




# Human Resources for Science & Technology: The Asian Region



Surveys of Science Resources Series  
Special Report  
National Science Foundation  
NSF 93-303



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Principal Author: Jean M. Johnson

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## Foreword

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The adequacy of future human resources for science and engineering is an important issue for the United States. This report is designed to further the understanding of this issue by providing a reliable data base and analyses for a region that contributes significantly to the global stock of scientists and engineers—the Asian region. Many international organizations are concerned about this topic. For example, the International Council of Scientific Unions is studying existing and projected human resources in science and engineering in order to be able to advise its national members in their future science policy. The Organisation for Economic Co-operation and Development and the Commission of the European Communities have also been active in discussing these topics.

We hope that this publication will also be of assistance to an Asian regional association, the Pacific Economic Cooperation Council, which is seeking to develop a reliable data base on science and technology (S&T) indicators in this region, and to the emerging S&T indicator groups in developing countries.

This report complements and supplements the National Science Board's *Science and Engineering Indicators* volumes and several other reports prepared by the Division of Science Resources Studies.

Kenneth M. Brown  
Director, Division of Science Resources Studies  
Directorate for Social, Behavioral,  
and Economic Sciences

May 1993

## Acknowledgments

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This report was prepared by Jean M. Johnson, Senior Science Resources Analyst, Science and Engineering Indicators (IND) Program, Division of Science Resources Studies (SRS), National Science Foundation (NSF).

The data base developed to prepare this report builds on data provided by the Division of Statistics of the United Nations Educational, Scientific, and Cultural Organization (UNESCO). Through an annual survey sent to more than 150 countries, UNESCO gathers worldwide data on higher education, research, and other dimensions of development, which it has generously provided to NSF.

To verify and update the UNESCO data, NSF was fortunate in receiving full cooperation from individuals in Ministries of Education and in science and technology indicator groups in each of the six Asian countries studied in this report. In addition to their other contributions, these individuals have provided their national primary sources on higher education and research and development so that NSF

could develop a reliable data base on human resources for science and technology. Their names, affiliations, and addresses are listed in the Contacts section of the report. This voluntary exchange of information is very encouraging and will assist SRS in completing several other regional profiles.

The NSF Division of International Programs supported this research for 1 year, funding the detail of the author to SRS. Jennifer Bond, Program Director, IND, saw the value of this research, arranged for its continued support within the Division, and provided access to the SRS library of international materials and consultation with the Division grantees in the academic research community. Colleagues within SRS and the Office of Planning and Assessment provided technical advice. Guidance and review were provided by Jennifer Bond and Kenneth M. Brown, Director, SRS.

Overall editing of the report was performed by Kitty Stone of The KEVRIC Company, Inc.

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## Acronyms

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ASEAN	Association of Southeast Asian Nations	KIST	Korea Institute of Science and Technology
CAS	Chinese Academy of Science	KOSEF	Korean Science and Engineering Foundation
CIP	Classification of Instructional Programs	NIEs	Newly industrialized economies
CSIR	Council for Scientific and Industrial Research (India)	NS&E	Natural science and engineering
FTE	Full-time equivalent	NSF	National Science Foundation
GDP	Gross domestic product	OECD	Organisation for Economic Co-operation and Development
GNP	Gross national product	\$PPPs	Purchasing power parity dollars
ICP	International Comparison Program	R&D	Research and development
IITs	Indian Institutes of Technology	RSE	Research scientist and engineer
IMF	International Monetary Fund	S&E	Science and engineering
IPEDS	Integrated Postsecondary Education Data System	S&T	Science and technology
ISCED	International Standard Classification of Education	STA	Science and Technology Agency (Japan)
ITRI	Industrial Technology Research Institute (Taiwan)	UNESCO	United Nations Educational, Scientific, and Cultural Organization
KAIST	Korean Advanced Institute of Science and Technology		