S LANKA SCIENCE, TECHNOLOGY & INNOVATION

STATISTICAL HANDBOOK

2008

NATIONAL SCIENCE FOUNDATION

National Science Foundation
47/5, Maitland Place
Colombo 07
Sri Lanka
www.nsf.ac.lk

SRI LANKA SCIENCE & TECHNOLOGY STATISTICAL HANDBOOK - 2008

Price : SL Rs. 300.00 (Sri Lankans), US $ 10.00 (Foreign nationals)

For a copy of the Publication or suggestions for improvements, please write to:

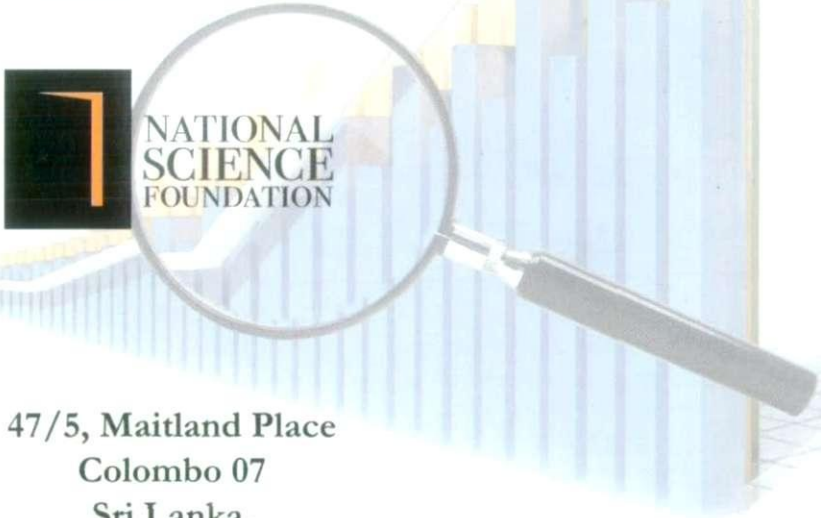
Head, Science and Technology Policy Research Division
National Science Foundation
47/5, Maitland Place
Colombo 7
Sri Lanka

Tel/Fax : 011 2675841, 2679209
E-mail : stprd@nsf.ac.lk
Website : www.mis.nsf.ac.lk

2010

ISBN 978 - 955 - 590 - 108 - 6

Sri Lanka Science, Technology & Innovation Statistical Handbook 2008



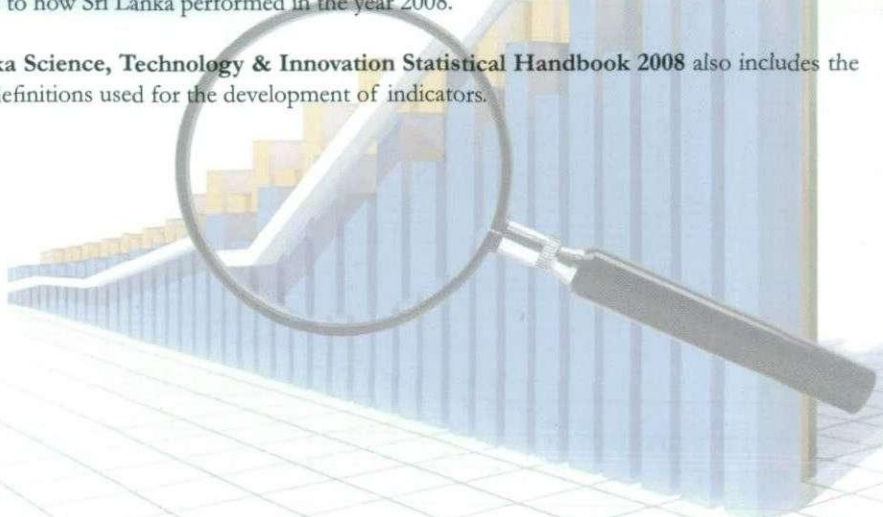
47/5, Maitland Place
Colombo 07
Sri Lanka.

FOREWORD

Sri Lanka Science, Technology & Innovation Statistical Handbook 2008, is the publication of data of the National Research & Development (R&D) Survey 2008 carried out by the NSF in 2009/2010 to provide the latest nationally and internationally comparable statistical indicators on Science and Technology. The definitions and classifications used in the National R&D Survey 2008 and in this book are based on the International Standardization of Statistics on Science and Technology (UNESCO, 1978) and the Frascati Manual (OECD, 2002). This Handbook will complement the detailed report of the 2008 survey which will be published by the NSF within this year.

Compared to the previous books, a special feature of this book is that an attempt has been made to workout the basic innovation indicators to give an idea to the society as to how Sri Lanka performed in the year 2008.

For easy reference of the users, **Sri Lanka Science, Technology & Innovation Statistical Handbook 2008** also includes the highlights of the survey and the general definitions used for the development of indicators.



Prof. Sirimali Fernando
Chairperson
National Science Foundation
Colombo, Sri Lanka

September 2010

PREFACE

Sri Lanka Research and Development Survey 2008 was designed to measure the levels and trends of the R&D activities conducted during the year 2008. This survey is conducted once in two years. The S&T indicators and statistical data identified in the book are aimed at policymakers, planners, researchers, scientists and technologists requiring a quantitative overview of the national S&T activities. The definitions and classifications used for the survey appears at the end of the book.

Sri Lanka Science, Technology & Innovation Statistical Handbook 2008 was produced by the research team of the Science and Technology Policy Research Division (STPRD) under the close guidance of the Advisory Board to the Division. The overall supervision of the survey was done by the Head of the Division.

The valuable comments and editorial changes made by the external reviewer Mr. M.A.T. de Silva, were immensely useful in finalizing the document.

The Management Information Systems (MIS) Unit of the University Grants Commission assisted in the data collection relevant to the University Sector while the Department of Census & Statistics collected S&T information from a sample of 250 enterprises.

All the establishments that provided information for successful completion of the survey are gratefully acknowledged. Finally, the co-operation extended by the Chairperson, Director and the Board of Management of the National Science Foundation is very much appreciated.

Dr. Seetha I. Wickremasinghe
Head/S&T Policy Research Division
National Science Foundation
Colombo, Sri Lanka.

September 2010

HIGHLIGHTS-2008

- Sri Lanka spent a total of Rs. million 5,047.73 (USD million 46.1) on R&D. This corresponds to 0.11% of the GDP of *the country* which was a decrease compared to the amount spent in 2006.

- The annual investment for R&D by the government of Sri Lanka amounts to Rs. million 3,624.41 which is 71.8% of the total R&D expenditure of 2008 and 0.08 of the GDP.

- The private sector (business sector enterprises) contribution for R&D expenditure had been increased to Rs. million 1,004.01 which was 19.9% of the total R&D expenditure of 2008 and 0.02 of the GDP.

- Foreign sector contribution to R&D expenditure decreased to Rs. million 215.58, which was 4.3% of the total R&D expenditure of 2008 and 0.005 of the GDP, while the contribution by other sources was Rs. million 203.73, which was 4.0% of the total R&D expenditure of 2008 and 0.005 of the GDP.

- 56.9% (Rs. million 2,872.56) of the R&D expenditure had been invested in the state sector organizations (R&D institutes and S&T service sector institutions), and 24.8% (Rs. million 1,250.67) had been in the higher education institutes and 18.3% (Rs. million 924.50) in the private sector enterprises.

- 40% of the R&D expenditure was invested in applied research followed by 31% on basic research and 29% on experimental development research.

- In 2008, 33% of the total R&D expenditure was spent on agriculture sciences followed by 30% in engineering and technology, 17% in medical sciences, 13% in natural sciences, and 7% in social science and humanities.

- In 2008, Sri Lanka had a total work force of 44,655 in the S&T related organizations. 23% of this comprised scientists, engineers and professionals engaged in the work on R&D, testing, constructions and other service based activities including administration and management.

- In 2008, the number of scientists engaged in the R&D work (full time or part time) was 4,037 and the number of technicians was 2,166.
- 61% of R&D scientists were employed in the higher education sector while 29% were in the state sector organizations and 10% in the private sector institutions respectively.
- The highest number of R&D scientists were engaged in research in natural sciences (25%). This was followed by agriculture sciences (23%), engineering and technology (23%), medical sciences (19%), social science and humanities (7%) and 3% in other fields.
- In 2008, 39.8% of the total R&D scientists were females.
- The total number of Full-Time Equivalent (FTE) researchers was 1,972, of which 39% were female scientists.
- Out of the total number of Full-Time Equivalent (FTE) researchers, 50% were in the state sector organizations, 31% in higher education and 19% in private sector organizations.
- The number of patents registered by the Patent Office of Sri Lanka was 168, of which 98 were registered by Sri Lankan residents and 70 by the non-residents.
- In 2008, 303 articles were published by the Sri Lankan scientists in the SCI journals, of which 36% were with foreign co-authors.
- In 2008, 1,292 completed postgraduate degrees, which included 24-Ph.D; 235 -MS/MD; 73-M.Phil; 617 M.Sc/M.Eng; and 343 -Postgraduate Diploma.

- Of the total revenue in 2008 from the sale of products or services by industries involved in R&D, 62% was from the local market, 6% from Asia Pacific, 16% from Europe, 11% from USA and 5% from others.
- In 2008, the number of new products developed by the industrial sector was 272, while the number of technology transferred was 11, and the number commercialized was 228.
- In 2008, the number of new services developed by the industrial sector was 79, while the number transferred was 05 and the number commercialized was 27.
- In 2008, the number of existing products or services improved significantly by the industrial sector was 407, while the number transferred was 2 and the number commercialized was 35.
- In 2008, the industrial sector utilized Rs. 442,712,426 for innovation activities
- In 2008, the government R&D institutions developed 81 new product technologies, transferred 56 technologies and commercialized 43.
- In 2008, the government R&D institutions developed 53 new services, transferred 34 and commercialized 21.
- In 2008, the government R&D institutions produced 464 new plant varieties and hybrids, transferred 43 and commercialized 14.
- In 2008, the government R&D institutions improved 34 existing processes or products, transferred 25, and commercialized 09.

Abbreviations

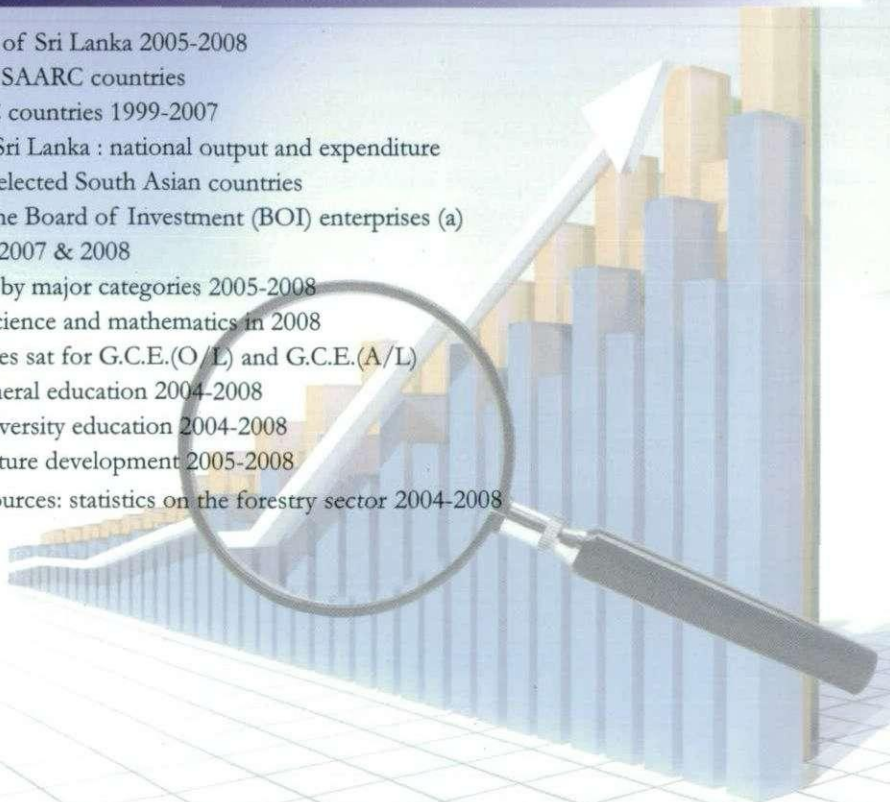
FTE	Full Time Equivalent
GERD	Gross Expenditure on R&D
GDP	Gross Domestic Product
GNP	Gross National Product
HND	Higher National Diploma
IT	Information Technology
na	Not available
NA	Not Applicable
NARESA	Natural Resources, Energy & Science Authority
NGO	Non Government Organization
NSF	National Science Foundation
R&D	Research and Development
S&T	Science and Technology
SCI	Science Citation Index
SLAAS	Sri Lanka Association for the Advancement of Science
STP	Science and Technology Personnel
STPRD	Science & Technology Policy Research Division
UGC	University Grants Commission

CONTENTS

3. Performance Indicators for Science and Technology

4. Innovation Indicators

5. Key Socio - Economic Indicators - General



FINANCIAL RESOURCES FOR RESEARCH AND DEVELOPMENT

1.1 : Gross expenditure on R&D (GERD) in Sri Lanka 1966-2008

Year	GDP current prices Rs.million	GERD Rs. million (US$)	GERD as percent of GDP	Total population million	GERD per million population Rs. million
1966	7,529	20 (4.2)	0.30	11.5	1.7
1975	11,100	45 (6.4)	0.40	13.5	3.3
1984	142,700	257.0 (9.7)	0.18	15.6	16.5
1993	499,800	649.0 (13.1)	0.13*	17.6	36.8
1996	769,900	1,410.0 (23)	0.18	18.3	77.0
2000	1,258,000	1,810.0 (22.9)	0.14*	18.4	98.4
2004	1,800,750	3,807.5 (40.9)	0.21	19.4	196.2
2006	2,939,000	5,119.19 (47.9)	0.17	19.8	258.5
2008	4,410,682	5,047.73 (46.1)	0.11	20.2	249.9

Source : National R&D Surveys Sri Lanka 1996 (NARESA); 2000, 2004, 2006 & 2008 (NSF)

* Estimates

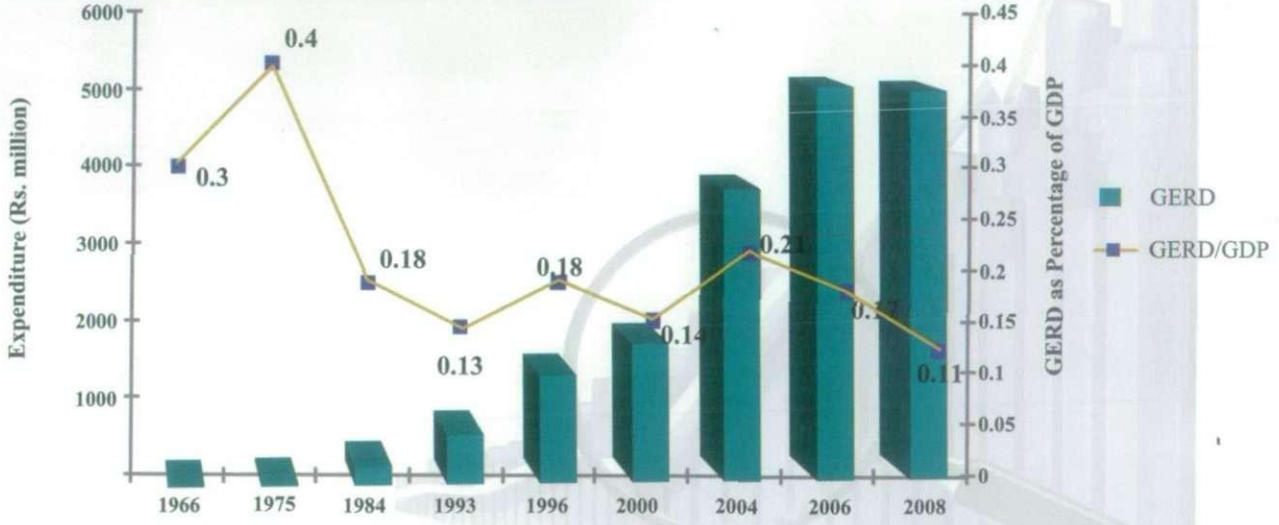


Figure 1: Gross Expenditure on R&D in Sri Lanka

1.2 : Gross expenditure on R&D (GERD) in selected countries

Country	Year	GERD in '000 PPP$	GERD as a percentage of GDP	GERD per capita (in PPP$)
Australia	2006	14,867,500.60	2.17	720.74
Brazil	2006	17,336,531.45	1.02	92.14
Bulgaria	2007	417,101.45	0.48	54.59
China	2007	104,901,360.26	1.49	78.93
Cyprus	2007	95,885.63	0.45	123.14
India	2007	24,784,716.13	0.80	21.28
Indonesia	2005	347,237.36	0.05	1.58
Iran	2006	4,697,983.41	0.67	65.63
Japan	2007	147,585,472.02	3.44	1158.48
Malaysia	2007	2,085,039.49	0.64	79.9.
New Zealand	2007	1,385,775.21	1.25	330.51
Pakistan	2007	2,751,785.37	0.67	15.89
Republic of Korea	2007	41,654,789.59	3.47	868.49
Russian Federation	2007	23,490,544.83	1.12	165.49
Singapore	2007	6,017,304.31	2.61	1341.78
South Africa	2006	4,120,396.05	0.96	84.71
Sri Lanka*	2008	504,773.36*	0.11	24.9
Thailand	2006	1,205,910.66	0.25	18.13
United Kingdom	2007	37,749,477.31	1.84	619.87
United States	2007	368799000.00	2.67	1194.78

Source : Adapted from UNESCO Statistics 2009

* Current Price

1.3 : National expenditure on R&D (GERD) by source of funding 2008

Rs.million

Source of Funding	Recurrent	Capital	Total	GDP
Government	3,078.79	545.62	3,624.41	0.08
	(61.0%)	(10.8%)	(71.8%)	
Private	814.54	189.47	1,004.01	0.02
	(16.1%)	(3.8%)	(19.9%)	
Foreign	171.91	43.61	215.58	0.005
	(3.4%)	(0.9%)	(4.3%)	
Other	159.27	44.46	203.73	0.005
	(3.2%)	(0.9%)	(4.0%)	
Total	**4,224.57**	**823.16**	**5,047.73**	**0.11**
	(83.7%)	(16.3%)	(100.0%)	

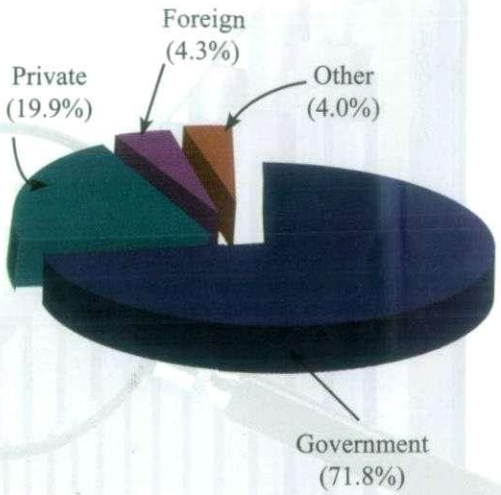


Figure 2

1.4 : Trends in national expenditure on R&D (GERD)by source of funding 2004-2008

Rs.million

Source of Funding	2004	2006	2008
Government	2,571.3	3,338.1	3,624.4
	(67.5%)	(65.2%)	(71.8%)
Private	21.9	975.0	1,004.0
	(0.6%)	(19.0%)	(19.9%)
Foreign	861.8	246.9	215.6
	(22.6%)	(4.8%)	(4.3%)
Other*	352.5	559.2	203.7
	(9.3%)	(10.9%)	(4.0%)
Total	**3,807.5**	**5,119.2**	**5,047.7**
	(100)	**(100%)**	**(100%)**

Source: National R&D Surveys Sri Lanka 2004, 2006 & 2008 (NSF)
*Other: funds generated by the institution itself by providing services plus unspecified funds.

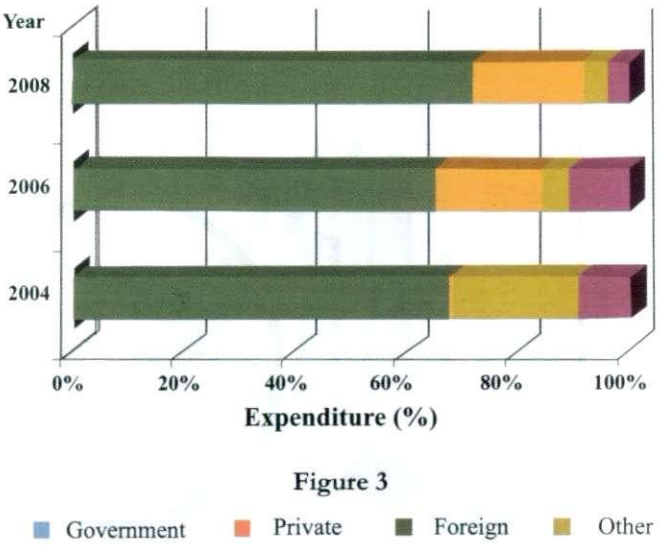


Figure 3

1.5: Trends in national expenditure on R&D (%GDP) by source of funding 1996-2008

% GDP

Source of Funding	1996	2004	2006	2008
Government	0.12	0.14	0.11	0.08
Private	0.00	0.00	0.03	0.02
Foreign	0.04	0.05	0.01	0.005
Other*	0.01	0.01	0.02	0.005
Total	**0.18**	**0.21**	**0.17**	**0.11**

Source: National R&D Surveys Sri Lanka 1996 (NARESA), 2004, 2006 & 2008 (NSF)

*Other: funds generated by the institution itself by providing services plus unspecified funds

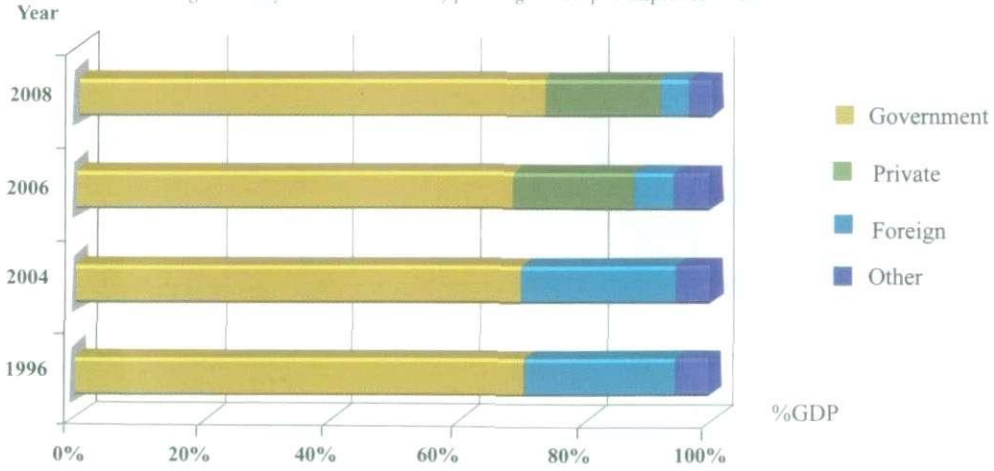


Figure 4

1.6 Gross expenditure on R&D (GERD) by source of funding in selected countries

Country	GERD						
	Year	% GDP	% Business enterprise	% Government	% Higher education	% Private non-profit	% Not specified
Australia	2006	2.17	57.31	14.07	25.73	2.89	-
China	2007	1.49	72.29	19.23	8.48	-	-
Indonesia	2005	0.05	3.74	96.26	-	-	-
Iran	2006	0.67	14.21	55.34	30.45	-	-
Israel	2007	4.74	78.70	5.14	12.56	3.60	-
Japan	2007	3.44	77.89	7.77	12.59	1.75	-
Malaysia	2007	0.64	84.92	5.18	9.90	-	-
Pakistan	2007	0.67	73.25	26.75		-	-
Republic of Korea	2007	3.47	76.25	11.65	10.65	1.45	-
Russian Federation	2007	1.12	64.24	29.10	6.33	0.33	-
Singapore	2007	2.61	66.81	12.16	21.03	-	-
South Africa	2006	0.96	55.94	22.80	19.97	1.29	-
Sri Lanka	2008	0.11	19.9	71.8	-	-	8.3
Thailand	2006	0.25	40.92	-	-	-	59.08
United Kingdom	2007	1.84	64.10	9.22	24.54	2.14	-
United States	2007	2.67	71.91	10.67	13.26	4.16	-

Source : UNESCO Statistics 2009

1.7 : National expenditure on R&D (GERD) by sectors 2004-2008

Rs.million

Sector	2004			2006			2008		
	Recur-rent	Capital	Total	Recur-rent	Capital	Total	Recur-rent	Capi-tal	Total
Higher Education	1,150.00	127.60	1,277.60	1,341.90	174.20	1,516.10	1,099.61	151.06	1,250.67
			(33.5%)			(29.6%)			(24.8%)
State	1,319.90	1,001.20	2,321.10	2,065.80	558.90	2,624.70	2,384.92	487.64	2,872.56
			(61.0%)			(51.3%)			(56.9%)
Private	132.40	76.40	208.80	304.90	673.50	978.40	740.04	184.46	924.50
			(5.5%)			(19.1%)			(18.3%)
Total	**2,602.30**	**1,205.20**	**3,807.50**	**3,712.60**	**1,406.60**	**5,119.20**	**4,224.57**	**823.16**	**5,047.73**
	(68.3%)	**(31.7%)**	**(100.0%)**	**(72.5%)**	**(27.5%)**	**(100.0%)**	**(83.7%)**	**(16.3%)**	**(100.0%)**

Source: National R&D Surveys Sri Lanka 2004; 2006 & 2008 (NSF)

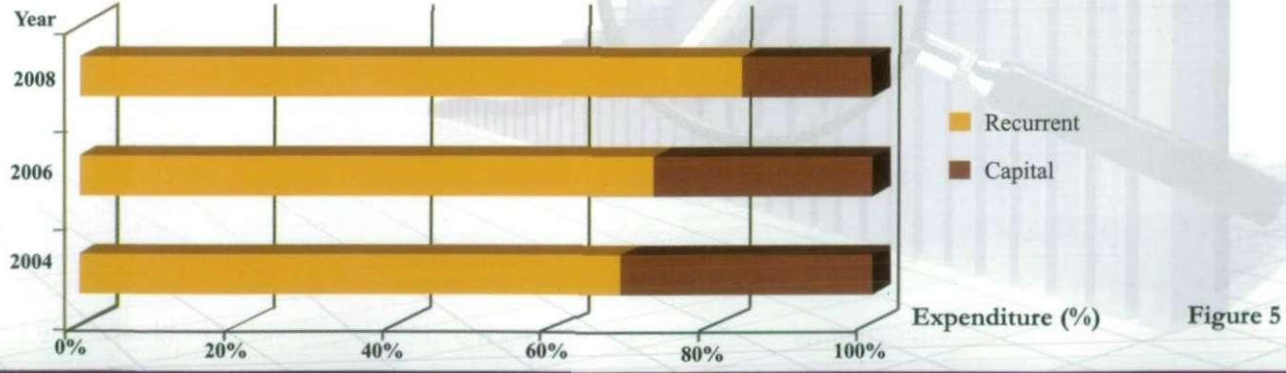


Figure 5

1.8: National expenditure on R&D (GERD) by nature of research activities 2004-2008

Rs.million

Nature of Research	2004		2006		2008	
	Amount	%	Amount	%	Amount	%
Basic research	519.6	13.6	1,143.1	22.4	1,581.1	31.3
Applied research	2,886.1	75.8	2,950.1	57.6	2,023.5	40.1
Experimental development	401.8	10.6	1,026.0	20.0	1,443.1	28.6
Total	**3,807.5**	**100.0**	**5,119.2**	**100.0**	**5,047.7**	**100.0**

Source: National R&D Surveys Sri Lanka 2004; 2006 & 2008 (NSF)

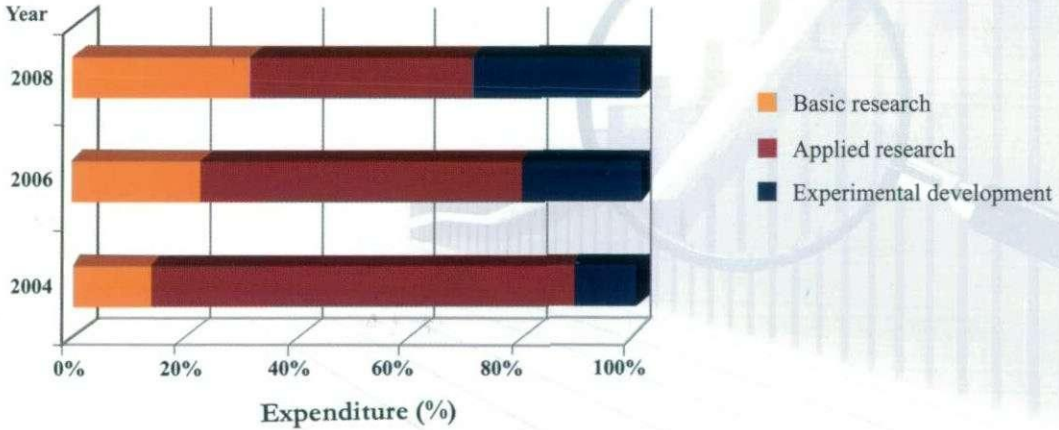


Figure 6

1.9: National expenditure on R&D (GERD) by discipline 2004-2008

Rs.million

Discipline	Year 2004	2006	2008
Natural sciences	627.6	1,148.7	645.0
	(16.5%)	(22.4%)	(12.8%)
Engineering & technology	614.1	1,096.5	1,490.2
	(16.1%)	(21.4%)	(29.5%)
Medical sciences	531.4	726.7	875.1
	(14.0%)	(14.2%)	(17.3%)
Agricultural sciences	1,002.5	1,258.9	1,669.6
	(26.3%)	(24.6%)	(33.1%)
Social sciences & humanities	999.5	393.9	367.8
	(26.2%)	(7.7%)	(7.3%)
Other	32.4	494.7	0.0
	(0.9%)	(9.7%)	(0.0%)
Total	**3,807.5**	**5,119.2**	**5,047.7**

Source: National R&D Surveys Sri Lanka 2004; 2006 & 2008 (NSF)

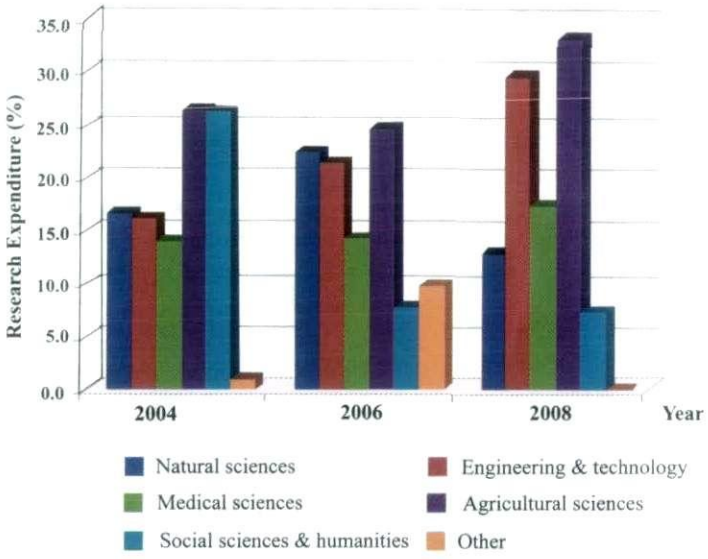


Figure 7

1.10 Expenditure on R&D in the agriculture sector (disciplines & commodity group) 2008

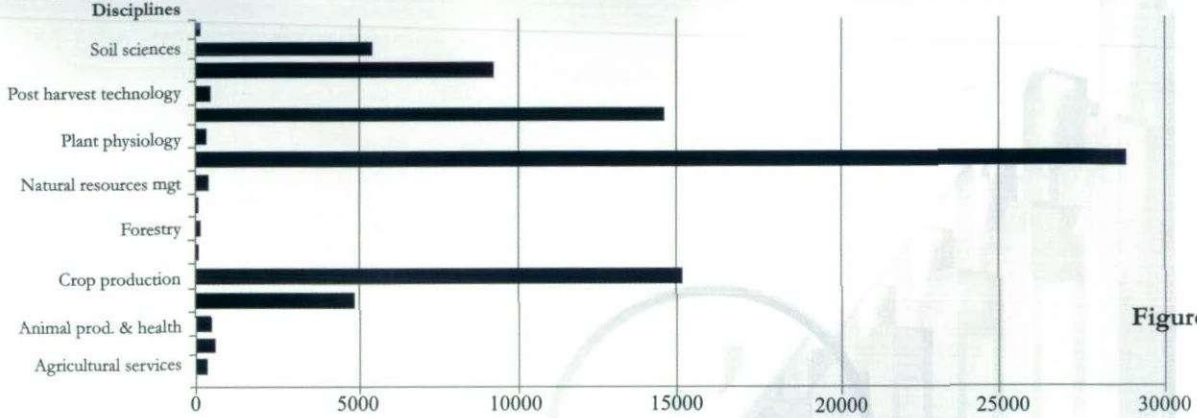


Figure 8

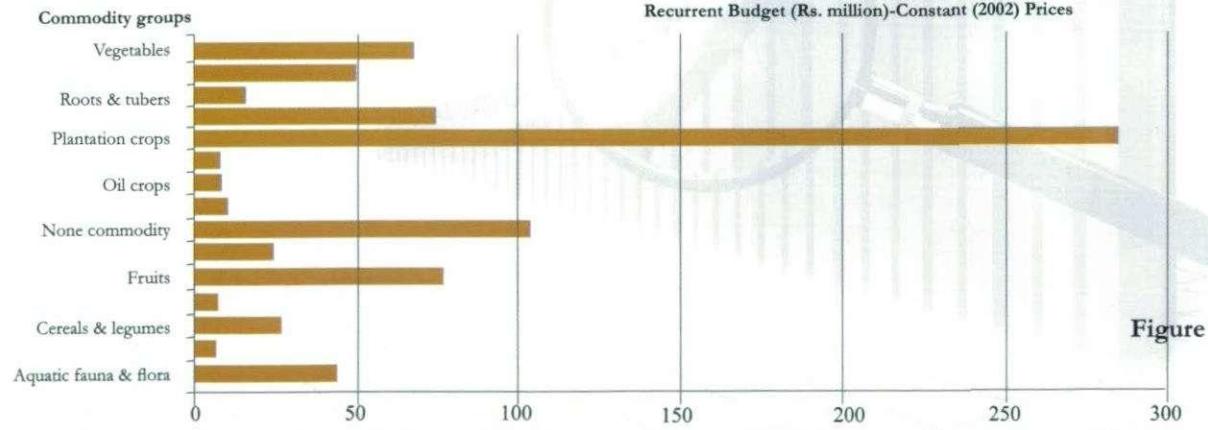


Figure 9

Source : INFORM - Council for Agricultural Research Policy (CARP), Sri Lanka 2008

HUMAN RESOURCES
IN
SCIENCE AND TECHNOLOGY

2.1: Number of R&D scientists and technicians (Headcount) by sector 2006 & 2008

Sector	2006				2008			
	Scientists		Technicians		Scientists		Technicians	
	No	%	No	%	No	%	No	%
Higher Education	2,839	62.8	807	42.1	2,466	61.1	793	36.6
State	1,479	32.9	1,031	53.7	1,187	29.4	1,204	55.6
Private and NGO	202	4.5	80	4.2	384	9.5	169	7.8
Total	**4,520**	**100.0**	**1,918**	**100.0**	**4,037**	**100.0**	**2,166**	**100.0**

Source: National *R&D Surveys* Sri Lanka 2006 & 2008 (NSF)

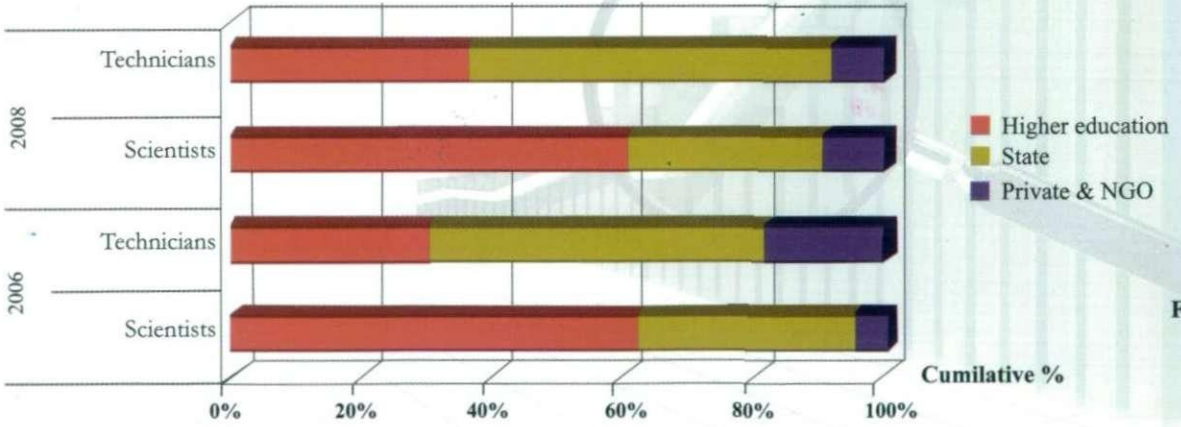


Figure 10

2.2: Number of R&D scientists (Headcount) by discipline and sex 2006 & 2008

Discipline	Headcount of R&D scientists (2006)						Headcount of R&D scientists (2008)					
	Male		Female		Total		Male		Female		Total	
	No	%	No	%	No	%	No.	%	No.	%	No.	%
Natural sciences	698	26	645	34	1,343	30	634	26	391	24	1,025	25
Agriculture	507	20	335	17	842	19	522	21	417	26	939	23
Engineering	741	28	320	17	1,061	23	661	27	266	17	927	23
Medical sciences	480	18	410	22	890	20	385	16	383	24	768	19
Social sciences humanities	177	7	155	9	332	7	156	6	111	7	267	7
Other	39	1	13	1	52	1	70	3	41	3	111	3
TOTAL	**2,642**	**100**	**1,878**	**100**	**4,520**	**100**	**2,428**	**100**	**1,609**	**100**	**4,037**	**100**

Source: National R&D Surveys Sri Lanka, 2006 & 2008 (NSF)

Distribution of R&D scientitits in different disciplines 1996-2008

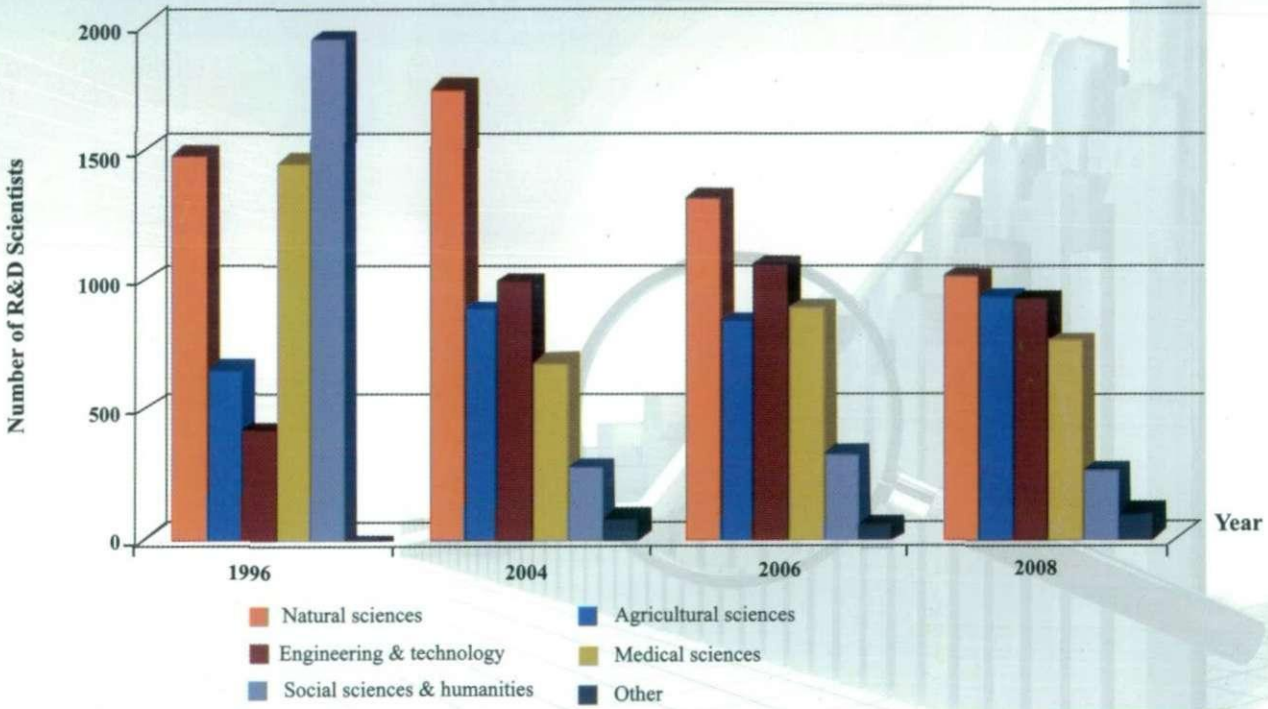


Figure 11

2.3: Educational qualifications of R&D scientists 2008

Qualification	Male		Female		Total	
	No	%	No	%	No	%
Ph.D.	760	31.3	378	23.5	1,138	28.2
M.Phil./ M.Sc.	637	26.2	444	27.6	1,081	26.8
MD/MS	155	6.4	149	9.3	304	7.5
B.Sc. + PG Diploma	106	4.4	79	4.9	185	4.6
B.Sc. Special	318	13.1	263	16.4	581	14.4
B.Sc. General	276	11.3	241	15.0	517	12.8
Other	178	7.3	53	3.3	231	5.7
Total	**2,430**	**100.0**	**1,607**	**100.0**	**4,037**	**100.0**

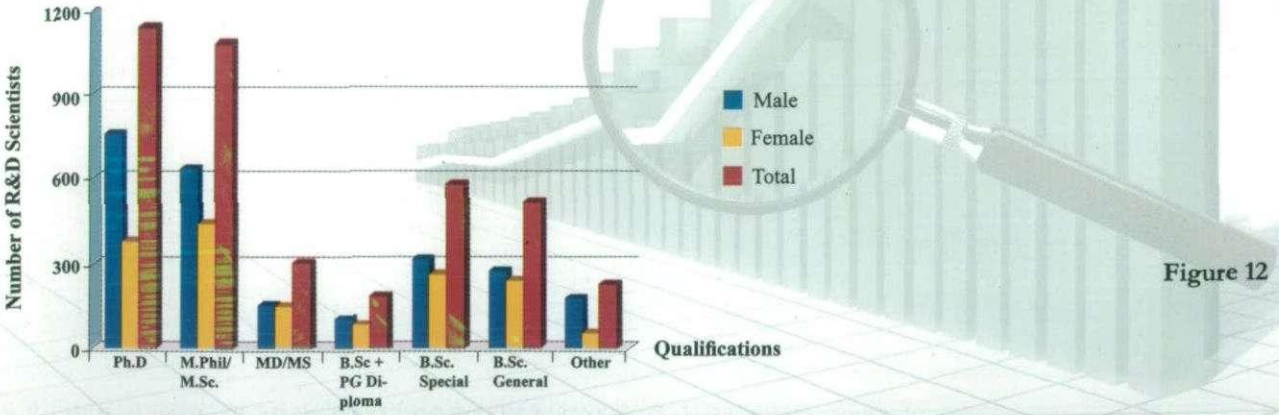


Figure 12

2.4 Distribution of of R&D scientists (FTE) by sector 2008

Sector	Full Time Equivalent of R&D scientists			
	Male	Female	Total	% Female
Higher education	364	253	617	13
State	518	453	971	23
Private	323	61	384	3
Total	**1,205**	**767**	**1,972**	**39**

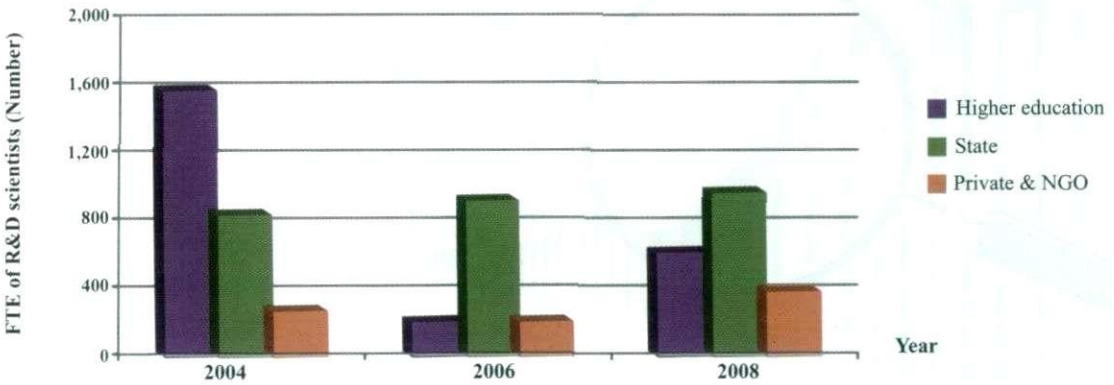


Figure 13

2.5: Distribution of R&D scientists (FTE) by discipline 2008

Discipline	Full Time Equivalent of R&D scientists			
	Male	Female	Total	%Female
Natural sciences	281	159	440	36
Engineering & technology	340	286	626	46
Medical sciences	323	82	405	20
Agricultural sciences	123	138	261	53
Social sciences and humanities	87	74	161	46
Other	51	28	79	35
Total	**1,205**	**767**	**1,972**	**39**

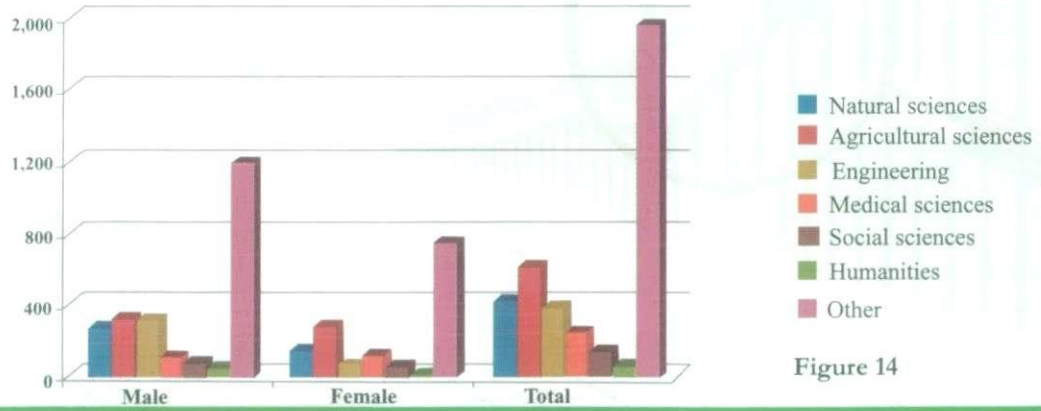


Figure 14

2.6: Number of R&D scientists (Headcount) by age and sex 2008

Age group	Headcount of R&D scientists				HeadCount of R&D scientists FTE			
	Male	Female	Total	%	Male	Female	Total	%
21-30	283	313	596	14.8	161	147	308	15.6
31-40	749	555	1,304	32.3	391	285	676	34.3
41-50	751	456	1,207	29.9	357	199	556	28.2
51-60	456	194	650	16.1	240	102	342	17.3
above 60	96	25	121	3.0	28	7	35	1.8
not mentioned	98	61	159	3.9	28	27	55	2.8
Total	**2,433**	**1,604**	**4,037**	**100.0**	**1,205**	**767**	**1,972**	**100.0**

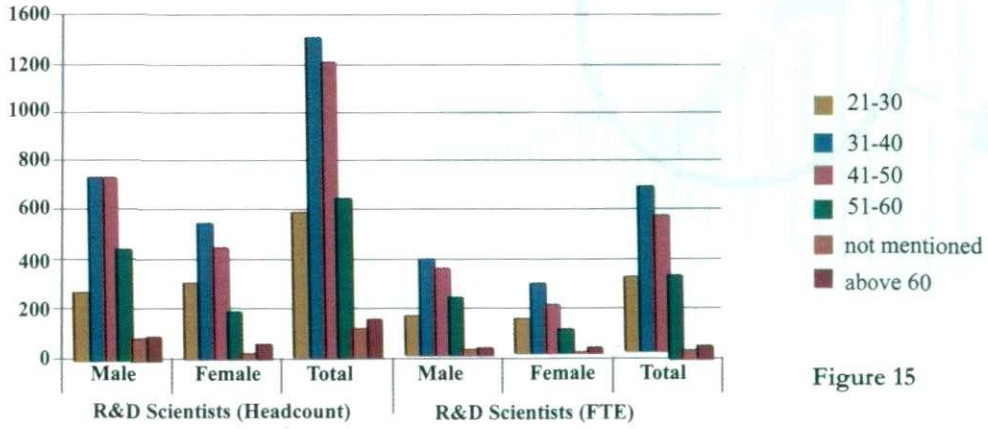


Figure 15

2.7 : Number of R&D scientists in selected countries 2005-2008

Country	Year (data available)	Researchers per million population	Researchers (FTE) per million population
Argentina	2007	1,495	980
Brazil	2006	1,015	629
Bulgaria	2007	na	1,466
China	2007	na	1,071
Colombia	2007	243	151
Cyprus	2006	1,922	961
Indonesia	2005	162	na
Iran	2006	947	706
Italy	2006	2,326	1,499
Japan	2007	6,934	5,573
Malaysia	2007	729	371
New Zealand	2007	7,084	4,365
Pakistan	2007	310	152
Poland	2007	2,551	1,610
Republic of Korea	2007	6,028	4,627
Russian Federation	2007	na	3,305
Singapore	2007	7,059	6,088
South Africa	2006	814	382
Sri Lanka	2008	200	98

Source : UNESCO Statistics 2009 na=not available

2.8 : Science and technology personnel (STP) by category 2006 & 2008

STP Category	2006			2008		
	Total number	Per cent of STP	Per million inhabitants	Total number	Per cent of STP	Per million inhabitants
S&T scientists	7,907	17.9	399.3	10,222	22.9	506.0
Technicians	9,803	22.2	495.1	7,978	17.9	395.0
Other supporting staff	26,358	59.9	1,331.2	26,455	59.2	1,309.6
Total STP	**44,068**	**100.0**	**2,225.6**	**44,655**	**100.0**	**2,210.6**

Source: National R&D Surveys Sri Lanka 2006 & 2008 (NSF)

NOTE: Total STP includes all researchers, other scientists & engineers in the service sector institutions, plus technicians and supporting staff

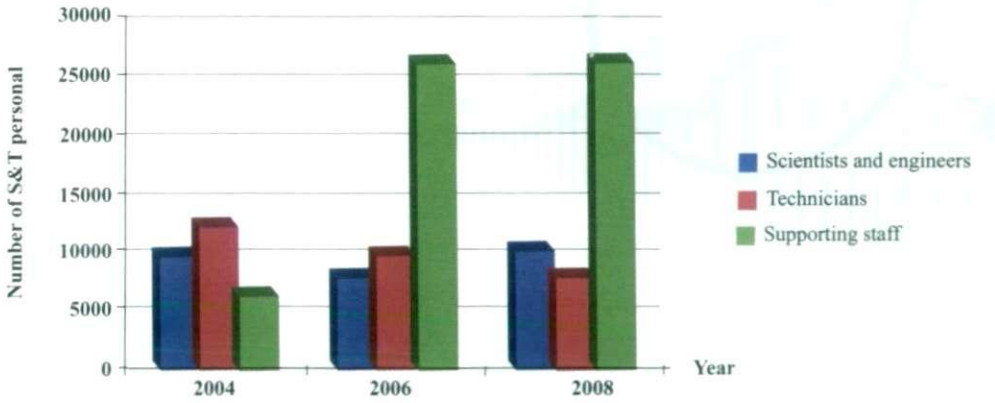


Figure 16

2.9 : Number of Science & technology personnel (STP) by sector 2004-2008

Sector	2004		2006		2008	
	STP	Percent	STP	Percent	STP	Percent
Higher education	4,285	15.1	4,218	9.6	4,107	9.2
State	12,685	44.6	27,272	61.9	30,687	68.7
Private	11,462	40.3	12,578	28.5	9,861	22.1
Total	**28,432**	**100.0**	**44,068**	**100.0**	**44,655**	**100.0**

Source: National R&D Surveys Sri Lanka 2004; 2006 & 2008 (NSF)

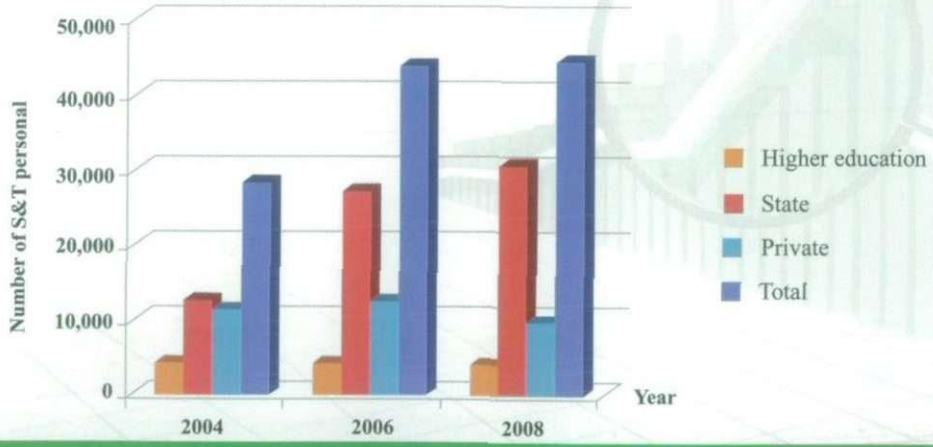


Figure 17

2.10 : Number of science and technology personnel by discipline 2004-2008

Discipline	2004		2006		2008	
	No	%	No	%	No	%
Natural sciences	8,227	28.9	8,400	19.1	6,979	15.6
Agricultural sciences	5,766	20.3	8,350	19.0	2,331	5.2
Engineering & technology	8,244	29.0	21,038	47.7	22,076	49.4
Medical sciences	1,126	4.0	1,862	4.2	4,696	10.5
Social sciences & humanities	1,540	5.4	1,550	3.5	1,944	4.4
Other / not specified	3,529	12.4	2,867	6.5	6,629	14.8
Total	**28,432**	**100.0**	**44,068**	**100.0**	**44,655**	**100.0**

Sources: National R&D Surveys Sri Lanka 2004; 2006 & 2008 (NSF)

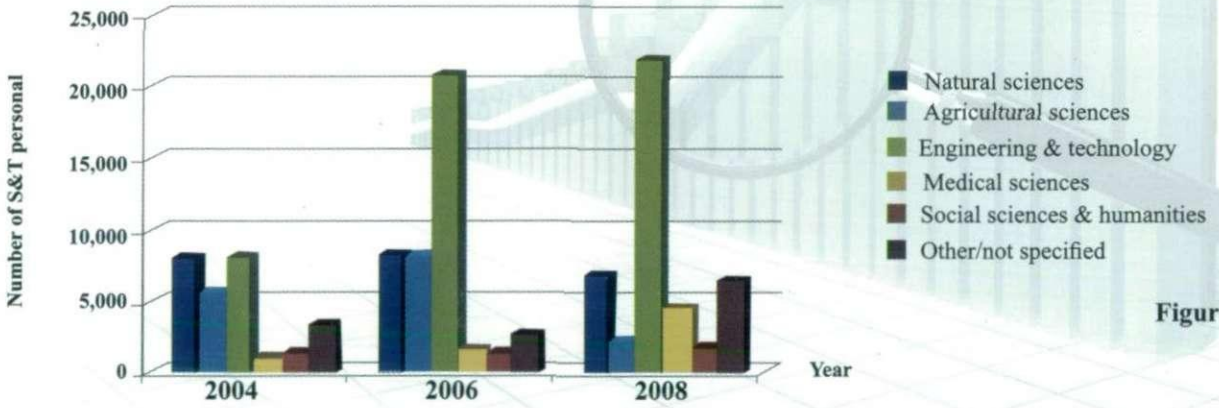


Figure 18

PERFORMANCE INDICATORS FOR SCIENCE AND TECHNOLOGY

3.1 : Number of patents registered locally 1997 - 2008

Year	Resident	Non resident	Total
1997	65	96	161
1998	44	97	141
1999	78	101	179
2000	59	69	128
2001	71	104	175
2002	62	56	118
2003	59	53	112
2004	99	91	190
2005	103	85	188
2006	68	69	137
2008	89	70	159

Source : Adapted from information of the National Intellectual Property Office of Sri Lanka

3.2 : Number of patents registered by residents by sector 2002- 2008

Category	2002	2004	2006	2008
S&T institutes	5	5	3	10
Higher education institutes	1	4	1	4
Private institutes	4	13	4	6
Individuals	52	77	60	69
Total	**62**	**99**	**68**	**89**

Source : Adapted from information of the National Intellectual Property Office of Sri Lanka

3.3 : Distribution of patents obtained 2002-2008

Classification	Year			
	2002	2004	2006	2008
Agricultural systems and development technology	5	7	11	8
Construction technology and materials	1	4	6	6
Drugs, cosmetics & other product development	10	26	6	5
Dryers/dehydration technology	0	1	2	1
Energy saving/ Generating devices	9	5	3	9
Food and beverage process technology	2	5	9	13
Innovations in domestic appliances/utilities	19	13	5	10
Innovations in IT and telecommunication & other	7	19	16	21
Packaging and packing materials	1	7	1	2
Process technology	3	5	1	6
Process technology - Manufacturing sector	2	5	7	7
Rubber production and processing technology	3	2	1	1
Total	**62**	**99**	**68**	**89**

Source : Adapted from information of the National Intellectual Property Office of Sri Lanka

3.4 : Main fields of Sri Lanka publications in the SCI journals 2007 & 2008

	2007		2008	
	Total number	% With foreign co-authorship	Total number	% With foreign co-authorship
Agriculture	20	70	25	56
Biological sciences	31	61	20	25
Molecular biology & biotechnology	16	81	8	25
Chemical sciences	29	59	16	50
Earth sciences	13	85	11	36
Engineering & technology	9	89	12	17
Environmental sciences	8	88	21	38
Fisheries/ Aquaculture	0	0	1	0
Food science	9	67	7	57
Forestry	5	80	7	43
Health sciences	92	53	143	32
Mathematics	5	60	4	0
Nanotechnology	2	50	1	0
Physics	8	75	20	40
Veterinary sciences	7	57	7	86
Total	**269**	**64**	**303**	**36**

SCI : Science Citation Index
Source : Adapted from the SCI database

Publication trends in the SCI journals by Srilankan scientists 2004-2008

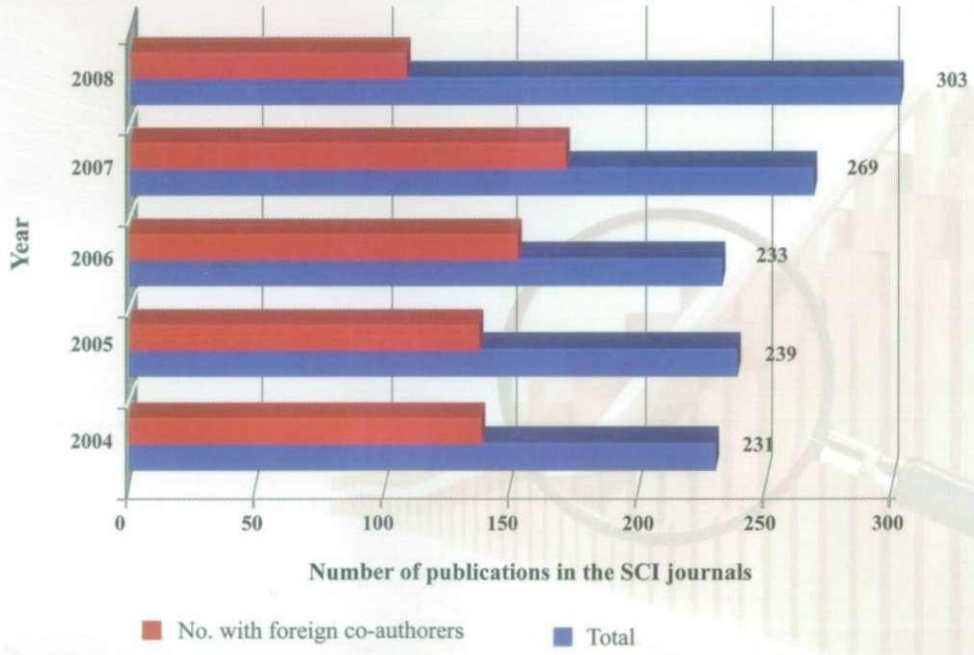


Figure 19

3 5 : Sri Lanka S&T postgraduate output 2006 & 2008

Type	Year	Medi-cal	Com-puter	Agricul-ture	Science	Engineer-ing	Total
PG Dip.	2006	11	82	12	91	18	214
	2008	221	1	14	80	27	343
MSc./MEng.	2006	63	103	220	116	40	542
	2008	22	42	192	194	167	617
M.Phil.	2006	1	-	13	21	3	38
	2008	5	4	14	24	26	73
MS/MD	2006	224	-	-	-	-	224
	2008	235	-	-	-	-	235
Ph.D.	2006	1		4	21	-	26
	2008	-	-	8	10	6	24
Total	**2006**	**300**	**185**	**249**	**249**	**61**	**1,044**
	2008	**483**	**47**	**228**	**308**	**226**	**1,292**

Source : Sri Lanka University Statistics 2006, 2008

INNOVATION INDICATORS

4.1 : Distribution of R&D expenditure by industries in 2008

Rs.million

Category	2008		
	Capital	Recurrent	Total
Agriculture	6.73	22.82	29.54
Mining and quarrying	1.85	1.50	3.35
Manufacturing	141.82	703.02	844.83
Electricity	0.00	0.20	0.20
Construction	0.29	1.58	1.88
Trade & services	0.03	0.27	0.30
Health services	33.75	10.65	44.40
Total	**184.47**	**740.04**	**924.50**

Source : National R&D Survey Sri Lanka 2008

4.2 : Percentage of total revenue from the sale of products/services by industries across the world 2006 & 2008

Category	2006	2008
Local market	58.84	62.07
Asia pacific	7.64	6.27
European	18.65	15.99
USA	10.57	10.98
Other	4.30	4.69

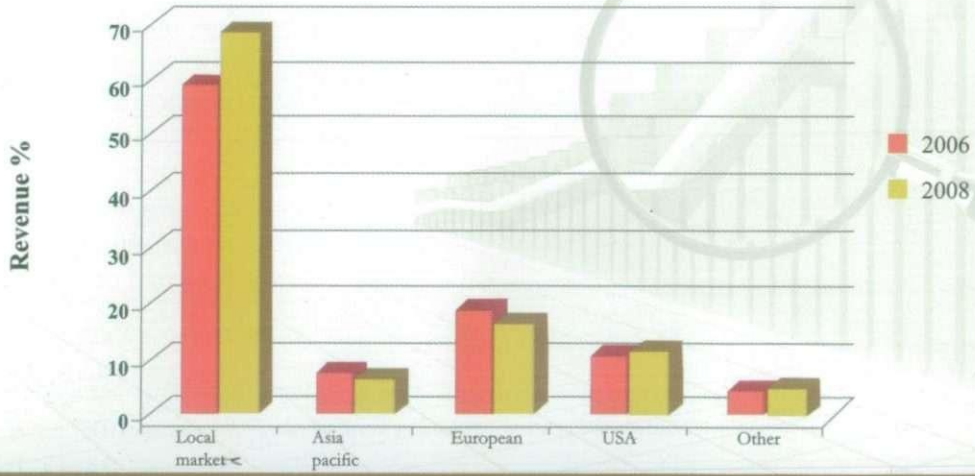


Figure 21

4.3 : Numbers of Technologies developed, transfered & commecialized by the industries and the government R&D institutions 2008

Innovation Type	Number developed	Number transferred	Number commercialized
a. Industrial Sector			
New products	272	11	228
New services	79	5	27
New plant varieties / hybrids	5	0	2
Existing products or services improved significantly	407	2	35
Expenditure (Rs.)			442,712,426
b. Government R&D Institutions			
New products	81	56	43
New services	53	34	21
New plant varieties /hybrids	464	43	14
Existing processes or products improved significantly	34	25	9
Expenditure (Rs.)			na

na: not available

Source : National R&D Survey Sri Lanka 2008 (NSF)

Rate of importance identified by the idustries for their success during 2004-2008

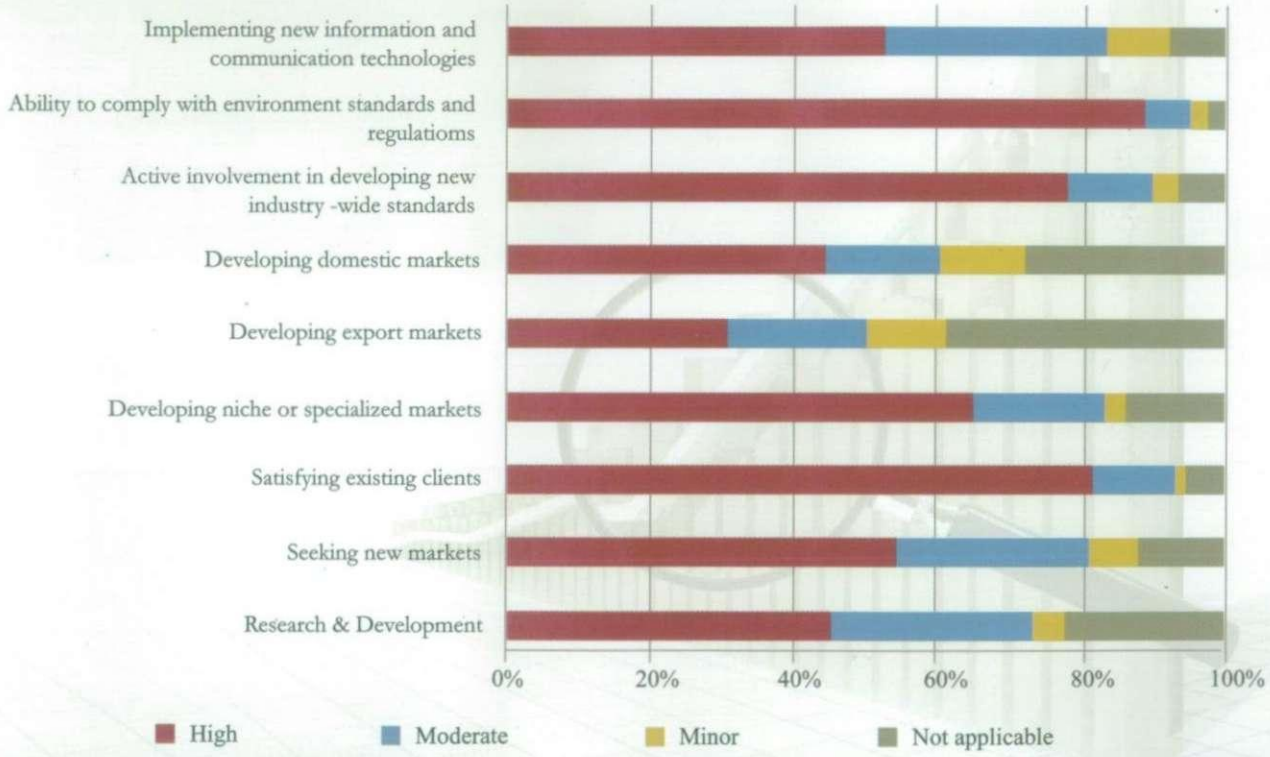


Figure 22

4.4 : Involvement of industries with other institutions in conducting R&D and innovation activities 2006 & 2008

Institution	% Institutional involvement in R&D	
	2006	2008
Company alone	48.6	52.7
With parent company	25.8	20.7
Collaboration with other institutions	16.4	19.0
Outsourcing	9.2	7.6

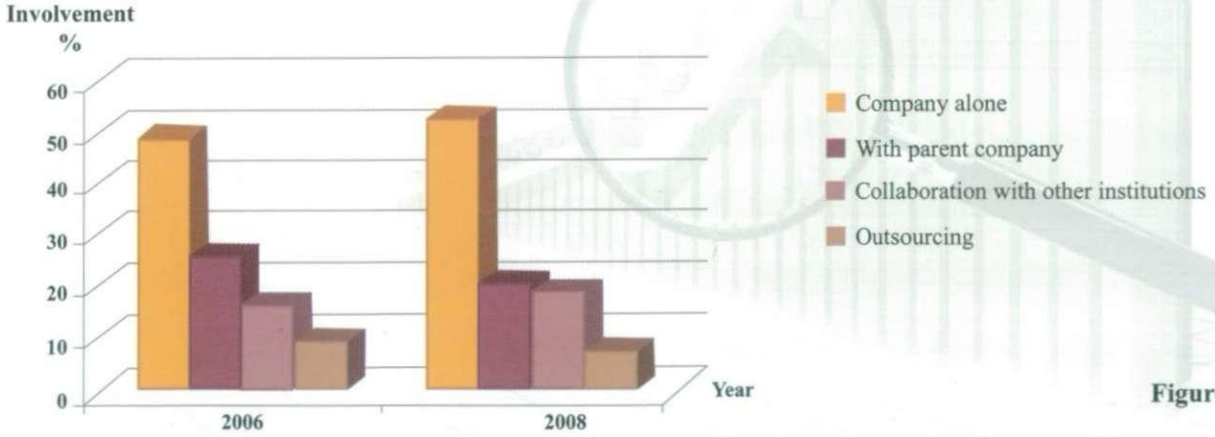


Figure 23

4.5: Local and foreign technologies/patents/ related knowledge bought by industries 2006 & 2008

Institution	Capital	2006	2008
Local	Government	07	13
	Private	01	02
	Individual	-	01
Foreign	Belgian	-	03
	China	01	01
	Finland	01	-
	France	-	01
	Germany	-	03
	India	05	07
	Italy	02	02
	Japan	01	01
	Korea	01	-
	Malaysia	01	-
	Taiwan	01	-
	Thailand	-	01
	UK.	01	01
	USA	03	04
Total cost involved in adapting technologies (Rs.)		33,003,222.00	159,770,422.00

Source: National R&D Surveys Sri Lanka 2006 & 2008 (NSF).

4.6: Methodologies used by industries (%) to protect the intellectual property (IP) 2006 & 2008

Methodologies	2006	2008
a. Formal :		
Patents	9.7	23.1
Trademarks	37.8	65.1
Copyrights	9.7	14.8
b. Strategic Methods:		
Secrecy	34.1	64.5
Complexity of design	15.9	37.3
Other	3.0	2.4

Source: National R&D Surveys Sri Lanka 2006 & 2008 (NSF).

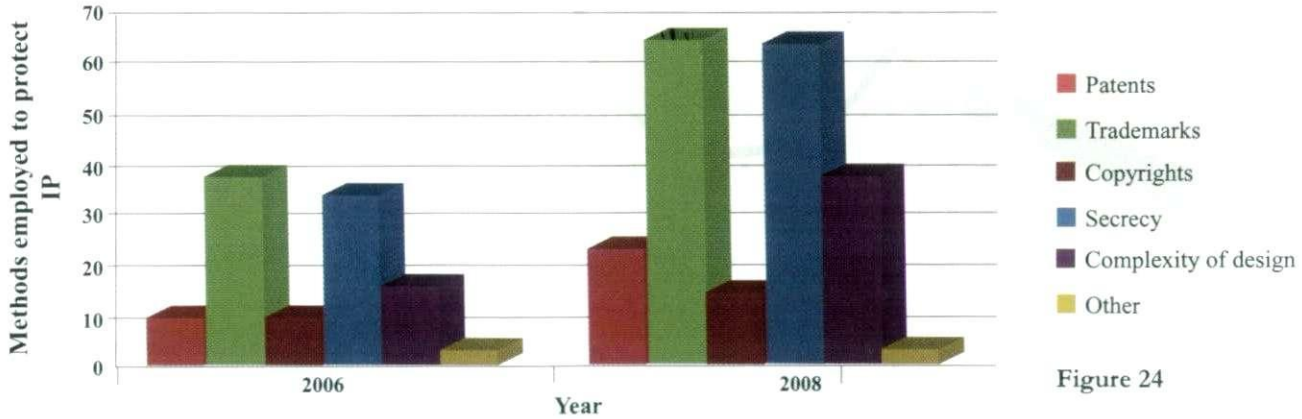


Figure 24

4.7: Industrial property statistics 2004 - 2008

Year	Applications			Registrations		
	Resident	Non resident	Total	Resident	Non resident	Total
a. Marks						
2004	2,343	3,600	5,943	853	975	1,828
2006	4,821	2,392	7,213	741	901	1,642
2008	2,895	3,012	5,907	907	1,001	1,908
b. Designs						
2004	254	50	304	224	40	264
2006	477	39	516	422	45	467
2008	333	56	389	85	4	89
c. Patent						
2004	120	195	315	103	85	188
2006	153	270	423	68	69	137
2008	209	241	450	89	70	159

Source : Adapted from information of the National Intellectual Property Office of Sri Lanka

Problems and constraints for innovation activities of the industries 2008

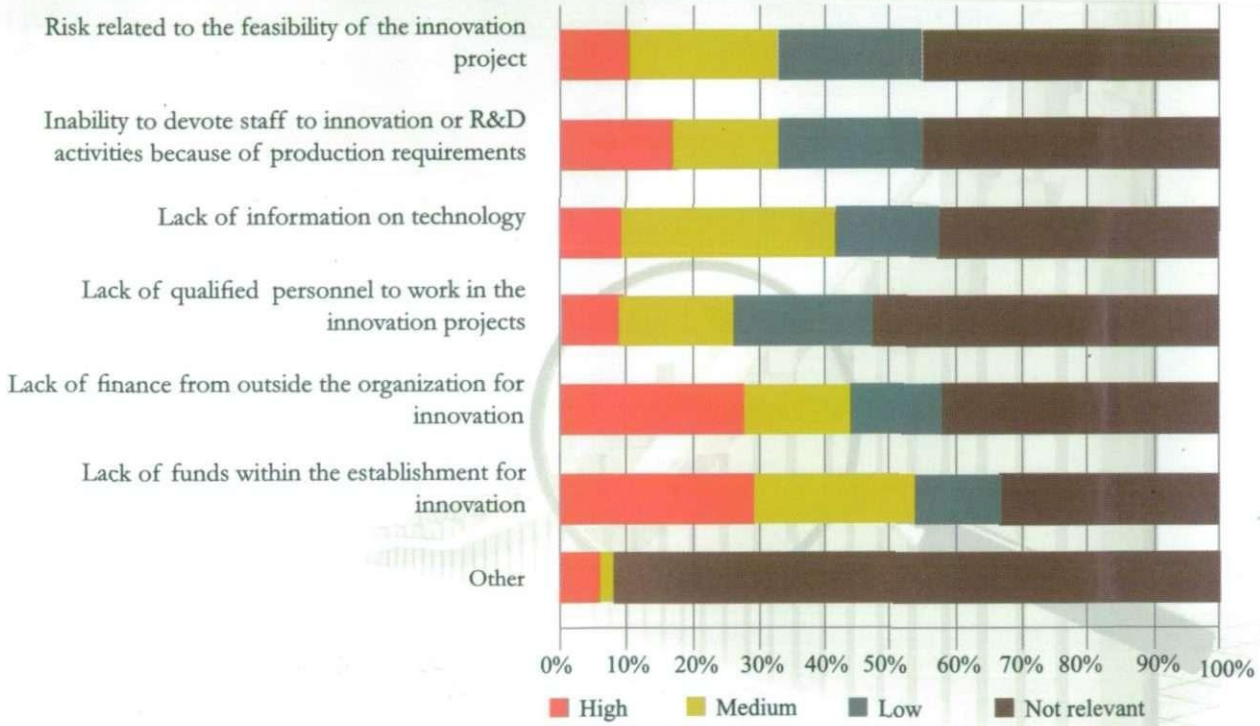


Figure 25

Source: National R&D Survey Sri Lanka 2008 (NSF).

4.8: Value added products in industry 2006-2008

Category	Constant prices			Current prices		
	2006	2007	2008	2006	2007	2008
Food, beverages and tobacco products	**155,842**	**166,101**	**174,794**	**241,854**	**282,843**	**348,358**
Food	132,325	142,146	150,643	203,459	233,341	287,390
Beverages	8,875	9,466	9,862	14,490	13,581	16,726
Tobacco products	14,642	14,489	14,289	23,905	35,921	44,241
Textiles, wearing apparel and leather products	**78,870**	**84,603**	**87,215**	**113,956**	**131,522**	**147,822**
Textile	13,447	14,721	15,175	19,429	22,885	25,721
Wearing apparel	62,663	67,006	69,074	90,539	104,165	117,075
Leather products	2,760	2,877	2,965	3,988	4,472	5,026
Wood and wood products	**1,026**	**1,061**	**1,085**	**1,245**	**1,353**	**1,447**
Paper products, publishing and printing	**1,385**	**1,503**	**1,598**	**3,998**	**4,883**	**5,798**
Paper and paper products	588	624	663	1,620	2,026	2,406
Publishing and printing	797	879	935	2,378	2,857	3,392
Chemical, petroleum, coal, rubber and plastic products	**51,714**	**55,140**	**58,650**	**95,346**	**112,915**	**135,447**
Non-metalic mineral products	**13,687**	**14,547**	**15,306**	**17,930**	**20,352**	**22,776**
Fabricated metal products, Basic metal products and machinery and transport equipment	**29,284**	**30,941**	**32,660**	**40,164**	**49,468**	**56,823**
Manufactured products not elsewhere specified	**1,564**	**1,715**	**1,907**	1,879	**2,208**	**2,508**
Total	**333,372**	**355,611**	**373,215**	**516,372**	**605,544**	**720,979**

Source : Central Bank of Sri Lanka 2009

4.9: Information on hi-technology products for selected countries 2007 & 2008

Country	Year	High-technology exports (current US$ million)	High-technology exports (% of manufactured exports)
Australia	2008	4,154.15	11.8
Brazil	2008	10,571.52	12.5
China	2008	381345.00	28.7
Germany	2008	162,421.00	13.5
India	2008	6,497.24	5.7
Indonesia	2008	5,624.86	10.6
Japan	2008	123,733.00	17.9
Malaysia	2008	42,764.06	39.6
Mexico	2008	41,200.64	19.4
Pakistan	2008	274.68	1.9
Philippines	2008	26,875.22	66.3
Republic of Korea	2007	110,633.00	33.4
Singapore	2008	120,345.00	50.8
South Africa	2008	2,010.87	5.1
Sri Lanka	2008	101.27	1.8
Thailand	2008	32,369.59	25.4
United Kingdom	2008	61,766.50	19.3
United States	2008	231,126.00	27.1
Vietnam	2007	2,376.04	8.9

Source : http://data.worldbank.org/indicator/Tx.VAL.TECH.MF.25

KEY SOCIO-ECONOMIC INDICATORS

5.1: Demographic indicators of Sri Lanka 2005-2008

Item	2005 (a)	2006 (a)	2007 (a)	2008 (a)
Mid-Year population, '000	19,668	19,886	20,010	20,217
0-14 Years,'000	5,240	5,297	5,331	5,315
15-54 Years,'000	11,801	11,933	12,006	12,230
55 Years and over,'000	2,627	2,656	2,673	2,672
Growth of population, %	1.0	1.1	1.1	1.0
Crude birth rate, per 1,000 population	18.1	18.7	19.0	18.8
Crude death rate, per 1,000 population	6.5	5.8	5.8	5.9
Rate of natural increase, per 1,000 population	11.6	12.9	13.2	13.0
Net migration rate, per 1,000 population	-1.5	-1.5	-1.8	-2.1
Infant mortality rate, per 1,000 live births	11.2	10.0	n.a.	n.a.
Density of population, persons per Sq.Km.	314	317	319	322

(a) Provisional

Sources : Registrar General's Department and Department of Census and Statistics

5.2: Demographic indicators: SAARC countries

Indicator	Ref. Year	Sri Lanka	Afgani-stan	Bangla-desh	Bhutan	India	Mal-dives	Nepal	Pakistan
Mid-Year population, Mn.	2006	19.9	24.1	138.8	0.6	1,118.0	0.3	25.9	156.8
	2007	20.0	24.5	140.6	0.7	1,134.0	0.3	26.4	159.6
Population growth, %	2005	1.1	1.7	1.3	1.3	1.5	1.5	2.3	1.9
	2006	1.1	2.1	1.3	1.9	1.5	1.8	2.3	1.8
	2007	0.6	1.7	1.3	1.9	1.4	2.0	2.1	1.8
Land area, '000 Sq.km.	2003	65.6	n.a.	130.2	47.0	2,973.2	0.3	143.0	770.9
Density of population [Persons per Sq. km.]	2007	319	n.a.	953	16	345	1,016	180	200
Population by age groups, %									
0-14 Years	2006	24	47	35	32	33	33	39	36
15-64 Years	2006	70	49	62	64	62	63	58	60
65 Years & above	2006	7	4	4	5	5	4	4	4
Crude birth rate, Per 1,000	2006	18.7	49.0(a)	25.4	19.3	23.5	23.1	28.5	25.6
Crude death rate, Per 1,000	2006	5.8	19.0(a)	7.6	7.3	7.5	5.9	7.9	6.7
Infant mortality rate [per 1,000 Live Births]	2006	11	165	52	63	57	26	46	78
Maternal mortality rate [per 100,000 Live Births]	2005	58	n.a.	578	440	450	120	830	320
Expectation of life at birth, Years	2006	71.9	43.2	63.5	65.2	64.1	67.6	63.0	64.9

(a) Data relevant to 2005.
Source: Central Bank of Sri Lanka 2009

5.3: Social indicators: SAARC countries 1999-2007

Indicator	Ref. Year	Sri Lanka	Afgan-istan	Bangla-desh	Bhutan	India	Mal-dives	Nepal	Pakistan
Human development index (a) (Max.:1,000; Min.: 0.000)	2006	0.742	n.a.	0.524	0.613	0.609	0.749	0.530	0.562
Literacy rate, % Male	1999-2006	92.7	43.1	57.9	66.2	76.4	96.9	69.3	67.7
(15 Years and over) Female		89.1	12.6	46.8	40.5	53.4	97.0	42.0	39.6
Labour force, % Male	2007	67.8	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	70
Female		33.4	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	19.1
Population below the poverty line , %	1990-2004	25.0	n.a.	49.8	26.0	28.6	92.0	30.9	32.6
Physicians per 100,000 population	2005	55	20	30	5	60	92	21	80
Hospital Beds per 10,000 people	2005	31.0	4.0	3.0	16.0	9.0	23.0	2.0	7.0
Daily per capita protein supply, grams	2003	56	n.a.	50	n.a.	63	109	65	64
Daily Per capita calorie supply, Kilo Calories	2003	2,390	n.a.	2,200	n.a.	2,470	2,600	2,430	2,320
Daily newspapers per 1,000 persons	2000	29	n.a.	9	n.a.	60	n.a.	12	39
Television sets per 1,000 persons	2004	117	n.a.	59	n.a.	83	n.a.	8	150
Radios per 1,000 persons	2004	215	n.a.	49	n.a.	120	n.a.	39	105
Telephones per 1,000 persons (main lines)	2007	142	3	8	34	34	109	27	30
Telephones per 1,000 persons (mobile phones)	2007	413	172	217	172	200	1040	42	481

Source : Central Bank of Sri Lanka 2009

5.4: Economic indicators of Sri Lanka : national output and expenditure

Sector	2006	2007(a)	2008(a)	2006	2007(a)	2008(b)
AGRICULTURE	**333,137**	**418,104**	**590,114**	**257,147**	**265,870**	**285,897**
Agriculture, livestock and forestry	297,887	363,404	522,180	235,887	241,285	258,881
Fishing	35,251	54,700	67,934	21,260	24,585	27,016
INDUSTRY	**900,479**	**1,070,737**	**1,295,470**	**590,298**	**635,199**	**672,791**
Mining and quarrying	46,202	56,645	71,768	35,769	42,631	48,090
Manufacturing	564,987	661,983	791,898	370,355	394,233	413,681
Electricity, gas and water	72,457	88,005	104,666	52,926	55,339	56,847
Construction	216,833	264,104	327,138	131,248	142,996	154,173
SERVICES	**1,705,064**	**2,089,847**	**2,525,099**	**1,243,119**	**1,331,587**	**1,406,813**
Wholesale and retail trade	659,597	790,628	949,372	514,511	546,145	571,911
Hotel and restaurants	16,646	18,367	20,611	9,411	9,199	8,741
Transport and communication	344,909	423,820	530,980	259,546	286,764	310,029
Banking, insurance and real estate etc.	266,972	328,158	413,322	177,817	193,375	206,048
Ownership of dwellings	103,201	126,212	141,794	71,533	72,345	73,137
Government services	257,837	333,758	380,765	161,611	171,259	181,051
Private services	55,902	68,905	88,255	48,689	52,500	55,896
GROSS DOMESTIC PRODUCT	**2,938,680**	**3,578,688**	**4,410,682**	**2,090,564**	**2,232,656**	**2,365,501**
GROSS NATIONAL PRODUCT	**2,898,256**	**3,539,634**	**4,305,650**	**2,061,807**	**2,208,291**	**2,309,172**

(a) Revised
(b) Provisional

Source : Central Bank of Sri Lanka 2009

5.5: Economic indicators in selected South Asian countries

estimated at current price

Indicator	Ref. Year	Sri Lanka	Indonesia	Malaysia	Philip-pines	Rep. of Korea	Singa-pore	Thai-land
Gross national product (GNP) (GNI)) Mn US $	2005	23,724	272,473	135,025	105,204	786,921	115,021	164,867
	2006	26,908	348,727	151,280	128,045	887,998	127,978	198,210
	2007	32,557	336,942	182,589	157,081	971,205	155,641	238,059
GNP per capita (GNI),US$	2005	1,204	1,239	5,167	1,234	16,294	26,705	2,660
	2006	1,352	1,570	5,678	1,472	18,386	28,541	3,098
	2007	1,628	1,498	6,713	1,772	20,025	33,835	3,618
GDP per capita PPP, US$	2006	n.a.	3,471	12,314	3,127	23,050	47,065	7,403
Growth rate of real GDP,% (at constant price)	2005	n.a.	5.7	5.0	4.9	4.2	7.3	4.5
	2006	3,930	5.5	5.9	5.4	5.1	8.2	5.0
	2007	n.a.	6.3	6.3	7.2	5.0	7.7	4.8
Sectoral composition of GDP, %								
Agriculture	2005	11.8	13.0	8.3	14.3	3.0	0.1	10.2
	2006	10.3	12.9	8.6	14.2	3.3	0.1	10.7
	2007	6.0	13.8	10.0	14.1	3.0	0.1	11.4
Industry	2005	30.2	46.8	49.7	31.9	40.3	31.2	44.1
	2006	29.7	47.0	48.6	31.7	39.6	31.3	44.6
	2007	31.6	46.7	46.8	31.7	39.4	29.4	43.9
Services	2005	35.1	40.2	43.1	53.7	56.3	68.7	45.7
	2006	60.0	40.1	42.8	54.2	57.1	68.6	44.7
	2007	62.4	39.4	43.2	54.2	57.6	70.5	44.7

Source : Central Bank of Sri Lanka 2009

5.6: Realised investments in the Board of Investment (BOI) enterprises (a)

Category	Number of projects		Foreign investment (Rs. Million)		Total investment potential (Rs. Million)	
	2007	2008	2007	2008	2007	2008
Food, beverages and tobacco products	145	146	22,766	28,970	36,604	45,556
Textiles, wearing apparel and leather products	467	419	44,906	47,629	65,107	70,721
Wood and wood products	26	30	5,581	5,929	6,160	6,591
Paper products, publishing and printing	28	28	1,004	1,579	2,085	2,962
Chemical, petroleum, coal, rubber and plastic products	138	130	29,415	35,617	39,804	48,707
Non-metallic mineral products	64	67	11,371	7,395	25,478	27,014
Basic metal products						
Fabricated metal products, machinery and transport equipment	84	89	14,440	12,303	17,362	15,135
Manufactures products (n.e.s.)	153	155	11,890	14,317	16,387	18,534
Services	872	925	222,871	286,669	392,107	466.604
Total	1,977	1,989	364,244	440,408	601,093	701,824

(a) Cumulative figures as at end of the year; n.e.s. - not elsewhere specified

Source : Central Bank of Sri Lanka 2009

5.7: Composition of exports 2007 & 2008

US Dollars million

Category	2007(a)		2008(b)		Change in value (b)	Growth rate (b) %	Contribution to growth (b) %
	Value	Share %	Value	Share %			
Agricultural Exports	**1,507.2**	**19.7**	**1,854.8**	**22.8**	**347.6**	**23.1**	**70.0**
Tea	1,025.2	13.4	1,271.5	15.6	246.3	24.0	49.6
Rubber	109.4	1.4	125.1	1.5	15.7	14.4	3.2
Coconut	141.2	1.8	171.0	2.1	29.8	21.1	6.0
Other agricultural products	372.7	4.9	458.4	5.6	85.5	70.3	17.2
Industrial Exports	5,967.3	78.1	6,159.5	75.7	192.2	3.2	38.7
Food, beverages and tobacco	513.5	6.7	458.3	5.6	-55.1	-10.7	-11.1
Textiles and garments	3,339.6	43.7	3,468.7	42.6	129.1	3.9	26.0
Petroleum products	168.9	2.2	254.8	3.1	85.9	50.9	17.3
Rubber products	482.5	6.3	541.9	6.7	59.4	12.3	12.0
Ceramic products	47.1	0.6	49.0	0.6	2.0	4.2	0.4
Leather, travel goods and footwear	22.9	0.3	16.7	0.2	-6.3	-27.3	-1.3
Machinery and equipment	542.2	7.1	461.0	5.7	-81.2	-15.0	-16.4
Diamond and jewellery	367.2	4.8	436.1	5.4	68.8	18.7	13.9
Other Industrial exports	483.6	6.3	473.1	5.8	-10.5	-2.2	-2.1
Mineral Exports	**127.8**	**1.7**	**122.4**	**1.5**	**-5.4**	**- 4.2**	**- 1.1**
Unclassified	**37.6**	**0.5**	**0.0**	**0.0**	**-37.6**	**-100.0**	**-7.6**
Total Exports (c)(adjusted)	**7,640.0**	**100.0**	**8,136.7**	**100.0**	**496.7**	**6.5**	**100.0**

a) Revised b) Provisional c) Excludes re-exports

Source : Central Bank of Sri Lanka 2009

5.8: Composition of imports by major categories 2005-2008

Rs. million

Item	2005	2006	2007	2008
Consumer Goods	**151,021**	**185,461**	**195,480**	**236,572**
Food and beverages	61,410	78,854	91,853	123.203
Rice	1,554	576	4,261	4,785
Flour and Sugar	16,503	23,577	17,285	22,461
Milk & milk products	13,401	17,761	20,688	32,042
Fish	6,989	9,647	12,015	12,623
Other food products	22,963	27,294	37,603	51,292
Other consumer goods	89,611	106,607	103,627	113,369
Intermediate Goods	**549,004**	**640,810**	**747,489**	**943,750**
Fertilizer	13,552	17,036	21,422	62,420
Petroleum	166,562	215,168	276,899	364,284
Other	368,891	408,607	449,167	517,642
Investment Goods	**188,061**	**233,637**	**297,266**	**330,272**
Building materials	50,967	56,822	86,414	102,060
Transport equipment	32,743	37,928	40,292	47,699
Machinery & equipment	86,567	110,853	138,033	144,147
Other	17,785	28,035	32,527	36,366
Unclassified imports	**3,272**	**6,781**	**10,152**	**15,111**
Total imports (b)	**891,359**	**1,066,689**	**1,250,386**	**1,525,705**

Source : Central Bank of Sri Lanka 2009

5.9: Number of teachers in science and mathematics in 2008

Grade	Trained *	Not Trained
Teaching up to O/L		
Mathematics only	9,664	495
Science only	10,820	418
Science & mathematics	2,664	109
Teaching A/L		
Combined Mathematics	-	637
Physics	-	3,188
Biological Sciences**	-	3,547
Agriculture	-	836

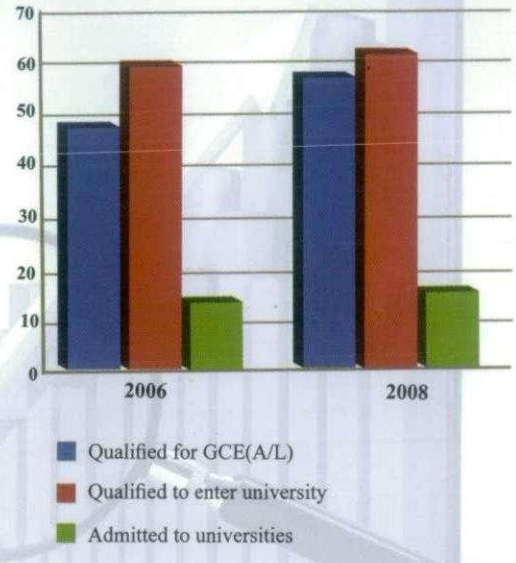
* In A/L, all graduate teachers are categorized as "Not trained" due to the reason of having a degree

** Biological Science - includes chemistry

Source : Department of Education

5.10: Performance of candidates sat for G.C.E.(O/L) and G.C.E.(A/L)

	2006	2008
All candidates sat for GCE (O/L)	439,420	283,197(a)
Percentage of qualified for GCE (A/L)	47	57(a)
% passed in mathematics	42	52
% passed in science & technology	45	48
All candidates sat for GCE(A/L)	201,398	210,100
All candidates qualified for university admission	119,869	130,120
percentage qualified for university admission	60	62
Total number admited to universities	17,196	20,846
percentage admitted to universities	14	16
% passed combined mathematics	54	46
% passed in biology	79	75
% passed in physics	59	57
% passed in chemistry	54	58



(a) New Syllabus
Sources : Department of Census and Statistics 2010; UGC 2009; Department of Examinations

5.11: Education indicators: general education 2004-2008

Item	2004	2005	2006	2007	2008
Schools (No.)	**10,501**	**10,461**	**10,461**	**10,430**	**10,447**
Government schools	9,765	9,723	9,714	9,678	9,662
o/w National schools	324	324	327	328	330
Other schools	736	738	747	752	785
Private	85	85	93	94	92
Pirivenas	651	653	654	658	691
Students (No.)	**4,028,186**	**4,103,512**	**4,000,714**	**4,111,022**	**4,101,509**
Government schools	3,870,628	3,942,077	3,837,548	3,942,185	3,930,374
Other schools	157,558	161,435	163,166	168,837	171,135
Private	100,683	106,262	107,874	113,884	115,070
Pirivenas	56,875	55,173	55,292	54,953	56,065
Teachers (No.)	**197,697**	**199,715**	**217,369**	**220,505**	**224,410**
Government teachers	187,337	189,234	206,559	211,424	213,212
Other	10,360	10,481	10,810	11,081	11,198
Student/Teacher ratio (government schools)	**21**	**21**	**19**	**19**	**20**
Expenditure on education (Rs. mn.) (a)	42,340	63,557	78,344	92,540	100,083
Current expenditure	33,792	50,697	61,144	72,592	77,141
Capital expenditure	8,548	12,860	17,200	19,948	22,942
Expenditure as a % of GDP	2.03 (b)	2.59 (b)	2.67 (b)	2.59 (b)	2.27 (b)

(a) Government expenditure on General and Higher Education
(b) Data based on GDP estimates compiled by the Department of Census and Statistics

Source : Central Bank of Sri Lanka 2009

5.12: Education indicators: university education 2004-2008

Item	2004	2005	2006	2007	2008
University (No.)	13	15	15	15	15
Students (No.)	64,801	66,386	65,206	66,996	66,891
Lecturers (No.)	3,725	3,875	4,016	4,304	4,452
Number graduating	10,525(a)	7,154 (b)	11,713(c)	12,005(d)	12,958(e)
Arts and oriental studies	3,366	1,652	4,405	5,142	4012
Commerce & management studies	3,091	1,436	2,198	2,301	2,547
Law	166	345	327	208	345
Science	1,323	1,250	2,348	1,492	2,274
Engineering	984	755	809	894	1,114
Medicine	964	805	896	901	1,294
Dental surgery	84	74	123	70	125
Agriculture	388	554	430	484	510
Veterinary science	42	74	64	57	80
Architecture and quality surveying	69	59	13	132	116
New admissions for basic degrees (No.)	13,396	14,520	16,585	17,196	20,069

(a) Including Ayurvedic/Unani/Sidda Medicine(48)
(b) Including Ayurvedic/Unani/Sidda Medicine (134) and Computer SC/IT/ICT/MIT (16)
(c) Including Computer SC/IT/ICT/MIT (100)
(d) Including Computer SC/IT/ICT/MIT (107), Indigenous Medicine (134) and Food Science (83)
(e) Including Computer SC/IT/ICT/MIT (303), Indigenous Medicine (170) and Food Science (68)

Source : Central Bank of Sri Lanka 2009

5.13: Key indicators of Infrastructure development 2005-2008

Commodity	2005	2006	2007	2008
Telecommunication				
Telephones – Wire line telephones	919,040	909,894	931,737	933,536
Wireless local loop	324,953	974,184	1,810,322	2,512,875
Cellular phones	3,361,775	5,412,496	7,983,489	11,082,508
Public pay phones	6,285	7,561	8,526	7,417
Telephones per 1,000 persons, including cellular phones	234	370	536	719
Internet and e-mail subscribers	115,000	130,000	202,348	234,000
Postal Services				
Delivery areas (No.)	6,729	6,729	6,729	6,729
Post offices (No.)	4,704	4,727	4,737	4,737
Public	4,041	4,043	4,053	4,053
Main post offices	633	636	641	643
Sub post offices	3,408	3,407	3,412	3,410
Private	663	684	684	684
Agency post offices	442	463	463	463
Rural agency post offices	156	156	156	156
Estate agency post offices	65	65	65	65
Area served by a post office (Sq. Km)	13.9	13.8	13.8	13.8
Population served by a post office (No.)	4,100	4,167	4,252	4,311

Source : Central Bank of Sri Lanka 2009

5.14: Indicators of natural resources: statistics on the forestry sector 2004-2008

	Unit	2004	2005	2006	2007(a)	2008(b)
Total forest cover (c)	hectares '000	1,942	1,942	2,035	1,422	1,422
Closed canopy forest	hectares '000	1,471	1,461	1,458	1,046	1,046
Sparse forest	hectares '000	472	472	472	367	367
Mangroves (d)	hectares '000	9.5	9.5	9.5	8.8	8.8
Extent deforested (e)	hectares	442	358	173	873	744
Extent reforested (f)	hectares	805	1,229	1,848	893	732
Number of forest offences recorded	No.	2,842	2,758	2,797	3,498	2,860
Volume of timber detected	cubic meters	4,466	3,334	2,602	2,516	2,607
Value of timber detected	Rs. mn.	33.7	20.8	48.3	17.7	36.29

(a) Revised.
(b) Provisional.
(c) Total forest cover showed a marked decline after updating the figures using latest satellite imagery and aerial photographs in 2002.
(d) Numbers from 1999 to 2007 were revised.
(e) Estimates.
(f) Excluding extents under the Participatory Forestry Project.

Source : Central Bank of Sri Lanka 2009

DEFINITIONS

The definitions and classifications used in the National R&D Survey 2008 and in this Handbook are based on the *International Standardization of Statistics on Science and Technology* (UNESCO, 1978) and the *Frascati Manual* (OECD, 2002).

1. Research and Experimental Development (R&D)

Comprises creative work undertaken on a systematic basis in order to increase the stock knowledge including the knowledge of humanity, culture and society, and the use of this stock knowledge to device new applications. The term R&D covers three activities: basic research, applied research and experimental development work.

Basic research : the experimental or theoretical work undertaken primarily to acquire new knowledge of the underlying foundations phenomena and observed facts, without any particular application or use in view.

Applied research: the original investigations undertaken in order to acquire new knowledge. It is, however, directed primarily towards a specific practical aim or objective.

Experimental development : the systematic work, drawing on existing knowledge gained from research and practical experience that is directed to producing new materials, products and devices; to installing new process, systems and services; or to improving substantially those already produced or installed.

2. Sectors

Government sector : includes all departments, offices and other bodies which furnish, but normally do not sell to the community, those common services.

Higher Education sector : includes all universities, colleges of technology and other institutions providing tertiary education, whatever their sources of funds or legal status.

Private sector : includes all firms, organizations and institutions whose primary activity is the market production of the goods or services (other than higher education) for sale to the general public at an economically significant price and to the private non profit institutions mainly serving them.

3. R&D Expenditures

R&D Expenditures : all expenditures for R&D performed within a sector of the economy, including both
a. Current cost (labour cost, non capital purchases of materials, supplies of R&D equipments, water, fuel, gas electricity, library materials etc.).
b. Capital expenditure (reported in full for the period when they took place and should not register as element of depreciation).

4. Human Resources in Research and Development

Science and Technology Personnel (STP) : It is defined according to the Canberra Manual (OECD) as persons fulfilling one of the following conditions:

- Successfully completed education at the tertiary level in a S&T field of study (seven broad S&T fields of study are Natural Sciences, Engineering and Technology, Medical Sciences, Agriculture Sciences, Social Sciences, Humanities and other fields).
- Not formally qualified as above but employed in an occupation where the above qualifications are normally required.
- Working in the above fields providing technical services or supporting services.

R&D Personnel : all persons employed directly on R&D, as well as those providing direct services such as R&D managers, administrators, and clerical staff excluding persons providing an indirect service such as canteen and security.

Researchers : professionals engaged in the conception or creation of new knowledge, products, processes, methods and systems and also in the management of the projects concerned. Postgraduate students at the Ph.D. level engaged in R&D are also considered as researchers.

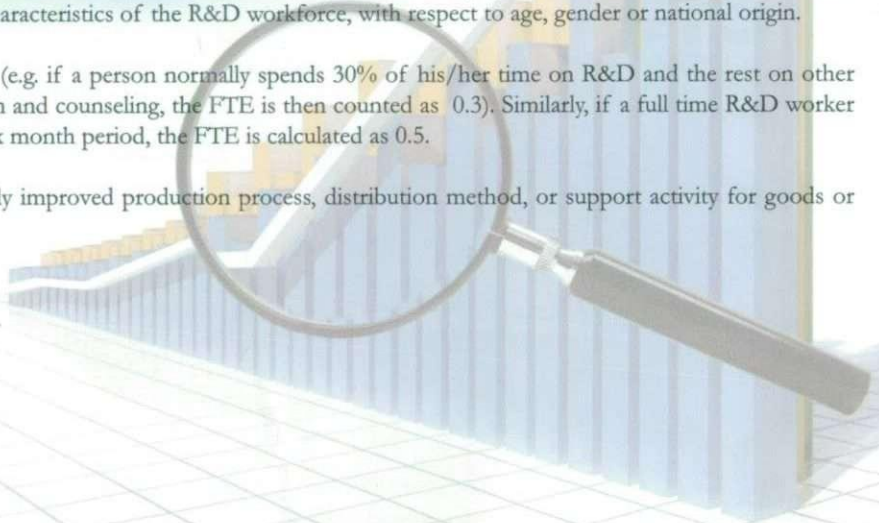
Technicians and equivalent staff : persons whose main tasks require technical knowledge and experience in one or more fields of engineering, physical and life sciences (technicians) or social sciences and humanities (equivalent staff). They participate in R&D by performing scientific and technical tasks involving the application of concepts and operational methods normally under the supervision of researchers.

Other supporting staff : includes skilled and unskilled craftsmen, secretarial and clerical staff participating in R&D projects or directly associated with (or providing services to researchers involved in) such projects.

Headcount : reflects the total number of persons employed in R&D, independently from their dedication. These data allow links to be made with other data series, such as education and employment data or the results of population censuses. They are also used for calculating indicators analyzing the characteristics of the R&D workforce, with respect to age, gender or national origin.

One Full-time equivalent : one person-year. (e.g. if a person normally spends 30% of his/her time on R&D and the rest on other activities such as teaching , administration and counseling, the FTE is then counted as 0.3). Similarly, if a full time R&D worker is employed at an R&D unit for only a six month period, the FTE is calculated as 0.5.

Innovation : the use of new or significantly improved production process, distribution method, or support activity for goods or services.



Acknowledgement

- Dr. P.R.M.P. Dilrukshi, Scientific Officer - for coordination of the survey including questionnaire preparation, data collection, data analysis and indicator development.
- Mr. Lasantha Weerasooriya, Science & Technology Officer - for database preparation and data collection relevant to the S&T institutions.
- Ms. Chathurani Rankothge, Ms. Nanthaki Srikumaran, and Mr. Buddhima Rupasinghe, Research Assistants - for assisting in data collection.
- Mrs. Chandima Samarasinghe, Computer Applications Assistant - for designing of the book and typesetting.
- Mrs. Ajantha Kanthi, Steno/Typist - for data entry and data table preparation

Printed by M. D. Gunasena & Co. (Printers) Ltd.

National Science Foundation
47/5, Maitland Place
Colombo 07
Sri Lanka
www.nsf.ac.lk