

GOVERNMENT INITIATIVES IN PROMOTION OF R&D

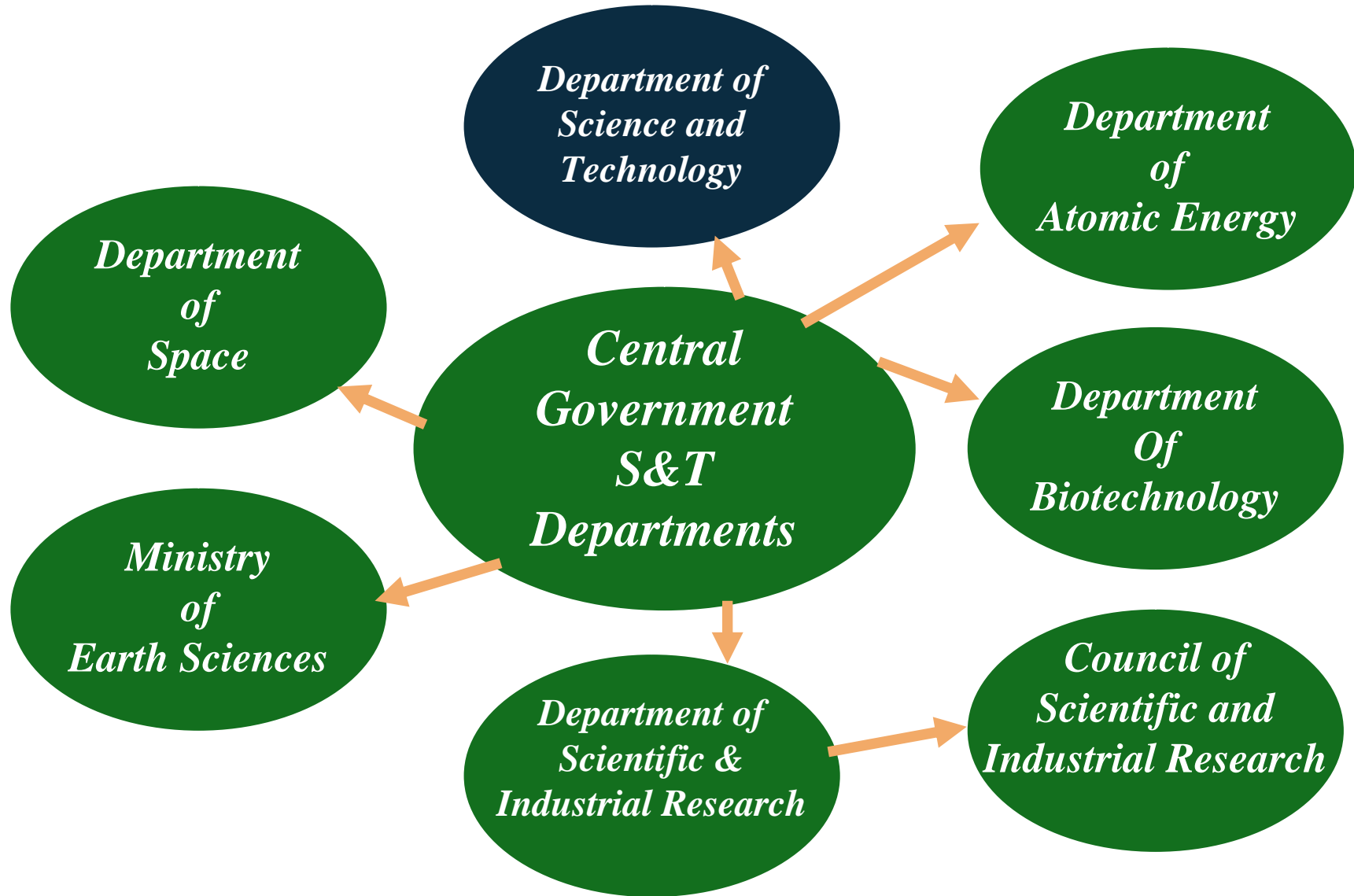
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HYDERABAD

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S & T SYSTEM IN INDIA



S&T DEPARTMENTS IN INDIA



SCIENTIFIC POLICY RESOLUTION - 1958

The key to national prosperity, apart from the spirit of the people lies, in the modern age, in the effective combination of 3 factors, technology, raw materials and capital, of which the first is perhaps the most important since the creation and adoption of new scientific techniques can, in fact make-up for a deficiency in natural resources and reduce the demands on capital. But technology can only grow out of the study of science and its applications.

TECHNOLOGY POLICY STATEMENT - 1983

- *Self Reliance – Development of Indigenous Technology*
- *Efficiency & Preservation and Adaptation of Imported Technologies appropriate to National Priorities and Resources*
- *Sustainable and Equitable Development*

SCIENCE POLICY - 2003

- *Human Resource Development*
- *Increase Resource Allocation for S&T (2% GDP)*
- *Public Private Partnership for R&D*
- *New Funding Mechanism for Basic Research*
- *Strengthening Infrastructure for S&T*
- *Promotion of Innovation*
- *Public Awareness of S&T*

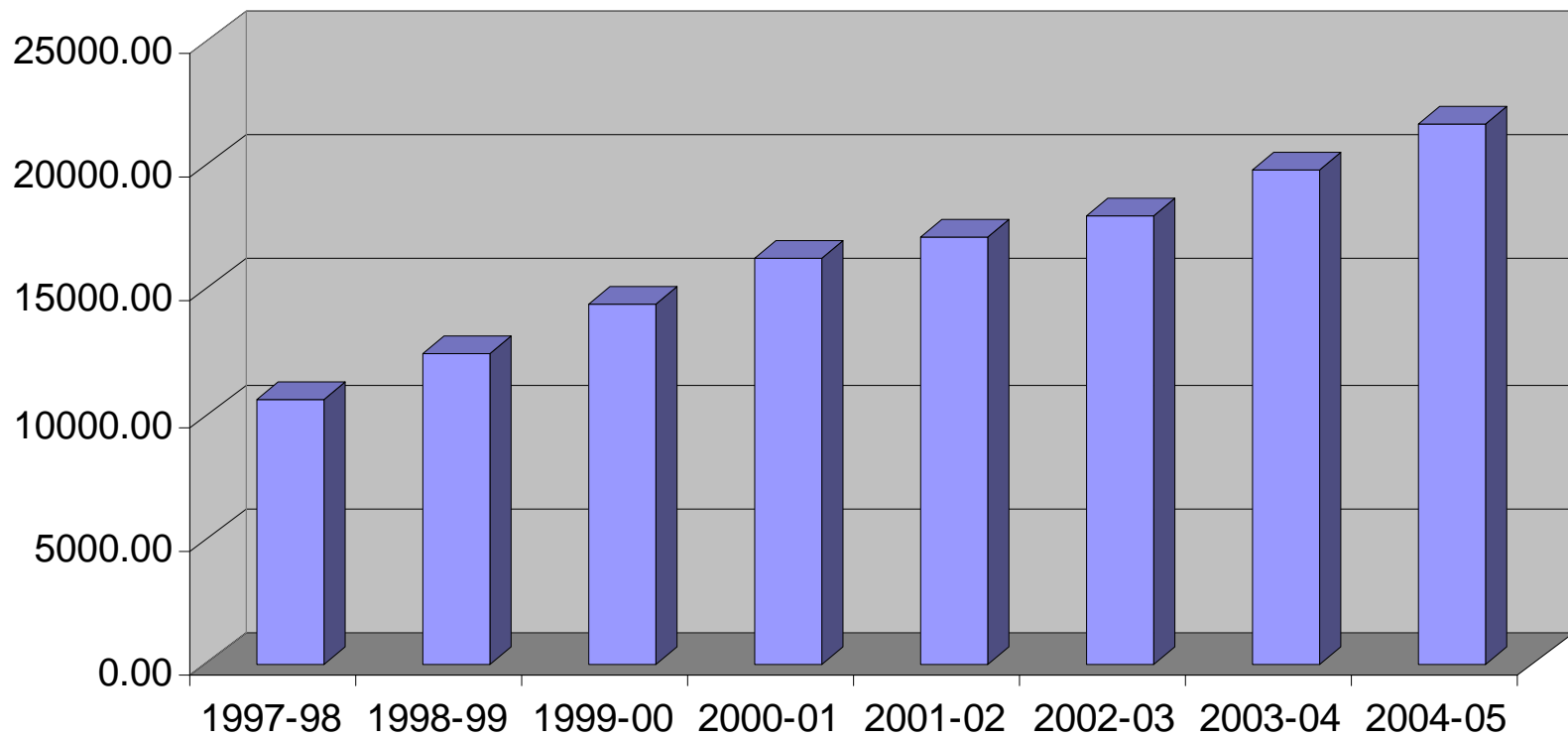
World R&D Expenditure by Regions/countries

- *Developed Countries* 84.7%
- *Developing Countries* 15.6%
- *USA* 36.2%
- *Japan* 15.1%
- *China* 3.9%
- *India* 2.0%
- *Africa* 0.7%
- *Arab States* 0.4%

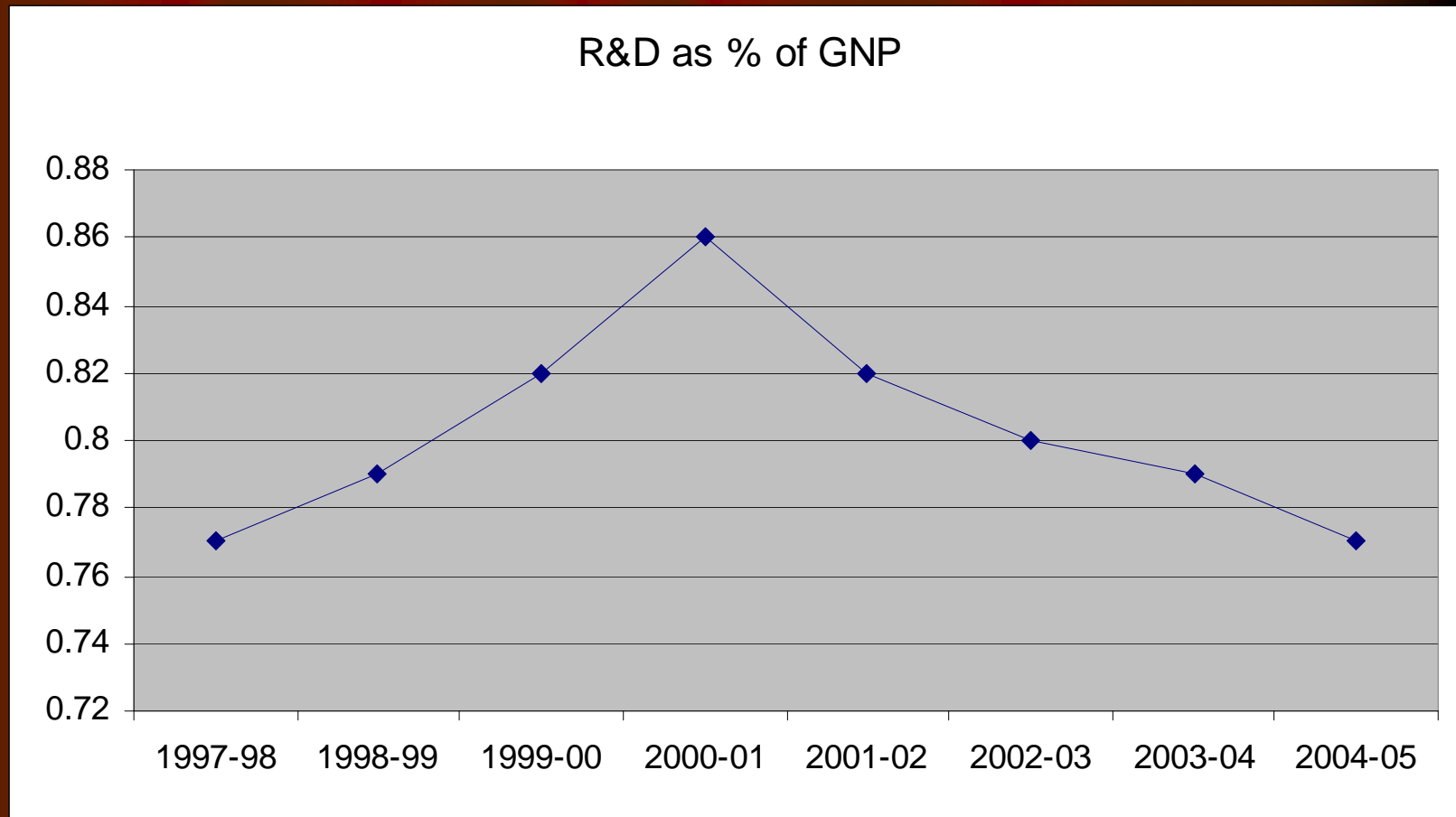
Developed Countries with 22% of world population and 61% of its GDP accounted for 84% of its global R&D expenditure.

National R&D Expenditure

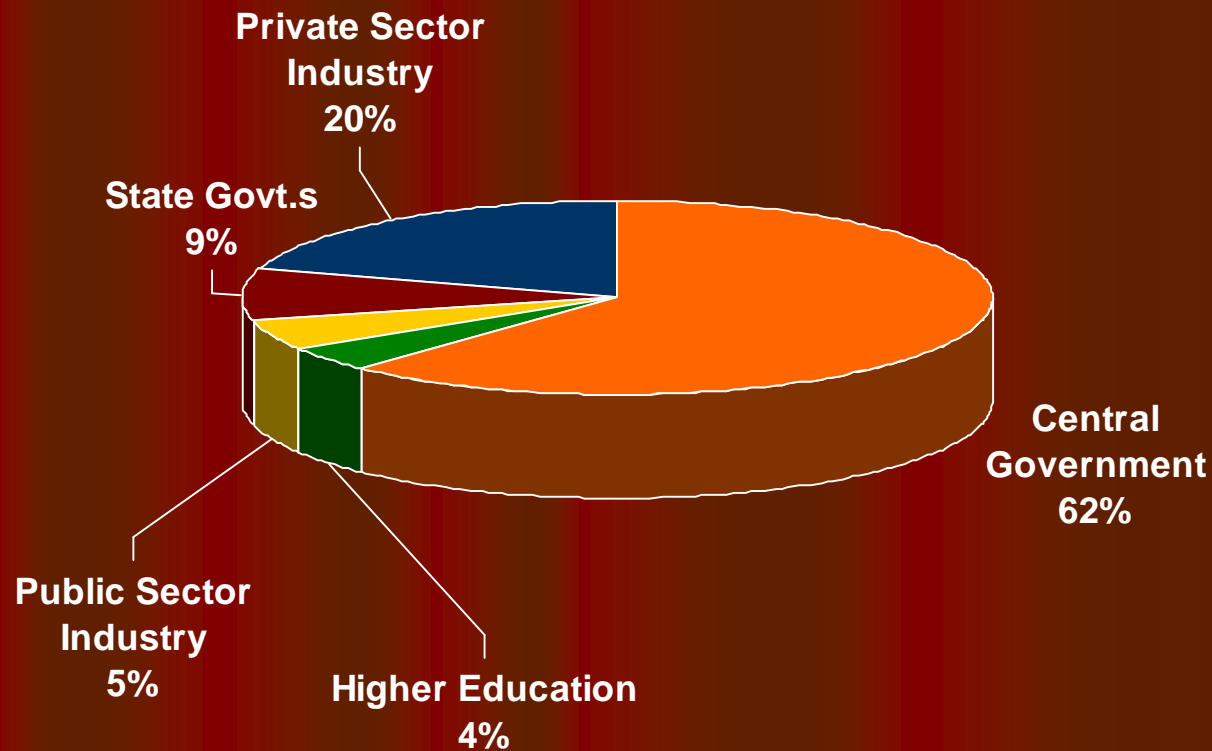
R&D Expenditure at current prices (Rs.Crores)



National R&D Expenditure as Percentage of GNP



National R&D Expenditure by Sector-2004-05



Total - Rs. 216.40 billions

Public Sector Investment on R&D

<i>Countries</i>	<i>Government Source%</i>
<i>Japan</i>	<i>26.0</i>
<i>USA</i>	<i>35.5</i>
<i>Germany</i>	<i>36.7</i>
<i>France</i>	<i>41.7</i>
<i>UK</i>	<i>32.7</i>
<i>Canada</i>	<i>30.1</i>
<i>India (2004-05)</i>	<i>79.7</i>
<i>Korea Rep.</i>	<i>15.9</i>
<i>Israel</i>	<i>40.7</i>

Government major initiatives: R&D

- ❖ **Incentives to in-house R&D / Siros / R&D companies**
- ❖ **Tax Holidays , weighted tax rebate on R&D expenditure, exemption from custom duty, income-tax rebate**
- ❖ **Soft loans for Technology modernisation / R&D / Commercialisation**

Growth of Indian Drug Industry

- *1901 – Bengal Chemicals & Pharma Works setup in Calcutta*
- *Slow growth till 1970 and the overall production of bulk drugs and formulation :Rs. 3 billion.*
- *Current turnover around Rs.550 billions (2004-05).*
- *Anticipated to become Rs.1000 billions during 2010.*
- *TRIPS Agreement 15.04.1994*
- *January, 2005 new patent law for product patents.*

ADVANTAGE INDIA

- **LARGE HUMAN RESOURCE**
- **CHAIN OF 3,000 R&D INSTITUTIONS**
- **NEARLY 300 UNIVERSITIES AND MORE THAN 10,000 COLLEGES.**
- **SIGNATORY OF TRIPS/WTO**
- **PROCESS TO PRODUCT PATENTS**
- **RICH BIODIVERSITY, TRADITIONAL SYSTEM OF MEDICINES**

ADVANTAGE INDIA

- **LARGE DOMESTIC MARKET**
- **SIGNIFICANT EXPORT GROWTH**
- **EXPORT OF OFF PATENT GENERIC DRUGS**
- **TILT OF GLOBAL MARKET TOWARDS NATURAL PRODUCTS**
- **TREND FOR OUTSOURCING R&D IN INDIA**
- **SUCCESS OF CONTRACT RESEARCH ORGANISATIONS (CRO)**

USFDA Approved Plants Outside the USA

India	-	61
Italy	-	60
Spain	-	25
China	-	22
Taiwan	-	9
Israel	-	7

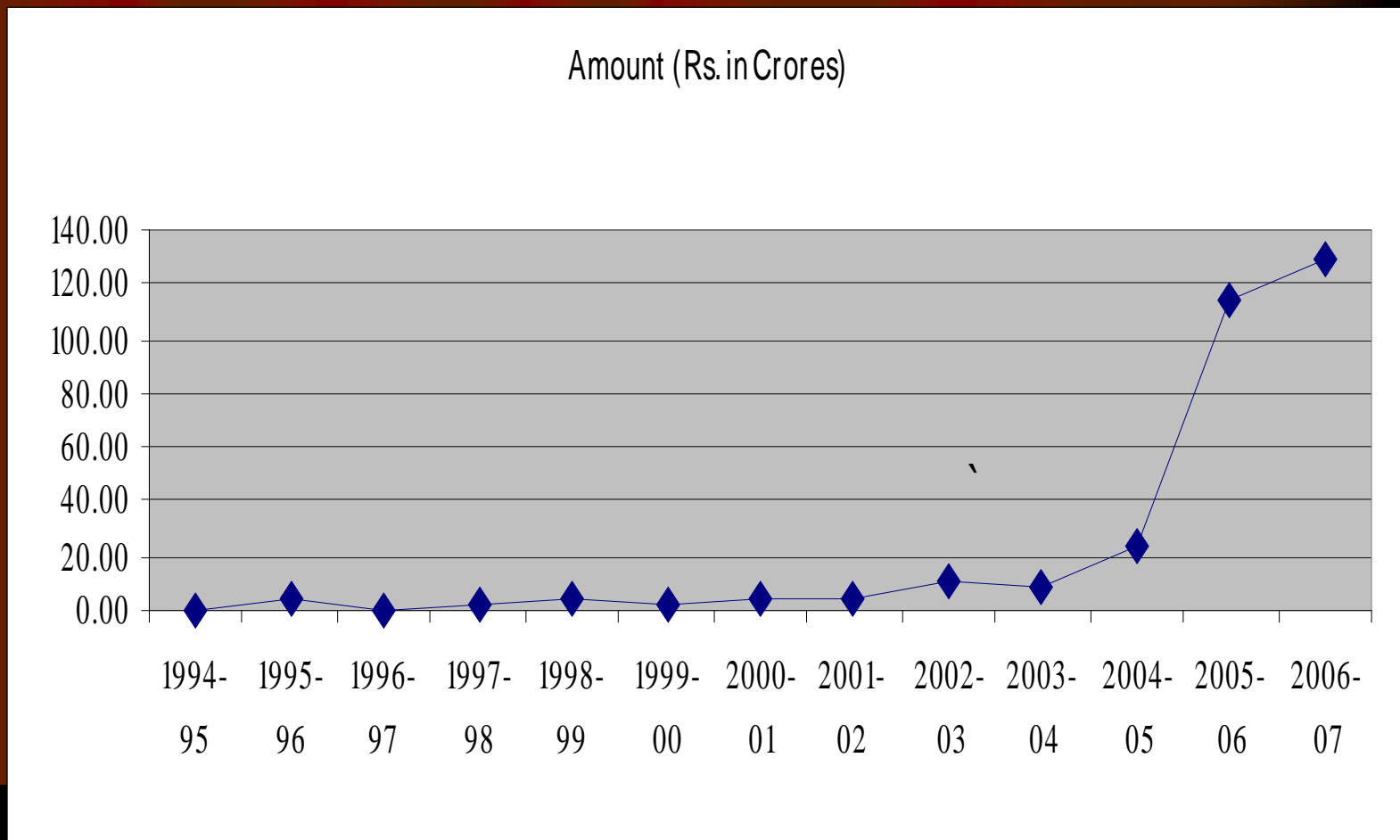
Indian Pharma Companies:

- Exports across 100 countries
- Largest no. of Drug Master Files (DMF) and Abbreviated New Drug Approvals (ANDA) filed for the high growth generic bulk drugs.

Public Private Partnership in R&D: Govt. of India

- **Department of Science & Technology (DST)**
Drugs and Pharmaceuticals Research Program (DPRP) – 1994
- **Department of Scientific and Industrial Research (DSIR)**
PATSER Programme - 1996
- **Council for Scientific and Industrial Research (CSIR)**
New Millennium Indian Technology Leadership Initiative (NMITLI) – 2000
- **Department of Biotechnology (DBT)**
Small Business Innovation Research Initiatives (SBIRI) - 2005

DPRP INVESTMENT TREND (Rs. in Millions)



SCENARIO ON INDIAN PATENTS

Year	India	Abroad	Total
PATENTS FILED			
2000-01	2179	6324	8503
2001-02	2371	8221	10592
2002-03	2693	8773	11466
2003-04	3218	9395	12613
PATENTS GRANTED			
2000-01	399	919	1318
2001-02	654	937	1591
2002-03	494	884	1378
2004-05	1078	1391	2469

INDIAN DRUGS ON CLINICAL TRIALS

Government Approval Phase I Trials

Industry / Institution	Molecule	Number
RANBAXY, Gurgaon	Anti-biotic HMG CoA Reductase Inhibitor Overactive bladder and urinary incontinence	RBx 7644 RBx 10558 RBx 9841
Sun	Hi-Receptor Antihistamine	1334H
Dr. Reddy's Laboratories	Anti-Cancer Anti-dyslipidemic Anti-cancer	DRF 1644 HCl DRF 10945 DRF 1042
Lupin Ltd.	Anti-tubercular	LL 4858
Wockhardt	Anti-bacterial	WCK 1152

INDIAN DRUGS ON CLINICAL TRIALS

Government Approval Phase I Trials

Industry / Institution	Molecule	Number
Zydus Cadila	Hyperlipidimia Anti-Dyslipidemic Agent	ZYHI ZYH2
Maladi Drugs	For Blood clot Disorders	Thrombinase
Central Drug Research Institute (CDRI), Lucknow	Anti-hyperglycemic agent Anti-hyperglycemic	CT1 CDR 134D
Nicholas Piramal	Anti-cancer agent	P276 00

INDIAN DRUGS ON CLINICAL TRIALS

Phase II Clinical Trials

Industry / Institution	Molecule	Number
Lupin Ltd.	Anti-Psoriasis	LL-4218, LLL-3348
RANBAXY, Gurgaon	Anti-asthmatic Anti-malarial Alpha I Adrenoreceptor BPH	RBx 7796 RBx11160 RBx2258
Wockhardt	Anti-bacterial	WCK 771
Dabur Research Foundation	Anti-Cancer	DRF 7295
Zydus Cadila	Anti-inflammatory	ZYI

INDIAN DRUGS ON CLINICAL TRIALS

Phase III Clinical Trial Permitted

Industry / Institution	Molecule	Number
Dr Reddy's Laboratories	Cerebral Gliomas	2-Deoxy-D-Glucose
Central Drug Research Institute (CDRI), Lucknow	Hypolipidemic Agent	80/574

DST Drugs & Pharmaceuticals Research Programme – Coverage upto March 2007

R&D PROJECTS : 83

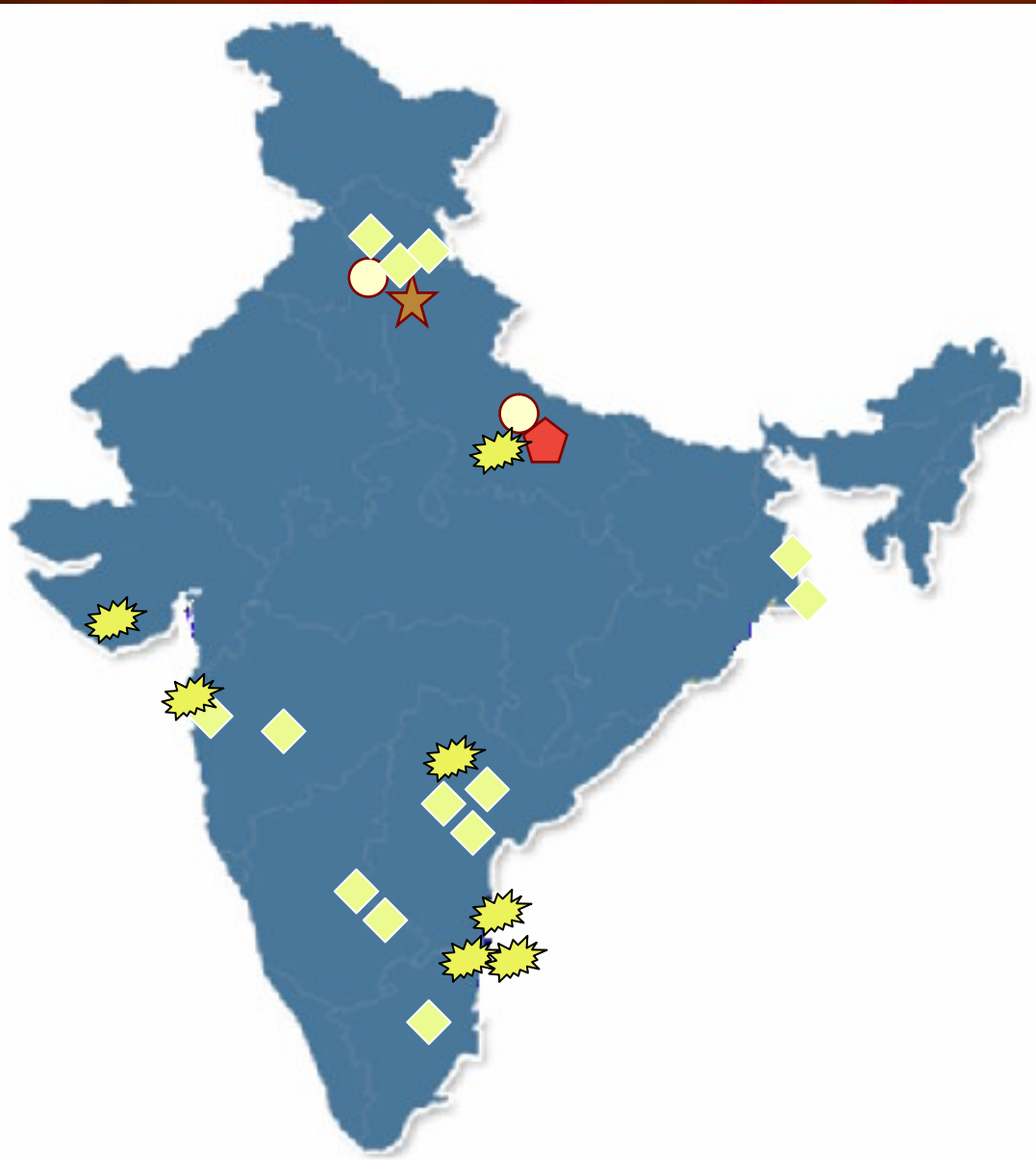
FACILITIES : 30

LOAN : 31

Diseases Covered

Cancer, Rabies, Hepatitis B, TB, Rheumatoid Arthritis, Cardiovascular disease, Obesity, Cataract, Diarrhoea, Malaria, Leishmaniasis, Amoebiasis, Asthama, Diabetes, Leucoderma, AIDS, Dengue, JEC etc.

NATIONAL FACILITIES CREATED



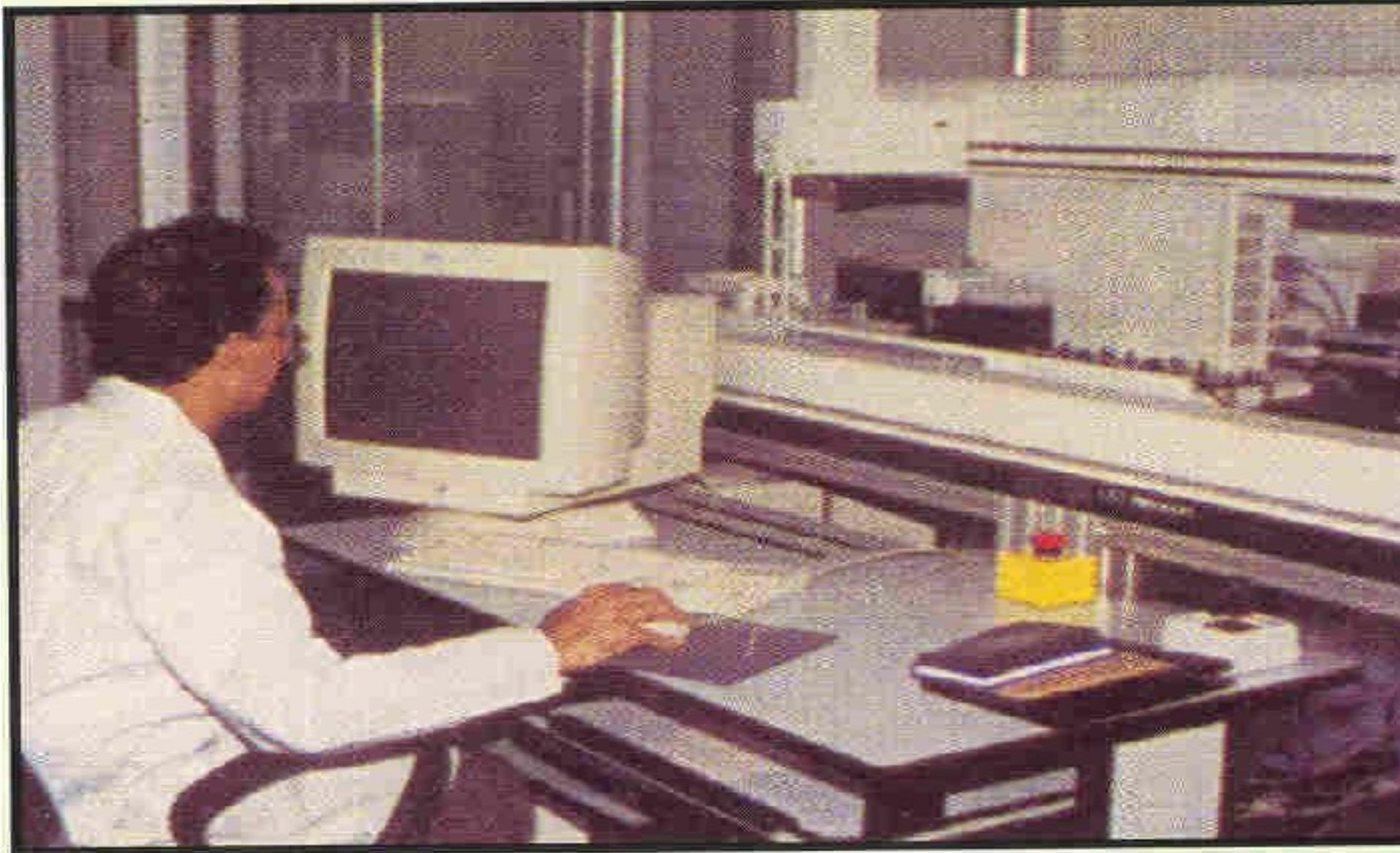
- Year 2002-03
- ★ Year 2003-04
- ◆ Year 2004-05
- ◆ Year 2005-06
- ★ Year 2006-07

- 2005-06
 - Pharmacokinetic evaluation, Jadavpur University, Kolkatta
 - Regulatory toxicology, NIPER
 - Advanced Proteomics and Protein, IICB K
 - Herbo-Metallic, IICT
- 2002-03
 - BSL4, NIV, Pune
 - Pharmacokinetics & Metabolic Regulatory, CDRI Lucknow
 - BSL3, IISc, Bangalore
 - Safety Pharmacology, NIPER
 - Genomics service facility, NIPER
 - Toxicology, CDRI Lucknow
- Combinatorial Natural Products, IICT,
 - Screening Drugs Cancer, AIDS & Malaria, JNCASR, Bangalore
 - Stem Cell Technologies, CCMB,
 - National Register on Clinical Trials, NIMS, New Delhi





Transgenic Mice Resources at CCMB, Hyderabad



**Automated High Throughput Screening - Central Facility
at CDRI, Lucknow**

SIGNIFICANT ACHIEVEMENTS

- **THOUSANDS OF COMPOUNDS SYNTHESIZED AND SCREENED**
- **LEADS IDENTIFIED IN THE FIELD OF CANCER-
CYCLOPENTENONES, ANTHRACENES AND
FLAVOPERERERINES**
- **A PEPTIDE BASED ANTI-CANCER DRUG FOR
THE TREATMENT OF COLORECTAL CANCER
HAS BEEN DEVELOPED AND IS POISED FOR
HUMAN TRIALS PHASE II.**

SIGNIFICANT ACHIEVEMENTS

- **21 PATENTS : 8 PRODUCT PATENTS
AND 13 PROCESS PATENTS**
- **STATE-OF-THE-ART FACILITIES IN
OPERATION AT VARIOUS PLACES
(COMPOUND FOR CANCER IN
BETEL LEAVES)**

