

The Yellow Book on Science and Technology Vol. 10

# CHINA SCIENCE AND TECHNOLOGY INDICATORS

## 2010

MINISTRY OF SCIENCE AND TECHNOLOGY  
OF THE PEOPLE'S REPUBLIC OF CHINA



科学技术文献出版社  
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# 2010



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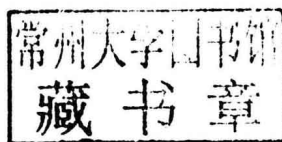
The Yellow Book on Science and Technology

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· 北京 ·

This book is the tenth volume in the biennially-released China Science and Technology Indicator, i.e. the Yellow Book on Science and Technology, published by the Ministry of Science and Technology of China.

The report has, on the basis of China's national S&T statistics and relevant economic and social statistics, presented a widely covered and systematic analysis and evaluation of China's S&T human resources, R&D expenditures, S&T output, S&T activities of main performance sectors (government research institutes, higher education institutions and enterprises), high-technology industries, the overall scale and structural distribution of regional S&T development from 2008 to 2009 during the 11th Five-Year Plan period. The report has mirrored the main characteristics of China's S&T activities.

With the help of richly and solidly collected S&T development data and information, the report has made itself a reliable evidence and data source not only suitable for studying China's S&T status quo, strength, achievements and development tendency but also desirable for the macro management and decision making process. It could also serve as a fine reference book for S&T professionals and school teachers and students.

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## Preface

Science and Technology (hereafter referred to as “S&T”) indicators represent quantitative means through which people can observe or measure S&T activities. S&T indicators can accurately reflect status of S&T development and its roles and impact on social and economic development. S&T indicators act as the basic evidences in decision-making process and the important instruments in evaluating the effects of S&T policies. Almost all the nations and international organizations have been paying more and more attention to S&T indicators and using them as the basic tools of scientific decision making and policy analysis.

Since 1990s, the Ministry of Science and Technology of China has, together with other governmental departments under the State Councils and relevant institutions, compiled and published series of reports as a government publication on China’s S&T indicators in the form of S&T yellow book. China Science and Technology Indicators 2010, or No. 10 Yellow Book on Science and Technology, is the tenth volume in the series.

This issue of China Science and Technology Indicators has made full use of the scientific statistics data and relevant economic and social statistics data until the end of 2009, mainly reflecting the basic S&T development status in all around way since the release of the National Plan for Long and Medium-Term Scientific and Technological Development (2006 — 2020). It unveils major characteristics of China’s S&T activities in the course of supporting the economic and social transformation and reflects historical process of strengthening the capacity of indigenous innovation and developing an innovative country.

As one of the serial reports, this volume is consistent with the structures and indicators system applied in the previous volumes. The report has presented a systematic analysis and evaluation of China’s S&T human resources, R&D expenditures, S&T activity output, S&T activities of main performance sectors (government research institutes, higher education institutions and enterprises), high-technology industries, overall scale and structural distribution of regional S&T development from 2008 — 2009 during the 11th Five-Year Plan period. At the same time, this volume has made some renewals. First, Based on the inventory data of the 2nd national R&D resources survey in 2009, this report has presented a well-covered and in-depth analysis of China’s R&D expenditure and R&D activities of enterprises, and also made a comparative study with the results of the 1st national R&D resources survey in 2000. Second, this report has made necessary adjustments of the

structure. This report made full use of the S&T data of the 2nd national R&D resources survey. The R&D activities of enterprises were analyzed in a separate chapter, at the same time, the government R&D institutes and high education institutes were classified as the academic sectors in one chapter, so as to analyze the historical variations of china's basic research and the status of the academic sectors R&D activities. Third, this report continued to emphasize on international comparison. Some representative and comparative S&T indicators have been used in the report to compare China with some important developed countries, emerging industrialized countries and developing countries so as to reflect the national characteristics of China's S&T and China's position in the world. To facilitate readers' understanding of the report, some columns of background information and relevant knowledge were inserted when necessary.

Because of the limitation in statistic data collection and application, the report, unless otherwise noted, does not contain the data on Hong Kong SAR, Macao SAR and Taiwan regions.

The Editorial Board of China Science and Technology Indicators 2010 acknowledges its gratefulness to the guidance and assistance provided in the course of compiling this report by authorities, experts and scholars of many government agencies and institutions including Ministry of Science and Technology, Chinese Association for Science and Technology, Chinese Academy of Science, National Natural Science Foundation, State Administration of Foreign Exchange, Ministry of Education, National Bureau of Statistics, State Intellectual Property Office, the National Development and Reform Commission, Ministry of Finance, Ministry of Commerce, Commission of Science Technology and Industry for National Defense. The Board also appreciates comments or suggestions, if any, from readers.

Editorial Board  
China Science and Technology Indicators 2010  
June 2011

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## Summary

2008 and 2009 is so important stage of implementation of 10th five-year plan of national economic and social development in China, and is highly unusual period of China's economic and social development. During this period China was hit by extraordinarily severe snow disaster in South, Wenchuan earthquake and other natural disasters, and experienced a once-in-a-century international financial crisis. Under the strong leadership of the CPC Central Committee and the State Council China effectively resolved various unfavorable problems, successfully host the Beijing Olympic Games and maintained the steady development of China's economy and society. By facing all these challenges science and technology in China experienced a significantly jumping period, the capability of independent innovation greatly improved, and the building of an innovative country made important progress. According to *National innovation index report 2010* by Chinese Academy of Science & Technology for Development, in 2008, China ranked the 21st in the 40 main countries of world, increased from the 25th in 2005, which indicated that China's innovation capability had been improved greatly.

### **1. Significantly increasing input on S&T, and greatly enhancing allocation capability of S&T resource**

The total S&T resources leapt to the forefront of the world. Human resources in S&T(HRST) and R&D expenditure reflect the overall size of a country's S&T activities, also reflect the capability of independent innovation to a large extent. The development of higher education ensures steady growth in the total HRST. In 2009, China's HRST reached 5100 million, an increase of, an up by 16 million, or 45.7% in 2005; the number of university or higher education was about 22 million, and our HRST with undergraduate or higher education has surpassed the United States, ranking first in the world.

In 2009, China's R&D personnel reached 318.4 million, and included 17.9 million Dr., 43.3 million Master, and 94.5 million undergraduates. In terms of full-time equivalent, the total amount of R&D personnel was 229.1 million, an increase of 326,000 or 16.6% compared with 2008. Compared with 2005, China's R&D personnel increased 92.6 million person-years, and the average annual growth rate was 13.8%; the compound annual growth rate (CAGR) in the period of 11th Five Year plan was 8.2%, and increased 5.3 percentage points more than that of the 10th Five-Year Plan (2000 — 2005). During 11th Five-Year plan, our R&D expenditure exceeded 500 billion yuan, and kept rapid growth. In 2009, R&D expenditure reached 580.21