number of agreements, MoUs and protocols will get affected

Minister of State, Independent Charge (Science & Technology)

Secretary, Department of Science & Technology

Place: New Delhi

Date: 29th December, 2009