

CHAPTER VI

HIGHER EDUCATION AND SCIENTIFIC RESEARCH

University Grants Commission (UGC), which was established in 1956, under an Act of Parliament, is expected to coordinate the major responsibility of regulating the standard in higher education sector of the country. It has been monitoring the growth of higher education as well as the establishment of new universities and colleges, so as to ensure that higher education grows in response to the needs of society for trained manpower with appropriate levels of professional training, skills and specialisations or general educational attainments.

The introduction of new National Policy on Education (NPE) in 1986 has made the Commission to direct its efforts towards an overall improvement in higher education through appropriate emphasis on: Autonomous Colleges, Redesigning of Courses, State Councils of Higher Education Accreditation and Assessment Councils, Alternative Models of Management in Universities, National Qualifying Test for recruitment of teachers, making Research and Development broad-based, Training Orientation of teachers, Improvement of Efficiency, Youth and Sports and Education for the Minorities Scheduled Castes/Scheduled tribes, Handicapped and Women.

The Expenditure on Education by Central and State Governments increased from Rs. 114.4 crores in 1950-51 to Rs. 9211.86 crores in 1985-86 and further to Rs. 95111.13 crores in 2003-04. The State Governments were accounting for 81.3% of the expenditure during 2003-04 (Ref. Table 25). The expenditure on University and the higher education (Revenue account) has increased in absolute terms from Rs. 1106.59 crores in 1985-86 to Rs. 9278.2 crores in 2003-04, but its percentage share in the total education expenditure declined from 14.7% in 1985-86 to 12.2% in 2003-04 (Ref. Table 26).

The Higher Education Sector is one of the major performers of research. There is no reliable data available on R&D in Higher Education Sector in the country. The Department of Science and Technology has taken efforts during 1998 for quantification of manpower and financial resources devoted to R&D in Science and Technology of Higher Education Sector by launching a national survey executed through 4 zonal centres on sponsored project mode. In 1998-99 for the first time intramural R&D expenditure of Higher Education Sector was quantified from 106 universities and 27 Post Graduate Colleges having R&D to the tune of Rs. 378.56 crores constituting 2.9% in the national

R&D expenditure. Further the data from 131 universities and 46 colleges has been collected and analysed and the R&D expenditure has gone up to Rs. 750.54 crores in 2002-03 constituting 4.2% of National R&D expenditure. This amount does not include the expenditure incurred by the State Agricultural Universities and also the Extramural projects funded by Central Departments/Agencies. Such an expenditure has been included under State Sector and Central Sector respectively.

Data on enrolment of students in institutions of higher education can be used as one of the parameters to assess the growth of qualified manpower in the country. The data shown in Table 6.1 reveals that as against the enrolment of 36.05 lakhs students in all faculties in 153 Universities/deemed universities with 5816 colleges in the year 1985-86, there were 99.53 lakhs students enrolled in as many as 302 universities/deemed universities with 16,885 colleges in 2003-04. The number of universities excluding institutions of national importance, which enjoy university status as on 1.4.2003, was 302.

Table 6.1

GROWTH OF UNIVERSITIES/DEEMED UNIVERSITIES/COLLEGES AND ENROLMENT

Year	Universities	Deemed Universities	Colleges	(Number)
				Total Enrolment
1980-81	116	12	4722	27,52,437
1985-86	136	17	5816	36,05,029
1986-87	143	21	6040	37,57,158
1987-88	144	22	6685	40,20,159
1988-89	145	27	6773	42,85,489
1989-90	149	28	7145	46,02,680
1990-91	150	29	7346	49,24,868
1991-92	155	31	7761	52,65,886
1992-93	159	31	7993	55,34,966
1993-94	163	34	8441	58,17,249
1994-95	168	36	9019	61,13,929
1995-96	171	37	9252	65,74,005
1996-97	172	38	9940	68,42,598
1997-98	182	39	10678	72,60,418
1998-99	182	40	11397	77,05,520
1999-00	189	42	11865	80,50,607
2000-01	193	47	12806	83,99,443
2001-02	196	52	15437	89,64,680
2002-03 *	200	81	16206	95,16,773
2003-04 **	213	89	16885	99,53,506

The figures on enrolment include all faculties including arts, commerce, humanities, etc.

* Provisional

** Estimated

Table 6.2

GROWTH OF ENROLMENT IN HIGHER EDUCATION BY VARIOUS FACULTIES

(Thousand)

Faculty	1985-86		1990-91		1995-96		2002-03		2003-04	
	(000)	%	(000)	%	(000)	%	(000)	%	(000)	%
Science	701	19.4	869	19.6	1260	19.6	1884	19.8	2035	20.4
Engg. Tech.	177	4.9	217	4.9	322	4.9	714	7.5	717	7.2
Medicine	123	3.4	150	3.4	223	3.4	314	3.3	313	3.2
Agriculture	42	1.2	47	1.1	72	1.1	57	0.6	59	0.6
Vet. Science	9	0.3	11	0.2	19	0.3	19	0.2	15	0.1
Others	2553	70.8	3131	70.8	4648	70.7	6529	68.6	6815	68.5
Total	3605	100.0	4425	100.0	6574	100.0	9517	100.0	9954	100.0

Table 6.2 shows the growth of enrolment faculty wise in higher education from 1985-86 to 2003-04. Though there was an increase in enrolment in absolute terms,

the percentage share of S&T faculties in total did not show any change.

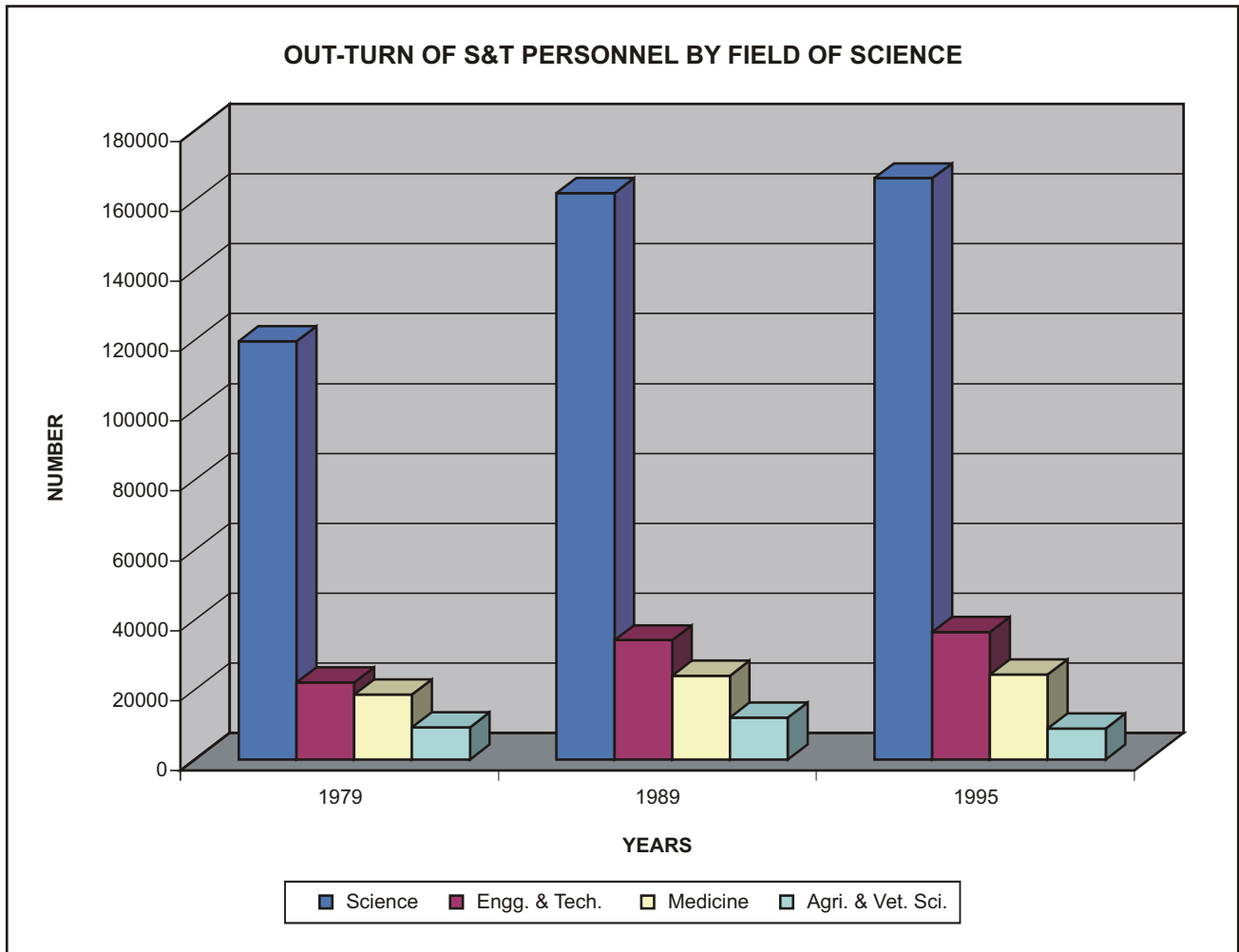


Table 6.3**FACULTY WISE GROWTH OF WOMEN ENROLMENT IN HIGHER EDUCATION**

(Thousand)

Faculty	1985-86		1990-91		1995-96		2002-03		2003-04	
	(000)	%	(000)	%	(000)	%	(000)	%	(000)	%
Science	216	6.00	289	6.50	440	6.80	737	7.7	809	8.1
Engg. & Tech.	12	0.30	17	0.40	26	0.40	154	1.6	165	4.7
Medicine	38	1.10	49	1.10	-	-	134	1.4	145	1.5
Agriculture &	2	0.10	3	0.10	-	-	9	0.1	10	0.1
Vet. Science	1	0.03	1	0.02	-	-	3	0.03	3	0.03
Others	798	22.10	1079	24.40	1725	26.81	2658	27.9	2870	28.8
Total	1067	29.63	1438	32.52	2191*	34.01	3695	38.8	4002	40.2

Note: * Includes Agriculture, Veterinary and Medicine.

The percentages are work out to on total enrolment of the respective years.

There has been a remarkable growth in the number of women enrolled in the institutions of higher education from 10.67 lakhs in 1985-86 to 40.02 lakhs in 2003-04. Data presented in table 6.3 shows that their percentage share in total enrolment has gone up from 29.6 in 1985-86 to 40.2% in 2003-04. In absolute terms, their number in S&T faculties increased from 2.69 lakhs in 1985-86 to 4.66 lakhs in 1995-96 and further to 11.33 lakhs in 2003-04. Among the women enrolled in S&T faculties 71.4% belonged to pure science, 12.8% to medicine, 14.6% to engineering and technology and 1.2% to agriculture and veterinary sciences during 2003-04.

S&T personnel has increased from 1,69,393 in 1979 to 2,31,930 in 1989 and further to 2,35,792 in 1995. The percentage share of outturn in Pure Science, Medicine, Agriculture and Veterinary Science in total S&T out-turn has declined though marginally during the period 1979 to 1989, whereas during the same period the share of out-turn in engineering and technology has increased. However, it may be observed that in absolute terms, there is an increase in the outturn in all the disciplines and levels of qualification except Agr./Vet. during 1989-95. Graduate degree holders formed the single largest group with 83.5% of the total out-turn of S&T personnel. Out of them 70.7% were pure science graduates during the year 1995 (Ref. Table 22).

The data in Table 6.4 reveals that the out-turn of

Table 6.4**OUT-TURN OF S&T PERSONNEL FROM UNIVERSITIES BY FIELD OF SCIENCE AND LEVEL OF QUALIFICATION**

(Number)

	Graduate			Post Graduate			Doctorates			Total		
	1979	1989	1995	1979	1989	1995	1979	1989	1995	1979	1989	1995
Science	99749	134366	139257	17638	24591	23807	2262	3044	3155	119649	162001	166219
										(70.6)	(69.8)	(70.5)
Engg. & Tech.	18364	28927	32250	3155	4560	3667	506	560	546	22025	34047	36463
										(13)	(14.7)	(15.4)
Medicine	15090	17968	19613	3485*	5945*	4634*	-	-	-	18575	23913	24247
										(11)	(10.3)	(10.3)
Agriculture & Vet. Science	6280	8301	5752	2384	2876	2284	480	792	827	9144	11969	8863
										(5.4)	(5.2)	(3.8)
Total	139483	189562	196872	26662	37972	34392	3248	4396	4528	169393	231930	235792
	(82.3)	(81.7)	(83.5)	(15.7)	(16.4)	(14.6)	(2.0)	(1.9)	(1.9)	(100.0)	(100.0)	(100.0)

Note: *Includes Doctorates in Medical Sciences.

Doctorate degree holders are highly qualified personnel of education system. Analysis of data of Ph.D degree recipients during 2002-03 reveals that 48.9% of them were from S&T faculties and the rest 51.1% from other non S&T faculties. Pure science alone shared 32.7% of total doctorates to whom Ph. D degrees were awarded during 2002-03 (Table 6.5).

Table 6.5

FACULTY WISE NUMBER OF DOCTORATE DEGREE AWARDED, 2002-03

Faculty	Doctorates	%
Science	4497	32.7
Engineering & Technology	779	5.7
Medicine	243	1.8
Agriculture	1042	7.6
Veterinary Science	153	1.1
Other*	7019	51.1
Total	13733	100.0

*Others includes Music, Fine Arts, Library Science Physical Education etc.

Teaching staff in higher education plays a vital role for training better manpower. UGC is making all efforts to keep the standard of teaching staff up-to-date in knowledge, technical know-how, skill by providing requisite facilities and incentives through Faculty Improvement Programme and other schemes. As given in Table 6.6, out of the total 4.56 lakhs of teaching staff serving in higher education sector, 16.6% were in university departments/colleges and 83.4% in affiliated colleges. Percentage share of Professors in the total strength of teaching staff was only 8.7% and that of Readers/Senior Lecturers, Lecturers and Tutors/Demonstrators were 39.8%, 47.9% and 3.6% respectively.

As envisaged in NPE (1986), the University Grants Commission has been strengthening various facilities of educational institutions by way of increased infrastructure facilities such as class rooms, libraries, laboratories, hostels, staff quarters, teacher hostels and other inputs like technical and research support and resources for purchase of equipments, books and journals etc.

Table 6.6

TEACHING STAFF POSITIONED IN HIGHER EDUCATION SECTOR, 2003-04

Organisations	Professors	Readers Sr. Lecturers	Lecturers	Tutors/ Demonstrators*	Total
Univ. Deptts./ Univ. Colleges	15944	35624	22401	1956	75925
Affiliated** Colleges	23801*	145991	196312	14713	380817
Total	39745 (8.7%)	181615 (39.8%)	218713 (47.9%)	16669 (3.6%)	456742 (100%)

* Includes Principals and Senior Teachers who are equivalent to professors.

** Estimated

Note : Figures in parentheses indicate the percentage of the cadres in total staff.

To sum up, the salient features are as under:

- There were 302 universities/deemed universities, 11 institutes of National importance and 16,885 colleges during 2003-04 to impart higher education in the country.
- Expenditure on University and other Higher Education (Revenue account) was Rs. 9278.23 crores during 2003-04. Rs. 99.53 lakhs students were enrolled for higher education out of which 31.5% were in S&T faculties during 2003-04.
- Women enrolment in S&T faculty was 11.4% in total enrolment of 99.53 lakhs during 2003-04.
- Higher Education sector spent Rs. 750.54 crores on R&D activities with a share of 4.2% in the national R&D expenditure for the year 2002-03.
- Out turn of S&T personnel increased from 1,69,393 in 1979 to 2,31,930 in 1989 and further to 2,35,792 in 1995. The percentage share of out-turn of engineering and technology increased by 2.4% during the period 1979-95
- Out of 13,733 Ph.D. degrees awarded during 2002-03, 4497 doctorates were from pure science. Total SET Doctorates were 6714.
- During 2003-04 there were 4.5 lakhs teaching staff in all faculties in higher education sector, 8.7% of them were in the grade of Professor.