

sector. The fiscal measures, *inter-alia*, include increase in plan expenditure, reduction in indirect taxes, sector-specific measures for textiles, housing, infrastructure, automobiles, micro and small sector and exports, authorisation to specified financial institutions to raise tax free bonds to fund infrastructure projects, farm loan waiver package, etc. The monetary and credit related measures taken by the RBI relate to provisioning of adequate liquidity and credit delivery, progressive reduction in the Repo rate under the liquidity adjustment facility (LAF), reduction in cash reserve and statutory liquidity ratios (CRR and SLR) for banks, etc. These measures have been supplemented with sector specific credit measures for exports, housing, micro and small enterprises and infrastructure.

#### **Investment in S&T research**

84. SHRI N.R. GOVINDARAJAR: Will the Minister of SCIENCE AND TECHNOLOGY be pleased to state:

(a) whether it is a fact that the investment in the field of Science and Technology and development in our country is very low as compared to the other developing countries;

(b) if so, the details thereof;

(c) whether there is slow progress in Scientific Research activities as the number of Research papers in India in the past 10 years has increased from 11,000 to 19,000 as compared to China during the same period and the number of Scientific Research papers has jumped from 10,000 to 55,000; and

(d) if so, the steps taken by Government to increase the investment in Science and Technology Research?

THE MINISTER OF STATE OF THE MINISTRY OF SCIENCE AND TECHNOLOGY (SHRI PRITHVIRAJ CHAVAN): (a) and (b) According to available official statistics, the investment in the field of Science and Technology as percentage of Gross Domestic Product (GDP) is 0.88% which is lower compared to that of China and Hungary where it is 1.42% and 1.00% respectively. But it is higher compared to several developing countries like, Brazil, Pakistan, Sri Lanka, Argentina, Mexico and Venezuela. In absolute terms, India's R&D investment has increased over the years from Rs. 18,088.16 crores in 2002-03 to Rs. 28,776.65 crores in 2005-06 and is estimated to be of the order of Rs. 37,777.90 crores in 2007-08.

(c) and (d) As per the Science Citation Index (SCI) database, the number of scientific research papers in India increased from 11,067 (in 1997) to 22,215 (in 2007). Whereas, in China, the research papers during the same period increased from 12,632 (in 1997) to 67,433 (in 2007). The Government have taken several measures for the promotion and growth of scientific research in the country. These measures include higher allocation for scientific research from Plan to Plan for setting up of new institutions for science education and research, creation of centres of excellence and facilities in emerging and frontline areas in academic and national

institutes, induction of new and attractive fellowships such as INSPIRE, strengthening infrastructure for R&D in universities, encouraging public-private R&D partnerships, national awards for outstanding R&D etc. Accordingly, the Government have enhanced Eleventh Plan allocation for Scientific Departments to Rs. 75,304.00 crores from Rs. 25,301.35 crores during Tenth Plan.

#### Forecast of monsoon

85. SHRI RAHUL BAJAJ: Will the Minister of EARTH SCIENCES be pleased to state:

(a) what has been the accuracy of long-term and short-term (say weekly) forecasts of monsoon rainfall by the Indian Meteorological Department in the last three years, for both total and division-wise spatial distribution; and

(b) the steps that are being taken to improve these forecasts?

THE MINISTER OF STATE OF THE MINISTRY OF EARTH SCIENCES (SHRI PRITHVIRAJ CHAVAN): (a) India Meteorological Department (IMD) issues various types of monsoon rainfall predictions to the users. Details of forecast verification are presented below:—

(i) Long range rainfall forecast for the southwest monsoon season (June-September) for the country as a whole and also for 4 homogeneous regions. The forecast is issued in 2 stages, first in April with the data up to March and the second by end of June with the data up to May.

Regions	2006		2007		2008	
	Actual	Forecast	Actual	Forecast	Actual	Forecast
(% of Long Period Average — LPA): Figures in Brackets indicate error bars of respective spatial domain forecasts)						
All India (June-September)	100	92(±4)	106	93(±4)	98	100(±4)
All India (July)	98	97(±9)	98	95(±9)	83	98(±9)
Northwest India	94	91(±8)	85	90(±8)	107	96(±8)
Northeast India	83	94(±8)	104	98(±8)	94	101(±8)
Central India	116	90(±8)	108	96(±8)	96	101(±8)
South Peninsula	95	97(±8)	126	94(±8)	96	98(±8)

(ii) Short range rainfall predictions, up to 3 days, are generated daily for all 36 Meteorological sub-divisions in the country. Average skill of rainfall predictions was found to be in the range of 71-96% during 2006; 72-92% during 2007 and 76-85% during 2008.