

HANDBOOK  
ON  
**ENVIRONMENT  
STATISTICS**

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The views and opinions expressed in this book are those of the authors and do not necessarily represent the views of the Asian Development Bank.

## Foreword

**T**he rapid pace of economic growth in the Asian and Pacific region has been accompanied by resource depletion and environmental degradation. Air and water pollution, water scarcity, desertification, and the depletion of natural resources are beginning to have an adverse impact on almost all forms of economic activity by causing frequent disasters such as floods and landslides, and generally diminishing the quality of life in the region. To address those problems, a broad-based program of environmental policies and regulations is needed. Such programs require that countries collect and compile authentic environment data for use by government officials and other decision makers. Data relating to existing environmental conditions is crucial for environmental planning and decision making. The developing countries of the region will therefore need to vigorously collect and collate environment statistics on an urgent basis.

In 1995, the Asian Development Bank (ADB) initiated the Regional Technical Assistance (RETA) for Institutional Strengthening and Collection of Environment Statistics in 11 selected developing member countries (DMCs) of the Asian and Pacific region. The objective of the RETA was to assist the countries in improving the collection of environment statistics. In 1999, ADB extended the RETA to five Central Asian DMCs, including Mongolia.

In the process of implementing the RETAs, it was felt that methodologies in the field of environment statistics were relatively new and not adequately developed. New concepts are emerging and many definitions remain ambiguous or otherwise lack broad agreement. Moreover, environment statistics is a new subject for statisticians working in a national statistical office (NSO), who have been traditionally involved

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in collecting and disseminating economic and social statistics. Thus, a handbook on environment statistics is needed to assist NSOs in collecting and compiling environment statistics.

By drawing on the experiences of the 16 countries in the Asian and Pacific region as well as on the works of the OECD, UN, World Bank, and some industrialized countries, the authors developed a series of statistical tools to monitor air and water pollution and to measure environment conditions relating to human settlements. The Handbook also gives a detailed discussion of certain methodological issues relating to the measurement of environmental pollution and environment quality. It contains a number of recommendations that should help in planning and designing a system of environment statistics. The discussion in the Handbook is aimed primarily at practitioners in countries that either have recently begun to collect environment statistics or are still at an early stage of the program.

The publication of the Handbook is the first attempt to address some of the existing methodological gaps in the field of environment statistics. It should be a useful guide to statisticians, environment experts, and government policy makers in their effort to develop a system for collecting environment statistics in the developing countries.

The preparation of the Handbook was undertaken by a team of consultants comprising Messrs. Robert Ballance, Biplab Biswas, and Vikram Pattarkine under the supervision of Bishnu Dev Pant, Principal Statistician, Development Indicators and Policy Research Division, Economics and Research Department.

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## Abbreviations

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|                  |  |
|------------------|--|
| AAS              | atomic absorption spectrometer                                       |
| ADB              | Asian Development Bank   |
| BOD              | biochemical oxygen demand  |
| CES              | compendium of environment statistics                                 |
| CFC              | chlorofluorocarbons  |
| CO               | carbon monoxide  |
| CO <sub>2</sub>  | carbon dioxide   |
| COD              | chemical oxygen demand   |
| DO               | dissolved oxygen   |
| ECE              | Economic Commission for Europe                                       |
| EI               | environmental indicator  |
| ESCAP            | Economic and Social Commission for Asia and<br>the Pacific           |
| EU               | European Union   |
| FAS              | ferrous ammonium sulfate   |
| FDES             | framework for development of environment<br>statistics               |
| FID              | flame ionization detector  |
| GDP              | gross domestic product   |
| GEMS             | Global Environment Monitoring System                                 |
| GHG              | greenhouse gases   |
| H <sub>2</sub> S | hydrogen sulfide   |
| ISIC             | International Standard Industrial Classification                     |
| MPN              | most probable number test  |
| N                | nitrogen   |
| NDIR             | nondispersive infrared technique<br>(for monitoring carbon monoxide) |
| NGO              | nongovernment organization   |
| NH <sub>3</sub>  | ammonia  |
| NO               | nitric oxide   |

|                 |   |
|-----------------|---|
| NO <sub>2</sub> | nitrogen dioxide  |
| NO <sub>x</sub> | oxides of nitrogen  |
| NSO             | national statistical office   |
| O&G             | oil and grease  |
| OECD            | Organisation for Economic Co-operation and<br>Development             |
| P               | phosphorus  |
| Pb              | lead  |
| POC             | persistent organic compounds  |
| ppm/C           | parts per million by carbon   |
| ppm/V           | parts per million by volume   |
| PSR             | pressure-state-response framework                                     |
| QA/QC           | quality assurance and quality control                                 |
| RETA            | regional technical assistance   |
| SNA             | system of national accounts   |
| SO <sub>2</sub> | sulfur dioxide  |
| SO <sub>4</sub> | sulfate   |
| SO <sub>x</sub> | oxides of sulfur  |
| SOE             | state-of-the-environment report                                       |
| SPM             | suspended particulate matter  |
| TDS             | total dissolved solids  |
| TEOM            | tapered element oscillating microbalance                              |
| TFE             | tetrafluoroethylene   |
| TKN             | total Kjeldahl nitrogen   |
| TSS             | total suspended solids  |
| UN              | United Nations  |
| UNCHS           | United Nations Conference on Human<br>Settlements                     |
| UNEP            | United Nations Environment Programme                                  |
| UN-FDES         | United Nations Framework for Development of<br>Environment Statistics |
| USEPA           | United States Environmental Protection Agency                         |
| UVF             | ultraviolet fluorescence  |
| VOC             | volatile organic compound   |
| WHO             | World Health Organization   |
| WMO             | World Meteorological Organization                                     |