

## **CHAPTER IV**



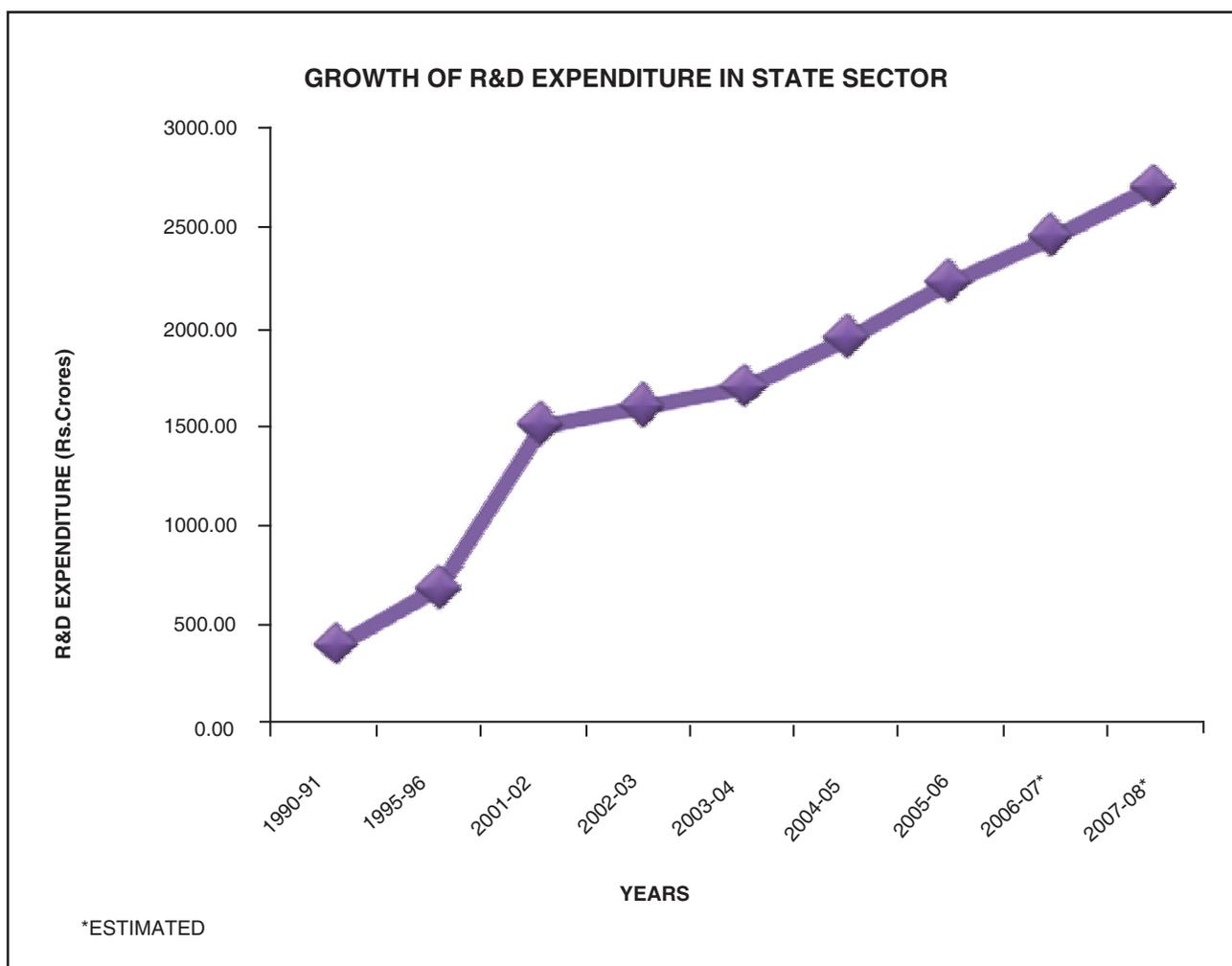
## CHAPTER IV

# RESEARCH AND DEVELOPMENT IN THE STATE SECTOR

The Research and Development (R&D) expenditure incurred by the States has increased from Rs. 365.92 crores in 1990-91 to Rs.1588.15 Crores in 2002-03 and further to Rs. 2227.42 crores in 2005-06. The annual growth rate of the R&D expenditure of the States in 2005-06 over 2002-03 was 11.9 %. It is expected to be of the order of Rs. 2461.08 crores in 2006-07 and Rs 2719.24 crores in 2007-08. The R&D expenditure by the states accounted for 7.7% of the National R&D expenditure during 2005-06. The R&D expenditure in the States

constituted only 0.07% of the GNP at current prices during 2005-06. This share has almost remained the same for the past few years.

Out of the total S&T expenditure of Rs. 2708.44 crores incurred by States during 2005-06, R&D activities comprising of Basic Research, Applied Research and Experimental Development accounted for 82.2%. The total R&D expenditure incurred by States by type of work for some recent years are presented in Table 4.1.



**Table 4.1**  
**RESEARCH AND DEVELOPMENT**  
**EXPENDITURE BY TYPE OF WORK**

<b>Percentage of R&amp;D Expenditure by type of work</b>			
<b>Year</b>	<b>Basic Research</b>	<b>Applied Research</b>	<b>Experimental Development</b>
2000-01	12.2	55.0	32.8
2001-02	12.2	54.9	32.9
2002-03	14.9	50.1	35.0
2003-04	14.9	50.4	34.8
2004-05	16.0	49.8	34.3
2005-06	15.9	50.2	33.9

Basic Research varied from 12.1% to 16.0%, Experimental Development from 32.8% to 35.0% and the rest accounted by Applied Research which varied from 49.8% to 55.0% for the various years.

Having dealt with the state sector as a whole, it is perhaps useful to analyze the intensity of R&D activities in different States measured in terms of resources deployed. The State-wise percentage distribution of R&D expenditure for the year 2005-06, arranged in descending order is given in Table 4.2.

**Table 4.2**  
**DISTRIBUTION OF R&D EXPENDITURE BY**  
**VARIOUS STATES, 2005-06**

<b>State</b>	<b>Percentage</b>
Maharashtra	12.3
Karnataka	8.1
Gujarat	7.9
Punjab	7.0
Tamil Nadu	6.6
Haryana	5.4
Andhra Pradesh	5.3
Kerala	5.3
Uttar Pradesh	4.9
Uttaranchal	4.9
Madhya Pradesh	4.7
Himachal Pradesh	4.4
Jammu & Kashmir	4.4
Rajasthan	4.1
Assam	3.3
Jharkhand	2.8
West Bengal	2.5
Orissa	2.3
Bihar	1.8
Manipur	1.2
Chhattisgarh	0.8
Others	0.02
<b>Total</b>	<b>100.0</b>

A few States accounted for a major share of the total R&D expenditure of the State Sector as a whole. More than 50% of the total R&D expenditure of the States was accounted by Maharashtra, Karnataka, Gujarat, Punjab, Tamil Nadu, Haryana and Andhra Pradesh in that order.

The expenditure incurred by the state governments on R&D has been apportioned into 13 objectives as defined by the UNESCO. Accordingly, the data on R&D expenditure by major objectives for the year 2005-06 are presented in Table 4.3

**Table 4.3**  
**PERCENTAGE DISTRIBUTION OF R&D**  
**EXPENDITURE BY OBJECTIVES, 2005-06**

<b>Objective</b>	<b>Percentage</b>
Development of Agriculture, Forestry and Fishing	91.5
General Advancement of Knowledge	1.9
Development of Health Services	1.8
Others	4.8
<b>Total</b>	<b>100.0</b>

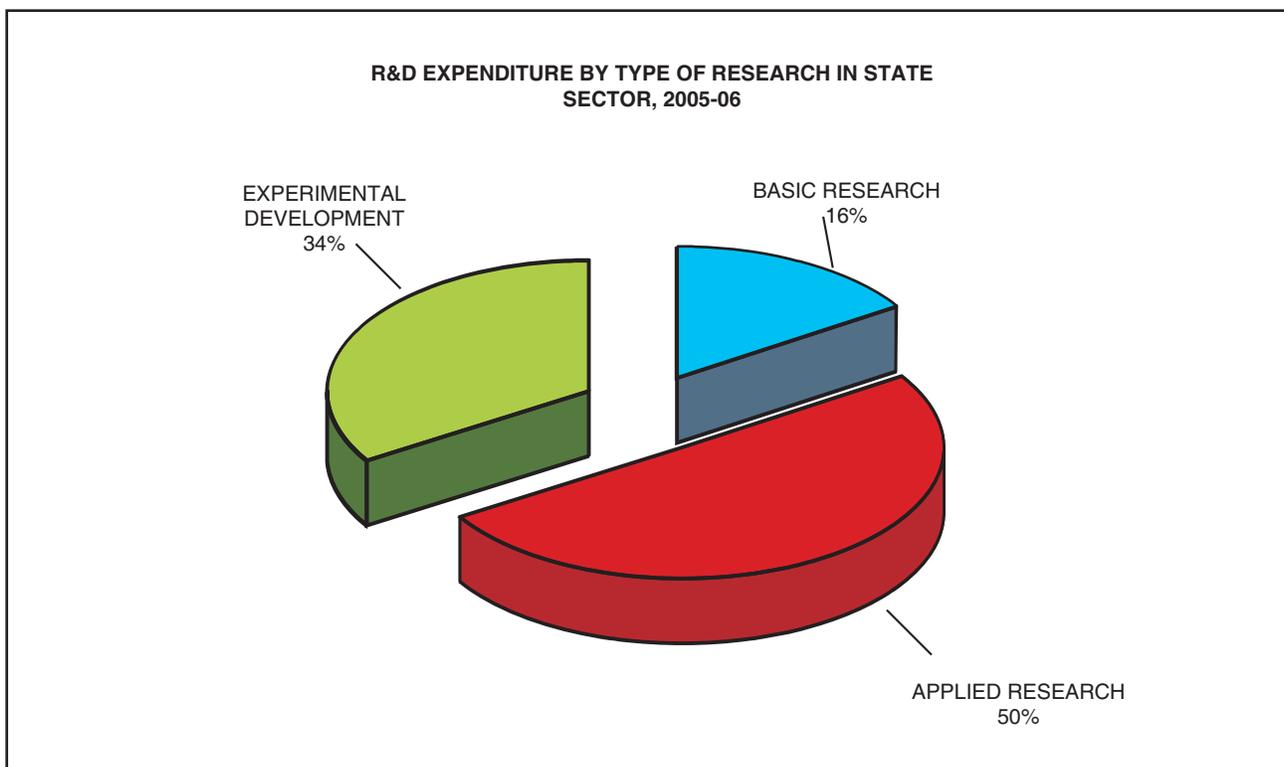
Development of Agriculture and related areas is the major objective in the State Sector incurring 91.5% of the total R&D expenditure during 2005-06.

By field of science, the R&D expenditure in state sector is also concentrated in Agricultural Sciences as may be seen from Table 4.4.

**Table 4.4**  
**PERCENTAGE DISTRIBUTION OF R&D**  
**EXPENDITURE BY FIELD OF SCIENCE, 2005-06**

<b>Field of Science</b>	<b>Percentage</b>
Agricultural Sciences	71.7
Natural Sciences	10.5
Engineering and Technology	10.1
Medical Sciences	4.6
Social Sciences	3.1
<b>Total</b>	<b>100.0</b>

Another major resource deployed for R&D activities is the manpower employed for such



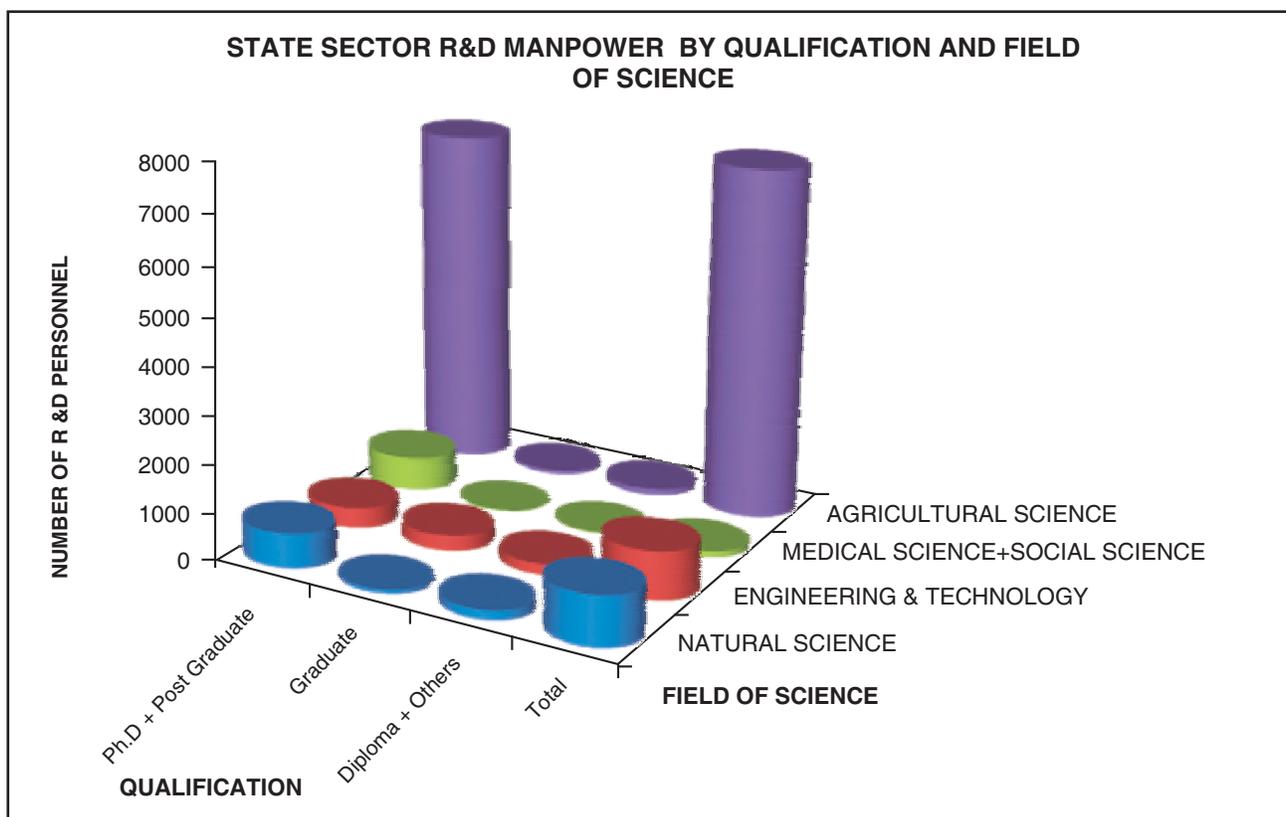
activities. The total personnel employed in the R&D institutions in the States were 85,422 as on 1st April, 2005. Out of this, about 22.4% (or 19,135 personnel) were employed directly on R&D activities called as R&D personnel. Besides, 23.6% (or 20,146 personnel) of the total were supporting R&D activities called auxiliary personnel and the rest 54.0% (or 46,141 personnel) were administrative staff. It was noticed that there were 12,603 women personnel employed in the State R&D institutions and out of them 2,421 women were engaged primarily (or directly) on R&D activities.

The educational qualification of personnel engaged in R&D activities as on 1st April, 2005 was available for 10,073 personnel. 71.7% of them were from Agricultural Sciences, 10.5% from Natural Sciences, 10.1% from Engineering & Technology and rest from Medical and Social Sciences. The analysis by level of qualification of 10,073 R&D personnel has shown that 57.1% were Ph.Ds, 30.9% were Post-Graduates, 5.6% were Graduates and the rest 6.3% were Diplomas/Others. Since the majority of S&T personnel employed in R&D activities are from the Agricultural Sciences, an analysis has been attempted regarding their qualifications as presented in Table 4.5.

**Table 4.5**  
**PERCENTAGE SHARE OF R&D PERSONNEL IN**  
**AGRICULTURAL SCIENCES**  
**BY QUALIFICATION**

Qualification	Percentage
Ph.D	68.5
Post-Graduate	28.2
Graduate	1.3
Diploma and Others	2.0
<b>Total</b>	<b>100.0</b>

It may be seen from the Table 4.5 that about 96.7% of R&D personnel in the field of Agricultural Sciences had Ph.D or Post-Graduate degrees. It may be mentioned that most of them are employed in Agricultural Universities and their regional centres and it is quite possible that they do both teaching and research functions. The analysis by salary of 8,087 R&D personnel shows that about 12.6% of R&D personnel draw annual gross emoluments less than Rs. 2,00,000, 32.7% in the range of Rs. 2,00,000 - Rs. 2,99,000, 53.4% in the range of Rs. 3,00,000 - Rs. 4,99,000 and the rest 1.3% were drawing Rs. 5,00,000 or more.



Note: Out of 19,135 R&D personnel information was available for 10073 R&D personnel

**The salient features of the R&D scene in the State sector are as under:**

- ❖ State Sector spent Rs. 2227.42 crores on Research and Development activities during 2005-06.
- ❖ State Sector accounted for only 7.7% of National R&D expenditure and 0.07% of Gross National Product during 2005-06.
- ❖ R&D activities were concentrated in few States only.
- ❖ Agriculture was the major field of research in the States.
- ❖ Women personnel engaged in R&D activities in the states continued to be very small in number as compared to men and they constitute only about 14.7% of the total R&D personnel in the state R&D establishments.
- ❖ There were about 19,135 personnel deployed on R&D activities in State Sector, out of them 2,421 were women.